UNIVERSITY OF KWAZULU-NATAL

TONE AT THE TOP'S ROLE IN THE DETECTION AND PREVENTION OF FINANCIAL STATEMENT MANIPULATION IN SOUTH AFRICA

By

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A dissertation submitted in fulfilment of the requirements for the degree of Doctor of Philosophy (Accounting)

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2024

PREFACE

The candidate completed the research in this thesis while based in the discipline of accounting in the School of Accounting, Economics and Finance of the College of Law and Management Studies, University of KwaZulu-Natal, Pietermaritzburg Campus, South Africa. The financial support of the University of KwaZulu-Natal University Capacity Development Grant, Research Office Conference Fund, College of Law and Management Studies Doctoral Research Grant and INSETA Worker Programme Grant is gratefully acknowledged.

The contents of this work have not been submitted in any form to another university and, except where the work of others is acknowledged in the text, the results reported are due solely to investigations by the candidate.

Signed: Professor Claire Vermaak

Date: 17 March 2025

Signed: Dr Patricia Shewell

Date: 18 March 2025

DECLARATION 1: PLAGIARISM

I, Alastair Malcolm Marais, declare that:

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Date: 17 March 2025

DECLARATION 2: PUBLICATIONS

While the sections detailing each paper contain a Statement of Contribution by co-authors, this serves as a general declaration that all papers included here are the original work of PhD candidate Mr Alastair Malcolm Marais.

Professor Claire Vermaak and Dr Patricia Shewell, in serving as supervisors, have contributed in their supervisory role by providing overall guidance to the coherence of this body of work. Their contributions have been advisory in nature. The PhD candidate wrote the work in its entirety. In submitting papers for consideration for publication, PhD candidate Mr Alastair Marais, has been the corresponding author.

_____

Signed: Mr AM Marais

Date: 17 March 2025

LIST OF PUBLICATIONS

Chapter 2: Paper 1 (Published)

Title:	Predicting financial statement manipulation in South Africa: A comparison of the Beneish and Dechow models
Journal:	Cogent Economics and Finance
Journal ranking:	*Scimago:* Q3 (2023) *Australian Business Deans Council:* B
ISSN:	2332-2039
Accreditation:	DOAJ, IBSS, SCOPUS
Citation:	Marais, A., Vermaak, C. & Shewell, P. 2023. Predicting financial statement manipulation in South Africa: A comparison of the Beneish and Dechow models. *Cogent Economics & Finance, 11*(1), DOI: 10.1080/23322039.2023.2190215
Conference presentations:	2021 South African Accounting Association KwaZulu-Natal Regional Virtual Conference 2023 University of KwaZulu-Natal School of Accounting, Economics and Finance Research Day (Awarded best paper in the category of Accounting: staff)

Chapter 3: Paper 2 (Published)

Title:	Audit committee effectiveness and financial statement manipulation: The moderating effect of tone at the top
Journal:	Southern African Journal of Accountability and Auditing Research
Journal ranking:	*Scimago:* N/A *Australian Business Deans Council:* N/A

ISSN:	1028-9011
Accreditation:	DHET
Citation:	Marais, A., Shewell, P. & Vermaak, C. 2024. Audit committee effectiveness and financial statement manipulation: The moderating effect of tone at the top. *Southern African Journal of Accountability and Auditing Research, 26*(2024), 45-67, DOI: https://doi.org/10.54483/sajaar.2024.26.1.3.
Conference presentations:	2023 South African Accounting Association Biennial International Conference

Chapter 4: Paper 3 (Published)

Title:	Audit quality and financial statement manipulation: The moderating effect of tone at the top
Journal:	International Journal of Economics and Financial Issues
Journal ranking:	*Scimago:* Pending (2024) *Australian Business Deans Council:* C
ISSN:	2146-4138
Accreditation:	DOAJ, SCOPUS
Citation:	Marais, A. 2023. Audit quality and financial statement manipulation: The moderating effect of tone at the top. *International Journal of Economics and Financial Issues, 14*(5), 220-232, DOI: https://doi.org/10.32479/ijefi.16409.
Conference presentations:	2023 University of KwaZulu-Natal College of Law and Management Studies Research Day

Chapter 5: Paper 4 (Under review)

Title:	Does top management tone moderate market reaction to earnings management in South Africa?
Journal:	Journal of Accounting, Finance and Auditing Studies
Journal ranking:	*Scimago:* N/A
	Australian Business Deans Council: N/A
ISSN:	2149-0996
Accreditation:	DOAJ
Citation:	N/A, currently under review
Conference presentations:	2024 South African Accounting Association KwaZulu-Natal Regional Conference (Awarded best paper overall)

ABSTRACT

Corporate frauds destroy wealth, undermining investor confidence. Given the severity of corporate fraud, regulators have enhanced monitoring mechanisms designed to prevent and detect financial statement manipulation. Despite these efforts, financial statement manipulation continues to occur, and academic research has found mixed results regarding the effectiveness of interventions. An identified reason is that a company's overall culture, as set by the tone at the top, may undermine the effectiveness of monitoring mechanisms. Consequently, this study investigated the role of tone at the top in detecting and preventing financial statement manipulation. The study adopted a quantitative methodology, analysing data from non-financial firms on the JSE, to estimate how tone at the top moderates the effectiveness of three fundamental monitoring mechanisms: the audit committee, the external auditor and the market reaction.

The study's first paper found that commonly used financial statement manipulation detection models (the Beneish M-score and Dechow et al. F-score) are unsuitable in South Africa. Consequently, the study used two measures to proxy for financial statement manipulation: financial statement fraud and accruals-based earnings management. Tone at the top was measured by analysing CEO statements in the annual report using the DICTION software's five master variables. Principal component analysis was used to reduce these five themes into two primary tones: autocratic and pragmatic. Principal component analysis was also used to develop five audit committee (activity, diversity, financial expertise, governance expertise and independence) and two external auditor proxies (competence and independence). The market reaction was measured using cumulative abnormal returns. The relationships between these variables were estimated using panel data regression methods.

Overall, the study found that tone at the top is not directly related to financial statement manipulation. Considering tone at the top's moderating effect, the findings suggested that an autocratic tone undermines the effectiveness of audit committees' activity and diversity. However, the autocratic tone can enhance the committees' financial expertise and independence, the external auditors' competence, and result in a more negative market reaction to financial statement manipulation. In contrast, the pragmatic tone can inhibit the audit committees' financial expertise, but enhance its activity and diversity. The pragmatic tone does not impact the external auditor or the market reaction.

These findings would interest regulators, investors, audit committee members, external auditors and market analysts as they show the importance of understanding how tone at the top either undermines or supports these monitoring mechanisms. Consequently, careful attention must be paid to the individuals appointed to key monitoring positions to ensure they will be effective rather than ceremonial.

Keywords: Audit committee; Earnings management; External auditor; Financial statement manipulation; Fraud; Market reaction; Tone at the top.

ACKNOWLEDGEMENTS

First, I thank my Lord and Saviour, Jesus Christ, for blessing me with the opportunity to undertake and complete my PhD and for his provision of strength, grace and perseverance. To God be the glory, great things He has done.

I sincerely thank my supervisors, Professor Claire Vermaak and Dr Patricia Shewell. Thank you for your guidance and support on this life-changing journey. You pushed me beyond what I thought I was capable of and believed in me even when I had lost belief in myself. I will take all the valuable lessons you taught me into the future and apply them as best I can.

To my wife, Christine, no words would be enough to express my thanks for the late nights you spent keeping me company and the sacrifices you made to help me achieve this dissertation. You were my sanity, strength and anchor during the difficult and stressful times. You were my shoulder to cry on when the rejection emails came and my greatest cheerleader when my papers were finally accepted.

To my son, Joshua, your arrival gave me the strength to push through to completion. Thank you for your happy smiles and laughs, which brought me joy even through the most stressful times.

To my parents, thank you for everything! I thank my mother for her emotional support and prayers during my darkest hours. I thank my father for his assistance in extracting data from annual reports and reading endless versions of my articles and PhD.

Thank you to both my sisters. To Pauline Esterhuizen and her work colleague, Ruan van Rooyen, thank you for your assistance with slide designs for my three-minute thesis presentation based on this dissertation, and to Siobhan Smith for her constant encouragement.

I want to thank all the attendees of the PhD Accounting Cohort. In particular, I would like to thank Mr and Mrs (soon to be Doctors) Yoshin and Carley Chetty, for being the stable backbone of the cohort and my dear friends. You always pushed me out of my comfort zone and willingly listened to each presentation, providing valuable guidance and honest critique.

I thank the participants of the College of Law and Management Studies PhD Support Group participants, particularly the leaders Dr Margot Freedman and Dr Zama Khanyile, for their constant support, encouragement and eagerness to celebrate the small victories.

I want to thank Mbangiseni (Eric) Mchunu from the UKZN Cecil Renaud Library and Eshara Singh from the Bessie Head Library, for their assistance in obtaining various articles and newspapers during my dissertation.

I thank Mr Andile Nyandeni for guiding me through the event study methodology. You were once the student but are now the master!

I thank my colleagues (past and present) in the Managerial Accounting and Financial Accounting Cluster, for giving me the space and support to complete my PhD. I wish to specifically mention Dr Karen Bargate, Mrs Qondeni Khumalo and Mrs (soon to be Doctor) Kajal Ramnanun for constantly pushing me to complete my PhD and remain focused.

I would like to thank all my colleagues in the School of Accounting, Economics and Finance for your encouragement and belief in me. I would like to specifically mention Professor Paul Muzindutsi for his guidance on journal selection and Professor Kerry McCullough and Dr Peter Moores-Pitt for their suggestions on approaching a PhD by Publication. I would also like to thank Dr Suhayfa Bhamjee from the School of Law for her assistance with the three-minute thesis.

Thank you to Mrs Jerusha Singh for guiding me through the administrative matters.

As a result of undertaking a PhD by Publication and numerous conference presentations, I have received insightful feedback from many anonymous reviewers, journal editors and conference participants. Thank you for the time you spent reading through and listening to my work and for the guidance and suggestions you provided.

I would like to thank the various language editors who assisted me throughout this project: the late Dr Naas Ferreira, Dr Jaqui Hiltermann and Jenny Kerchhoff (KZN Language Institute). I also thank Dr Noleen Loubser for her inputs on the paper in Chapter 5.

Finally, I would like to thank everyone I have not mentioned specifically by name and who contributed in some way to me completing my PhD. You were the crowd of supporters who cheered me on to the end. THANK YOU!

FINANCIAL ACKNOWLEDGEMENTS

I acknowledge the financial assistance provided to me by the following:

1. The University of KwaZulu-Natal for granting me fee remission for the duration of my studies.
2. The University of KwaZulu-Natal University Capacity Development Grant Staff Credentialing Funding for funding my teaching relief for the duration of my studies.
3. The Research Office Conference Fund for funding my attendance at the 2023 SAAA Biennial International Conference and the 2024 SAAA KwaZulu-Natal Regional Conference.
4. The College of Law and Management Studies Doctoral Research Grant for funding the editing of my PhD dissertation.
5. The INSETA Worker Programme Grant.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The International Financial Reporting Standards (IFRS) aim to provide a company's external stakeholders with high-quality financial information about the company's financial position, performance and cash flows, with which to make economic decisions (International Accounting Standards Board, 2024a). Such decisions include, but are not limited to, investment decisions, the provision of loan capital, and voting to influence management's use of corporate resources (International Accounting Standards Board, 2024b). The higher the quality of the financial information companies provide through their annual reports, the better the decisions that can be made. However, management may manipulate financial statements for their personal benefit to deceive the user. This study focuses on top management's role in financial statement manipulation through the influence of their tone.

Corporate failures and frauds (such as Enron, Worldcom, FTX, Silicon Valley Bank and, specifically in South Africa, Steinhoff, Tongaat-Hulett and VBS Bank, to name a few), have led stakeholders to question the reliability of externally reported financial information (Martins and Júnior, 2020; Yahaya, 2022). These corporate frauds and failures are costly to investors, creditors, regulators, analysts, auditors, employees and society, who suffer from lost returns, reputational damage, litigation and loss of employment (Dechow et al., 2011; Pududu and De Villiers, 2016; Rabin, 2016). Dyck et al. (2024) estimate that 10% of large public United States firms commit fraud[1] annually, destroying an estimated 1.6% of equity value each year (equivalent to USD 830 billion in 2021). Of these frauds, evidence suggested that only one-third are detected (Dyck et al., 2024). While they note that fraud is not widespread, accounting violations are. They estimate that "in an average year, 41% of companies misrepresent their financial reports, even when we ignore simple clerical errors" (Dyck et al., 2024: 738).

Ronen and Yaari (2008: 6) identify earnings (or net profit) as the "ultimate object of managing the accounting numbers". This is not only because it is a significant performance measure, but also because of its information content, role in contracting, and role in wealth transfer (Alshorman, 2016; Ronen and Yaari, 2008; Stolowy and Breton, 2004). This is

[1] Dyck et al. (2024) define 'fraud' loosely as they measure misconduct and alleged fraud. They used four measures to identify fraud. First, they used firms against which a securities class action lawsuit has been filed (after accounting for trivial cases). Next, they used Securities Exchange Commission (SEC) Accounting and Auditing Enforcement Actions. Their third measure was non-trivial financial misreporting and their final measure was securities fraud under SEC section 10b-5.

confirmed by Graham et al. (2005: 13), who found that Chief Financial Officers (CFO) view earnings as "the most important financial metric to external constituents." Consequently, given the importance of earnings and their being the object of manipulation, an entire field of research has developed around earnings management.

Earnings management refers to:

> *"when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers"* (Healy and Wahlen, 1999: 368).

Thus, earnings management intends to distort the company's financial performance (Mishra and Malhotra, 2016). Expressly excluded from earnings management is managers' use of judgment to provide more informative financial information (through signalling) (Rabin, 2016).

Widespread and excessive earnings management within a company is a precursor to full accounting fraud (Mishra and Malhotra, 2016). Ajekwe (2017) and Rose et al. (2021) describe the 'slippery slope' from earnings management to full fraud. First, to nudge earnings to achieve a target, a small, seemingly harmless adjustment is made, or a rule is violated (Ajekwe, 2017; Rose et al., 2021). Those committing these small earnings violations grow numb to their actions and, to maintain earnings targets, the initially harmless adjustments grow in magnitude, spiralling into full financial statement fraud (Rose et al., 2021; Wati and Chandra, 2022). This dissertation uses financial statement manipulation as a blanket term for earnings management and financial statement fraud.

To mitigate the cost of corporate fraud and failures, regulators have enhanced corporate governance mechanisms designed to protect the various stakeholders. The most recently released governance code in South Africa is the King IV Report on Governance for South Africa 2016 ("King IV"), which became effective on 1 April 2017. This latest edition of the King series changed from an 'apply or explain' approach to an 'apply and explain' approach, making its requirements mandatory for Johannesburg Stock Exchange (JSE) listed companies (Institute of Directors Southern Africa, 2016). However, the difference between superficially applying corporate governance regulations and purposefully applying the regulations for the betterment of stakeholders remains debatable (Ahmed and Uddin, 2025; Klepczarek, 2023; Lisic et al., 2016).

While regulators attempt to strengthen governance mechanisms to protect shareholders, top management may have incentives to undermine these mechanisms to keep internal controls weak, allowing them to manipulate earnings and extract rents from the company (Lisic et al., 2016). One way that governance mechanisms can be undermined is through the tone at the top (Rose et al., 2021). Tone at the top refers to a company's values as shaped by top management (Cunningham, 2005). On the one hand, top management may provide governance structures with late or low-quality information, resulting in those charged with governance being unable to perform their duties effectively (Lisic et al., 2016). Alternatively, as top management is responsible for setting the organisation's ethical culture (Alshorman, 2016), upper echelons theory predicts that tone at the top will trickle down to employees who will act ethically or unethically based on top management's behaviour (Hambrick and Mason, 1984).

1.2 Problem statement, research question and objectives

The Association of Certified Fraud Examiners (2024) notes that financial statement fraud is the least common form of occupational fraud, accounting for only 5% of cases globally. However, it is the costliest, with a median loss of USD 766 000. Concerningly, when performing a ten-year trend review, the report found that perpetrators are in roles with higher levels of authority. The report noted that 19% of perpetrators hold executive or owner positions, causing the highest median loss of USD 500 000 (Association of Certified Fraud Examiners, 2024).

South Africa is a critical environment in which to study financial statement manipulation. As an emerging economy, South Africa is characterised by a small stock exchange, an insider economy, concentrated ownership and weak legal enforcement, all of which are associated with an increased risk of financial statement manipulation (Pududu and De Villiers, 2016; Rabin, 2016). The latest report by the Association of Certified Fraud Examiners (2024) noted that South Africa had the highest instance of occupational fraud in Sub-Saharan Africa (88 cases, representing 29.43%). Furthermore, the percentage of involvement in fraud by owners and executives was 13% in 2024, with a median value of USD 597 000. The PricewaterhouseCoopers (2020) Global Economic Crime and Fraud survey[2] found that South Africa had the third highest instance of economic crime in the world, with 60% of companies being affected by economic crime between 2009 and 2020, compared to a global average of

[2] Although PricewaterhouseCoopers has released the 2022 edition of their Global Economic Crime and Fraud survey, the 2022 edition focused on platform fraud and is, therefore, not directly relevant to this study.

47%. This report also found that the percentage of South African companies experiencing financial statement fraud was 34% in 2020 (PricewaterhouseCoopers, 2020).

Recent corporate scandals, including those of firms such as Steinhoff International, Tongaat-Hulett, and VBS Mutual Bank, have highlighted the country's high levels of unethical behaviour, resulting in lost investor confidence and wealth. The Steinhoff scandal, which broke in December 2017, for example, resulted in a collapse in the share price from ZAR 45.65 to ZAR 17.61 in one day (van der Linde, 2022). The share price continued to decline, and the company was liquidated on 13 October 2023 (Mahlangu, 2023). In 2018, Tongaat-Hulett was revealed to have overstated its financial results by approximately ZAR 4.5 billion. Tongaat-Hulett's shares were suspended by the JSE on 19 July 2022, and the company went into business rescue on 27 October 2022 (Cokayne, 2024). Also, in 2018, VBS Mutual Bank (a company which planned to list on the JSE) was found to have been looted of nearly ZAR 2 billion (Business Insider South Africa, 2020). Concerningly, in all three cases, the executive directors were involved (Business Insider South Africa, 2020).

Despite the high occurrence of financial statement manipulation in South Africa, research in the area remains limited. This is due to the country's small sample of suspected earnings management cases (Rabin, 2016). South Africa's worsening levels of economic crime and the high costs of such crimes reveal the need for a proactive approach to address the situation (PricewaterhouseCoopers, 2018). Likewise, top management's regular involvement in such crimes highlights the need to understand their role in financial statement manipulation better. This study focuses on top management's role in financial statement manipulation through their influence on tone at the top. Collectively, the empirical studies comprising this dissertation seek to answer the following overarching research question:

> *What is the role of tone at the top in detecting and preventing financial statement manipulation in South Africa?*

The four empirical studies which address this central question each form the basis of a chapter of this study, complete with its introduction, literature review, methodology, results and conclusion. The major objectives used to answer the overarching research question, together with the chapters in which they are answered, are as follows:

Objective 1: *To investigate the usefulness of financial statement manipulation detection models in detecting financial statement manipulation in*

South Africa and determine whether these models can be modified to suit the South African context better (Chapter 2).

Objective 2: *To determine if an association exists between tone at the top and financial statement manipulation (Chapters 3 and 4).*

Objective 3: *To determine how tone at the top moderates the audit committee's effectiveness in detecting and preventing financial statement manipulation in South Africa (Chapter 3).*

Objective 4: *To determine how tone at the top moderates the relationship between audit quality and financial statement manipulation in South Africa (Chapter 4).*

Objective 5: *To determine how tone at the top moderates the South African market's reaction to financial statement manipulation (Chapter 5).*

The remainder of Chapter 1 presents a discussion of elements that are critical to the dissertation as a whole, including the philosophical underpinning of the research, a discussion on defining and measuring financial statement manipulation, and a review of the theories on why companies manipulate their financial statements, how tone at the top influences the governance mechanisms designed to detect and prevent financial statement manipulation, and how tone at the top influences the market reaction.

1.3 Philosophical underpinning of the research

This study sought to objectively test hypotheses regarding the relationship between financial statement manipulation, governance mechanisms to prevent such manipulation, and tone at the top. Consequently, the scope of the research is clearly defined and formalised research methods are used. Further, the data consists primarily of objective data in the form of numbers. Therefore, this research's nature is quantitative, with a positivist philosophical approach (Saunders et al., 2019). This approach is consistent with prior research in the field by Abou-El-Sood and El-Sayed (2022), Baatwah et al. (2018), Felix et al. (2021), Lisic et al. (2016), Liu et al. (2023), Patelli and Pedrini (2015), Tonin and Scherer (2022) and Zalata et al. (2022).

Given the positivist philosophical underpinning, this research tested theoretically-driven hypotheses through data collection. Thus, this research followed the deductive approach (Saunders et al., 2019).

1.4 Defining and measuring financial statement manipulation

This study uses the term financial statement manipulation to encompass earnings management and financial statement fraud. This section begins by defining these two terms before identifying their differences. It then highlights some nuances of their measurement in this study.

1.4.1 Defining earnings management

Currently, there is no single definition of earnings management (Brennan, 2021; El Diri, 2017). Ronen and Yaari (2008) review the work of several authors (including the widely used definition of Healy and Wahlen (1999)) and extract commonalities in their definitions. They then classify the summarised earnings management definitions as depicted in Table 1.

Table 1: Alternative definitions of earnings management

White	Gray	Black
Earnings management is taking advantage of the flexibility in the choice of accounting treatment to signal the manager's private information on future cash flows.	Earnings management is choosing an accounting treatment that is either opportunistic (maximising the utility of management only) or economically efficient.	Earnings management is the practice of using tricks to misrepresent or reduce transparency of the financial reports.

(Source: Ronen and Yaari, 2008: 25)

Likewise, El Diri (2017) identifies common elements of the definitions in the literature, such as what earnings management is, how managers manipulate earnings, and the motivations to manage earnings. However, he notes that these definitions ignore the conditions under which earnings can be managed. To overcome this shortfall, El Diri (2017: 8) provides a four-stage definition of earnings management as:

> *"...the within GAAP management discretion over external financial reporting by abusing some contracting deficiencies, stakeholders' bounded rationality, and information asymmetry in the market, through some economic decisions, a change in*

the accounting treatment, or other sophisticated method. The purpose of management is to present earnings in a way different (up or down) from what is known to them to achieve private benefits while misleading the stakeholders; although such discretion may not always be harmful to [the stakeholders].”

This definition is summarised in Figure 1.

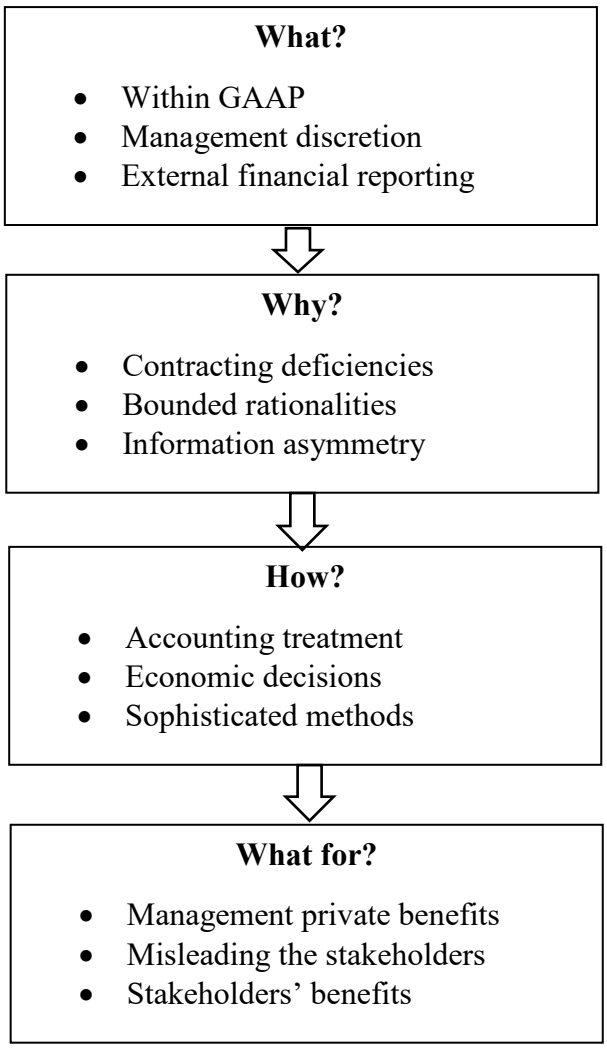

Figure 1. Earnings management definition

(Source: El Diri, 2017: 9)

There are two main earnings management categories: accruals-based and real earnings management (Duong and Evans, 2016). Accruals-based earnings management arises because reporting frameworks (such as IFRS) require companies to use the accrual basis of accounting, allowing management to use estimates and judgements when arriving at the final accounting numbers (Alshorman, 2016). This flexibility accommodates the unique nature of

each firm and the environment in which it operates (Mishra and Malhotra, 2016). While this flexibility aims to achieve higher quality financial reporting, managers can take advantage to manipulate earnings without violating the IFRS provisions (Lee and Vetter, 2015). Common techniques of accruals-based earnings management involve the timing of revenue and expense recognition and using discretionary estimates and accruals to manipulate profits (Pududu and De Villiers, 2016). As these methods use accruals to manipulate profits, there is no direct effect on the company's cash flows (Sun et al., 2014).

Real earnings management, on the other hand, is when management manipulates the company profits via operational transactions, such as the reduction of discretionary expenditure (for example, research and development, advertising and maintenance), asset sales, overproduction of inventories, and offering discounts to boost sales (Roychowdhury, 2006; Sun et al., 2014). While these transactions may be optimal in certain situations, their extensive use outside the company's regular operations to manipulate profits results in them being considered real earnings management (Roychowdhury, 2006). As these transactions are inefficient, they are costly, as economic resources are sacrificed and cash flows are affected (Alshorman, 2016; Roychowdhury, 2006). Interestingly, Graham et al. (2005) report that CFOs would pay these costs to achieve smoother earnings. Despite the cost of real earnings management, it is more difficult for auditors and regulators to detect and challenge than accruals-based earnings management (Habib et al., 2022; Rabin, 2016).

1.4.2 Defining financial statement fraud

Fraud is a global problem that is a concern to auditors, regulators and investors (Craja et al., 2020). International Standard on Auditing (ISA) 240 defines fraud as:

> *"[a]n intentional act by one or more individuals among management, those charged with governance, employees, or third parties, involving the use of deception to obtain an unjust or illegal advantage"* (International Auditing and Assurance Standards Board, 2022a: 105)

There are three broad categories of fraud: asset misappropriation, corruption, and financial statement fraud (Association of Certified Fraud Examiners, 2024). Of these three categories, this study focuses on financial statement fraud, which the Association of Certified Fraud Examiners (2022: 9) briefly defines as "schemes, in which the perpetrator intentionally causes a material misstatement or omission in the organization's financial statements". ISA 240 confirms the definition of fraudulent financial reporting as "intentional misstatements,

including omissions of amounts of disclosures in financial statements to deceive financial statement users*"* (International Auditing and Assurance Standards Board, 2022a: 110)

1.4.3 Contrasting earnings management and financial statement fraud

From the above definitions of earnings management and financial statement fraud, it can be seen that both intend to deceive the financial statement user for some form of economic gain (Albizri et al., 2019; Marais et al., 2023). However, a distinction is that financial statement fraud violates accounting frameworks, while earnings management does not (Albizri et al., 2019). Figure 2, drawn from Dechow and Skinner (2000), provides a distinction between fraud (which constitutes actions that violate generally accepted accounting practices (GAAP)) and earnings management (which constitutes actions that are within GAAP).

	Accounting choices	Real cash flow choices
	within GAAP	
"Conservative" Accounting	Overly aggressive recognition of provisions or reserves	Delaying sales
	Over valuation of acquired in-process R&D in purchase acquisitions	Accelerating R&D or advertising expenditures
	Overstatement of restructuring charges and asset write-offs	
"Neutral" Earnings	Earnings that result from neutral operation of the process	
"Aggressive" Accounting	Understatement of the provision for bad debts	Postponing R&D or advertising expenditures
	Drawing down provisions or reserves in an overly aggressive manner	Accelerating sales
	Violates GAAP	
"Fraudulent" Accounting	Recording sales before they are "realizable"	
	Recording fictitious sales	
	Backdating sales invoices	
	Overstating inventory by recording fictitious inventory	

Figure 2. The distinction between fraud and earnings management

(Source: Dechow and Skinner, 2000: 239)

1.4.4 Measuring financial statement manipulation

This thesis uses financial statement manipulation as an overarching term that incorporates both earnings management and fraud. The research, therefore, needed to identify companies that manipulate their financial statements in either of these two ways. Regarding earnings management, Pududu and De Villiers (2016) identify four methods of measurement:

1. Total accruals,
2. Specific accruals,
3. Real earnings management and
4. Earnings distributions.

It is important to note that financial statement manipulation is unobservable as its effects are intended to be hidden. Consequently, no measure is perfect. To overcome this limitation, multiple proxies of financial statement manipulation were selected, as discussed below.

Like Rabin (2016), this study excludes real earnings management, as such actions may be driven by the company's strategic objectives, cannot be challenged by auditors, and are not identified by accruals-based models (Graham et al., 2005; Rabin, 2016). Instead, this study focuses on total accruals using the Modified Jones Model by Dechow et al. (1995) and its adaptation by Kothari et al. (2005) to extract the discretionary element of accruals. Despite their shortcomings, these accruals-based models are considered as some of the most powerful (Chen, 2010). They are widely used in the earnings management literature (see, for example, Abou-El-Sood and El-Sayed (2022), Biswas et al. (2022), Lee and Vetter (2015), Makhlouf et al. (2021), Mishra and Malhotra (2016), Penning and de Villiers (2015), Rabin (2016); Selahudin et al. (2018) and Waweru (2018)).

While the study briefly considers earnings distributions in Paper 1, these are not extensively used in the remainder of the dissertation. Pududu and De Villiers (2016) failed to find evidence of abnormal earnings distributions on the JSE. They claimed that investors may not overly focus on earnings thresholds because the JSE is a smaller market with a smaller following. These distributions also require large sample sizes (Pududu and De Villiers, 2016).

Regarding the measurement of fraud, prior international studies have used a combination of regulatory enforcement actions (Beneish, 1999; Chakrabarty et al., 2022; Dechow et al., 2011), severe restatements (Price et al., 2011), media reports (Beneish, 1999; Kamal et al., 2016), civil lawsuits (Kamal et al., 2016), adverse or disclaimed audit opinions (Sylwestrzak, 2022) or fraud detection models, such as the Beneish (1999) M-score and the Dechow et al.

(2011) F-score, to proxy for financial statement fraud. Similarly, in South Africa, prior studies have used financial restatement announcements (Watson and Rossouw, 2012) and qualified (including emphasis of matter) audit opinions (Moepya, 2017). As there is no exhaustive list of fraudulent South African companies (Marais et al., 2023; Rabin, 2016), Paper 1 determined whether popular fraud prediction models (the Beneish (1999) M-score and Dechow et al. (2011) F-score) could be used as suitable proxies. Paper 1 determined that both models were ineffective in South Africa, even after updating them with South African data (Marais et al., 2023). Consequently, a list needed to be compiled. Three primary sources were used to identify fraudulent companies, as follows:

1. The Financial Sector Conduct Authority (FSCA, formerly the Financial Services Board) enforcement actions. Only the enforcement actions related to "section 76 of the Securities Services Act no. 36 of 2004 (pre-2013) and section 81 of the Financial Markets Act no. 19 of 2012 (post-2013)" were used (Marais et al., 2023: 9).
2. Securities Exchange News Service (SENS) announcements that identified a forced restatement by the Financial Reporting Investigation Panel (FRIP, formerly the GAAP Monitoring Panel) that identified an IFRS violation and
3. Qualified audit opinions related to an IFRS violation and disclaimers of opinion (Marais et al., 2023).

The following section discusses the study's theoretical framework.

1.5 Theoretical framework: Contrasting the information and opportunistic perspectives of financial statement manipulation

Two perspectives attempt to explain why management manipulates earnings: the information perspective based on signalling theory and the opportunistic perspective based on agency theory (Beneish, 2001; Habib et al., 2022). Both perspectives rely on asymmetric information between managers and stakeholders and the use of discretion when reporting accounting information under acceptable frameworks (Pham et al., 2019). Asymmetric information arises because of the separation of ownership and control (Lin and Hwang, 2010), while management's use of discretion arises due to the flexibility allowed in acceptable reporting frameworks (Anh and Ling, 2016)

From the information perspective, financial statements enable a company to communicate information to its stakeholders. However, not all relevant information is captured in the financial statements (Stocken and Verrecchia, 2004). Thus, managers may manipulate

financial information to convey their private information and reduce asymmetries (Rabin, 2016; Subramanyam, 1996). For example, management can use upward earnings management if they have inside information about improved future performance, or they can use downward earnings management if they know that current profit levels are unsustainable (Rabin, 2016). This signalling of inside information will benefit stakeholders, as it helps to reduce the cost of capital and improve firm value and reputation because profits are more predictable (Yimenu and Surur, 2019).

On the other hand, from an opportunistic perspective, management's intention in manipulating financial statements is to deceive the user for some personal, undisclosed benefit (Yimenu and Surur, 2019). This is because the separation of ownership and control under agency theory leads to a divergence of interests between managers and shareholders (Zalata et al., 2018). Due to humans' inherent self-interested nature, managers may seek to maximise their own wealth at the expense of the shareholder. Management can achieve this because of their position within the company, which grants them access to information that the shareholders do not have (Cuevas-Rodriguez et al., 2012). Management can exploit these information asymmetries for their personal benefit (Surbakti et al., 2017). To address this goal conflict, the company may incentivise the managers to act in the shareholders' best interest or set up monitoring mechanisms (or both) (Jensen and Meckling, 1976). While incentivising management is a central tenet of agency theory (Firth et al., 2007), it is problematic from an earnings manipulation perspective, as incentives linked to performance may encourage earnings management rather than prevent it (Mishra and Malhotra, 2016).

In summary, manipulation, from the information perspective, may intend to improve information content, while from an opportunistic standpoint, it is meant to deceive the user. In line with prior studies by Bédard et al. (2004), Mishra and Malhotra (2016) and Rabin (2016), and with the definition of financial statement manipulation used by this study (refer to the previous section), this investigation adopted an opportunistic perspective. Based on this perspective, the following section discusses the theories that explain the conditions that enable financial statement manipulation.

1.6 The prerequisite conditions for financial statement manipulation

Following the opportunistic perspective, several fraud theories explain the conditions which enable management to manipulate company financial statements (Sujeewa et al., 2018). This section explains the origins and evolution of these theories.

1.6.1 The fraud triangle

The fraud triangle[3] was developed by Cressey in 1953 to explain the factors contributing to people committing fraud. Cressey (1953) identified three common fraud factors: pressure, opportunity and rationalisation. ISA 240 describes pressure (or incentive) as when management faces pressure to meet a specified earnings target. This pressure may originate internally or externally to the company (International Auditing and Assurance Standards Board, 2022a). Examples of these pressures include earnings benchmarks set by analysts, debt covenants that must be maintained, credit ratings, remuneration incentives, and political visibility (Graham et al., 2005; Sujeewa et al., 2018).

Opportunity relates to the fraud perpetrator believing that they can commit the fraud and get away with it (Sujeewa et al., 2018). This would occur when management can override the internal controls designed to prevent fraud (International Auditing and Assurance Standards Board, 2022a). Gupta and Gupta (2015: 83) identify several factors which present an opportunity to commit fraud: "knowledge of the weaknesses of the company's internal control systems, access to accounting records or assets, lack of supervision, unethical 'Tone at the Top' and belief that the person will not get caught." Given their position in a company, management has a unique opportunity to engage in fraudulent financial reporting (International Auditing and Assurance Standards Board, 2022a).

Finally, rationalisation relates to the perpetrator's need to justify their actions (Gupta and Gupta, 2015). While some individuals may already have an attitude that allows them to commit fraud, honest individuals must be able to justify their actions before committing the fraud, if they are under sufficient pressure to do so (Gupta and Gupta, 2015; International Auditing and Assurance Standards Board, 2022a). Sujeewa et al. (2018) identify some rationalisations as transferring blame, revenge, the view that no party suffered loss and that the money would be repaid in the future.

[3] Although the fraud triangle theory attempts to explain the conditions under which someone would commit occupational fraud in general (Sujeewa et al., 2018), it applies to financial statement fraud as a subset of occupational fraud. In addition, as the underlying intention of both fraud and earnings management is to deceive the financial statement user for some benefit or advantage, the concepts underlying the fraud triangle would also apply to earnings management.

1.6.2 The evolution of the fraud triangle to the fraud heptagon

Since the initial development of the fraud triangle, numerous researchers have added elements to enhance the understanding of the conditions under which fraud is committed. The evolution of the fraud triangle into the fraud hexagon is summarised in Figure 3[4] below.

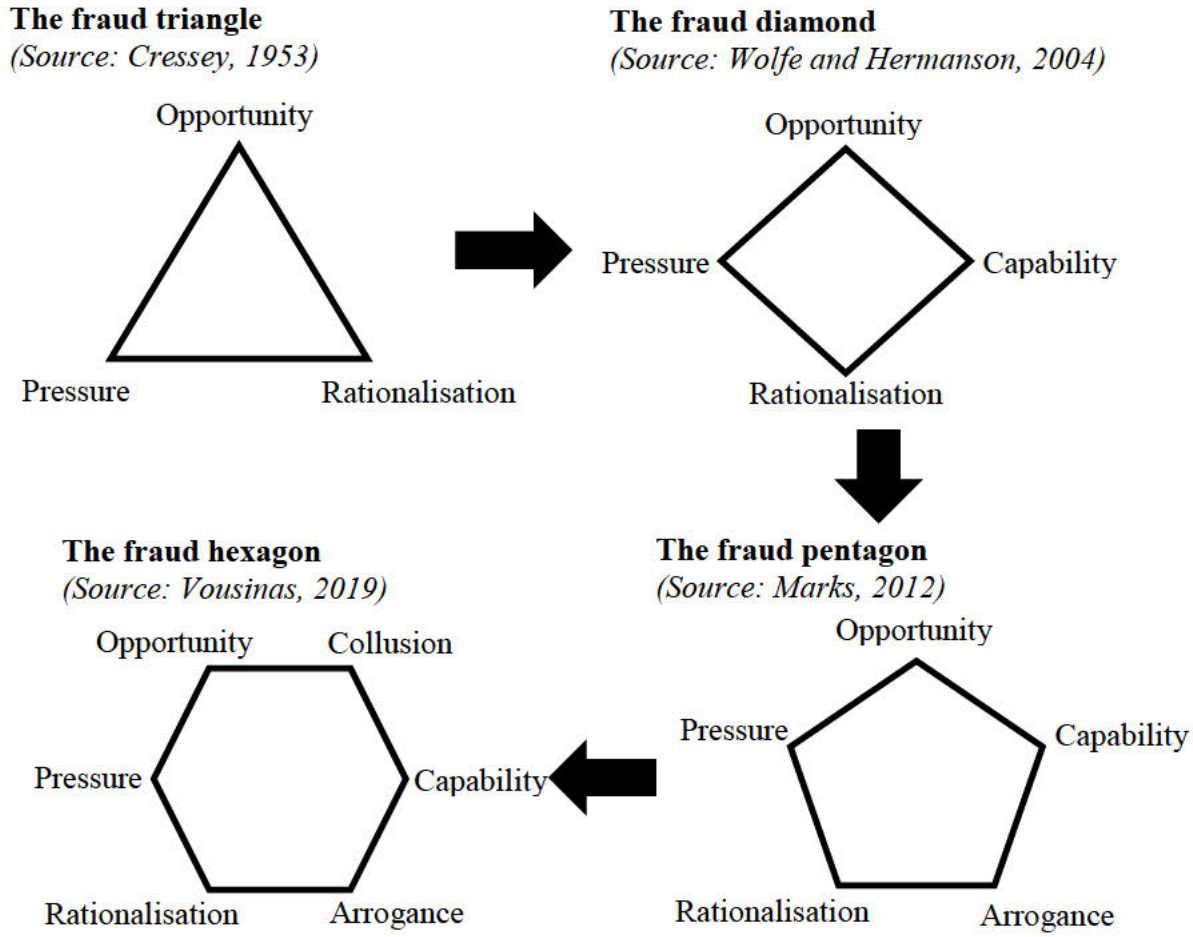

Figure 3. The evolution of the fraud triangle into the fraud hexagon

(Source: Researcher's own)

Wolfe and Hermanson (2004) added capability to the original fraud triangle to form the fraud diamond. Fraud would not exist if nobody was capable of committing it. Indicators of capability included the position or function within the firm, sufficient knowledge and understanding of the internal control systems and their weaknesses, the belief that they would not be detected and the ability to deal with stress (Christian et al., 2019). Some overlap is noted here between other elements: for example, both opportunity and capability consider

[4] Figure 3 does not include the fraud heptagon due to numerous different versions being proposed.

knowledge of the internal control weaknesses. However, Wolfe and Hermanson (2004) argued that capability is so important that it needs to be separately considered.

Crowe Horwath LLP later added arrogance to form the fraud pentagon[5] (Marks, 2012). Marks (2012: 32) describes arrogance as "an attitude of superiority and entitlement or greed." Here, the person committing the fraud believes that the company's internal controls do not apply to them (Antawirya et al., 2019). To arrive at the fraud hexagon, Vousinas (2019) added collusion[6]. Vousinas (2019) noted that recent major frauds are complex; individuals cannot carry them out. Instead, they are carried out by multiple parties colluding. Collusion also makes fraud harder to prevent and, in the presence of a weak corporate culture, can draw in honest employees (Vousinas, 2019).

Following the fraud hexagon, numerous researchers have added additional elements to arrive at a fraud heptagon. For example, Yusof (2016) extended the fraud pentagon to the fraud heptagon by adding ignorance and greed. Alternatively, Joshua et al. (2023) extended the fraud hexagon by adding economy. Finally, another version of the fraud heptagon included culture and religiosity, although it removed collusion (Azizah and Reskino, 2023).

Once the reason for committing financial statement manipulation and the enabling conditions are identified, it is possible to develop mechanisms to detect and prevent it. The following section discusses such mechanisms.

1.7 Detecting and preventing financial statement manipulation

Detecting and preventing financial statement manipulation is critical to protect investors and ensure the appropriate allocation of capital resources. As discussed under the definition section and opportunistic perspective, financial statement manipulation arises because management, given its position of power and information asymmetries (i.e. capability and opportunity), acts opportunistically with the intention to deceive the financial statement user for some private benefit (i.e. pressure or stimulus).

Agency theory states that bonding and monitoring costs must be incurred to align the goals of management and the shareholder (Jensen and Meckling, 1976). Bonding costs predominantly focus on management incentives and linking management's remuneration to company

[5] It is noted that Crowe's fraud pentagon used the term competence instead of capability as used by Wolfe and Hermanson (2004).

[6] Vousinas (2019) used the acronym S.C.C.O.R.E for the fraud hexagon. Here, the terms capability, rationalisation and opportunity remained the same as per the fraud triangle and diamond. However, the term stimulus was used instead of pressure and ego was used in place of arrogance.

performance, either in terms of accounting profits or share price (Conyon, 1997). However, this is problematic from a financial statement manipulation perspective, as such incentives would encourage manipulation by providing a pressure or stimulus rather than preventing it (Bergstresser and Philippon, 2006; Cheng and Warfield, 2005). For instance, manipulating profits upward would increase the manager's remuneration or wealth if the incentives are linked to accounting profits. Similarly, if incentives are linked to the share price, manipulating earnings to meet or beat expectations would result in the market rewarding the company through increased share prices, and, in turn, this would increase the manager's remuneration or wealth (Kasznik and McNichols, 2002). However, if a company reported losses or failed to meet the earnings target, the market would punish the company through negative share returns, thereby decreasing a manager's wealth or resulting in the manager losing their job or reputation (Kasznik and McNichols, 2002), thus incentivising the manager to engage in manipulation.

As incentives are thus likely ineffective in overcoming agency problems related to financial statement manipulation, monitoring is required. Corporate governance is an essential monitoring mechanism that regulators have attempted to enhance in response to manipulation (Farber, 2005). Good corporate governance enables high-quality information to be provided timeously, reducing the risk of manipulation (Martins and Júnior, 2020). King IV defines corporate governance as:

> *"the exercise of ethical and effective leadership by the governing body towards the achievement of the following governance outcomes: 1) ethical culture, 2) good performance, 3) effective control, 4) legitimacy"* (Institute of Directors in Southern Africa, 2016: 20).

Thus, the board of directors is responsible for implementing sound corporate governance practices in the company setting. King IV identifies four further governance roles and responsibilities, as depicted in Figure 4 below. Of particular interest for this dissertation, are the roles of monitoring management and ensuring accountability through reporting and disclosure.

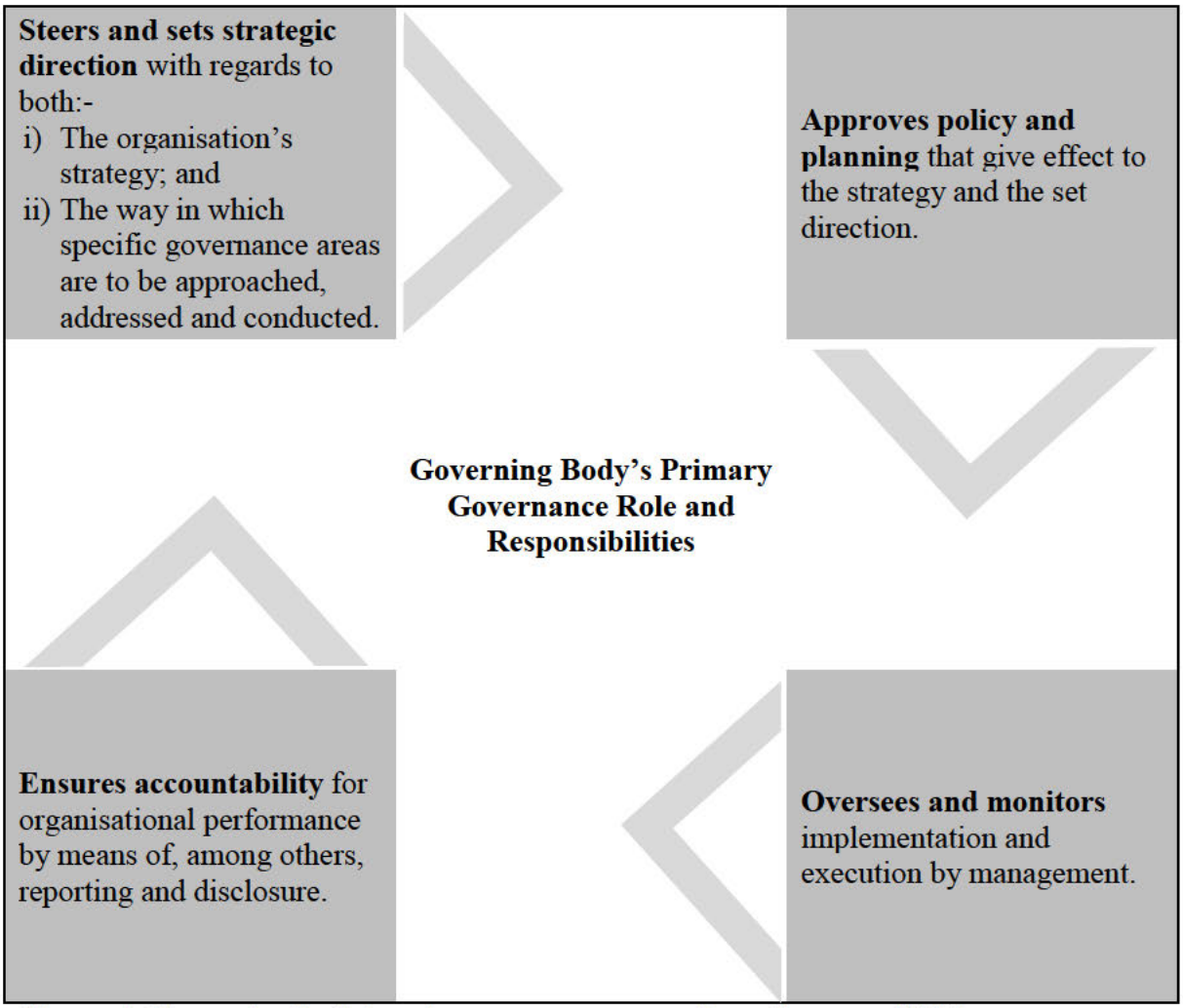

Figure 4. Governing body's primary governance role and responsibilities

(Source: Institute of Directors Southern Africa, 2016: 21)

Watson and Rossouw (2012) note that poor corporate governance and financial reporting are key reasons for financial restatement and corporate scandals. Consequently, this study investigates three key monitoring mechanisms[7]: the audit committee, the external auditor, and share price movements. These are briefly discussed in the following sections.

1.7.1 The role of the audit committee and nuances in measuring its effectiveness

The audit committee is an internal corporate governance mechanism required by King IV. In South Africa, while the board of directors is ultimately responsible for the quality of the company's financial statements, this is often delegated to the audit committee (Institute of Directors in Southern Africa, 2016). Section 94 of the Companies Act No. 71 of 2008

[7] Gramling et al. (2004) identify the four cornerstones of corporate governance as 1) the external auditor, 2) the audit committee, 3) management, and 4) the internal audit function. While the external auditor and the audit committee are discussed in this section, management's role is discussed in the next section (1.7). The role of the internal audit function is beyond the scope of this dissertation.

identifies the key roles of the audit committee as supervising the financial reporting process and overseeing the external auditors (Republic of South Africa, 2008). Prior literature notes that the committee requires sufficient expertise, independence, activity, and diversity to execute its responsibilities (Bédard et al., 2004; Guest, 2019).

Paper 2 of this dissertation focused on audit committee effectiveness. As this quality is inherently unobservable, this study used numerous proxies to measure it (Marais et al., 2024). Audit committee expertise was measured using financial, governance, and firm expertise. Independence was proxied using individual audit committee members' independence, their share ownership and the role of the CEO and chairperson in the committee. The committee's activity level was measured based on the committee's size and meeting frequency. Finally, diversity was proxied using gender and racial diversity (Marais et al., 2024). Principal component analysis was then used to reduce these proxies into five components: financial expertise, governance expertise, independence, activity and diversity (Marais et al., 2024).

1.7.2 The external auditor and measuring their effectiveness

In South Africa, an external auditor is required for all public companies[8] in terms of section 90 of the Companies Act No. 71 of 2008 (Republic of South Africa, 2008). The external auditor's role is to ensure that the financial statements are prepared following acceptable reporting standards (i.e. IFRS in South Africa) and are free of material misstatement (from fraud or error) (International Auditing and Assurance Standards Board, 2022b). Harber and Marx (2020) note that a high-quality audit depends on the auditor's competence and independence.

Paper 3 of this dissertation focused on the external auditor. As with audit committee effectiveness, the external auditor's quality is also inherently unobservable (Balsam et al., 2003). Thus, numerous proxies were used to measure this complex construct. Based on Harber and Marx's (2020) characteristics of a high-quality audit, auditor competence was proxied using auditor type (i.e. Big 4 or not), industry specialisation and whether joint auditors performed the audit. Auditor independence was measured using auditor size, tenure, and non-audit services provision. Again, principal component analysis was used to reduce these proxies into two components which aligned with the literature: competence and independence.

[8] Although other categories of companies are also required to be audited (such as state-owned companies), this study only focuses on JSE-listed companies which are all public in nature.

1.7.3 Stock market prices as a monitor of management and measuring the market reaction

Holmström and Tirole (1993) identify the stock market as crucial in monitoring management. Listed firms are scrutinised by investors (da Silva, 2021), with share traders providing external monitoring of management by influencing the share price (Garvey and Swan, 2002). This can take place in two ways. First, firms that perform poorly may become targets for a takeover (resulting in management's replacement). Second, changing share prices influence management's incentives (Holmström and Tirole, 1993).

Institutional investors, in particular, have a financial incentive to monitor the companies they invest in (Choi et al., 2024; Garvey and Swan, 2002). In recent years, investors have increased in sophistication and are thus better able to read the information contained in share prices (Goldstein, 2023). However, it is not only investors who can use the information contained in share prices. Regulators and credit rating agencies have also been able to use share prices to change policies, regulations and company credit ratings (Goldstein, 2023). As such, the movement in the share price after financial statements are released can reveal important information on the quality of the financial information provided. This is because the market aggregates information from multiple sources (Goldstein, 2023).

Paper 4 of this dissertation focused on the market reaction to the release of financial statements, using a short-window event study methodology. Here, the market model was used to determine the cumulative abnormal returns over multiple event windows ranging from two to forty-two days.

1.8 Tone at the top and financial statement manipulation

Tone at the top refers to a company's value set as shaped by top management (Cunningham, 2005). It is created through the language and actions of top management and heavily influences the company's culture and internal control environment (Anderson and Lueg, 2017; Cutler, 2004; Garrett et al., 2022). ISA240 notes that it is management's responsibility (together with those charged with governance) to create "a culture of honesty and ethical behavior" (International Auditing and Assurances Standards Board, 2022a: 104). Upper echelons theory explains that top management influences a company's culture by acting as a key role model to employees and rewarding employees according to management's desired behaviours (Beaudoin et al., 2015). Consequently, top management is considered one of the four cornerstones of good corporate governance in a company (Rose et al., 2021). While this view was confirmed by Cohen et al. (2002), who found that external auditors considered top

management as playing a pivotal role in corporate governance, it is contrary to agency theory, as corporate governance (a monitoring mechanism) should be independent of management (i.e. the agent being monitored).

Given its power to shape corporate culture, executive management can ensure that governance mechanisms are supported and perform effectively or are compromised and ineffective (Lisic et al., 2016). In this light, it is possible that, while governance mechanisms may appear effective in form, due to top management's influence, they are ineffective in practice (Lisic et al., 2016). This aligns with institutional theory, which suggests that governance mechanisms may merely fulfil a ceremonial role (Zengin-Karaibrahimoglu et al., 2021). The following sections briefly discuss the possible influences of tone at the top on the audit committee, external auditors, and market reaction. This is followed by a brief explanation of how tone at the top is measured for this study.

1.8.1 Tone at the top and the audit committee

Tone at the top may moderate the audit committee's governance ability in several ways. First, regulatory requirements (such as King IV) typically recommend that all audit committee members be independent. This gives management an information advantage over the committee members, giving it the power to influence the nature and timing of information provided to the committee (Beasley et al., 2009; Zengin-Karaibrahimoglu et al., 2021). Thus, a powerful CEO may set (or heavily influence) the committee's agendas (Lisic et al., 2016). Second, although the committee members may meet the independence criteria according to the relevant regulations, they may be connected to management via professional (i.e. director interlocks) or personal ties (Bruynseels and Cardinaels, 2013; Cohen et al., 2022). Institutional theory also predicts the tendency for companies to attract similar individuals, resulting in the directors not challenging one another (Cohen et al., 2008). This reduces the likelihood of the audit committee members challenging the executive management. Finally, upper echelons theory anticipates that top management's tone influences how the rest of employees act, particularly regarding ethical behaviour (Hambrink and Mason, 1984). Consequently, employee behaviour reflects that of management's, which acts as a key role model to employees and rewards employees according to its desired behaviours (Beaudoin et al., 2015). Thus, if management does not actively support internal control and governance mechanisms, the employees will likely replicate such behaviour.

Tone at the top's moderation of the audit committee's effectiveness is explored in Paper 2.

1.8.2 Tone at the top and the external auditor

The external auditor's ability to execute their duties may also be affected by a company's tone at the top. As with the audit committee, there are information asymmetries between executive management and the external auditor. Thus, again, the company's top management may influence the nature and timing of information provided to the external auditor (Zengin-Karaibrahimoglu et al., 2021), the evidence provided (Greiner et al., 2020), or the narratives used to justify the manipulated amounts (Abou-El-Sood and El-Sayed, 2022). In addition, Cohen et al. (2011) found that the external auditor had greater power in discussions with management when the audit committee supported them. However, as discussed in section 1.7.1, top management may compromise the audit committee's support if its role is ceremonial.

Despite these negative influences of tone at the top on the external auditor, auditing standards require the external auditor to consider the risk associated with the company's tone at the top (Greiner et al., 2020). Tone at the top is related to an audit's inherent and control risks. The external auditors will adjust the nature, timing and extent of their audit procedures to change their level of detection risk to maintain an acceptable level of overall audit risk (Garrett et al., 2022). Unfortunately, Schmidt (2014) identifies three biases held by auditors that may result in an incorrect risk assessment by auditors related to tone at the top. These biases are 1) using prior mental representations, which are more likely to be positive, 2) the fact that tone at the top evidence is more likely to reflect favourably on management, and 3) audit procedures are designed to uncover positive rather than negative evidence (Schmidt, 2014).

Tone at the top's impact on the external auditor's effectiveness is explored in detail in Paper 3.

1.8.3 Tone at the top and the market reaction

The annual integrated report is an essential means of communication between a company and its stakeholders (Dou et al., 2016). It provides markets with decision-relevant information for the optimal allocation of capital resources (Perotti and Wagenhofer, 2014). On average, as Lo et al. (2017) note, the textual narrative accounts for approximately 80% of the integrated report. These narratives are largely voluntary, with little to no regulation governing their presentation.

Given the absence of regulation around these voluntary narratives, management can use the text's tone to either enhance or impair a stakeholder's ability to understand a company's financial performance (Rahman, 2019). The language choices in the narratives impact the market's reaction. as the narratives help stakeholders make meaning of events, ideas, strategies and the company's overall performance (Amernic et al., 2010). The obfuscation hypothesis states that companies trying to hide something will make the narratives more cryptic and difficult to understand, thereby concealing information from stakeholders (Lo et al., 2017; Moreno and Jones, 2022). The voluntary disclosure hypothesis states that management will only present voluntary information that supports the view they wish to show stakeholders (Price et al., 2012).

Tone at the top's influence on the stock market reaction to financial statement manipulation is explored in detail in Paper 4.

1.8.4 The measurement of tone at the top

In each paper in this study, tone at the top was measured using the DICTION software to analyse the CEO's statement in the annual report, after which principal component analysis was applied to DICTION's five master variables (activity, certainty, commonality, optimism and realism) to extract the core components and develop the tone measures for each paper. As tone at the top is unobservable and challenging to measure, this section provides an overall justification for using the following elements: 1) linguistic analysis using DICTION, and 2) use of the CEO statement in the annual report.

Linguistic analysis using DICTION

Linguistic analysis can be performed either manually or automatically. Early studies such as Bryan (1997) and Callahan and Smith (2004) relied on manual analysis by human coders. While this method has greater precision because it considers the precise context of the word, it is hampered by smaller sample sizes due to high costs, the need to train coders and low replicability (Li, 2010). The automated approach, which has become more popular given advances in technology, can be performed using statistical methods (such as Naïve Bayesian algorithms) or wordlists and dictionaries (also known as the 'bag-of-words' approach) (Larcker and Zakolyukina, 2012; Li, 2010). Researchers initially preferred the statistical approach, as no wordlist had been developed for corporate texts (Li, 2010). However, domain-specific wordlists, such as those by Henry (2008) and Loughran and McDonald (2011), were subsequently developed explicitly for the corporate narrative. Moreover, various

general wordlists, including the Harvard General Inquirer, the Linguistic Inquiry and Word Count and the DICTION software, were successfully used to analyse corporate texts (Hope and Wang, 2018). The 'bag-of-words' approach offers several advantages to researchers, including being simple to understand, resource-efficient, objective and replicable (Hope and Wang, 2018). However, the approach suffers from several weaknesses, such as not differentiating between different word meanings and failing to consider the context in which the word is used (Larcker and Zakolyukina, 2012; Li, 2010).

Following studies by Abou-El-Sood and El-Sayed (2022), Alshorman (2016), Amernic et al. (2010), Bassyouny et al. (2020), Hope and Wang (2018), Huang et al. (2018), Kayed and Meqbal (2024), Lacker and Zakolyukina (2012) and Patelli and Pedrini (2015), this study applies the 'bag-of-words' approach, specifically, using the DICTION software. DICTION is "especially attractive to those interested in the influence of communication and language of senior corporate leadership on the tone at the top" (Amernic et al., 2010: 51). This is because senior leadership in the corporate environment is viewed as being political (Amernic et al., 2010). While DICTION was designed to analyse the political leadership narrative, it includes business context norms (Amernic et al., 2010; Hart and Carroll, 2015). Furthermore, DICTION has previously been successfully applied in the business context (see, for example, Amernic et al. (2010), Caglio et al. (2020), Mokoaleli-Mokoteli et al. (2009), Nel et al. (2022), Patelli and Pedrini (2015) and Totowa and Mokoaleli-Mokoteli (2021)). Although the DICTION software is not domain specific, by considering a wider range of tones than the positive-negative spread, which is the focus of domain-specific lists, it allows for a more holistic measure of tone at the top (Enslin et al., 2023; Marais et al., 2024) and provides a more general text analysis (Hart and Carroll, 2015). Domain-specific wordlists are generally limited to the positive-negative word spread, making them less helpful in measuring tone at the top.

Using the CEO statement in the annual report

This study proxies tone at the top using the CEO statement in the annual report. The role of the CEO was selected, as the highest-ranked person in a company who is intimately involved in running the company (Nel et al., 2022). Consequently, the CEO is expected to have the greatest impact on tone at the top (Craig and Amernic, 2018; Hope and Wang, 2018). Gupta and Gupta (2015) and Yahaya (2022) note that CEOs are highly involved in financial statement manipulation cases. The PricewaterhouseCoopers' (2020) Global Economic Crime

and Fraud Survey identified a dominant CEO as the number one red flag in corporate governance failures. This reveals the importance of considering the CEO's role in financial statement manipulation.

Given its importance as a corporate narrative, the CEO statement in the annual report was selected for analysis. These statements "are public documents signed by a corporation's CEO, published annually as an integral part of a corporation's Annual Report, and provide a personal accountability narrative" (Amernic et al., 2007: 1844). These statements are important because they have "the capacity to reflect the CEO's priorities, mindset, implicit ideologies and perceived charisma and greatness", thus enabling the CEO to shape the company's corporate culture (Amernic et al., 2010: 31). As the letters are also not audited, the CEO is allowed to speak more freely (Boudt and Thewissen, 2019). However, two issues arise with the use of CEO statements. First, they are carefully planned and not spontaneous and may, therefore, not reflect a company's genuine tone at the top (Hope and Wang, 2018). The second issue is whether CEOs write their own statements (Craig and Amernic, 2018).

Spontaneous executive narratives (such as earnings conference calls) are the best for identifying unethical behaviour, and hence an inappropriate tone at the top (Hobson et al., 2012; Hope and Wang, 2018; Larcker and Zakolyukina, 2012). However, conference calls and similar spontaneous narratives are not widely available in South Africa. This lack of availability would hinder the study by significantly reducing the sample size. Thus, following studies by Alshorman (2016), Boudt and Thewissen (2019), Craig and Amernic (2018), Nel et al. (2022) and Patelli and Pedrini (2015), this study uses CEO statements in the annual report, which are widely accessible in South Africa. Using such a document "allows for greater accessibility, reliability and replicability" (Alshorman, 2016: 34).

Regarding whether CEOs write their own statements, Craig and Amernic (2011) put forward four arguments for why CEO statements are suitable proxies for tone at the top, even if written by others. Their first argument is that various prominent CEOs confirmed their personal involvement in preparing the statements. Secondly, they argue that it is unrealistic for the CEO to completely delegate responsibility for a document attributed to and signed by them. It is highly likely that the CEO would thoroughly brief any ghostwriter. Schoenberger (2001: 281) argues that corporate executives' "sense of themselves is too strong to allow themselves to be ventriloquized by another person" as they "are accustomed to speaking not only for themselves, but for giant organizations." Craig and Amernic's (2011) third argument

is that because the CEOs sign their statements, they are legally responsible for the content and would thus be heavily involved in producing the document. Finally, the statement is an important symbolic document that the reader would attribute to the CEO. These aspects would give the CEO strong psychological ownership of the document.

Based on the preceding discussion, this study argues that applying the 'bag-of-words' approach to the CEO statement in the annual report is a suitable proxy for tone at the top.

1.9 Originality of the study

This dissertation offers several areas of originality to the existing literature. The first area of originality is that it is the first study to test the usefulness of the widely used fraud detection models developed by Beneish (1999) and Dechow et al. (2011) on recent data in the African context, specifically South Africa. While various African studies (such as Mavengere (2015), Nyakarimi (2022), Nyakarimi et al. (2020), Okiro and Otiso (2021) and Onyebuchi and Nkem (2021)) have used these models as proxies for financial statement manipulation risk, a model's ability to detect financial statement manipulation in Africa has not been established. Establishing model validity is critical before reliance is placed on its usage (Rad et al., 2021). This is relevant, as both models were developed using pre-2005 United States data, which may not be appropriate to contemporary studies in developing economies. Not only was the accuracy of the two models tested, but the study also investigated the nature of false positives identified by the models. They were also updated based on recent South African data to determine if this would improve their accuracy. This area of the study would benefit academics, analysts, external auditors and regulators who wish to screen companies for the risk of financial statement manipulation, as it would assist these stakeholders in determining whether they can place reliance on fraud prediction models in South Africa.

The second area of originality lies in considering the role of tone at the top in financial statement manipulation in the South African context. Prior studies and reports have noted the involvement of top management, particularly CEOs, in financial statement manipulation (Gupta and Gupta, 2015; PricewaterhouseCoopers, 2020; Yahaya, 2022). Yahaya (2022) calls for a greater analysis of the influence of CEOs on earnings management. The tone at the top, which is heavily influenced by the CEO (Hope and Wang, 2018), is one such characteristic. Bicudo de Castro et al. (2019) note that most studies on tone at the top focus on the United States and may not apply to other countries where the legislative environment and corporate culture may differ. Moreover, based on domain-specific wordlists, most studies are limited to

considering tone at the top from a positive-negative word spread perspective. In South Africa, tone studies are limited, with a focus on analyst stock recommendations (Caglio et al., 2020), integrated reporting (Mokoaleli-Mokoteli et al., 2009) and impressions management (Nel et al., 2022; Totowa and Mokoaleli-Mokoteli, 2021). Currently, South African studies do not consider the association between tone at the top and earnings management. This study fills this gap. This area of the research would benefit stakeholders who want to assess the risk of financial statement manipulation as it will highlight if tone at the top directly impacts the level of manipulation. Further, the study will highlight which tones indicate more or less risk of manipulation.

The study's third area of originality is to expand the existing literature on financial statement manipulation in South Africa by considering the role of governance mechanisms in detecting and preventing it. South Africa is especially vulnerable to financial statement manipulation as a developing economy with high levels of corruption, weak legal enforcement, an insider economy, and concentrated ownership, thus making such research paramount (Pududu and De Villiers, 2016; Waweru, 2018). Existing literature on financial statement manipulation in South Africa tends to focus on its detection (Moepya, 2017; Moepya, Akhoury et al., 2014; Moepya, Nelwamondo et al., 2014; Mongwe and Malan, 2020; Rabin, 2016) or its relationship with corporate social responsibility (Jordaan et al., 2018; Marais, 2023), the mandatory adoption of IFRS (Sellami and Slimi, 2016), integrated report quality (Eloff and Steenkamp, 2022) and its use to achieve various thresholds (Li and Chen, 2020; Pududu and De Villiers, 2016). Thus, there is a gap in the South African literature considering the role played by the audit committee and external auditor in mitigating financial statement manipulation, which this study fills. The findings from this aspect would benefit investors and regulators by highlighting which characteristics of audit committee members and external auditors are beneficial for addressing financial statement manipulation and which are not.

The study's fourth area of originality is investigating the moderating effect of tone at the top on the audit committees' and external auditors' effectiveness in preventing financial statement manipulation. Research on tone at the top's influence on these governance mechanisms designed to prevent financial statement manipulation has been limited (Garrett et al., 2022). Tone at the top's moderating effect on the audit committee has not been previously studied in depth. Studies by Lisic et al. (2016) and Zengin-Karaibrahimoglu et al. (2021) have touched on the matter by considering the effect of the CEO's power and narcissism on

the audit committee. While studies by Garrett et al. (2022), Greiner et al. (2020), Rose et al. (2021) and Zengin-Karaibrahimoglu (2021) have considered the role of tone at the top (or some aspect thereof) in auditors' risk assessments and pricing, they have not considered the extension to financial statement manipulation. This aspect of the study would be of particular interest to investors, audit committee members, external auditors and regulators. Investors can determine if appropriate audit committee members and external auditors are appointed to address financial statement manipulation in light of the company's tone at the top. Likewise, audit committee members and external auditors can adapt their processes and procedures to ensure management does not manipulate them. Finally, regulators can incorporate responses to top management tone when setting laws and regulations.

The study's final area of originality is to extend the work of Rabin (2016) and Rabin and Negash (2015) in South Africa, following international trends, by incorporating an analysis of the market's reaction to tone at the top (see for example, Price et al. (2012) for the United States and Tonin and Scherer (2022) for Brazil). This has yet to be investigated in the South African context. The study further extends the international literature by considering how tone at the top and financial statement manipulation interact to impact the market reaction. These findings would interest financial analysts and fund managers who would be able to build the market's reaction to tone at the top into their financial analyses and decision-making models.

1.10 Plan of the thesis

This dissertation adopts the format of a PhD by Publication. Consequently, its layout differs from a traditional thesis, which typically consists of an introduction, literature review, methodology, results and conclusion. Rather, this PhD consists of an introduction (Chapter 1), four original papers (presented in Chapters 2 to 5) and a conclusion (Chapter 6). This plan, therefore, demonstrates the coherency of this dissertation (McCullough, 2017; Moores-Pitt, 2019).

In this thesis, the introduction (Chapter 1) serves the traditional role of introducing the overall study and presenting the problem statement and research objectives. Following this, each paper chapter (Chapters 2 to 5) consists of three parts:

a) Each chapter begins with an outline, the purpose of which is to locate the paper within the broader thesis by explaining how it addresses the thesis' primary objectives. This

outline provides a summary of the paper and the key findings in relation to the dissertation.

b) Next is a statement of the author's contribution. This is a declaration that the paper presented in the chapter is the doctoral candidate's own original work.
c) Finally, the research paper is presented as prepared for submission to the journal or as published. Some minor formatting differences occur between the papers because the different journals have different styles. While the individual papers have been formatted for consistency as far as possible, some inconsistencies remain, maintaining the submitted/published form of the articles. An exception is that a consolidated reference list is presented once at the end of the thesis rather than with each paper.

Finally, the conclusion (Chapter 6) summarises the thesis results and identifies areas of future research.

1.11 Conclusion

This chapter introduced the study, its objectives, and its motivation. Given that this dissertation takes the form of a PhD by Publication, this chapter discussed overarching aspects of the study, including defining financial statement manipulation and the overall theoretical framework. The chapter also briefly reviewed the three mechanisms of interest (i.e. the audit committee, the external auditor, and the stock market reaction) in detecting and preventing financial statement manipulation and tone at the top's influence, framing the four papers that comprise the dissertation. Chapters 2 to 5 present the four papers that comprise the study. Chapter 6 draws the conclusions of these papers together to address the overall research aim, discusses the study's implications, and highlights its contribution to the existing literature. Finally, Chapter 6 identifies the study's limitations and potential areas for future research.

CHAPTER 2: PREDICTING FINANCIAL STATEMENT MANIPULATION IN SOUTH AFRICA: A COMPARISON OF THE BENEISH AND DECHOW MODELS

2.1 Paper outline

This chapter presents the paper that addresses Objective 1 by investigating the usefulness of existing financial statement manipulation detection models in South Africa, and whether they can be modified to suit South Africa better. The paper specifically examined the popular Beneish (1999) M-score and Dechow et al. (2011) F-score. It compiled a comprehensive list of known manipulating companies in South Africa based on three criteria (FSCA enforcement actions, FRIP restatements, and qualified audit opinions – refer to section 1.3.4 for a detailed discussion). The models were then tested to determine if they could correctly classify the manipulating and non-manipulating companies. Given the poor performance of the original M- and F-scores, the model coefficients were re-estimated based on contemporary South African data. Holistically, this re-estimation failed to improve the models' classification abilities.

Consequently, this paper's key finding related to this dissertation was that the models were unsuitable for South Africa and, therefore, could not be used as a proxy for manipulation for the remainder of the study. This finding should caution other researchers who may be tempted to use these models outside their original context. They should first thoroughly assess the effectiveness of these popular models before relying on them.

2.2 Statement of author contribution

The University of KwaZulu-Natal, College of Law and Management Studies, offers a PhD by Publication that aligns with international practice. This declaration confirms that the paper presented in Chapter 2 of this thesis, "Predicting financial statement manipulation in South Africa: A comparison of the Beneish and Dechow models", is the doctoral candidate's original work, as stated in Declaration 2: Publications.

_____

Signed: Mr AM Marais

2.3 Paper as published in Cogent Economics & Finance

Section 2.3 presents the paper in its published form. The reference list has been removed, as the reference list to this thesis represents an amalgamation of all references used in all chapters of this thesis.

Citation:

Marais, A., Vermaak, C. & Shewell, P. 2023. Predicting financial statement manipulation in South Africa: A comparison of the Beneish and Dechow models. *Cogent Economics & Finance, 11*(1), DOI: 10.1080/23322039.2023.2190215

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Appendix B

Predicting financial statement manipulation in South Africa: A comparison of the Beneish and Dechow models

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Abstract

Recently, South Africa has suffered from several large financial statement frauds. To assist stakeholders in identifying fraud, this study investigated the ability of the Beneish M-score and the Dechow et al. F-score to identify fraud in South Africa. The study also explored similarities in earnings management characteristics between false positives and fraudulent companies. Finally, the study re-estimated the models' coefficients based on current South African data to determine if this improved their predictive capabilities. The study used a sample of 23 manipulated and 2 320 non-manipulated observations from 2006 to 2018 and found that both scores showed low sensitivity and precision. The false positives share similar, or higher, earnings management characteristics to the manipulators. Re-estimating the coefficients reduced the M-scores' sensitivity by, on average, 6.52% but improved precision by, on average, 4.21%. Conversely, re-estimation increased the F-scores' sensitivity by, on average, 58.70% but increased the type II error by, on average, 48.09%. These findings suggested that either the M- and F-scores are unsuitable in the South African context or that regulators have failed to identify manipulators adequately. Therefore, investors and other stakeholders should use caution when applying these models in South Africa.

Subjects: Auditing; Business ethics; Corporate governance

Keywords: Beneish M-score; Dechow et al. F-score; earnings management; fraud detection; fraudulent financial reporting; South Africa

JEL Classifications: G11; G32; G38; M41; M42

1. Introduction

Globally, financial statement fraud accounts for ten per cent of occupational frauds (Association of Certified Fraud Examiners, 2020). While this is the least common of the three major fraud categories (asset misappropriation, corruption and financial statement fraud), it is the costliest, resulting in a median loss of United States (US) $954 000 in 2020 (Association of Certified Fraud Examiners, 2020). Concerningly, an increase in financial statement fraud is anticipated in the post-COVID-19 pandemic period (Association of Certified Fraud Examiners, 2021). Financial statement fraud undermines the quality of financial data utilised to make economic decisions. Poor economic decisions lead to financial loss for the stakeholders and may have negative consequences for an economy due to an inefficient allocation of resources (Pududu & De Villiers, 2016).

South Africa (SA) is no stranger to financial statement fraud, with the Steinhoff and Tongaat-Hulett scandals being two of the largest frauds in recent years. The Steinhoff scandal broke in December 2017 with the resignation of then-CEO Markus Jooste and the commencement of an investigation into accounting irregularities, including overstating revenue and hiding losses in off-balance-sheet companies (Hlobo et al., 2022; Rossouw & Styan, 2019). These revelations resulted in the share price declining from ZAR45.65 at the start of trading on 6 December 2017 to ZAR17.61 by the close of the day (van der Linde, 2022). By the close of trading on 8 December 2017, the share price had declined to ZAR6.00 and continued to descend (Rossouw & Styan, 2019). A few months later, in 2018, fraud at Tongaat-Hulett was revealed. The company's financial results had been overstated by approximately ZAR4.5 billion through the overstatement of revenue and assets and the understatement of expenses (Hlobo et al., 2022; Muzata & Marozva, 2022).

In addition to the frauds mentioned above, the PricewaterhouseCoopers (2020) Global Economic Crime and Fraud survey reported that SA had the third-highest occurrence of economic crime in the world, after India and China. The survey revealed that 60% of SA companies had been affected by fraud or economic crime between 2009 and 2020, compared to 47% of companies globally. The survey indicated that the percentage of companies experiencing accounting and financial statement fraud in SA had increased from 22% in 2018 to 34% in 2020.

Notwithstanding the prevalence of fraud in SA and the related economic costs, companies' responses to fraud prevention and detection have been ineffective. In Sub-Saharan Africa (a

region that includes SA), an external audit is the most common anti-fraud control, despite only being responsible for the initial detection of 4% of frauds (Association of Certified Fraud Examiners, 2020). Concerningly, several financial statement frauds are committed with the auditor's knowledge (Mongwe & Malan, 2020). Only 58% of companies in SA reported having performed an investigation of their most severe fraud, and 59% of such frauds were never reported to the board of directors, 66% were not reported to the appropriate regulator, and 72% were never disclosed to the auditors (PricewaterhouseCoopers, 2020).

Given the country's high levels of fraud, SA provides a unique environment to study the detection of financial statement fraud. The country has the third-largest economy in Africa and is an emerging economy (World Bank, 2020), and is characterised by a small stock exchange, an insider economy, concentrated ownership and weak legal enforcement. These factors increase the risk of fraud (Pududu & De Villiers, 2016). Although investors in a high-risk country should be able to better detect manipulated financial statements, SA investors struggle to do so (Rabin, 2016). Despite these negative characteristics, SA has, until 2017, consistently ranked highly in the World Economic Forum's (2017) Global Competitiveness Report in terms of strong investor rights, the strength of auditing and financial reporting standards, protection of minority shareholders, efficiency of corporate boards and firm ethical behaviour. Following the revelations around the Steinhoff scandal, SA's rankings in the Global Competitiveness Reports declined markedly post-2017.

Academic research on fraud detection in SA is limited. An early study by Koornhof and Du Plessis (2000) considered red flags as an early warning system to identify potential fraud. A series of articles used machine learning models to identify qualified audit opinions (see Moepya et al., 2016; Moepya, Akhoury, et al., 2014; Moepya, Nelwamondo, et al., 2014). Finally, Rabin (2016) used earnings discontinuities to identify companies engaging in earnings management, a precursor to financial statement fraud (Mishra & Malhotra, 2016).

Given SA's prevalence of fraud, the inability of investors to detect misrepresented financial statements, and the limited academic literature on fraud detection, the purpose of this study was three-fold. The first objective used a sample of 23 manipulated observations and 2 320 non-manipulated observations from 2006 to 2018 to determine the usefulness of two popular financial statement fraud detection models (namely the Beneish (1999) M-score and the Dechow et al. (2011) F-score) to detect cases of fraud in SA correctly. Several recent academic studies in African countries have used these models as proxies for financial

statement fraud risk (see, for example, Mavengere (2015), Nyakarimi (2022), Nyakarimi et al. (2020), Okiro and Otiso (2021), Onyebuchi and Nkem (2021)). However, few studies have thoroughly tested the models' prediction abilities in contexts outside the United States and, specifically, in Africa. Consequently, Rad et al. (2021) call on researchers to test the accuracy of fraud detection models to determine their effectiveness in the context they are applied. This is particularly relevant given that both models were developed in the US using pre-2005 data. As South Africa is considered an emerging economy and uses International Financial Reporting Standards (IFRS), it provides a very different context to the US, a developed country that uses US GAAP.

The second objective was to investigate the nature of the false positives produced by these models to determine whether they have similar earnings management characteristics to fraudulent companies. Concerningly, prediction models tend to generate many false positives (Beneish & Vorst, 2021; Walker, 2020). Consequently, Dechow et al. (2011) call for further research into the characteristics of false positives, but research in this area is limited. The final objective was to re-estimate the coefficients of the two models based on SA data to increase the models' predictive ability in SA. This addresses initial concerns about the differences in the US (where the models were developed) and SA contexts, as well as the later period under consideration.

This study contributes to the existing body of knowledge by showing that the M- and F-scores perform poorly in correctly identifying manipulating companies in SA. African studies have incorrectly relied on the earlier good performance of these models in non-African contexts (such as the US, Europe and Asia) without testing the validity of the models in an African context. Of further concern is that recent studies in the US and China have shown declined performance of these prediction models (see, for example, Beneish and Vorst (2021) and Lu and Zhao (2021)), highlighting the need to test these models thoroughly in different contexts before relying on them. The study further contributes to understanding the nature of false positives generated by the models. In this study, false positives were shown to have similar or higher levels of accruals-based earnings management compared to the manipulator sample, highlighting that the models may not be picking up fraud but rather aggressive accounting practices. Finally, the study further provides evidence that re-estimation may not improve the models' performance. Re-estimation of the M-score coefficients using publicly available South African data reduces the models' ability to identify manipulators correctly by, on average, 6.52%. Conversely, re-estimating the coefficients for the F-score improves

the scores' ability to classify manipulators correctly by, on average, 58.70%, but the number of false positives is substantially increased.

The remainder of the article is organised as follows: section 2 presents the literature review and hypothesis development, section 3 details the methodology applied in the study, the results are presented and discussed in sections 4 and 5 and, finally, section 6 concludes.

2. Literature review and hypothesis development

2.1. Defining financial statement fraud

Financial statement fraud is defined as an intentional misstatement of financial statements to gain some benefit (Association of Certified Fraud Examiners, 2020). It is essential to distinguish between financial statement fraud and earnings management. While both relate to intentional misstatement for economic gain, financial statement fraud occurs outside acceptable accounting standards, while earnings management occurs within such standards (Albizri et al., 2019).

2.2. Financial statement fraud detection models

Financial statement fraud detection models incorporate financial ratios and other elements, such as textual analysis, which contain proxies for the fraud risk factors identified in the theoretical literature. Models have been developed using various methods, including simple financial ratios, statistical methods (such as logit and probit models) and advanced machine learning methods (such as artificial neural networks and support vector machines). While neural networks are the most widely used method in the academic literature, they are complex, lack transparency and are less interpretable (Mongwe & Malan, 2020). As a result, they are not suitable for widespread use in emerging markets such as SA. In addition, these advanced methods do not necessarily deliver superior predictive power than the F-score or a simple screen of sales growth (Walker, 2020). Mongwe and Malan (2020) claim that there is no overall best method, with performance often based on the data set used.

For these reasons, this study used the M- and F-scores. Both models are widely used in the literature and require only information directly obtainable from the company financial statements to estimate. They can thus serve as suitable screening tools (Skousen & Twedt, 2009), particularly in emerging economies where there is increased information asymmetry and a lack of comprehensive databases compared to advanced economies. In addition, the F-score is considered the standard in financial statement fraud prediction (Walker, 2020).

2.2.1. Beneish (1999) M-score

The M-Score was developed by Beneish (1999) using probit estimation with data from 1982 until 1992. US Security Exchange Commission (SEC) enforcement actions and news reports were used to identify 74 non-financial US companies that manipulated their earnings matched to 2 332 non-manipulators by industry and year. The financial statement elements used to predict manipulation were based on signals identified in the academic and practitioner literature. The unweighted model, as estimated by Beneish (1999), is as follows:

$$M = -4.840 + 0.920DSRI + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI + 4.679TATA - 0.327LVGI \quad (1)$$

Where *DSRI* refers to the days' sales in receivables index, *GMI* refers to the gross margin index, *AQI* denotes the asset quality index, *SGI* denotes the sales growth index, *DEPI* is the depreciation index, *SGAI* is the sales, general and administrative expenses index, *TATA* refers to the total accruals to total assets, and finally, *LVGI* is the leverage index (Beneish, 1999). The detailed variable calculations are presented in Appendix 1. Beneish (1999) then determined three cut-off points that minimised the expected cost of misclassification (ECM) at different relevant costs of type I and II errors[9]. These cut-off points were −1.49, −1.78 and −1.89, representing relative costs of 10:1, 20:1 and 40:1, respectively, where a score greater than the cut-off indicates that the company is classified as a manipulator.

Not all the variables in the M-score are equally important (Paolone & Magazzino, 2015). As a result, a simplified five-variable model was also developed in the literature as follows (Nyakarimi, 2022):

$$M = -6.065 + 0.823DSRI + 0.906GMI + 0.593AQI + 0.717SGI + 0107DEPI \quad (2)$$

Where the variables maintain their meaning from the original model. However, as the full M-score has not yet been thoroughly tested in the South African context, and in line with the majority of academic literature (see, for example, Aghghaleh et al. (2016), Beneish et al. (2013), Beneish and Vorst (2021), Cecchini et al. (2010), Jones et al. (2008), Kamal et al.

[9] The cost of type I and type II errors cannot be objectively measured. As such, Beneish (1999) used relative costs between the error types to determine the expected cost of misclassification based on the expected loss in value upon the discovery that a company is manipulating its financial statements compared to the appreciation in value of a non-manipulator.

(2016), Price et al. (2011) and Tarjo and Herawati (2015), this study uses the original M-score, inclusive of all eight variables.

2.2.2. Dechow et al. (2011) F-score

Dechow et al. (2011) also recognised the usefulness of financial information beyond accruals to detect financial statement fraud. Unlike prior models, however, they aimed to allow a user to calculate the F-score for an individual company and simplify the assessment of whether it was misstating its financial statements. To achieve this, they did not include any indices as their variables or perform any form of matching between manipulating and non-manipulating firms. Using a total of 2 190 accounting violations identified by the US SEC from May 1982 to June 2005, they developed three models using logistic regression to detect manipulation. Model 1 contained financial statement variables only as follows:

$$Predicted\ value = -7.893 + 0.790RSST + 2.518\Delta REC + 1.191\Delta INV + 1.979SASS + 0.171\Delta CSALES - 0.932\Delta ROA + 1.029AISS \quad (3)$$

Where *RSST* represents accruals as measured by Richardson et al. (2005)[10], *ΔREC* is the change in receivables, *ΔINV* is the change in inventory, *SASS* is the percentage of soft assets[11], *ΔCSALES* represents the percentage change in cash sales, *ΔROA* is the change in return on assets, and finally, *AISS* represents whether the company issued securities during the period (Dechow et al., 2011). Appendix 2 presents full details of the variable calculations.

Model 2 introduced off-balance sheet and non-financial variables as follows:

$$Predicted\ value = -8.252 + 0.665\mathrm{R}SST + 2.457\Delta REC + 1.393\Delta INV + 2.011SASS + 0.159\Delta CSALES - 1.029\Delta ROA + 0.983AISS - 0.150\Delta EMP + 0.419LEASE \quad (4)$$

Where *ΔEMP* and *LEASE* represent the abnormal change in employees and the existence of operating leases, respectively (Dechow et al., 2011).

Finally, Model 3 added two market-based variables as follows:

[10] Although there are numerous techniques to measure total accruals, when calculating the F-score, this study used the method set out by Richardson et al. (2005) as this was the technique used in the development of the original F-score (Dechow et al., 2011). The calculation of total accruals using Richardson et al. (2005) method can be found in Appendix 2.

[11] Soft assets refer to those assets that are neither cash nor property, plant and equipment (Dechow et al., 2011).

$$Predicted\ value = -7.966 + 0.909\text{R}SST + 1.731\Delta REC + 1.447\Delta INV + 2.265SASS + 0.160\Delta CSALES - 1.455\Delta ROA + 0.651AISS - 0.121\Delta EMP + 0.345LEASE + 0.082RET_t + 0.098RET_{t-1} \quad (5)$$

Where RET_t and RET_{t-1} represent the market-adjusted share returns and the lagged market-adjusted share returns, respectively (Dechow et al., 2011).

The first model offers two advantages. First, it contains most of the predictive power. Second, it is the least restrictive model, as the required information may be accessed from financial statements (Price et al., 2011; Skousen & Twedt, 2009). This second benefit is particularly relevant for emerging economies. Thus, given the importance of this second benefit for the current study's context, as well as in line with the majority of the prior literature (see, for example, Aghghaleh et al. (2016), Chakrabarty et al. (2022), Price et al. (2011) and Walker (2020)), Model 1 of the F-score is used in this study.

Following the calculation of the predicted value, it is then converted to a probability as follows:

$$Probability = \frac{e^{Predicted\ value}}{1 + e^{Predicted\ value}} \quad (6)$$

Finally, the F-score is calculated by dividing the probability by the "unconditional expectation of misstatement" (UEM). The UEM is the proportion of misstated firms to total firms (Dechow et al., 2011:60). Companies that obtained an F-score above one are considered an above-normal risk, whilst companies scoring above 2.45 have a high risk of manipulation (Dechow et al., 2011).

2.2.3. Comparative performance literature

Numerous studies have investigated the ability of the M- and F-scores to detect financial statement fraud. In his original study, Beneish (1999) determined that the M-score could correctly detect 76% of manipulating firms and 82.5% of non-manipulating companies in the estimation sample. The model only identified 56.1% of manipulators in the holdout sample, although the correct classification of non-manipulating companies rose to 90.9%. Several later studies also found positive results for the model. In the US, using a maximum of 142 manipulated and 72 815 non-manipulated observations from 1988 to 2001, Jones et al. (2008) found that the model was significantly positively associated with both the occurrence of fraud and the magnitude of the fraud. Using a later sample of 43 534 US observations over the

period 1993 until 2010, Beneish et al. (2013) showed that the M-score could identify 71% of manipulators. In Asia, Tarjo and Herawati (2015) used a matched sample (based on assets and industry) of 35 manipulators and 35 non-manipulators from 2001 to 2014. They found that 77.1% of the manipulators and 80% of the non-manipulators were correctly classified. In Malaysia, Kamal et al. (2016) tested the M-score's ability to identify 17 manipulated companies from 1993 to 2014. They reported an 82% accuracy when using a −2.22 cut-off, a 76% accuracy for a −1.89 cut-off and a 71% accuracy for the −1.78 cut-off.

Regarding the F-score, in their original study, Dechow et al. (2011) identified that Model 1 correctly classified 68.6% of manipulating companies and 63.7% of non-manipulators in the estimation sample and 73.8% of manipulating companies and 61.7% of non-manipulating companies in the holdout sample. A subsequent study in the US from 1991 until 2008 by Chakrabarty et al. (2022) used a sample of 853 manipulators and 119 967 non-manipulators. They found that the F-score correctly identified 68.5% of manipulators and 57.5% of non-manipulators.

Based on the above results and the detective power of the M- and F-scores, recent African literature has relied on these models as proxies for fraud (see, for example, Mavengere (2015), Nyakarimi (2022), Nyakarimi et al. (2020), Okiro and Otiso (2021), Onyebuchi and Nkem (2021)). However, these studies ignore that these models have not been tested in the African context, where they may not be applicable due to the different context from the US and the later period (Lu & Zhao, 2021). Further, more recent studies have found that the models, particularly the M-score, are less able to predict manipulation in recent times correctly. For example, Beneish and Vorst (2021) used a sample of 768 manipulated observations and 136 144 non-manipulated observations from 1979 to 2016 in the US. They found that the M-score only identified 23.18% of manipulators. Likewise, Lu and Zhao (2021) randomly selected 40% of a sample of 190 manipulators and 9 693 non-manipulators for Chinese listed firms. They found that the M-score could only detect 29.63% of the fraud sample.

Thus, given the mixed findings and the seeming decline in the models' performance, there is a need to test whether the M- and F-scores are relevant in the SA context before being able to rely on the models as proxies for fraud risk. Consequently, the following hypothesis is drawn:

H_1: The M- and F-scores can detect financial statement fraud in SA.

Several studies have compared the performance of the M- and F-scores on a homogenous sample. These studies have demonstrated that, while both models can correctly identify manipulating companies, the F-score is a more robust model with greater predictive accuracy. Cecchini et al. (2010) used US data from 1991 to 2003. Using 149 fraudulent observations matched to 3 389 non-fraudulent observations (based on industry and year), they found that the M-score correctly classified 54.2% of fraudulent and 45.5% of non-fraudulent observations. Using 57 fraudulent and 1 244 non-fraudulent observations[12], the F-score outperformed the M-score by correctly identifying 70.0% of fraudulent and 84.9% of non-fraudulent observations. Price et al. (2011) also studied US companies. They used a total sample of 57 185 observations from 1994 until 2008, including 866 SEC enforcement actions, 542 accounting irregularities and 948 lawsuits. Their results found that the F-score outperformed the M-score. In a Malaysian context, Aghghaleh et al. (2016) used a one-for-one matched sample (based on industry and year) of 82 fraudulent observations from 2001 to 2014. They found that the F-score identified a higher proportion of fraudulent observations than the M-score (73.17% compared to 69.51%) with a lower type II error (26.83% compared to 30.49%).

Based on these studies, the F-score seems to have greater detecting power than the M-score. Therefore, the following hypothesis is drawn:

H_2: The F-score outperforms the M-score in detecting financial statement fraud in SA.

2.3. Earnings management characteristics of false positives

A fundamental problem with financial statement fraud detection models is the high occurrence of type II errors (false positives) generated (Beneish & Vorst, 2021). This problem is particularly prevalent when detecting a rare event such as financial statement fraud (Walker, 2020). Given the inherent unobservability of financial statement fraud and the resource constraints regulators face when investigating such fraud, an avenue for further research is identifying characteristics of the false positives (Dechow et al., 2011).

Multiple studies revealed that companies that commit fraud have previously engaged more aggressively in earnings management (Dechow et al., 1996; Marinakis, 2011; Perols & Lougee, 2011). As extensive earnings management eventually reverses or reduces

[12] The difference in the number of fraudulent and non-fraudulent observations between the M- and F-scores is due to missing data.

manipulation flexibility, managers may resort to fraud to maintain appearances (Perols & Lougee, 2011). For this reason, earnings management is considered a precursor to accounting fraud (Mishra & Malhotra, 2016). Therefore, it is expected that companies identified as false positives by the M- and F-scores would display earnings management characteristics more in accordance with the manipulator sample. Hypothesis three is thus:

H_3: The false positive samples generated by the M- and F-scores display earnings management characteristics consistent with the manipulator sample.

2.4. M-score, F-score and model drift

The M- and F-scores were developed in the US using pre-2005 data. These models are static; the world, however, changes. Thus, using these models on more recent data in a different country may reveal model deterioration (Lu & Zhao, 2021). This is due to either concept drift (where the output characteristics change) or data drift (where the input characteristics change) (Ackerman et al., 2019; Webb et al., 2016).

Several studies have updated the M- and F-scores in different ways. First, some studies (such as Cecchini et al. (2010) and Marinakis (2011)) re-estimated the coefficients using US data from 1991 to 2003 and UK data from 1994 to 2007, respectively. Next, other studies (such as Hung et al. (2017) and Putra and Dinarjito (2021), who studied 614 Vietnamese observations from 2014 to 2016 and 81 Indonesian companies from 2012 to 2018, respectively) first identified variables within the scores which could differentiate between manipulators and non-manipulators. Variables that were unable to differentiate were omitted from the models before re-estimating the coefficients. The last group of studies (such as Chakrabarty et al. (2022), Hung et al. (2017), Lu and Zhao (2021) and Marinakis (2011)) added additional variables in an attempt to improve the models. While most of these studies do not report a direct comparison between the predictive ability of the original and revised models, Chakrabarty et al. (2022) noted that, for the estimation and holdout sample, the model's ability to correctly detect manipulators increases by 3.6% and 3% respectively after the inclusion of additional variables and re-estimation.

The following research hypothesis is, therefore, developed:

H_4: Updating the coefficients of the M- and F-scores will increase the ability of the two models to identify manipulators and decrease misclassification errors in SA.

3. Methodology

3.1. Population, sample and data collection

The population for this study is all 330 non-financial companies listed on the main board of the Johannesburg Stock Exchange (JSE) from 2006 until 2018. Financial companies are excluded, because the M-score was developed on non-financial firms (Kukreja et al., 2020) and financial firms have different regulatory and other requirements which may influence the outcome of the calculations (Orazalin & Akhmetzhanov, 2019). The 2006 year represents the first available enforcement action by the Financial Sector Conduct Authority (FSCA). Ending the sample in 2018 allows regulators sufficient time to investigate suspected irregularities. Walker (2020) notes that the mean and median time between the fraud and the SEC issuing an enforcement action is four years in the US. Based on 1 243 SEC enforcement actions, Karpoff et al. (2017) found the median period from the violation until the first enforcement action was 2.41 years. Finally, Bao et al. (2020) allowed for a two-year gap. In SA, studies have used other measures, such as qualified audit opinions (Moepya, 2017), small losses (Pududu & De Villiers, 2016) and earnings distribution discontinuities (Rabin, 2016), rather than enforcement actions to proxy for financial statement manipulation. Consequently, there is a lack of data on how long the Financial Reporting Investigation Panel (FRIP) and FSCA take to issue an enforcement action or equivalent. Thus, this study allowed for a three-and-a-half-year gap for regulators to identify violations (2019 until mid-2022).

Based on the above, an unbalanced panel of 330 firms across 13 years, representing 2 775 firm-year observations, was arrived at. The financial data were collected from the Standard and Poor's Capital IQ and Bloomberg databases. The 'as originally reported' data was used to avoid the risk of abnormalities being removed when the data was restated.

In arriving at the final sample, 26 firm-year observations in which the company listed after year-end but before the release of the annual report were removed. Further, 52 firm-years in which a company's year-end changed were removed together with the year immediately after the change in year-end (for a total of 104 firm-years). This was due to the length of the periods not being comparable. Next, five firm-years were removed because the financial statements were reported in a currency experiencing hyperinflation.

A total of 272 observations with missing data that prevented the calculation of either the M- or F-scores were removed from the sample. Only using observations for which both models can be calculated increases the power of the statistical tests (Price et al., 2011). Mongwe and

Malan (2020) also found that 94% of studies surveyed on fraud detection either do not deal with missing data or simply delete the affected observation. While this approach results in data loss, it avoids imputing data that may not exist (Mongwe & Malan, 2020).

Finally, 25 companies with only one firm-year observation were removed from the sample. This process resulted in a final unbalanced panel of 274 companies representing 2 343 firm-years, summarised in Table 1 below.

Table 1: Sample size determination

	No. of companies[1]	No. of firm-year observations
Population	330	2 775
Listed after year-end but before the release of AFS	(1)	(26)
Change of year-end	(3)	(104)
Other anomalous situations	(0)	(5)
Missing data for M- or F-score	(27)	(272)
Companies with only one observation	(25)	(25)
Sample size	274	2 343

Note: [1]The removal of firm-year observations exceeds the removal of companies as, for some companies, not all observations were removed.

(Source: Researchers' own construction)

3.2. Identifying earnings manipulators

In SA, a complete list of firms that have manipulated their earnings is not readily available. Further, unlike advanced economies, the oversight bodies are not considered sophisticated and do not examine IFRS compliance on a sufficiently regular basis (Rabin, 2016). As such, a list of instances when companies engaged in manipulation was compiled as described below.

Investigations by regulators (such as the SEC in the US) are the most common proxy for financial statement fraud (Mongwe & Malan, 2020). SA has two regulatory bodies that monitor listed company financial statements: the FSCA (formerly the Financial Services Board) and the FRIP (formerly the GAAP Monitoring Panel). The FSCA is responsible for regulation and supervision within the SA financial markets and addresses issues around market abuses, including prohibited trading practices, insider trading and false and misleading reporting. As this study focused on financial statement fraud, only those enforcement actions relating to section 76 of the Securities Services Act no. 36 of 2004 (pre-2013) and section 81 of the Financial Markets Act no. 19 of 2012 (post-2013) were used. FSCA enforcement actions were obtained from the FSCA website.

The JSE tasks the FRIP to investigate instances of non-compliance with IFRS. Unlike the FSCA, the FRIP does not publish a list of investigations and their outcomes. However, following the investigation, the JSE may instruct companies guilty of non-compliance to publish or reissue any necessary information and make a public announcement via the Securities Exchange News Service (SENS) (Watson & Rossouw, 2012). Following Watson and Rossouw (2012), the IRESS database was searched to identify SENS announcements which included the words "GAAP Monitoring Panel", "GMP", "Financial Reporting Investigation Panel" and "FRIP". Each FSCA enforcement action and FRIP restatement identified was then examined to determine whether it involved an IFRS violation and the year(s) to which that violation relates.

Finally, similar to Moepya (2017), companies that had a qualified audit opinion during the period were included in the manipulator sample. However, not all qualifications relate to fraud (Jones et al., 2008). Thus, unlike Moepya (2017), this study excluded the emphasis of matter opinions and qualifications that did not relate to IFRS violations (i.e. going concern issues). Thus, only qualifications related to IFRS violations and disclaimers of opinion, where the auditor cannot draw an opinion, formed part of the manipulator sample.

Thus, only companies found guilty of fraud or a violation by the FSCA or FRIP, or having received a qualified audit report due to fraud or violation, were included in the manipulator sample. All other non-financial companies listed on the JSE between 1 January 2006 and 31 December 2018 formed part of the non-manipulating sample (i.e. these companies had not been found guilty of fraud or a violation, nor had they received a relevant qualified audit opinion). Table 2 discloses a sample of 23 manipulated firm-year observations (9 unique companies) representing 0.98% of the total observations. This provides a smaller absolute number of manipulated observations compared to the original studies. Proportionally, however, this sample does compare favourably to the original studies, particularly that of Dechow et al. (2011).

3.3. Calculation of the M- and F-scores

The M- and F-scores were estimated as described in Equations (1) and (3) above. As justified under sections 2.2.1 and 2.2.2, the original eight variable M-score and model 1 for the F-score were used. Following Beneish (1999) and Dechow et al. (2011), all variables used in calculating the M- and F-scores were winsorized at the first and ninety-ninth percentiles.

For the M-score, in the original study, Beneish (1999) used a balance sheet approach to determine total accruals (refer to TATA_BS in Appendix 1). However, more recent studies (such as Beneish et al. (2013) and Beneish and Vorst (2021)) have used an income statement approach to determine total accruals (refer to TATA_IS in Appendix 1). This change was driven by new disclosure requirements in financial reporting standards (Beneish et al., 2013). This study presents both methods separately, referred to as the M-score (BS) and M-score (IS). In addition, all three cut-off points (i.e. −1.49, −1.78 and −1.89) were used to predict whether an observation was manipulated.

For the F-score, Dechow et al. (2011) determined the UEM to be 0.0037 based on their sample of US companies. However, it is unclear in the literature whether the UEM should be updated for country-specific risk, particularly given SA's higher risk of economic crime (PricewaterhouseCoopers, 2020). As a result, this study used the original US UEM of 0.0037 and a recalculated UEM specific to the SA sample of 0.0098 (23/2343).

3.4. Testing the detective power of the M- and F-scores

Following the estimation of the M- and F-scores, various classification performance metrics and the area under the receiver operating characteristic curve (AUC) were used to test the detective power of models in SA. Mongwe and Malan (2020) identify the common classification performance metrics in the literature as follows:

$$Accuracy = \frac{True\ positive^{13} + True\ negative}{True\ positive + False\ positive + True\ negative + False\ negative} \quad (7)$$

$$Sensitivity = \frac{True\ positive}{True\ positive + False\ negative} \quad (8)$$

$$Specificity = \frac{True\ negative}{True\ negative + False\ positive} \quad (9)$$

$$Precision = \frac{True\ positive}{True\ positive + False\ positive} \quad (10)$$

$$F - measure = \frac{2\ x\ Precision\ x\ Sensitivity}{Precision + Sensitivity} \quad (11)$$

[13] The terms positive and negative refer to the classifications of manipulated and non-manipulated observations respectively. A true positive is when a manipulated observation is correctly classified by the model. A true negative is when a non- manipulated observation is correctly classified by the model. A false positive occurs when a non-manipulated observation is incorrectly classified as a manipulated observation (i.e. a type II error) and, finally, a false negative is when a manipulated observation is incorrectly classified as a non-manipulated observation (i.e. a type I error).

Table 2: Summary of classification between manipulated and non-manipulated observations

	Current study		Beneish (1999)		Dechow et al. (2011)	
	No. of observations	**% of observations**	**No. of observations**	**% of observations**	**No. of observations**	**% of observations**
Manipulated observations	**23**	**0.98**	**74**	**3.08**	**494**	**0.37**
FSCA enforcement actions	14	0.60				
FRIP restatements	5	0.21				
Applicable qualified audit opinions	4	0.17				
Non-manipulated observations	**2 320**	**99.02**	**2 332**	**96.92**	**132 967**	**99.63**
Total observations	**2 343**	**100.00**	**2 406**	**100.00**	**133 461**	**100.00**

Note: (Source: Researchers' own construction, as well as data obtained from Beneish (1999) and Dechow et al. (2011))

While classification accuracy was the most commonly used measure in the prior literature, it is not appropriate due to the scarcity of financial statement fraud cases (Mongwe & Malan, 2020). Instead, sensitivity and precision are superior in such situations (Moepya, 2017). For this study, the accuracy, sensitivity, precision and F-measure are presented for a clearer picture of classification performance.

The final measure of model performance is the AUC. This measure provides a single statistic based on the sensitivity and specificity of the model. A higher AUC statistic represents better model performance, with an AUC of one representing perfect prediction and an AUC of 0.5 representing a random guess.

3.5. Investigating the earnings management characteristics of false positives

This research focused on accruals-based earnings management (AEM) and companies that meet or just beat prior-year earnings to investigate the earnings management characteristics of false-positive observations.

AEM was measured using the cross-sectional modified Jones model. This model is considered one of the most powerful accruals-based models and is widely used throughout the earnings management literature (Mishra & Malhotra, 2016; Rabin, 2016). This model was estimated as follows:

$$NDA_{i,t} = \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \qquad (12)$$

Where $NDA_{i,t}$ represents the estimated non-discretionary accruals for company i in year t, $A_{i,t-1}$ represents total assets for company i in the year $t-1$, $\Delta REV_{i,t}$ represents the change in revenue for company i between years t and $t-1$, $\Delta REC_{i,t}$ is the change in net receivables for company i between years t and $t-1$, and $PPE_{i,t}$ is the gross property, plant and equipment for company i in year t (Dechow et al., 1995). The residual from Equation (12) represents the discretionary accrual element. A Wilcoxon rank sum test was used to identify any statistically significant difference in the means of the discretionary accruals between the manipulator and non-manipulator samples.

Earnings per share (EPS) was used to identify companies that meet or just beat the prior year's earnings, defined as the change in EPS falling between zero and a small positive number. For robustness, three measures of a small positive number were used; namely, a one, two or three cents change in EPS (Lo et al., 2017). A Pearson Chi-squared test was used to

identify any statistically significant difference between the two samples' proportions of meet or just beat prior year EPS.

3.6. Re-estimating the coefficients of the M- and F-Scores for the SA context

The coefficients of the M- and F-scores were re-estimated by applying the same variables and methodologies (i.e. probit and logit estimation, respectively) originally used by Beneish (1999) and Dechow et al. (2011) to the current SA data. To determine the appropriate cut-offs for the M-score, following Beneish (1999), the ECM was minimised at the cost-error ratios of 10:1, 20:1, 30:1 and 40:1. The ECM was calculated as:

$$ECM = P(M)P_I C_I + [1 - P(M)]P_{II} C_{II} \quad (13)$$

Where *P(M)* represents the prior probability of encountering earnings manipulators (calculated as 0.0098), P_I and P_{II} represent the probability of type I and type II errors, respectively, and C_I and C_{II} represent the relative costs of type I and type II errors respectively (Beneish, 1999). For the F-score, the UEM of 0.0037 and 0.0098 were used with the cut-off of one representing above-average risk observations.

Classification performance and the AUC were used to compare the detective powers of the original models compared to the re-estimated models. For the classification performance metrics, the number of manipulator companies was considered too small to keep a holdout sample.

When determining the AUC, k-fold cross-validation with ten folds was used. Determining the out-of-sample prediction error is essential to avoid hindsight bias when developing predictive models. K-fold cross-validation is considered superior to bootstrapping procedures, which overlap the training and test samples. This overlap underestimates the prediction error (Witten et al., 2011). Following Larcker and Zakolyukina (2012) and Moepya (2017), ten folds were used. The AUC of the ten iterations were then averaged to determine the overall AUC.

4. Results and discussion

4.1. Descriptive statistics

Table 3 below presents descriptive statistics on the breakdown of manipulated and non-manipulated observations across industries. Although basic materials, consumer services and industrials are the three largest sectors in the SA economy, they only account for a combined

total of five (21.74%) manipulated observations. Instead, consumer goods, a medium-sized sector, accounts for sixteen (69.57%) of the manipulated observations. This is due to the companies involved in SA's recent major frauds (i.e. Steinhoff and Tongaat-Hulett) being classified in this sector. SA's three smallest sectors (healthcare, oil and gas, and telecommunications) have no manipulated observations[14].

Table 3 also presents the average size and return on assets for the manipulated and non-manipulated samples. On average, manipulated observations tend to be smaller and show a lower return on assets. This lower average performance may have provided an incentive for the companies to engage in manipulative practices.

Table 3: Industry classifications and descriptive statistics

	Manipulated observations	Non-manipulated observations	Total
Industry classification	23	2 320	2 343
Basic materials	2	580	582
Consumer goods	16	238	254
Consumer services	2	473	475
Healthcare	0	79	79
Industrials	1	728	729
Oil and gas	0	35	35
Technology	2	143	145
Telecommunications	0	44	44
Size (R'000)	31 665 723.61	35 788 356.25	35 747 886.53
Return on assets (%)	3.52	9.86	9.80

Note: (Source: Researchers' own construction)

4.2. Distribution of variables underlying the M- and F-scores

Table 4 Panel A presents the distribution of the variables underlying the M-score for manipulators and non-manipulators for the current sample compared to those obtained by Beneish (1999). Unlike in the original study, where a significant difference in mean between manipulators and non-manipulators was found for five of the eight variables, in the current sample, a significant difference was only found for one variable (TATA_BS). This finding is also contrary to Marinakis (2011) and Tarjo and Herawati (2015), who found that four of the eight variables could be used to detect manipulation.

Similarly, Panel B shows the distribution of variables underlying the F-score and the comparison to the original study by Dechow et al. (2011). Unlike the original study, for

[14] In order to account for some sectors and years not having any manipulated observations, additional tests using matched observations (based on industry and year) are performed in section 4.6.

which six of the seven variables showed a significant difference between manipulators and non-manipulators, only the AISS variable showed a significant difference in the current sample. This finding is contrary to Bertomeu et al. (2021), who found that the variables included in the F-score are influential in detecting manipulation. However, it does align with Deniswara et al. (2022), Hung et al. (2017) and Putra and Dinarjito (2021), who found that the variables underlying the F-score had limited, if any, ability to distinguish between manipulating and non-manipulating companies in Indonesia.

The lack of a statistically significant distribution of the underlying variables indicates that these variables appear unable to differentiate between manipulating and non-manipulating firms in the current SA sample.

4.3. Detective power of the M- and F-scores

The classification performance of the M- and F-scores in SA at various cut-offs and UEMs are summarised in Table 5. The accuracy (i.e. correct classification of both manipulators and non-manipulators) of the M-scores across all cut-offs is high, comparable to the original study. This high accuracy is also in accordance with studies by Aghghaleh et al. (2016), Beneish and Vorst (2021) and Tarjo and Herawati (2015), who report accuracies of 73.17%, 82.59% and 78.57%, respectively.[7] For the F-score, the SA-specific UEM of 0.0098 yields the highest accuracy of all the models. However, the original UEM of 0.0037 produces the lowest accuracy of all the models, which is reasonably in line with the original study results as well as subsequent results of Aghghaleh et al. (2016), Beneish and Vorst (2021) and Chakrabarty et al. (2022), who report accuracy levels of 76.22%, 60.71% and 57.60% respectively[15]. However, the high accuracy across all models benefits from the imbalance between manipulators and non-manipulators. As such, it is primarily driven by the correct classification of the non-manipulator sample (true negatives).

[15] These studies did not report this classification performance metric. However, they provided sufficient information for the metric to be recalculated.

Table 4: Distribution of underlying M- and F-score variables for manipulators and non-manipulators

Panel A: Beneish (1999) M-score

	Current sample			Beneish (1999)		
Characteristic	Manipulators mean	Non-manipulators mean	Wilcoxon Z	Manipulators mean	Non-manipulators mean	Wilcoxon Z p-value[1]
DSRI	1.1386	1.0710	-1.2680	1.465	1.031	0.000
GMI	0.8986	1.0044	0.2970	1.193	1.014	0.006
AQI	1.0529	1.1464	0.0970	1.254	1.039	0.096
SGI	1.0944	1.1278	0.5050	1.607	1.134	0.000
DEPI	1.0788	1.0571	-1.5100	1.077	1.001	0.307
SGAI	1.0170	1.1006	-0.1050	1.041	1.054	0.271
LVGI	1.0217	1.0469	-0.3730	1.111	1.037	0.394
TATA_BS	-0.0042	-0.0287	-2.1900**	0.031	0.018	0.000
TATA_IS[2]	-0.0061	-0.0006	0.0910			

Panel B: Dechow et al. (2011) F-score

	Current sample			Dechow et al. (2011)		
Characteristic	Manipulators mean	Non-manipulators mean	Wilcoxon Z[3]	Manipulators mean	Non-manipulators mean	Pairwise t-test
RSST	0.0313	0.0369	-0.4190	0.135	0.044	3.85***
REC	0.0185	0.0173	-0.7230	0.071	0.028	6.12***
INV	0.0079	0.0122	-0.0600	0.046	0.023	4.22***
SASS	0.5925	0.5588	-0.5710	0.647	0.611	3.87***
CSALES	0.0558	0.1245	0.2260	0.466	0.257	3.88***
ROA	-0.0048	-0.0085	0.5930	-0.032	-0.025	-0.38
AISS	0.9565	0.8039	-1.8400*	0.938	0.869	4.75***

Note: [1]Beneish (1999) did not present the Wilcoxon Z, but only the associated p-value.
[2]Total assets to total accruals based on the income statement approach was not used in the original Beneish (1999) study, so the means and p-value are unavailable.
[3] Given the nature of the underlying data, a Wilcoxon rank sum test was more appropriate than the pairwise t-test used by Dechow et al. (2011). A t-test did not yield different conclusions to the Wilcoxon rank sum test.
**Statistical significance <0.10, **Statistical significance <0.05, ***Statistical significance <0.01*
(Source: Researchers' own construction, as well as data obtained from Beneish (1999) and Dechow et al. (2011))

In terms of precision (i.e. the ability to classify only true manipulators as manipulators) and the F-measure (a metric which combines sensitivity and precision), the M-score's performance in the SA sample is poor compared to what was achieved in the original study as well as studies by Aghghaleh et al. (2016) of 75.00% and 72.15%[7] respectively as well as Tarjo and Herawati (2015) of 79.41% and 78.26%[7] respectively. However, the M-score's precision and F-measure are similar to the results achieved by Beneish and Vorst (2021) of 0.76% and 1.48%[7], respectively. Surprisingly, the F-score (UEM = 0.0037) achieves higher precision and F-measure than the original study, despite being worse at correctly classifying manipulators. Further, the precision and F-measure of the F-score (UEM = 0.0037) are in line with other studies by Beneish and Vorst (2021) and Chakrabarty et al. (2022), who report a precision of 0.92% and 1.13%[15] respectively and an F-measure of 1.81% and 2.22%[15] respectively.

Considering the performance across scores, the M-score (BS) outperforms the M-score (IS) across all metrics for equivalent cut-offs (except for sensitivity and the type I error at the highest cut-off of −1.49, which are equal). By comparison, the F-score (UEM = 0.0098) has the highest accuracy across all scores, while the F-score (UEM = 0.0037) has the lowest accuracy. Despite this low accuracy, the F-score (UEM = 0.0037) is the best-performing score in terms of sensitivity. In addition, it is only outperformed in terms of precision and the F-measure by the M-score (BS) at the lowest cut-off point (−1.89).

The AUC reflects that both the M-score (BS) and F-score outperform a random guess, while the M-score (IS) does not. The AUC for the M-score (BS) of 0.5936 is substantially below Price et al. (2011), who report an AUC of 0.7324, but more in line with the AUC of 0.5770 reported by Beneish and Vorst (2021). The AUC for the F-score of 0.6067 is below that achieved in studies by Beneish and Vorst (2021), Chakrabarty et al. (2022), Price et al. (2011) and Walker (2020) of 0.6730, 0.6670, 0.7238 and 0.6600 respectively. While the F-score slightly outperforms the M-score based on this metric, Price et al. (2011) caution against such an interpretation as the AUC does not distinguish well between two "good" models.

Despite the high overall accuracy of the models, their ability to correctly predict manipulators is low, as shown by the poor sensitivity, precision and type I error metrics. Based on this, hypothesis 1, that the M- and F-scores can detect manipulation in SA, is not supported. Further, while the F-score does outperform the M-score on some metrics, it underperforms on

other metrics, depending on the cut-off points used. Thus, there is insufficient evidence to support hypothesis 2, that the F-score outperforms the M-score in the SA context.

Table 5: Classification performance of the M- and F-scores in the SA context

	M-score (BS) (Cut-off = -1.49)	M-score (BS) (Cut-off = -1.78)	M-score (BS) (Cut-off = -1.89)	M-score (IS) (Cut-off = -1.49)	M-score (IS) (Cut-off = -1.78)	M-score (IS) (Cut-off = -1.89)	F-score (UEM = 0.0098)	F-score (UEM = 0.0037)
Predicted manipulators	**224**	**342**	**408**	**261**	**459**	**553**	**62**	**926**
True positive	1	4	6	1	3	5	0	12
False positive	223	338	402	260	456	548	62	914
Predicted non-manipulators	**2 119**	**2 001**	**1 935**	**2 082**	**1 884**	**1 790**	**2 281**	**1 417**
True negative	2 097	1 982	1 918	2 060	1 864	1 772	2 258	1 406
False negative	22	19	17	22	20	18	23	11
Accuracy	**89.54%**	**84.76%**	**82.12%**	**87.96%**	**79.68%**	**75.84%**	**96.37%**	**60.52%**
Per original estimation sample[1]	*91.41%*[2]	*85.84%*[2]	*82.31%*[2]					*63.71%*
Per original holdout sample[1]	*95.63%*[2]	*92.17%*[2]	*90.38%*[2]					*61.73%*
Sensitivity	**4.35%**	**17.39%**	**26.09%**	**4.35%**	**13.04%**	**21.74%**	**0.00%**	**52.17%**
Per original estimation sample[1]	*58.00%*	*74.00%*	*76.00%*					*68.62%*
Per original holdout sample[1]	*37.50%*	*50.00%*	*56.10%*					*73.83%*
Precision	**0.45%**	**1.17%**	**1.47%**	**0.38%**	**0.65%**	**0.90%**	**0.00%**	**1.30%**
Per original estimation sample[1]	*18.24%*[2]	*13.55%*[2]	*11.28%*[2]					*0.70%*[2]
Per original holdout sample[1]	*13.64%*[2]	*9.30%*[2]	*8.36%*[2]					*1.15%*[2]
F-measure	**0.87%**	**2.19%**	**2.78%**	**0.70%**	**1.24%**	**1.74%**	**N/A**[4]	**2.53%**
Per original estimation sample[1]	*27.75%*[2]	*22.91%*[2]	*19.64%*[2]					*1.38%*[2]
Per original holdout sample[1]	*20.00%*[2]	*15.69%*[2]	*14.55%*[2]					*2.27%*[2]
Type I error	**95.65%**	**82.61%**	**73.91%**	**95.65%**	**86.96%**	**78.26%**	**100.00%**	**47.83%**
Per original estimation sample[1]	*42.00%*[2]	*26.00%*[2]	*24.00%*[2]					*31.38%*
Per original holdout sample[1]	*62.50%*[2]	*50.00%*[2]	*43.90%*[2]					*26.17%*
Type II error	**9.61%**	**14.56%**	**17.32%**	**11.20%**	**19.65%**	**23.61%**	**2.67%**	**39.38%**
Per original estimation sample[1]	*7.60%*	*13.80%*	*17.50%*					*36.31%*
Per original holdout sample[1]	*3.50%*	*7.20%*	*9.10%*					*38.35%*

Table 5: Classification performance of the M- and F-scores in the SA context (continued)

	M-score (BS) (Cut-off = -1.49)	M-score (BS) (Cut-off = -1.78)	M-score (BS) (Cut-off = -1.89)	M-score (IS) (Cut-off = -1.49)	M-score (IS) (Cut-off = -1.78)	M-score (IS) (Cut-off = -1.89)	F-score (UEM = 0.0098)	F-score (UEM = 0.0037)
Area under the receiver operator curve[3]		0.5936			0.4789		0.6067	

Note: [1]The performance measures for the original studies relate to Beneish (1999) for the M-score and Dechow et al. (2011) for the F-score. No original performance measures were presented for the M-score based on the income statement approach or for the F-score based on the UEM of 0.0098, as these were not included in the original study.

[2]These performance measures were not presented in the original studies by Beneish (1999) and Dechow et al. (2011), but they have been recalculated based on the data presented in these studies.

[3]The results for the area under the receiver operator curve were based on the underlying M- or F-score rather than a specific cut-off point or unconditional expectation of misstatement. The original studies did not include a calculation of the AUC, nor was it possible to recalculate based on the data presented in the studies.

[4]Due to both precision and sensitivity being equal to zero, it was impossible to compute the F-measure.

(Source: Researchers' own construction, as well as data obtained from Beneish (1999) and Dechow et al. (2011)).

4.4. Earnings management characteristics of the false positives

Given the inability of the M- and F-scores to identify manipulators in SA, it is helpful to consider the earnings management characteristics of the false positives to understand better what the models are identifying. Table 6 summarises these results. Panel A compares the false positives to the manipulator sample, whereas Panel B compares the false positives to the true negatives.

For the M-score (BS), the false positive samples do not display similar discretionary and absolute discretionary accruals levels compared to the manipulator sample. Rather, all three cut-offs display higher discretionary and absolute discretionary accruals levels. The F-score (UEM = 0.0098) shows similar results. However, for the M-score (IS) and the F-score (UEM = 0.0037), there is no statistically significant difference between the discretionary accruals and absolute discretionary accruals for the false positive and manipulator samples. For all scores, the discretionary and absolute discretionary accruals of the false positive samples are significantly different from the true negative samples. This indicates that the false positive samples have similar or higher levels of AEM compared to the manipulator sample. It also shows that the false positive samples do not share the same level of AEM compared to the true negative sample.

For all scores, the false positive samples do not display a significantly different proportion of observations that meet or just beat prior year EPS at any level (1, 2 or 3 cents) compared to the manipulators. However, for the M-score models, the false positive samples reveal a higher proportion of observations just beating the prior year's EPS by 1 cent compared to the true negative samples. At the 2 and 3-cent levels, there is no difference between the manipulators, true negatives or false positives for the M-score. For the F-score (UEM = 0.0037), there is a lower proportion of false positives, which just beat the prior year's EPS by 2 and 3 cents compared to the true negatives.

Thus, the evidence presented indicates that the false positives, as determined by the M-score (IS) and F-score (UEM = 0.0037), share similar AEM characteristics as the manipulators, while the false positives, as determined by the M-score (BS) and F-score (UEM = 0.0098), show higher levels of AEM compared to manipulators. When considering earnings thresholds, the M-score (both BS and IS) false positives display similar proportions of meeting or just beating prior year EPS by 1 cent to the manipulators. Considering the F-score,

false positives do not display different meet, or just beat, prior year EPS by 1 cent to either the manipulators or the true negatives.

As a result, hypothesis 3 is partially supported as the false positive samples appear to have similar or higher levels of AEM than the manipulator sample and share similar meet, or just beat, EPS characteristics, but only at the 1 cent level for the M-score.

4.5. Re-estimating the coefficients of the M-Score and F-Score

Due to the poor performance of the original M- and F-scores in detecting manipulation in SA, the models were re-estimated to determine the coefficients that apply in SA, as shown in Table 7. Except for the constant terms and the AISS term in the F-score, none of the variable coefficients were statistically significant. This closely mirrors Table 4, where only TATA_BS and AISS showed a significant difference between manipulators and non-manipulators. These results again revealed the inability of the underlying variables to distinguish between manipulators and non-manipulators in SA.

It should also be noted that the models as a whole display little explanatory power. All revised models have insignificant LR Chi_2 statistics and low pseudo R^2 statistics. This contradicts Marinakis (2011), who used UK data to report a revised M-score model with a statistically significant Chi^2 at the 1% level and a pseudo R^2 of 0.318.

Following the estimation of the models in Table 7, the M-score cut-offs that minimised the ECM were determined at relative costs of 10:1, 20:1, 30:1 and 40:1. Like Beneish (1999), the ECM at the relative costs of 20:1 and 30:1 were the same for both the balance sheet and income statement versions, resulting in the same cut-off. These cut-offs were determined as −1.7910 (10:1), −1.9653 (20:1) and −2.0407 (40:1) for the M-score (BS) and −1.4539 (10:1), −1.9735 (20:1) and −2.1641 (40:1) for the M-score (IS).

Table 6: Comparison of earnings management characteristics of false positives to true manipulators and non-manipulators

Panel A: False positives compared to manipulators	**M-score (BS) (Cut-off = -1.49)**	**M-score (BS) (Cut-off = -1.78)**	**M-score (BS) (Cut-off = -1.89)**	**M-score (IS) (Cut-off = -1.49)**	**M-score (IS) (Cut-off = -1.78)**	**M-score (IS) (Cut-off = -1.89)**	**F-score (UEM = 0.0098)**	**F-score (UEM = 0.0037)**
DISCRETIONARY ACCRUALS								
False positive mean	0.0836	0.0732	0.0706	0.0500	0.0454	0.0470	0.1460	0.0145
Manipulator mean	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280
Wilcoxon Z	2.0060**	2.1000**	2.1690**	1.3940	1.2940	1.2250	3.4410***	-0.0920
ABSOLUTE DISCRETIONARY ACCRUALS								
False positive mean	0.1396	0.1239	0.1157	0.1067	0.0974	0.0959	0.1623	0.0755
Manipulator mean	0.0684	0.0684	0.0684	0.0684	0.0684	0.0684	0.0684	0.0684
Wilcoxon Z	2.3240**	2.241**	2.084**	1.6390	1.4790	1.2600	2.8700***	0.1200
MEET OR JUST BEAT – 1 CENT								
False positive mean	0.0448	0.0414	0.0423	0.0423	0.0417	0.0365	0.0000	0.0186
Manipulator mean	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pearson Chi^2	1.0751[1]	0.9911[1]	1.0132[1]	1.0124[1]	0.9979[1]	0.8699[1]	N/A	0.4357[1]
MEET OR JUST BEAT – 2 CENT								
False positive mean	0.0583	0.0621	0.0597	0.0538	0.0570	0.0511	0.0192	0.0339
Manipulator mean	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pearson Chi^2	1.4156[1]	1.5173[1]	1.4553[1]	1.3029[1]	1.3867[1]	1.2358[1]	0.4483[1]	0.8068[1]
MEET OR JUST BEAT – 3 CENT								
False positive mean	0.0718	0.0799	0.0746	0.0692	0.0768	0.0693	0.0769	0.0481
Manipulator mean	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pearson Chi^2	1.7650[1]	1.9858[1]	1.8468[1]	1.7005[1]	1.9045[1]	1.7086[1]	1.8689[1]	1.1618[1]

Panel B: False positives compared to true negatives	**M-score (BS) (Cut-off = -1.49)**	**M-score (BS) (Cut-off = -1.78)**	**M-score (BS) (Cut-off = -1.89)**	**M-score (IS) (Cut-off = -1.49)**	**M-score (IS) (Cut-off = -1.78)**	**M-score (IS) (Cut-off = -1.89)**	**F-score (UEM = 0.0098)**	**F-score (UEM = 0.0037)**
DISCRETIONARY ACCRUALS								
False positive mean	0.0836	0.0732	0.0706	0.0500	0.0454	0.0470	0.1460	0.0145
True negative mean	-0.0105	-0.0142	-0.0164	-0.0079	-0.0128	-0.0162	-0.0044	-0.0115
Wilcoxon Z	9.4700***	12.2510***	13.8000***	8.4250***	11.0160***	12.0470***	6.9380***	7.3400***
ABSOLUTE DISCRETIONARY ACCRUALS								
False positive mean	0.1396	0.1239	0.1157	0.1067	0.0974	0.0959	0.1623	0.0755
True negative mean	0.0637	0.0620	0.0618	0.0666	0.0646	0.0635	0.0692	0.0683
Wilcoxon Z	8.1390***	9.7460***	9.8110***	6.1660***	7.4610***	7.1930***	5.2560***	1.8630*
MEET OR JUST BEAT – 1 CENT								
False positive mean	0.0448	0.0414	0.0423	0.0423	0.0417	0.0365	0.0000	0.0186
True negative mean	0.0224	0.0217	0.0209	0.0223	0.0204	0.0209	0.0251	0.0284
Pearson Chi^2	4.2315**	4.6879**	6.3707**	3.8446**	6.9231***	4.2590**	1.3398[1]	2.2425
MEET OR JUST BEAT – 2 CENT								
False positive mean	0.0583	0.0621	0.0597	0.0538	0.0570	0.0511	0.0192	0.0339
True negative mean	0.0448	0.0434	0.0433	0.0451	0.0435	0.0446	0.0467	0.0541
Pearson Chi^2	0.8313	2.3050	2.0386	0.3972	1.5319	0.4035	0.8743[1]	5.1057**
MEET OR JUST BEAT – 3 CENT								
False positive mean	0.0718	0.0799	0.0746	0.0692	0.0768	0.0693	0.0769	0.0481
True negative mean	0.0582	0.0560	0.0563	0.0583	0.0553	0.0564	0.0591	0.0669
Pearson Chi^2	0.6635	2.9428*	1.9934	0.4974	3.0263*	1.2469	0.2892[1]	3.4684*

Note: [1]The statistical significance of the Pearson Chi^2 for these characteristics was based on Fisher's exact rather than the standard p-value due to the small sample size. No differences in the significance level would have arisen had the standard p-value been used.

****, ** and * represent statistical significance at 1%, 5% and 10% respectively. (Source: Researchers' own construction)*

Table 7: Re-estimated coefficients for the M- and F-scores in the SA context

Panel A: Re-estimated M-score			Panel B: Re-estimated F-score	
	BS	IS		
DSRI	0.0776	0.1194	**RSST**	-0.4474
	(0.1622)	(0.1506)		(1.7727)
GMI	-0.1463	-0.1355	**REC**	0.9622
	(0.1497)	(0.1412)		(3.9236)
AQI	-0.0692	-0.0722	**INV**	-2.8220
	(0.1237)	(0.1267)		(5.9092)
SGI	-0.2178	-0.1280	**SASS**	0.7275
	(0.2997)	(0.2819)		(0.9417)
DEPI	0.0307	0.0347	**CSALES**	-0.5816
	(0.1848)	(0.1783)		(0.7008)
SGAI	-0.2042	-0.1875	**ROA**	0.8299
	(0.2180)	(0.2070)		(2.1063)
TATA_BS	1.4912		**AISS**	1.7646*
	(1.0488)			(1.0284)
TATA_IS		-0.3350	**Constant**	-6.5314***
		(0.9243)		(1.1503)
LVGI	-0.0603	-0.1538		
	(0.2713)	(0.2819)		
Constant	-1.6897***	-1.7944***		
	(0.6040)	(0.5898)		
Observations	2 343	2 343	**Observations**	2 343
LR Chi^2	5.10	3.19	**LR Chi^2**	6.68
Prob > Chi^2	0.7464	0.9219	**Prob > Chi^2**	0.4631
Pseudo R^2	0.0197	0.0123	**Pseudo R^2**	0.0258

Note: No evidence of multicollinearity was identified. Standard errors are presented in parentheses. The re-estimated M-score coefficients were based on probit estimation, while the re-estimated F-score coefficients were based on logit estimation, in line with the original studies.
**** and * represent statistical significance at 1% and 10%, respectively.*
(Source: Researchers' own construction)

Table 8 presents the classification performance for the revised M- and F-score models based on the estimation sample. Comparing the re-estimated models' classification performance to the original models' performance produced mixed results. For the M-score, the revised models performed better than the original models in this sample for accuracy, precision, the F-measure and the type II error. In contrast, the original models performed better in terms of sensitivity and the type I error. Thus, re-estimating the M-score coefficients reduced sensitivity but improved precision. By comparison, for the F-score, the revised scores performed better than the original scores for sensitivity and the type I error. In contrast, the original scores were superior in terms of accuracy and the type II error. The precision and F-measure were comparable and produced mixed results depending on the selected UEM. Thus, re-estimating the F-score improved sensitivity but at the cost of a higher type II error. This

trade-off between sensitivity and precision in fraud detection models is also identified by Beneish and Vorst (2021). It should be noted, however, that this comparison for the re-estimated models is based on the estimation sample and may suffer from hindsight bias. Further out-of-sample testing is required to validate these findings, but could not be performed on these data due to the small sample of manipulators.

The AUC results were more robust as they were based on k-fold cross-validation using ten folds. Here, the revised models were consistently outperformed by the original models.

Unfortunately, comparable studies such as Cecchini et al. (2010) and Marinakis (2011), who also re-estimated the coefficients of the M- and F-scores, did not provide comparative results between the original and the re-estimated coefficients. However, studies which added variables to the models before re-estimation have shown improved performance across all metrics. For the M-score, Marinakis (2011) revised model outperformed his re-estimated model for accuracy, sensitivity and precision in both the estimation and holdout samples for all relative cost levels. Likewise, Chakrabarty et al. (2022) revised F-score outperformed the original F-score based on the same metrics as well as the AUC, which increased from 0.6670 to 0.7271.

Given the mixed results presented above, hypothesis 4 is partially accepted. The re-estimated M-score failed to improve the identification of manipulators but did reduce misclassification errors. On the other hand, the re-estimated F-score improved the identification of manipulators but failed to reduce misclassification errors.

Table 8: Classification performance for re-estimated M- and F-scores (estimation sample)

	M-score (BS) (Cut-off = -1.7910)	M-score (BS) (Cut-off = -1.9653)	M-score (BS) (Cut-off = -2.0407)	M-score (IS) (Cut-off = -1.4539)	M-score (IS) (Cut-off = -1.9735)	M-score (IS) (Cut-off = -2.1641)	F-score (UEM = 0.0098)	F-score (UEM = 0.0037)
Predicted manipulators	**10**	**28**	**63**	**1**	**22**	**105**	**1 347**	**1 889**
True positive	1	2	3	0	1	4	17	22
False positive	9	26	60	1	21	101	1 330	1 867
Predicted non-manipulators	**2 333**	**2 315**	**2 280**	**2 342**	**2 321**	**2 238**	**996**	**454**
True negative	2 311	2 294	2 260	2 319	2 299	2 219	990	453
False negative	22	21	20	23	22	19	6	1
Accuracy	**98.68%**	**97.99%**	**96.59%**	**98.98%**	**98.16%**	**94.88%**	**42.98%**	**20.27%**
Sensitivity	**4.35%**	**8.70%**	**13.04%**	**0.00%**	**4.35%**	**17.39%**	**73.91%**	**95.65%**
Precision	**10.00%**	**7.14%**	**4.76%**	**0.00%**	**4.55%**	**3.81%**	**1.26%**	**1.16%**
F-measure	**6.06%**	**7.84%**	**6.98%**	**N/A[1]**	**4.44%**	**6.25%**	**2.48%**	**2.30%**
Type I error	**95.65%**	**91.30%**	**86.96%**	**100.00%**	**95.65%**	**82.61%**	**26.09%**	**4.35%**
Type II error	**0.39%**	**1.12%**	**2.59%**	**0.04%**	**0.91%**	**4.35%**	**57.33%**	**80.47%**
AUC[2]		**0.5339**			**0.4419**		**0.5546**	

Note: [1]Due to both precision and sensitivity being equal to zero, it was impossible to compute the F-measure.
[2]The AUC was based on 10-fold cross-validation.
(Sources: Researchers' own construction)

4.6. Additional tests

Following Beneish (1999), the manipulator sample was matched to the non-manipulators based on industry and year as an additional test. Regarding the classification performance of the original M- and F-scores, the scores' accuracy, precision and F-measure were marginally superior compared to the unmatched results. The matched AUC was also marginally better than the unmatched AUC. The sensitivity, however, remained unchanged. Regarding the earnings management characteristics of the false positives, the results using the matched data revealed no differences compared to using the unmatched data. Finally, regarding the re-estimated M- and F-scores, the comparative performance of the matched data for the M-score was mixed. The matched data results were marginally worse than the unmatched data for accuracy. Precision metrics were generally slightly superior for the matched data, but this depended on the relative cost ratio. Sensitivity was unchanged across the matched and unmatched data. Overall, the conclusions drawn remained unchanged, given the additional testing based on the matched data.

Further, Kukreja et al. (2020) argue that the M-score cannot detect every type of misstatement. The same may be true of the F-score. Consequently, the classification sensitivity[16] was recalculated based on the separate categories of manipulators (i.e. FSCA enforcement action, FRIP restatement and relevant qualified audit opinion) based on the original versions of the M- and F-scores. The results are presented in Table 9 below.

Table 9: Classification sensitivity per manipulator category

SCORE	CATEGORIES OF MANIPULATORS		
	FSCA enforcement action	FRIP restatement	Qualified audit opinion
M-score (BS)			
Cut-off = -1.49	0.00%	0.00%	25.00%
Cut-off = -1.78	7.14%	20.00%	50.00%
Cut-off = -1.89	7.14%	60.00%	50.00%
M-score (IS)			
Cut-off = -1.49	0.00%	20.00%	0.00%
Cut-off = -1.78	7.14%	20.00%	25.00%
Cut-off = -1.89	7.14%	40.00%	50.00%
F-score			
UEM = 0.0098	0.00%	0.00%	0.00%
UEM = 0.0037	50.00%	80.00%	25.00%

[16] For this additional test, the study focused on sensitivity as the misclassification of non-manipulators would remain largely unchanged meaning that the measures of accuracy, precision, F-measure and type I and II errors would remain largely unchanged.

Regarding FSCA enforcement actions, the scores performed worse for this category. The M-score (BS and IS) could only correctly classify 7.14% of such actions when the broader cut-offs of −1.78 and −1.89 were selected. The narrower cut-off of −1.49 was unable to classify any enforcement action correctly. Likewise, the F-score (UEM = 0.0098) could also not correctly classify any enforcement action. However, the F-score (UEM = 0.0037) identified 50% of such enforcement actions. The scores appeared to perform better with regard to classification sensitivity for FRIP restatements and qualified audit opinions. The M-score (BS) correctly classified 60% of FRIP restatements when using the more lenient −1.89 cut-off. However, the cut-off of −1.49 failed to classify any FRIP restatement correctly. The M-score (IS) performed worse than the M-score (BS) at the broadest cut-off of −1.89 by only correctly identifying 40% of FRIP restatements. However, it performed better at the more stringent −1.49 cut-off as it identified 20% of FRIP restatements. Again, the F-score (UEM = 0.0098) could not identify any FRIP restatements, while the F-score (UEM = 0.0037) performed the best of all the scores and correctly classified 80% of the FRIP restatements. Finally, regarding the qualified audit opinions, the M-score (BS and IS) performed moderately at the broadest cut-off of −1.89, identifying 50% of qualified opinions. At the most stringent cut-off (−1.49), the M-score (BS) outperformed the M-score (IS) but was still only able to identify 25% of qualified opinions. The F-score performed worst of the scores in correctly classifying qualified opinions, only correctly identifying 25% when using the UEM of 0.0037.

These results show that the F-score (UEM = 0.0037) outperformed both M-score models for FSCA enforcement actions and FRIP restatements. However, the M-score outperformed the F-score when identifying qualified audit opinions. Caution, however, should be applied when relying on this set of additional results. Firstly, the sensitivity was based on very few observations, particularly for FRIP restatements and qualified audit opinions. Secondly, only the classification sensitivity is provided. As the false positives would have changed only slightly, the scores would continue to perform poorly in terms of precision, the F-measure and the type I error.

5. Summary of results

This study tested four hypotheses. The first hypothesis, of whether the M- and F-scores could detect financial statement manipulation in SA, was not supported. The second hypothesis was that, based on the findings of prior studies, the F-score would outperform the M-score. Given

the inability of both models to successfully detect manipulation in SA, this hypothesis was also not supported. Partial support was found for the third hypothesis, which expected the false positive sample to share similar earnings management characteristics with the manipulator sample. Here, the study found that the false positives tended to have similar or higher levels of discretionary accruals in comparison to the manipulators. Finally, the fourth hypothesis expected that updating the coefficients of the M- and F-scores would improve the models' ability to identify manipulators in SA. This hypothesis was partially supported as, for the M-score, misclassifications were reduced, although the ability to identify manipulators worsened. The opposite occurred with the F-score as correctly identifying manipulators improved, but misclassifications increased substantially. In summary, the findings failed to support hypotheses 1 and 2, while partial support was found for hypotheses 3 and 4.

5.1. Discussion

The performance classification and AUC results reveal that both the M- and F-score appear ineffective in accurately identifying cases of manipulation in the SA context. This is consistent with more recent studies such as Beneish and Vorst (2021), Comporek (2020) and Lu and Zhao (2021), who also found limited ability of the models to detect fraud.

One possible explanation is that the models are inappropriate in the SA context. This could be a result of the underlying variables being unable to distinguish between manipulators and non-manipulators, as seen in section 4.2. This explanation is consistent with Lu and Zhao's (2021) argument that the M-score does not work in the Chinese context, given the period it was developed and the different reporting contexts. Such an argument also applies to SA as the period under consideration is predominantly post the 2008 financial crisis. Also, SA is an emerging market and uses IFRS rather than US GAAP.

Further supporting the above explanation are the earnings management characteristics. The false positive sample has either similar or higher levels of AEM than the manipulator sample. In addition, the false positive sample displays higher levels of AEM than the true negative sample. This presents evidence that the M- and F-score may identify firms with high AEM levels. However, Enomoto et al. (2015) claim that SA companies are less likely to manage earnings through AEM and more likely to manage them through real earnings management. Also, the false positive sample shows different proportions of meeting or just beating the prior year's EPS to the true negative sample. However, Pududu and De Villiers (2016) contend that SA may focus on thresholds other than earnings. Thus, models that distinguish

between manipulators and non-manipulators based on AEM and earnings thresholds may be inappropriate in SA.

The final support for the M- and F-scores being inappropriate in SA is that the models cannot identify the type of manipulation that occurs in SA. Kukreja et al. (2020) note that different models have different limitations. In particular, the M-score is unable to detect every form of manipulation. This is evident in the SA context from the additional tests where the models show different abilities to detect FSCA enforcement actions, FRIP restatements and qualified opinions. In particular, the M-score appears to struggle with FSCA enforcement actions, while the F-score has the worst performance for qualified audit opinions.

An alternative explanation could be that SA regulators are unable to identify manipulators. In SA, 59% of companies experiencing fraud do not report the fraud to the board, 66% do not report fraud to an appropriate regulator, and 72% do not report to the external auditor (PricewaterhouseCoopers, 2020). This culture of not reporting fraud, together with regulators lacking appropriate resources, lower legal enforcement associated with emerging economies and SA investors being unable to detect earnings management (Rabin, 2016), makes it difficult for regulators to investigate fraudulent activities and take appropriate action. As a result, the models may identify valid manipulators that regulators have not yet identified.

Both explanations provide reasons why re-estimating the coefficients of the original models would be insufficient to improve the ability of the models to detect manipulation without substantially increasing the extent of false positives.

6. Conclusion

This study investigated the ability of two popular fraud detection models (the Beneish (1999) M-score and the Dechow et al. (2011) F-score) to identify manipulating companies in the SA context correctly. Based on a sample of 23 manipulators and 2 320 non-manipulators from 2006 to 2018, the study found that both models showed limited ability to classify manipulators correctly. Further investigation into the earnings management characteristics of the false positive sample revealed that the models might be categorising companies based on AEM and earnings thresholds. While extensive earnings management is associated with financial statement fraud, it is not a definite indication that such fraud is occurring. Finally, updating the coefficients of the two models did improve aspects of detection, but at the cost of another. For example, re-estimating the M-score coefficients generally improved precision but at the expense of sensitivity. Conversely, re-estimating the F-score improved sensitivity

but at the cost of an increased type II error. These results indicate that either the models are not appropriate in the SA context or that SA regulators cannot identify manipulators due to a lack of reporting fraudulent activities, a lack of resources and weak legal enforcement.

This study makes several contributions. First, the study investigates the ability of two popular models in fraud detection to identify manipulators in the SA context accurately. The results indicate that stakeholders should apply caution in using such models to predict fraudulent financial reporting, given their inability to accurately classify manipulators without generating many false positives. Additionally, regulators should allocate more resources to identify and combat fraudulent financial reporting. Second, the study provides a caution to other academics. Researchers need to report on a wide range of performance metrics so that users understand what the model does well compared to what it does not do well. In addition, academics, particularly in African contexts, are cautioned against indiscriminately using these models as proxies for fraud risk without extensively testing them in the local context. Third, the study contributes to the academic literature by investigating the earnings management characteristics of false positives generated by the models, showing that the models tend to differentiate companies with high levels of earnings management rather than companies which commit fraud. Finally, the study contributes to the development of fraud detection models by showing that re-estimating the model coefficients is likely insufficient to improve the models' performance, particularly if the underlying variables appear incapable of distinguishing between manipulators and non-manipulators. Instead, the focus should be placed on incorporating new variables that better distinguish between manipulators and non-manipulators, especially as the global economy changes and new reporting conventions and standards are developed.

This research has some limitations that provide avenues for future research. The study investigated the fraud detection ability of only two popular models (which only incorporate information directly obtainable from the financial statements) in an SA-specific context. Consequently, the results may not be generalisable to other countries, even in Africa. Future researchers should test the models' performance in their country's context and employ more sophisticated models (which include non-financial information such as the modified M-score by Lu and Zhao's (2021) and models 2 and 3 of the F-score) and compare their performance. A second limitation is that this study considered only AEM and earnings thresholds when investigating the earnings management characteristics of the false positives. Given that companies may use different types of earnings management to achieve the same goals, future

studies may consider investigating the real earnings management characteristics of the false positives as well as identifying other thresholds that may be more applicable in SA. A third limitation of this study is that it only updated the original model coefficients for SA. The study did not attempt to add additional explanatory variables or remove insignificant variables from the models. Subsequent studies should attempt to identify new variables that are superior in discriminating between manipulators and non-manipulators and include such variables when revising such models.

Appendix 1: Beneish (1999) M-score

The Beneish (1999) M-score is calculated as follows:

$$M = -0.480 + 0.920DSRI + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI + 4.679TATA - 0.327LVGI$$

Where the independent variables are defined and calculated as follows:

Variable	Description	Calculation
DSRI	Day's sales receivable index	$\frac{Accounts\ Receivable_t/Revenue_t}{Accounts\ Receivable_{t-1}/Revenue_{t-1}}$
GMI	Gross margin index	$\frac{(Revenue_{t-1}-Cost\ of\ sales_{t-1})/Revenue_{t-1}}{(Revenue_t-Cost\ of\ sales_t)/Revenue_t}$
AQI	Asset quality index	$\frac{1-((Current\ assets_t+PPE_t)/Total\ assets_t)}{1-((Current\ assets_{t-1}+PPE_{t-1})/Total\ assets_{t-1})}$
SGI	Sales growth index	$\frac{Revenue_t}{Revenue_{t-1}}$
DEPI	Depreciation index	$\frac{Depreciation_{t-1}/(Depreciation_{t-1}+PPE_{t-1})}{Depreciation_t/(Depreciation_t+PPE_t)}$
SGAI	Sales, general and administrative expenses index	$\frac{Sales,general\ and\ admin\ expenses_t/Revenue_t}{Sales,general\ and\ admin\ expenses_{t-1}/Revenue_{t-1}}$
TATA_BS	Total accruals (based on the balance sheet approach) to total assets	$\frac{\left(\begin{array}{c}\Delta Current\ assets_t-\Delta Cash_t-\Delta Current\ liabilities_t- \\ \Delta Current\ maturities\ of\ long\ term\ debt_t- \\ \Delta Income\ tax\ payable_t-Depreciation\ and\ amortisation_t\end{array}\right)}{Total\ assets_t}$
TATA_IS	Total accruals (based on the income statement approach) to total assets	$\frac{(Income\ before\ extraordinary\ items_t-Cash\ from\ operations_t)}{Total\ assets_t}$
LVGI	Leverage index	$\frac{(Long\ term\ debt_t+Current\ liabilities_t)/Total\ assets_t}{(Long\ term\ debt_{t-1}+Current\ liabilities_{t-1})/Total\ assets_{t-1}}$

Appendix 2: Dechow et al. (2011) F-score

The Dechow et al. (2011) F-score is calculated as follows:

$$Predicted\ value = -7.893 + 0.790RSST + 2.518\Delta REC + 1.191\Delta INV + 1.979SASS + 0.171\Delta CSALES - 0.932\Delta ROA + 1.029AISS$$

Where the independent variables are defined and calculated as follows:

Variable	Description	Calculation
RSST	Accruals as measured by Richardson et al. (2005)	$\frac{\Delta WC+\Delta NCO+\Delta FIN}{Average\ total\ assets}$ Where: $\Delta WC = (Current\ assets - Cash\ and\ short\ term\ investments) - (Current\ liabilities - Debt\ in\ current\ liabilities)$ $\Delta NCO = (Total\ assets - Current\ assets - Investments\ and\ advances) - (Total\ liabilities - Current\ liabilities - Long\ term\ debt)$ $\Delta FIN = (Short\ term\ investments + Long\ term\ investments) - (Long\ term\ debt + Debt\ in\ current\ liabilities + Preferred\ stock)$
ΔREC	Change in receivables	$\frac{\Delta Accounts\ receivable}{Average\ total\ assets}$
ΔINV	Change in inventory	$\frac{\Delta Inventory}{Average\ total\ assets}$
SASS	Percentage soft assets	$\frac{Total\ assets_t - PPE_t - Cash\ and\ cash\ equivalents_t}{Total\ assets_t}$
ΔCSALES	Change in cash sales	Percentage change in cash sales, where cash sales is measured as $(Sales - \Delta Accounts\ receivable)$
ΔROA	Change in return on assets	$\frac{Earnings_t}{Average\ total\ assets_t} - \frac{Earnings_{t-1}}{Average\ total\ assets_{t-1}}$
AISS	Actual issuance	Indicator variable coded to 1 if the firm issued securities during year t.

CHAPTER 3: AUDIT COMMITTEE EFFECTIVENESS AND FINANCIAL STATEMENT MANIPULATION: THE MODERATING EFFECT OF TONE AT THE TOP

3.1 Paper outline

The paper in Chapter 3 addressed Objectives 2 and 3 by exploring tone at the top's relationship with financial statement manipulation and how tone moderates the relationship between the audit committee and financial statement manipulation. The paper used textual analysis software (DICTION) and principal component analysis to extract the dominant tones from the CEO statement in company annual reports, namely autocratic (certain, pessimistic) and pragmatic (realistic, diverse). Ten proxies for audit committee effectiveness were collected and reduced using principal component analysis into measures of financial expertise, governance expertise, independence, activity and diversity.

Panel regression analysis revealed that tone at the top is not directly related to financial statement manipulation. However, tone does influence audit committees' effectiveness. The autocratic tone undermines the audit committees' activity and diversity, but enhances the committees' financial expertise and independence. Alternatively, the pragmatic tone inhibits the committees' financial expertise, but supports its activity and diversity.

These findings address the overarching research question by showing that while the tone set by top leadership does not directly influence financial statement manipulation, top leadership can indirectly enable (or prevent) financial statement manipulation by impacting the audit committees' role through tone. Therefore, stakeholders must first interrogate a company's ethical environment created by top management before relying on the appearance of compliance with governance regulations, such as audit committee requirements, as they may be superficial.

3.2 Statement of author contribution

The University of KwaZulu-Natal, College of Law and Management Studies, offers a PhD by Publication that aligns with international practice. This declaration confirms that the paper presented in Chapter 3 of this thesis, "Audit committee effectiveness and financial statement manipulation: The moderating effect of tone at the top", is the doctoral candidate's original work, as stated in Declaration 2: Publications.

_____

Signed: Mr AM Marais

3.3 Paper as published in Southern African Journal of Accountability and Auditing Research

Section 3.3 presents the paper in its published form. The reference list has been removed, as the reference list to this thesis represents an amalgamation of all references used in all chapters of this thesis.

Citation:

Marais, A., Shewell, P. & Vermaak, C. 2024. Audit committee effectiveness and financial statement manipulation: The moderating effect of tone at the top. *Southern African Journal of Accountability and Auditing Research*, *26*(2024), 45-67, DOI: https://doi.org/10.54483/sajaar.2024.26.1.3.

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Appendix C

Audit committee effectiveness and financial statement manipulation: The moderating effect of tone at the top

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Abstract

Purpose: The audit committee is a governance mechanism used to combat financial statement manipulation. Prior evidence of its effectiveness, however, varies. Institutional theory suggests that audit committees fulfil a ceremonial role, as top management's tone inhibits the committee's effectiveness. This study, therefore, examined how the tone at the top moderates the association between audit committee effectiveness and financial statement manipulation.

Design/Methodology/Approach: Logit and panel regression were used to analyse 196 Johannesburg Stock Exchange-listed companies, from 2011 to 2018. Financial statement manipulation was measured using fraud and discretionary accruals, whilst principal component analysis was used to develop five audit committee components and two tone components.

Findings: An active audit committee was associated with less manipulation, whereas greater governance expertise and independence were associated with more manipulation. Although the tone components showed no independent association with manipulation, a certain, pessimistic tone inhibited the committee's diversity and activity, nevertheless enhancing financial expertise and independence. Conversely, a realistic, diverse tone enhanced the committee's activity and diversity, however, inhibiting financial expertise.

Research Limitations/Implications: Understanding the moderating role of tone at the top is crucial to stakeholders, in determining whether an audit committee can effectively execute its mandate. This study's findings imply that stakeholders cannot simply rely on compliance

with governance codes to ensure an effective committee, they must also consider the tone at the top, so as to determine the committee's effectiveness. Originality: This study is the first to show how audit committees are either empowered or overpowered by tone at the top, in South Africa.

Keywords: Audit committee effectiveness, discretionary accruals, earnings management, financial statement manipulation, fraud, tone at the top

1 Introduction

Recent corporate scandals have increased interest in governance mechanisms that prevent financial statement manipulation (FSM). Of particular interest, is the audit committee (Bala et al. 2020; Masmoudi & Fourati 2020). Academic literature has assessed various aspects of audit committee effectiveness and, generally, considered proxies for expertise, independence, activity and diversity. Despite the extensive research, the empirical evidence regarding the audit committee's effectiveness in reducing FSM, is mixed. Institutional theory and managerial hegemony theory suggest that this is attributable to audit committees fulfilling ceremonial roles, rather than being possessed of real power (Annuar 2012; Zengin-Karaibrahimoglu et al. 2021). Top management extensively influences the control environment in which the audit committee operates (Beasley et al. 2009), thus exercising the power to inhibit the committee's effective functioning (Lisic et al. 2016). Given the severity of corporate frauds, Amernic et al. (2010) advocated for a more holistic understanding of financial information, and a greater appreciation of "tone at the top", i.e., the ethical culture a company's top management creates by its language and actions (Noviyanti & Winata 2015). Consequently, this study investigated the moderating effect of the tone at the top on the audit committee's effectiveness in preventing FSM.

As a company's preeminent decision-maker, the chief executive officer (CEO) influences tone at the top the most (Hope & Wang 2018). Tone at the top is, thus, directly apparent via a CEO's language, as it enables them to create a company's identity and manage the public's expectations (Amernic et al. 2010; Patelli & Pedrini 2015). Studies focusing on the CEO's use of language, in order to identify tone at the top, have found that it provides incremental value to identifying FSM (Hope & Wang 2018; Larcker & Zakolyukina 2012; Patelli & Pedrini 2015; Purda & Skillicorn 2015).

Although the academic literature has explored the relationship between audit committee characteristics and FSM, or between tone at the top and FSM, independently, the way that

management's tone moderates audit committee effectiveness remains largely unexplored (Luo & Zhou 2020). Only a few studies—such as those by Lisic et al. (2016) and Zhong et al. (2022)—partially investigated this issue, and it predominantly conducted that in developed contexts. There is, thus, a gap to explore the moderating effect of tone at the top on audit committee effectiveness, in emerging economies. Emerging markets present a critical context for performing such research, given their contribution to the global economy and their growth prospects. These markets have attracted investors, despite the risks and lower quality of financial information (Orazalin & Akhmetzhanov 2019). Ensuring that emerging market companies operate effective audit committees will mitigate some of the risks associated with these markets. Waweru (2018) argued that such research is paramount in Sub-Saharan Africa, given the scant research investigating audit committees and FSM. As a developing region, Sub-Saharan Africa differs from developed economies, on account of low economic development, high corruption levels, political interference, weak legal protection of minorities, and concentrated ownership (Waweru 2018).

In Sub-Saharan Africa, South Africa presents a unique context. Firstly, the country is an emerging economy with features of both developed and developing countries (Wesson 2021). Secondly, South Africa is characterised by various factors that increase the risk of FSM, including an insider economy, concentrated ownership, and weak legal enforcement (Pududu & De Villiers 2016). Despite these negative features and recent corporate scandals, South Africa is considered a pioneer in good corporate governance (Janse van Vuuren et al. 2023). Finally, the country is the second largest economy in Sub-Saharan Africa, after Nigeria (World Bank 2022), and houses Africa's largest stock exchange by market capitalisation.

This study contributes to the existing literature by exploring the relationship of the tone at the top with FSM in an emerging economy and, specifically, tone at the top's moderating effect on audit committee effectiveness in a developing economy. Understanding this relationship is crucial to investors and other stakeholders in determining whether the audit committee is empowered or inhibited in carrying out its mandate to ensure the financial statements are free from manipulation. An empowered committee would reduce the risk of misstatement, whereas an overpowered committee would increase such risk. This study found that different tones moderate various aspects of the audit committee. Investors, auditors, and other stakeholders, therefore, cannot simply rely on compliance with governance codes to ensure an effective committee, but also need to consider the company's overall culture, as represented by the tone at the top.

The following section presents an overview of the literature and the hypothesis development. Next, the research methodology is discussed, after which the results are presented and conclusions are drawn.

2 Literature review and hypothesis development

2.1 Theoretical framework

This study adopted agency theory as its primary theoretical framework. Under agency theory, there is a separation of ownership—the shareholders—and control—the management (Jensen & Meckling 1976). Owing to this separation, an agency conflict arises, where management may act in self-interest, rather than in the interest of the shareholders (Totowa & Mokoaleli-Mokoteli 2021). This agency problem is exasperated, as management is in an advantageous position on account of information asymmetries and its control of the company's resources (Kapkiyai et al. 2020). Consequently, agency theory suggests that monitoring and bonding mechanisms are established to align management's interests with those of the shareholders (Jensen & Meckling 1976).

One such monitoring mechanism is the board of directors. In South Africa, the board of directors is responsible for the quality of a company's financial reporting processes (Institute of Directors Southern Africa [IoDSA] 2016). This responsibility is often delegated to the audit committee, which, under agency theory, acts as a monitoring mechanism to ensure that management's actions align with the shareholders' goals (Bala et al. 2020). The audit committee achieves this by ensuring that a company's true economic performance is reflected in the financial statements (Abubakar et al. 2021). Conversely, the institutional- and managerial hegemony theories argue that the committee is merely ceremonial and, therefore, ineffective (Annuar 2012; Beasley et al. 2009). The effectiveness of the audit committee, and the degree to which this is moderated by the tone at the top, were the focus of this study.

The following section discusses the underlying components commonly used in the literature as proxy for audit committee effectiveness.

2.2 Audit committee effectiveness

Audit committee effectiveness is inherently unobservable. Consequently, prior literature measures it by using various proxies, including expertise, independence, activity, and diversity (Bédard et al. 2004; Broye & Johannes 2021). The findings from these proxies, however, are varied. The theoretical literature concerning each proxy is discussed below, and

the conflicting empirical results are reported in Table 1. Given the contradictory findings in the literature, the direction of the hypotheses was primarily drawn from the underlying theories, particularly agency theory.

2.2.1 Audit committee expertise

Greater audit committee expertise enables the committee to monitor more effectively (Abubakar et al. 2021). Enhanced monitoring aligns the goals of management and shareholders, improving the financial reporting process (Khoo et al. 2020). The three aspects of audit committee expertise are those of financial-, governance- and firm expertise (Bédard et al. 2004).

Financial expertise allows committees to understand the financial records and ask probing questions, thereby ensuring the quality of the financial reporting process (Kapkiyai et al. 2020).

Governance expertise relates to a committee's ability to oversee a company (Bédard et al. 2004), and such expertise enhances knowledge regarding corporate governance practices. Furthermore, directors with more governance expertise strive to protect their reputations (Khoo et al. 2020; Zalata et al. 2022). Conversely, holding multiple directorships—so as to achieve such expertise—could render a director too busy (Felix et al. 2021; Khoo et al. 2020).

Finally, firm expertise refers to understanding a specific company (Bédard et al. 2004). Committee members with a greater company understanding are more likely to identify anomalies (Felix et al. 2021). However, long-serving directors may be less independent (Broye & Johannes 2021). Based on an agency perspective and accordant to the majority of the literature (refer to Table 1), the following hypothesis was stated:

H_1: Audit committee expertise is negatively associated with FSM.

2.2.2 Audit committee independence

Audit committee independence refers to the committee's ability to work, free from undue influence (Kapkiyai et al. 2020). Under agency theory, greater independence would indicate better monitoring, reducing FSM levels (Waweru 2018). However, managerial hegemony theory argues that independent directors suffer from increased information asymmetries (Annuar 2012). Further, the director selection process will likely compromise the director's

independence (Annuar 2012). Thus, under these theories, greater committee independence would be ineffective.

Independence is affected by a member's independence, share ownership, and the role of the chairperson and CEO on the committee (Bédard et al. 2004; IoDSA 2016). Independent committee members are concerned about financial reporting quality, to protect their reputation and avoid legal liability (Chen et al. 2020; Kapkiyai et al. 2020). However, information asymmetries and inadequate time availability may hinder independent members (Chen et al. 2020; Kapkiyai et al. 2020).

The convergence of interest-hypothesis suggests that higher share ownership-levels should incentivise the audit committee to constrain FSM (Waweru 2018). However, such ownership may result in less independence from management (Lin & Hwang 2010).

Finally, the board chairperson is influential in a company, and their presence on the audit committee compromises its independence (Al-Absy et al. 2020). The same argument may apply to the CEO. Prior literature on the chairperson and CEO's role in the committee is limited, owing to its rarity in practice, as most governance codes—including the King IV report on governance for South Africa 2016 (IoDSA 2016)—recommend that neither the chairperson nor the CEO serve on the committee. Based on an agency perspective and the majority of the literature (refer to Table 1), the following hypothesis was stated:

H_2: Audit committee independence is negatively associated with FSM.

2.2.3 Audit committee activity

Regardless of its expertise and independence, a committee cannot be effective, if it is inactive (Bédard et al. 2004). Under agency theory, greater audit committee activity should be associated with lower FSM levels, as the committee engages in its role (Kapkiyai et al. 2020). "Activity" comprises committee size and meeting frequency (Bédard et al. 2004). Regarding size, resource dependency theory suggests that larger committees contain more skills, experience, and expertise (Abubakar et al. 2021). However, too large a committee may become fragmented, have poor communication, or suffer from the free-riding problem (Felo et al. 2003). In terms of meeting frequency, more meetings show a committee's diligence and provide it with a greater opportunity to discharge its duties and uncover FSM (Kapkiyai et al. 2020; Qamhan et al. 2018). Alternatively, managerial hegemony theory suggests that meeting frequency is irrelevant, as management sets the meeting agenda and limits the information

provided (Lisic et al. 2016). Based on an agency- and resource dependency perspective, the following hypothesis was drawn:

H_3: Audit committee activity is negatively associated with FSM.

2.2.4 Audit committee diversity

Audit committee diversity is commonly proxied by gender and racial diversity (Guest 2019; Zalata et al. 2022). Under resource dependency theory, inclusion of diverse directors increase the resources available to the committee, as these directors avoid groupthink and offer different experiences, opinions and perspectives (Bassyouny et al. 2020). On the other hand, diversity can increase conflict, as the diverse director may be pressured to conform, or there may be a feeling of tokenism, that results in a dysfunctional committee (Felix et al. 2021; Guest 2019). Based on the above and the majority of the literature (refer to Table 1), the following hypothesis was drawn:

H_4: Audit committee diversity is negatively associated with FSM.

2.2.5 Summary of the empirical evidence

As summarised in Table 1, the empirical evidence on the audit committee's effectiveness in reducing FSM, is mixed. Possible reasons include the theoretical arguments that explain both positive and negative potential effects, the vast array of FSM and audit committee effectiveness proxies, the different contexts in which the studies take place, and the failure to consider an audit committee's multidimensional nature. Furthermore, despite Amernic et al.'s (2010) call for greater consideration of tone at the top, the moderating effect of management tone remains unaccounted for. Therefore, this study answered Amernic et al.'s (2010) call, by investigating how the tone at the top moderates the relationship between audit committee effectiveness and FSM, in South Africa. The study also addressed calls by Bala et al. (2020), to determine the interactions between governance variables, by Sun and Cahan (2009), to construct composite variables to consider the multidimensional nature of governance mechanisms, and by Waweru (2018), for greater consideration of Southern Africa. These calls have not yet been answered, in South Africa.

The next section considers the role of the tone at the top in creating a corporate environment where FSM is committed.

Table 1: Summary of findings from prior literature on audit committee effectiveness

Author (Year)	Country	Sample	Method	FSM measure	Audit committee characteristic	Findings Associated with:
Abdulla and Ismail (2016)	Malaysia	2 412 firm-year observations	Panel regression[1]	Discretionary accruals	Financial expertise Committee size Gender diversity	No association with FSM No association with FSM No association with FSM
Abubakar et al. (2021)	Nigeria	360 firm-year observations	Fixed effects regression	Real earnings management	Financial expertise Member independence Committee size	Reduced FSM Reduced FSM Reduced FSM
Al-Absy et al. (2018)	Malaysia	429 firm-year observations	Random effects regression	Discretionary accruals	Financial expertise Member independence Committee size Meeting frequency	Increased FSM No association with FSM No association with FSM No association with FSM
Al-Absy et al. (2020)	Malaysia	864 firm-year observations	Ordinary least squares regression	Discretionary accruals Real earnings management	Member independence Chair/CEO presence Committee size Meeting frequency	Increased FSM Increased FSM No association with FSM Reduced FSM
Bala et al. (2020)	Nigeria	624 firm-year observations	Logit regression	Profit smoothing	Financial expertise Member independence Gender diversity	Reduced FSM Reduced FSM Reduced FSM
Bédard et al. (2004)	United States	300 firm observations[2]	Logit regression	Discretionary accruals	Financial expertise Governance expertise Firm expertise Member independence Share ownership Committee size Meeting frequency	Reduced FSM Reduced FSM Reduced FSM No association with FSM Increased FSM No association with FSM No association with FSM

Table 1: Summary of findings from prior literature on audit committee effectiveness (continued)

Author (Year)	Country	Sample	Method	FSM measure	Audit committee characteristic	Findings Associated with:
Braswell (2018)	United States	2 355 firm-year observations	Fixed effects regression	Discretionary accruals Real earnings management	Financial expertise Firm expertise Member independence Share ownership Committee size Meeting frequency	No association with FSM Reduced FSM No association with FSM Increased FSM Increased FSM Increased FSM
Chatterjee and Rakshit (2023)	India	360 firm-year observations		Discretionary accruals	Committee size Member independence Meeting frequency	No association with FSM No association with FSM No association with FSM
Felix et al. (2021)	United States	17 283 firm-year observations	Logit regression	Financial statement restatements	Financial expertise Governance expertise Firm expertise Committee size Racial diversity	No association with FSM Reduced FSM Increased FSM Reduced FSM No association with FSM
Ghafran et al. (2022)	United Kingdom	1 125 firm-year observations	Clustered ordinary least squares regression	Discretionary accruals Real earnings management	Financial expertise Governance expertise Firm expertise Member independence Share ownership Committee size Meeting frequency	No association with FSM Increased FSM Increased FSM Reduced FSM Reduced FSM No association with FSM Reduced FSM
Guest (2019)	United States	11 916 firm-year observations	Logit model	Accounting misstatements	Racial diversity	No association with FSM
Ibrahim et al. (2023)	Nigeria	121 firm-year observations	Fixed effects regression	Discretionary accruals	Member independence Meeting frequency	No association with FSM No association with FSM

Table 1: Summary of findings from prior literature on audit committee effectiveness (continued)

Author (Year)	Country	Sample	Method	FSM measure	Audit committee characteristic	Findings Associated with:
Kapkiyai et al. (2020)	Kenya	490 firm-year observations	Random effects regression	Discretionary accruals	Member independence Meeting frequency Financial expertise	Reduced FSM Reduced FSM Reduced FSM
Khoo et al. (2020)	United States	10 773 firm-year observations	Logistic regression	Restatements Risk of material misstatement (F-score)	Financial expertise Committee size	No association with FSM No association with FSM
Lin and Hwang (2010)	Various[3]	48 prior studies	Meta-analysis	Discretionary accruals Financial statement restatements or reporting fraud	Financial expertise Member independence Share ownership Committee size Meeting frequency	Reduced FSM Reduced FSM Increased FSM Reduced FSM Reduced FSM
Lin et al. (2006)	United States	267 firm observations[2]	Logit regression	Financial statement restatements	Financial expertise Member independence Share ownership Committee size Meeting frequency	No association with FSM No association with FSM No association with FSM Reduced FSM No association with FSM
Liu et al. (2023)	United States	14 764 firm-year observations	Fixed effects regression	Discretionary accruals Restatement likelihood	Committee size	No association with FSM
Masmoudi and Fourati (2020)	Netherlands	640 firm-year observations	Ordinary least squares regression	Real earnings management	Financial expertise Member independence Meeting frequency Gender diversity	Reduced FSM Reduced FSM No association with FSM Reduced FSM

Table 1: Summary of findings from prior literature on audit committee effectiveness (continued)

Author (Year)	Country	Sample	Method	FSM measure	Audit committee characteristic	Findings Associated with:
Mohammad et al. (2016)	Malaysia	1 206 firm-year observations	Fixed effects regression	Discretionary accruals	Financial expertise Member independence Racial diversity	Increased FSM Increased FSM Increased FSM
Qamhan et al. (2018)	Oman	370 firm-year observations	Fixed effects regression	Discretionary accruals	Financial expertise Member independence Committee size Meeting frequency	Reduced FSM Reduced FSM Reduced FSM No association with FSM
Sellami and Slimi (2016)	South Africa	276 firm-year observations	Panel regression[1]	Discretionary accruals	Member independence	No association with FSM
Sun et al. (2014)	United States	100 firm-year observations	Clustered ordinary least squares regression	Real earnings management	Financial expertise Governance expertise Firm expertise Share ownership Committee size	No association with FSM Increased FSM Increased FSM Increased FSM No association with FSM
Waweru (2018)	Kenya and Tanzania	480 firm-year observations	Random effects regression	Discretionary accruals	Financial expertise Member independence Committee size Meeting frequency Racial diversity	Reduced FSM Reduced FSM No association with FSM No association with FSM Reduced FSM
Zalata et al. (2018)	United States	5 660 firm-year observations	Clustered ordinary least squares regression	Discretionary accruals	Financial expertise Committee size Gender diversity	Reduced FSM No association with FSM Reduced FSM
Zalata et al. (2022)	United States	5 398 firm-year observations	Fixed effects regression	Discretionary accruals	Committee size Gender diversity	Reduced FSM Reduced FSM

[1] These studies did not specify the form of panel regression used. [2] These studies took place over one year only. [3] This study used a meta-analysis of 48 articles from 13 countries. The majority of the 48 articles used in the study were from the United States (54.17%).
(Source: Own)

2.3 Tone at the top

Tone at the top relates to a company's ethical leadership and culture (Noviyanti & Winata 2015). It forms the foundation of a company's internal control system (Schmidt 2014) and may influence employees' ethical behaviour (Noviyanti & Winata 2015). The tone at the top is apparent from top management's language, as it enables them to manage external parties' impressions of a company (Amernic et al. 2010; Patelli & Pedrini 2015). Consequently, tone at the top is conveyed via the CEO and chairperson's letters in the financial statements, company road shows, financial press appearances, shareholder presentations, and other similar sources (Amernic et al. 2010). Thus, linguistic analysis of these communications provides insight into a company's tone at the top (Amernic et al. 2010).

Studies by Hope and Wang (2018), Huang et al. (2018), Kayed and Meqbel (2024), Larcker and Zakolyukina (2012), and Patelli and Pedrini (2015) applied various dictionaries and wordlists to measure tone at the top, through textual analysis of management narratives. These studies consistently showed that tone at the top provides incremental value to identifying FSM. Hope and Wang (2018) and Larcker and Zakolyukina (2012) used the Linguistic Inquiry and Word Count psychosocial dictionary. Hope and Wang (2018) analysed the CEO statements in conference calls and, using clustered OLS regression, found that deceptive narratives, following big baths, led to higher information asymmetry. Similarly, Larcker and Zakolyukina (2012) analysed corporate representatives' (defined as either the CEO or CFO) statements, from conference call transcripts. They found that identifying deceptive language in conference calls enhanced FSM detection, in the United States. Huang et al. (2018) and Kayed and Meqbel (2024) used the Loughran and McDonald (2011) wordlist, in the United States and the United Kingdom, respectively. Huang et al. (2018) analysed 22 188 earnings press releases. Using clustered OLS regression, they found that higher optimism was associated with higher abnormal accruals. Likewise, Kayed and Meqbel (2024) found that abnormal tone—in 840 earnings conference calls—was associated with more earnings management, using fixed effects regression. Finally, Patelli and Pedrini (2015) used DICTION to analyse 535 CEO letters, in the United States. Using fixed effects regression, they found that tones related to certainty, realism, and commonality were associated with increased financial reporting aggressiveness.

Textual analysis in Africa, especially in South Africa, is limited, and does not focus on the tone at the top's relationship with FSM. Instead, South African studies have used selected

DICTION variables—most notably, optimism, certainty, and activity—to investigate analyst stock recommendations (Caglio et al. 2020), integrated reporting (Mokoaleli-Mokoteli et al. 2009), and impression management (Nel et al. 2022; Totowa & Mokoaleli-Mokoteli 2021). Thus, there is a gap in the South African literature that considers the relationship between tone at the top and FSM. Given this gap and Waweru's (2018) call to further research FSM in the African context, the following non-directional hypothesis was drawn:

H_5: Tone at the top is associated with FSM.

Figure 1 presents the conceptual framework for hypotheses H_1 to H_5.

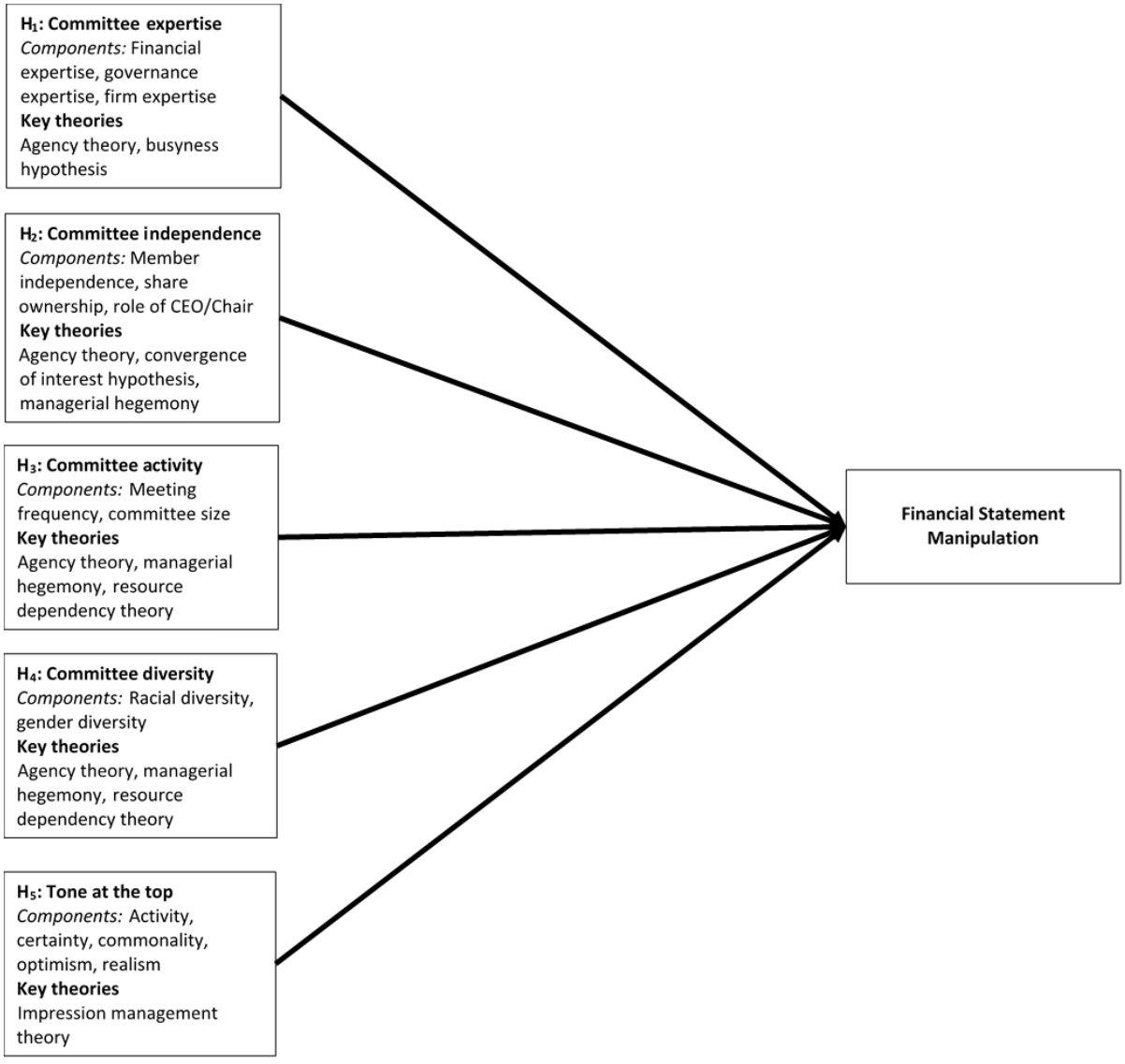

Figure 1: Conceptual framework for hypotheses H_1 to H_5

(Source: Own)

2.4 The moderating effect of tone at the top on audit committee effectiveness

Not only may tone at the top influence FSM within a company, but it may also influence the audit committee's effectiveness (Broye & Johannes 2021). This may transpire via two main mechanisms.

Firstly, top management has an information advantage over audit committees (Zengin-Karaibrahimoglu et al. 2021), particularly as regulatory bodies generally require the committee to comprise independent directors, however, such committee members rely on top management for information, by necessity (Lisic et al. 2016). This information advantage allows top management to decide what information is shared with the committee, how it is shared, and when it is shared (Beasley et al. 2009; Zengin-Karaibrahimoglu et al. 2021). Consequently, the committee may receive low-quality or delinquent information (Lisic et al. 2016). Also, a powerful CEO may dictate the committee's agenda (Lisic et al. 2016).

Secondly, upper echelons theory predicts that the tone at the top trickles down to employees (Barnett 2019). Consequently, employees act ethically or unethically based on top management's behaviour, particularly that of the CEO (Hambrick & Mason 1984). Thus, if top management views the audit committee in a ceremonial role, other employees replicate such views, compromising the committee's effectiveness. Therefore, although an audit committee may appear strong, top management's tone may render the committee ineffective (Zengin-Karaibrahimoglu et al. 2021).

Studies by Lisic et al. (2016) and Zengin-Karaibrahimoglu et al. (2021) investigated how a CEO's power and narcissism affect audit committee effectiveness. Lisic et al. (2016) constructed a composite CEO power index, for 7 217 United States firm-year observations. Using logit regression, they found that CEO power weakened a committee's financial expertise. Zengin-Karaibrahimoglu et al. (2021) studied 112 participants, using a 2x2 between-participants experimental design. They discovered that CEO narcissism weakened a committee's effectiveness, as perceived by auditors.

Unlike prior studies, this study considered how the tone at the top (rather than CEO-power or -narcissism) influences the effectiveness of a broader range of audit committee characteristics. No previous South African study has considered the moderating effect of the tone at the top on audit committee effectiveness. Based on the literature, the following non-directional hypothesis was formulated:

H_6: The tone at the top moderates the relationship between audit committee characteristics and FSM.

Figure 2 presents the conceptual framework for hypothesis H_6.

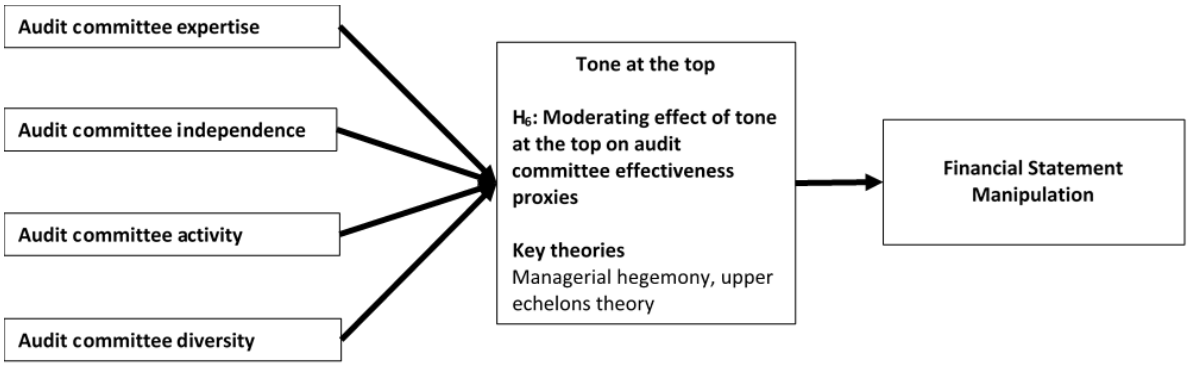

Figure 2: Conceptual framework for hypothesis H6

(Source: Own)

3 Methodology

This section expounds the methodology used in the study. It first details the sample selection process, after which the regression models are presented together with an explanation of the study variables.

3.1 Sample selection

The initial sample comprised all 278 non-financial companies listed on the Johannesburg Stock Exchange, from 2011 to 2018, representing 1 686 firm-year observations. Following studies by Kayed and Meqbel (2024), Liu et al. (2023), Masmoudi and Fourati (2020) and Orazalin and Akhmetzhanov (2019), financial companies were excluded on account of their unique regulatory- and other characteristics. Although other industries (such as food, pharmaceuticals and medicine) may also be highly regulated, these regulations do not affect the industries' financial reporting. In South Africa, financial institutions are subject to liquidity- and capital adequacy requirements, that impact their financial reporting, e.g., the Long-Term Insurance Act 52 of 1998 (Republic of South Africa [RSA] 1998) and the Banks Act 94 of 1990 (RSA 1990).

Finally, Dechow et al. (1995), Jones (1991), and Kothari et al. (2005) did not include financial institutions in the development of their models. Thus, these discretionary accrual models cannot be applied to financial institutions (Biswas et al. 2022).

The sample's starting point was 2011, representing the first full year when the King report (King III) on corporate governance for South Africa, 2009 (IoDSA 2009), was effective. This period ensures the adequate disclosure of data in the company's annual reports. The endpoint was 2018, as it allowed regulators four years (2019 until 2022) to identify manipulating companies (Marais et al. 2023). Fifty-two observations were removed owing to year-end changes—the reporting period length was not comparable. Furthermore, a separate CEO statement in the annual report is voluntary—not all companies include such a statement or, at times, it is combined with the chairperson or Chief Financial Officer statement. Consequently, 488 observations were excluded, as a separate CEO statement was not published. Thirty observations were excluded on account of lacking committee information. Finally, 23 companies with only one observation were removed from the sample. Table 2 summarises a final, unbalanced panel of 196 companies, that represents the remaining 1 080 observations.

Table 2: Sample size calculation

	No. of companies[1]	No. of firm-year observations
Population	278	1 673
Change of year-end	(2)	(52)
No separate CEO statement or letter	(52)	(488)
Missing data for audit committee	(5)	(30)
Companies with only one observation	(23)	(23)
Sample size	196	1 080

[1] The removal of firm-year observations exceeds the removal of companies as, for some companies, not all observations were removed.
(Source: Own)

3.2 Initial regression model and variable measurement

The following regression model was used to investigate the relationship between FSM and the audit committee, and tone at the top components—these were developed using principal component analysis (PCA), referred to in section 3.2.2.

$$FSM_{it} = \beta_0 + \beta_1 AUDITCOMM_{it} + \beta_2 TONE_{it} + \beta_3 CONTROLS_{it} + \varepsilon_{it} \quad (1)$$

Where FSM_{it} is the measure of FSM for company i in year t; $AUDITCOMM_{it}$ is a vector of audit committee components; $TONE_{it}$ is a vector of tone at the top components; and $CONTROLS_{it}$ is a vector of control variables (refer to section 3.2.3). A negative, significant coefficient for the committee components ($AUDITCOMM_{it}$), would indicate a rejection of the

null hypotheses for Hypotheses 1 to 4. As Hypothesis 5 is non-directional, a significant coefficient for the tone components ($TONE_{it}$) would indicate a rejection of the null.

Pooled logit regression was used, when FSM was measured as financial statement fraud. Panel logit models were not suitable, considering the lack of variation in the dependent variable. When FSM was measured using discretionary accruals, either fixed or random effects panel regression was used, depending on the outcome of the Hausman test. All continuous variables were winsorised at the first and ninety-ninth percentiles.

The following sections describe variable measurement, and Appendix 1 summarises all variables used in this study.

3.2.1 Measurement of FSM

Following Perols and Lougee (2011), this study broadly defined FSM to include financial statement fraud and earnings management. Whilst these concepts have the same intention—to mislead the user with regard to the company's performance—it differs, as earnings management falls within the scope of accepted accounting frameworks, whereas fraud violates such frameworks (Perols & Lougee 2011).

Fraudulent observations were identified as being subject to fraud or an international financial reporting standard (IFRS) violation. These were determined by a financial sector conduct authority enforcement action—related to s. 76 of the Security Services Act 36 of 2004 (pre-2013) [RSA 2004] and s. 81 of the Financial Markets Act 19 of 2012 (post-2013) [RSA 2012]—a forced financial reporting investigation panel restatement, or a relevant qualified audit opinion. Audit opinions related to going concern and other issues unrelated to fraud or non-compliance with IFRS, were excluded. This was represented as a dummy variable, assigned the value of 1, if the firm-year observation was guilty of fraud or an IFRS violation, and assigned 0, if otherwise (Marais et al. 2023). Although other methods of measuring fraud risk, such as the Beneish (1999) M-score and Dechow et al. (2011) F-score, are commonly used in the literature, these are ineffective in South Africa (Marais et al. 2023).

Earnings management was measured using the accruals-based cross-sectional model proposed by Kothari et al. (2005). This model improves the popular, modified Jones (1991) model, by including return on assets as a performance measure, and an intercept term to mitigate against model misspecification (Kothari et al. 2005). Thus, discretionary accruals were estimated as the residual of the following model:

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it}-\Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \alpha_4 ROA_{it} + \varepsilon_{i,t} \qquad (2)$$

Where NDA_{it} is the estimate of non-discretionary accruals for company *i* in year *t*; A_{it-1} is the total assets in year *t-1;* ΔREV_{it} represents the change in revenue between years *t* and *t-1*; ΔREC_{it} represents the change in net receivables between years *t* and *t-1*; PPE_{it} is the gross property, plant and equipment; and ROA_{it} is the return on assets. In addition to applying the absolute value of discretionary accruals, the study differentiated between positive and negative discretionary accruals. This distinction helps to determine whether the audit committee and tone at the top characteristics are associated with income-increasing or income-decreasing discretionary accruals (Eloff & Steenkamp 2022).

3.2.2 Development of audit committee and tone at the top components

Numerous proxies have been used to measure audit committee effectiveness and the tone at the top. Using an array of individual variables as proxies is inefficient, as it does not capture the interactions between the variables (Biswas et al. 2022). This study combined the individual variables into components, using PCA, which accounts for the orthogonal relationships between the individual variables, and reduces measurement error and multicollinearity (Tarchouna et al. 2017). Such components have a greater impact, than individual variables (Biswas et al. 2022).

In developing the components for audit committee effectiveness and tone at the top, components with eigenvalues exceeding one, were retained (Larcker et al. 2007). Components were rotated, using a varimax rotation. Variables with absolute loading factors greater than 0.40, were used to interpret the components (Larcker et al. 2007). Bartlett's sphericity, and the Kaiser-Meyer-Olkin test were used to indicate the sufficiency of the data for PCA (Biswas et al. 2022).

Measurement of audit committee effectiveness

Audit committee effectiveness is a multidimensional construct. Consequently, prior literature (refer to Table 1) uses a range of proxies to capture the committee's expertise, independence, activity and diversity.

In order to measure committee expertise, financial expertise (*ACFINEXP*) was calculated as the proportion of financial experts serving on the committee (Bala et al. 2020; Zalata et al. 2018). Governance expertise (*ACGOVEXP*) was measured as the average number of outside

directorships held by the committee members. Firm expertise (*ACFIRMEXP*) was calculated as the committee members' average board tenure at the company (Bédard et al. 2004; Felix et al. 2021).

The first measure of committee independence was individual member independence (*ACIND*), which was measured as the proportion of independent directors serving on the committee (Biswas et al. 2022; Masmoudi & Fourati 2020). Next, the committee's share ownership (*ACOWN*) was calculated as the cumulative proportion of shares held by committee members (Lin et al. 2006). The role of the board chairperson or CEO on the committee (*ACCHAIR*) was a dummy variable assigned the value of 1, if either the chair or CEO was a member of the committee, otherwise, it was assigned 0 (Al-Absy et al. 2020).

For committee activity, meeting frequency (*ACMEET*) was measured as the number of committee meetings held during the financial year (Biswas et al. 2022; Masmoudi & Fourati 2020). Committee size (*ACSIZE*) was calculated as the number of committee members (Biswas et al. 2022).

Finally, committee diversity comprised racial- (*ACRACE*) and gender diversity (*ACGENDER*). These were measured as the proportion of non-white directors and female directors on the committee, respectively (Bala et al. 2020; Felix et al. 2021; Guest 2019; Zalata et al. 2018).

As presented in Table 3, Panel A, the above 10 audit committee variables were reduced to five components. The underlying audit committee variables groupings aligned with the proxies identified in the literature. Committee expertise was split between Components 1 (financial expertise) and 2 (governance expertise). Component 3 represented a lack of independence. *ACIND* loaded negatively, which indicated reduced member independence. On the other hand, *ACOWN* loaded positively, also indicating reduced independence (Lin & Hwang 2010). Consequently, the Component 3 score was multiplied by -1, to represent independence. Component 4 was related to activity and, finally, Component 5 represented diversity.

Table 3: Development of audit committee and tone at the top components

PANEL A: AUDIT COMMITTEE EFFECTIVENESS					
Variable	**Comp 1** *Financial expertise*	**Comp 2** *Governance expertise*	**Comp 3** *Independence*	**Comp 4** *Activity*	**Comp 5** *Diversity*
ACFINEXP	0.7572				
ACGOVEXP		0.7378			
ACFIRMEXP		0.4925			
ACIND			-0.6714		
ACOWN			0.6795		
ACCHAIR					
ACMEET				0.5461	
ACSIZE				0.7592	
ACRACE					0.6680
ACGENDER					0.6095

PANEL B: TONE AT THE TOP		
Variable	**Comp 1** *Certain, pessimistic tone*	**Comp 2** *Realistic, diverse tone*
ACT		
OPT	-0.6059	
CER	0.6286	
REAL		0.6787
COMM		-0.6027

Components were determined using PCA with varimax rotation. Only components with eigenvalues greater than one were retained. The table reports loadings that exceeded 0.4.
Statistics for the sufficiency of the audit committee characteristics data for PCA included the Bartlett test of sphericity of 1010.669 ($p<.01$) and the Kaiser-Meyer-Olkin measure of sampling adequacy of 0.584, indicating sufficiency to conduct PCA (Biswas et al. 2022). A rho of 0.6763 was obtained.
Statistics for the sufficiency of the tone at the top data for PCA included the Bartlett test of sphericity of 320.109 ($p<.01$) and the Kaiser-Meyer-Olkin measure of sampling adequacy of 0.532, indicating sufficiency to conduct PCA (Biswas et al. 2022). A rho of 0.5475 was obtained.
(Source: Own)

Measurement of tone at the top

This study focused on the CEO as the proxy for top management, as they represent the foremost decisionmaker in a company, and they are expected to have the most significant influence on the tone at the top (Craig & Amernic 2018; Hope & Wang 2018). Prior studies commonly measured tone at the top using either CEO statements in the annual report (Amernic et al. 2010; Patelli & Pedrini 2015; Purda & Skillicorn 2015), or earnings conference call transcripts (Kayed & Meqbel 2024; Larcker et al. 2007; Larcker & Zakolyukina 2012). These documents are used as proxies for tone at the top, as leadership is demonstrated via language (Craig & Amernic 2011).

This study used CEO statements in the integrated reports. Although this is a limitation of the study, as such statements are carefully planned and not spontaneous, they are widely

available in South Africa, whereas spontaneous narratives—such as earnings conference calls and related transcripts—are not. Also, CEO statements are sufficiently important to investors that they impact investment decisions, as they are a key strategic tool used to convey a company's future prospects (Segars & Kohut 2001). Craig and Amernic (2011) identified the CEO statement as the most widely read element of the annual report. Finally, CEO statements are unaudited, allowing the CEO to express their views (Boudt & Thewissen 2019; Craig & Amernic 2018).

A pertinent issue, is whether CEOs write their own statements in the annual report. If CEOs do not, or are not sufficiently involved in the process, the CEO statement cannot be expected to adequately reflect the CEO's tone and is, therefore, not a suitable proxy for the tone at the top (Craig & Amernic 2011). However, Craig and Amernic (2011) provided four reasons why CEO statements were suitable proxies, despite the potential that others wrote them. Firstly, prominent CEOs have indicated their personal involvement in writing the statements (Craig & Amernic 2011). Secondly, should a CEO use a ghost writer for the letter, they would thoroughly brief the writer to ensure the statement conveys their underlying message and intent (Craig & Amernic 2011). Thirdly, the statement is attributed to the CEO and signed by them. As such, CEOs are legally responsible for the statement's content and would analyse the final version prior to signing it (Craig & Amernic 2011). Finally, stakeholders perceive the letter to be written by the CEO. As such, this attribution, the document's importance, and the CEO's pride will ensure that the CEO is involved in writing the letter (Craig & Amernic 2011).

This study used the bag-of-words approach to analyse CEO statements, which is informed by certain studies, such as those by Bassyouny et al. (2020) and Patelli and Pedrini (2015). Whilst domain-specific wordlists, such as that developed by Loughran and McDonald (2011), produce more accurate tone measures (Henry & Leone 2016), they are limited to identifying a positive or negative tone. This is inadequate to capture the tone at the top. Instead, so as to obtain a more holistic measure of a company's tone at the top, this study used the five main themes of the DICTION software (Patelli & Pedrini 2015).

DICTION uses thirty-one dictionaries to identify five main themes, i.e., activity, certainty, commonality, optimism and realism (refer to Appendix 1 for a detailed breakdown). Activity (*ACT*) represents movement, aggression, and change (Hart & Carroll 2015). It emphasises personal accomplishments, narcissism, and self-confidence and, likely, represents

overconfidence and risk-taking (Patelli & Pedrini 2015). Consequently, an active tone is likely to be positively associated with FSM (Alshorman 2016). Optimism (*OPT*) highlights a person's or group's positive aspects (Hart & Carroll 2015). It is also a form of impression management, used to manipulate stakeholders' perceptions (Patelli & Pedrini 2015). As such, higher optimism would be associated with more FSM. Certainty (*CER*) relates to resolve, inflexibility, and authority (Hart & Carroll 2015), and is associated with transactional leadership (Patelli & Pedrini 2015). Certainty in a CEO tends to represent a bias that their viewpoint is the only correct one (Alshorman 2016). A CEO with a certain tone may be more willing to engage in FSM to validate their views. Realism (*REAL*) reflects matters that affect people daily (Hart & Carroll 2015). Realism increases with the ease of reading the narrative, reflecting transparency (Patelli & Pedrini 2015). Under impression management theory, complex language is used to redirect attention (Patelli & Pedrini 2015). Consequently, higher realism scores should be associated with reduced earnings management. Conversely, Alshorman (2016) argued that realism is a feature of pragmatic leaders, who may rationalise FSM to achieve pragmatic outcomes. It may also indicate CEO hubris. Thus, he argued that increased realism would be associated with higher FSM. However, Craig and Amernic (2018) noted that realism in CEO statements is an attempt to appeal to a target audience and, thus, a common feature of the writing style, rather than an indicator of hubris. Finally, commonality (*COMM*) reflects the agreed-upon values of a community (Hart & Carroll 2015). It highlights interaction, cooperation, and the development of mutual understanding (Patelli & Pedrini 2015). As such, commonality is indicative of the CEO actively attempting to meet stakeholder expectations. Such a CEO should provide better quality financial information, thereby reducing FSM (Alshorman 2016).

Table 3, Panel B, presents the outcome of the tone at the top PCA with the five DICTION themes, reduced to two components. Component 1 comprises optimism and certainty. The negative loading of optimism is consistent with Cho et al. (2010), who found that optimism and certainty have opposite effects on impression management. Furthermore, as certainty represents a confident, authoritative CEO (Patelli & Pedrini 2015), optimism is expected to load in the opposite direction, as it causes the CEO to appear naïve and unrealistic (Wunderley et al. 1998). This tone was labelled a certain, pessimistic tone.

Component 2 comprises realism and commonality, that are expected to decrease FSM (Patelli & Pedrini 2015). However, commonality loaded negatively. Commonality relates to the collective and is negatively affected by diversity (Hart & Carroll 2015). This negative loading

may be explained, as the realism tone relates to present issues and transparency (Hart & Carroll 2015). Whereas transparency is a core component of ethical leadership, diversity is a current issue in South Africa. Diversity features highly in governance codes, as an imperative (IoDSA 2016). This tone was labelled a realistic, diverse tone.

3.2.3 Control variables

A series of control variables, shown to influence FSM, were included. *EATYPE* was a dummy variable assigned the value of 1, if the company was audited by a member of the Big 4 (i.e., Deloitte, EY, KPMG or PriceWaterhouseCoopers), otherwise, it was assigned 0 (Felix et al. 2021). *OPCASH* represented the operational cash flow over total assets (Sellami & Slimi 2016). *NEGATIVE* was an indicator variable showing whether the company experienced negative earnings (Patelli & Pedrini 2015). Leverage (*LEV*) was measured as debt to assets (Lin et al. 2006). Firm size (*SIZE*) was calculated as the natural log of market capitalisation (Sun et al. 2014). The market-to-book ratio represented growth opportunities, i.e., *GROW* (Patelli & Pedrini 2015). Finally, *JOINTCEO* was a dummy variable assigned the value of 1, if the company had joint CEOs, otherwise, it was assigned 0.

3.3 Testing the interaction between audit committee effectiveness and tone at the top

Interaction terms were introduced into equation (1) to test the moderating effect between committee effectiveness and tone at the top:

$$FSM_{it} = \delta_0 + \delta_1 AUDITCOMM_{it} + \delta_2 TONE_{it} + \delta_3 AUDITCOMM_{it} * TONE_{it} + \delta_4 CONTROLS_{it} + \varepsilon_{it} \quad (3)$$

Where $AUDITCOMM_{it}$*$TONE_{it}$ is a vector of interaction terms. As Hypothesis 6 is non-directional, a significant coefficient on this term would indicate a rejection of the null hypothesis. All other variables maintained their meaning.

4 Results

This section presents the study results. Firstly, the descriptive statistics are presented and discussed. Following this, the regressions excluding the interaction terms, are presented. Finally, the full regressions including the interactions between tone at the top and audit committee effectiveness, are presented.

4.1 Descriptive statistics

Table 4 shows that 1.48% of firm-year observations were fraudulent. Furthermore, mean absolute discretionary accruals amounted to 5.38% of total assets. This level of discretionary accruals was similar to Eloff and Steenkamp's (2022) findings in South Africa, over a comparable period. The mean of income-increasing and income-decreasing accruals were similar, representing that accruals reverse over time.

The audit committee variable means aligned with the King III (IoDSA 2009) and King IV (IoDSA 2016) recommendations. As King IV became effective for financial years commencing on or after 1 April 2017, King III was predominantly applicable to this sample. Most committee members (54.32%) were financially literate (King III principle 3.2.4; King IV principle 55). On average, an audit committee had 0.7619 external appointments. This was less than the three external directorships regularly used in the academic literature to define busy directors (Ferris et al. 2020), indicating that South African audit committee members were not too busy to carry out their duties. Committee tenure averaged 6.0409 years, which is below the nine years required for a rigorous review of independence (King III principle 2.18.8). Contrary to the recommendation of a fully independent audit committee (King III principle 2.18.8; King IV principle 56), the mean of *ACIND* was 95.75%, which was reasonably close. Of concern, was that certain committees only evinced 33.33% of members being independent. This implied that some audit committees might not have been sufficiently independent to execute their duties.

Committee share ownership was low (0.45%), again indicating greater independence. King III and IV recommend that the board chair and CEO are not committee members (King III principle 3.2.3; King IV principle 36a). Contrary to this, 19.63% of observations were non-compliant. For these observations, this implied that the board chair or CEO might have been overly powerful and inhibited the committee's operations. On average, audit committees convened 4.0824 times annually, exceeding King III's recommendation of twice per year (principle 3.1.4). The mean committee size was 3.4222 members, which slightly exceeded the guidance of three members (King III principle 3.2.2). Racial diversity exceeded gender diversity. It's worth noting that, based on the mean and median committee size of approximately three members, the racial- and gender diversity means indicated that one member was non-white, and one member was female. This lack of representation might

imply tokenism on the committee, that could detract from its effectiveness and the intentions of the King codes.

The means of the tone at the top measures indicated high optimism and realism levels, that exceeded the normal range of corporate financial reports, provided by DICTION. These ranges are based on Fortune 500 companies and may, therefore, not be comparable to South African companies. The activity, certainty, and commonality means fell within DICTION's normal range. The means of activity, optimism, and certainty aligned with those achieved by Totowa and Mokoaleli-Mokoteli (2021), of 49.0424, 55.3488 and 47.0869, respectively. No prior South African study—identified as using DICTION—reported on the realism and commonality components, for comparative purposes.

Table 4: Descriptive statistics (pooled sample)

Variable	Observations	Mean	Median	Standard deviation	Skewness	Kurtosis	Minimum	Maximum
Financial statement manipulation variables								
FSM_FRAUD	1 080	0.0148	0.0000	0.1209	8.0321	65.5150	0.0000	1.0000
FSM_EMABS[1]	953	0.0538	0.0377	0.0518	1.6915	5.8786	0.0000	0.2481
FSM_EMINC	476	0.0535	0.0392	0.0501	1.5279	5.1294	0.0000	0.2216
FSM_EMDEC	477	0.0541	0.0364	0.0534	1.8194	6.4019	0.0001	0.2481
AC variables								
ACFINEXP	1 080	0.5432	0.6000	0.2586	-0.1434	2.6455	0.0000	1.0000
ACGOVEXP	1 080	0.7619	0.6667	0.6625	0.7719	2.9409	0.0000	2.6667
ACFIRMEXP	1 080	6.0409	5.4326	3.3110	0.8978	3.5978	0.6137	16.2822
ACIND	1 080	0.9575	1.0000	0.1293	-3.1975	12.8195	0.3333	1.0000
ACOWN	1 080	0.0045	0.0000	0.0185	6.6385	50.6830	0.0000	0.1553
ACCHAIR	1 080	0.1963	0.0000	0.3974	1.5292	3.3386	0.0000	1.0000
ACMEET	1 080	4.0824	4.0000	1.4246	1.1903	5.0160	2.0000	9.0000
ACSIZE	1 080	3.4222	3.0000	0.7889	1.2205	4.5803	2.0000	6.0000
ACRACE	1 080	0.4541	0.4000	0.2852	0.1344	2.3548	0.0000	1.0000
ACGENDER	1 080	0.2684	0.3333	0.2256	0.2785	2.1077	0.0000	0.7500
Tone at the top variables								
ACT	1 080	49.5756	49.7100	1.8421	0.4859	4.0406	43.4900	53.8900
OPT	1 080	54.8487	54.5450	3.3958	0.5178	3.1592	48.2400	64.8000
CER	1 080	46.5725	47.4400	4.3782	-1.2502	5.0370	30.2000	53.5900
REAL	1 080	52.2958	52.3550	2.6290	-0.4460	3.8832	43.1900	58.2400
COMM	1 080	49.2727	49.3700	1.8761	-0.0927	3.8463	44.1100	54.9100
Control variables								
EATYPE	1 080	0.8204	1.0000	0.3841	-1.6691	3.7860	0.0000	1.0000
OPCASH	1 080	0.0828	0.0828	0.0929	-0.7343	6.0051	-0.2867	0.3282
NEGATIVE	1 080	0.1843	0.0000	0.3879	1.6288	3.6530	0.0000	1.0000
LEV	1 080	0.4800	0.4790	0.1700	0.0370	2.4508	0.1182	0.8483
SIZE	1 080	15.3938	15.3236	2.2473	0.0732	2.5095	10.6825	20.6207

Table 4: Descriptive statistics (pooled sample) (continued)

Variable	Observations	Mean	Median	Standard deviation	Skewness	Kurtosis	Minimum	Maximum
GROW	1 080	1.0571	0.7126	1.0065	2.1177	8.2993	0.0287	5.5354
JOINTCEO	1 080	0.0167	0.0000	0.1281	7.5510	58.0170	0.0000	1.0000

[1] To calculate the discretionary accruals using the Kothari model, any industry-year combination with fewer than 10 observations was excluded (Kothari *et al.* 2005). Consequently, 127 firm-year observations relating to the healthcare, oil and gas, technology, and telecommunications industries, were excluded.
(Source: Own)

4.2 Audit committee effectiveness and tone results

The regression results for the audit committee and tone components are presented in Table 5. Surprisingly, the financial expertise component revealed an insignificant relationship with FSM. Although contrary to expectations, this finding was in line with Felix et al. (2021) and Ghafran et al. (2022). The governance expertise component showed a positive and significant relationship with the FSM measures of fraud and absolute discretionary accruals. This may indicate that the committee had become overly familiar with management, on account of long tenure—mean of 6.0409 years and maximum of 16.28 years. Given the low mean, median and maximum for outside directorships, excessive director busyness was unlikely to be an issue. Governance expertise had an insignificant relationship with income-increasing and decreasing discretionary accruals. Thus, contrary to the expectations of agency theory, H_1—a negative association between audit committee expertise and FSM—was rejected.

The independence component was statistically insignificant across all discretionary accrual measures of FSM, which is in line with studies by Al-Absy et al. (2018), Braswell (2018) and Sellami and Slimi (2016). However, a positive, significant relationship was present for the fraud measure of FSM. This might have resulted from the information disadvantages experienced by outside directors. Consequently, in line with managerial hegemony, H_2—a negative association between audit committee independence and FSM—was rejected.

The activity component was negatively associated with FSM, and was statistically significant for fraud, absolute, and income-increasing discretionary accruals. This aligned with findings by Ghafran et al. (2022) and Zalata et al. (2022), indicating that an active committee is more diligent in executing its duties. The insignificant relationship with income-decreasing discretionary accruals may be due to income-decreasing accruals being considered more conservative (Chang et al. 2021), drawing less focus from the committee. Thus, support for H_3—a negative relationship between audit committee activity and FSM—was found, in line with the agency- and resource dependency theories.

The diversity component showed a positive but insignificant association for all FSM measures. This was in contrast to studies by Bala et al. (2020), Masmoudi and Fourati (2020), and Zalata et al. (2022). In South Africa, the conflict between pressure to conform and tokenism—evident from the low diversity in the descriptive statistics—may outweigh the benefits of different perspectives. Consequently, contrary to resource dependency theory, H_4—a negative association between audit committee diversity and FSM—was rejected.

The results for the audit committee effectiveness proxies showed that expertise, independence and diversity were not as important, in relation to FSM, as committee activity. Governance codes, such as the King Codes in South Africa and the Sarbanes-Oxley Act of 2002 in the United States, place heavy emphasis on expertise—particularly financial expertise—and independence. In South Africa, employment equity requirements place a significant emphasis on diversity. Consequently, given the large focus on expertise, independence and diversity in South Africa, the incremental benefit in relation to FSM is negligible (Ghafran & O'Sullivan 2017). A committees activity level, however, receives less focus in the regulations. Thus, most companies aim to meet the minimum requirements, as shown in Table 4, where the median number of meetings is 4 and the median committee size is 3. Committee activity provides the members with an opportunity to use their expertise, independence and diversity (Bédard et al. 2004). Consequently, it implies that regulators and shareholders should ensure that audit committees are sufficiently active, so as to ensure that they have an opportunity to use the members' skill sets, and execute their duties.

The results showed that neither tone component affected FSM. This contradicted Kayed and Meqbel (2024), Larcker and Zakolyukina (2012) and Patelli and Pedrini (2015), who found statistically significant relationships between tone and FSM. This could be explained by the fact that previous studies considered tone characteristics individually, rather than building comprehensive measures that consider the relationships between tones. Notably, the certain, pessimistic tone was dominated by optimism and certainty. Of these, Patelli and Pedrini (2015) only found certainty significantly related to fraud, whilst optimism was not. The realistic, diverse tone comprises realism and commonality. Patelli and Pedrini (2015) found that both have significant negative relationships with fraud risk. However, realism and commonality loaded into the PCA component in opposite directions, indicating offsetting effects. Consequently, H_5 —that a relationship between tone at the top and FSM exists—was rejected. The findings for hypotheses H_1 to H_5 were robust, for different panel regression models, including ordinary least squares, fixed effects and random effects where applicable.

The results for the tone at the top variables showed that it was irrelevant, when considering the likelihood of FSM in a company's financial statements. CEO statements in the annual reports are not spontaneous, such as earnings conference calls, restricting how well tone at the top is conveyed in CEO statements (Hope & Wang 2018; Larcker & Zakolyukina 2012). Consequently, shareholders seeking to uncover the true tone at the top of a company may need to focus on spontaneous communication formats.

Table 5: Regression estimates of audit committee effectiveness and tone

	(1)	(2)	(3)	(4)
	Fraud[1] *FSM_FRAUD*	Absolute discretionary accruals[2] *FSM_EMABS*	Income-increasing discretionary accruals[3] *FSM_EMINC*	Income-decreasing discretionary accruals[2] *FSM_EMDEC*
Financial expertise component	0.1350	-0.0001	0.0010	0.0035
	(0.3365)	(0.0028)	(0.0024)	(0.0050)
Governance expertise component	0.4168**	0.0074**	-0.0017	0.0048
	(0.2032)	(0.0032)	(0.0025)	(0.0053)
Independence component	0.9488*	-0.0021	0.0023	-0.0043
	(0.5324)	(0.0021)	(0.0018)	(0.0030)
Activity component	-1.1722**	-0.0055*	-0.0054*	-0.0039
	(0.5232)	(0.0028)	(0.0031)	(0.0044)
Diversity component	0.6808	0.0035	0.0015	0.0052
	(0.6623)	(0.0025)	(0.0022)	(0.0041)
Certain, pessimistic tone	-0.2457	0.0017	-0.0005	0.0021
	(0.2344)	(0.0017)	(0.0018)	(0.0025)
Realistic, diverse tone	-0.1122	-0.0004	0.0008	-0.0023
	(0.1709)	(0.0019)	(0.0020)	(0.0026)
EATYPE	-1.5827	-0.0170	-0.0053	-0.0836**
	(1.4104)	(0.0152)	(0.0092)	(0.0357)
OPCASH	-4.3345*	0.0149	-0.1636***	0.2096***
	(2.5954)	(0.0397)	(0.0537)	(0.0526)
NEGATIVE	-1.3253	0.0105*	-0.0078	0.0173*
	(1.3464)	(0.0063)	(0.0073)	(0.0094)
LEV	0.6157	0.0540*	-0.0110	0.1281***
	(1.2797)	(0.0278)	(0.0171)	(0.0431)
SIZE	0.9725***	0.0022	-0.0006	-0.0011
	(0.2503)	(0.0045)	(0.0017)	(0.0065)
GROW	-1.8256	-0.0001	0.0010	-0.0076
	(1.2091)	(0.0044)	(0.0028)	(0.0070)
JOINTCEO[4]		0.0092**	0.0156	
		(0.0041)	(0.0106)	
Constant	-17.8640***	0.0049	0.0832***	0.0638
	(3.1960)	(0.0656)	(0.0241)	(0.0951)
Observations	1 080	953	476	477
Clusters	196	179	162	163
Chi-squared	121.240***		33.740***	
F		3.246***		5.389***
Pseudo R-squared	0.2857			
R-squared		0.3464		0.5291
Adjusted R-squared		0.1812		0.2553
Between R-squared			0.0999	

Table 5: Regression estimates of audit committee effectiveness and tone (continued)

[1] Pooled logit regression with clustered standard errors was applied, as the dependent variable was binary.
[2] A fixed effects panel regression model was applied based on the outcome of the Hausman test.
[3] A random effects panel regression model was applied based on the Hausman test outcome.
[4] JOINTCEO was excluded from the fraud regression, on account of perfect prediction. It was excluded from the income-decreasing discretionary accruals, as it was non-zero for only one cluster.
Cluster robust standard errors are presented in parenthesis, to address heteroskedasticity and autocorrelation. Based on the correlation matrix, no issues with multicollinearity were identified.
*** p<.01, ** p<.05, * p<.1
(Source: Own)

Regarding the control variables, *EATYPE* showed a negative relationship with FSM. However, the coefficient was only significant in the income-decreasing model. This general lack of significance was consistent with research findings by Sellami and Slimi (2016), and Zalata et al. (2022). *OPCASH* showed a significant negative relationship with fraud and income-increasing accruals, but a positive relationship with income-decreasing accruals. This indicated that companies with higher operating cash flows were less likely to engage in fraud or inflate earnings. This contradicted Sellami and Slimi's (2016) findings, that evinced no relationship. *NEGATIVE* showed a statistically significant negative relationship with absolute discretionary accruals. This appeared to be driven by income-decreasing discretionary accruals. Companies already incurring losses may manage earnings downward to assist in achieving future performance targets (Saleh & Ahmed, 2005). *LEV* revealed a significant positive relationship with absolute discretionary accruals, driven by a significant positive relationship with incomedecreasing accruals. Higher debt levels are considered a replacement for shareholder monitoring (Sellami & Slimi 2016). Companies with higher debt levels may act more conservatively, by decreasing profits to avoid scrutiny by debt providers. *SIZE* showed a statistically significant positive relationship with fraud, but no significant association with any discretionary accrual measure. This general lack of a relationship was consistent with Patelli and Pedrini (2015). Growth prospects showed an insignificant relationship with FSM, consistent with Sellami and Slimi (2016). Finally, *JOINTCEO* was positively associated with absolute discretionary accruals.

4.3 The moderating role of tone at the top on audit committee effectiveness

This section explores whether tone at the top moderates the relationship between the audit committee proxies and FSM. Table 6 presents the regression results that include these moderating effects. The individual committee and tone components' findings remained unchanged from Table 5. The one exception was that the activity component was no longer significantly related to income-increasing discretionary accruals. Similarly, the results of the

control variables remained unchanged, except for *NEGATIVE*, which was no longer significantly associated with absolute discretionary accruals.

The interaction terms revealed interesting relationships, particularly regarding fraud. Financial expertise became more effective in constraining fraud under a certain, pessimistic tone. This component reflects financially knowledgeable directors who may view such a tone as riskier and, therefore, better apply their knowledge to constrain FSM. This finding was conceptually similar to that of Zhong et al. (2022), who found that older and more educated board members better constrain powerful CEOs. Alternatively, a certain, pessimistic CEO may expect more from financially knowledgeable directors, and drive them to pay more attention to the company. Under upper echelons theory, if the CEO has more respect for financially knowledgeable directors, other employees will also show them more respect and assist them, by providing better quality information. However, in a realistic, diverse tone, financial expertise showed a significant, positive relationship with fraud.

The independence component also became more effective under a certain, pessimistic tone. Under a realistic, diverse tone, however, independence's effectiveness was unaffected.

The activity component was less effective in addressing fraud in the presence of a certain, pessimistic tone. Similarly, the diversity component's effect was also weakened in the presence of a certain, pessimistic tone. Regarding activity, Lisic et al. (2016) suggested that this is due to the tone reflecting a top management that controls the agenda, in line with managerial hegemony. For diversity, such a tone may indicate that the company disregards different viewpoints and confines the diverse director to a token role. Conversely, both activity and diversity became more effective in a company with a realistic, diverse tone. This tone may empower the diverse directors' viewpoints, thus benefiting from the additional resources they bring, rather than treating them as tokens. This behaviour would then lend such directors the legitimacy to execute their duties (Lewellyn & Muller-Kahle 2020).

The interaction results were less pronounced, when considering discretionary accruals. Financial expertise reduced the extent of income-decreasing discretionary accruals, under a certain, pessimistic tone, only. Financial expertise's effectiveness remained unchanged, under a realistic, diverse tone. Governance experience was enhanced in reducing absolute discretionary accruals, only under a realistic, diverse tone. As with fraud, absolute discretionary accruals demonstrated that activity became less effective under a certain,

pessimistic tone. The effectiveness of both independence and diversity remained unchanged under the certain, pessimistic tone and the realistic, diverse tone.

The study outcomes, therefore, supported the hypothesis that the tone at the top moderates the audit committee's effectiveness concerning fraud. However, there was only limited support for its moderating effect regarding discretionary accruals (H_6). These findings were robust for different panel regression models. Overall, these results showed that, whilst tone at the top may not have an association with FSM on its own, it does influence the effectiveness of the audit committee. This implies that regulators and shareholders should pay more attention to a company's tone at the top and how it interacts with the audit committee characteristics, to ensure that the audit committee's effectiveness is enhanced, rather than inhibited.

Table 6: Regression estimates of the moderating effect of tone at the top on audit committee effectiveness

	(1) Fraud[1] *FSM_FRAUD*	(2) Absolute discretionary accruals[2] *FSM_EMABS*	(3) Income-increasing discretionary accruals[3] *FSM_EMINC*	(4) Income-decreasing discretionary accruals[2] *FSM_EMDEC*
Financial expertise component	0.1709	-0.0000	0.0011	0.0017
	(0.3014)	(0.0030)	(0.0024)	(0.0054)
Governance expertise component	0.4999**	0.0076**	-0.0018	0.0044
	(0.2060)	(0.0032)	(0.0026)	(0.0052)
Independence component	1.6094**	-0.0028	0.0018	-0.0054*
	(0.6824)	(0.0023)	(0.0020)	(0.0029)
Activity component	-1.3980***	-0.0052*	-0.0051	-0.0045
	(0.4936)	(0.0029)	(0.0032)	(0.0042)
Diversity component	0.8330	0.0029	0.0013	0.0045
	(0.6648)	(0.0026)	(0.0023)	(0.0040)
Certain, pessimistic tone	-0.2552	0.0015	-0.0006	0.0019
	(0.2389)	(0.0017)	(0.0018)	(0.0026)
Realistic, diverse tone	0.2592	-0.0002	0.0007	-0.0024
	(0.4263)	(0.0019)	(0.0021)	(0.0030)
Interaction of certain, pessimistic tone with:				
Financial expertise component	-0.1567*	-0.0015	-0.0008	-0.0052**
	(0.0888)	(0.0014)	(0.0014)	(0.0026)
Governance expertise component	-0.1641	0.0006	-0.0004	0.0012
	(0.1047)	(0.0016)	(0.0018)	(0.0035)
Independence component	-0.6175*	0.0004	0.0002	-0.0001
	(0.3406)	(0.0015)	(0.0012)	(0.0015)
Activity component	0.4796***	0.0022*	0.0006	0.0024
	(0.1618)	(0.0014)	(0.0019)	(0.0020)
Diversity component	0.4854***	-0.0007	-0.0003	-0.0017
	(0.1560)	(0.0015)	(0.0014)	(0.0025)
Interaction of realistic, diverse tone with:				
Financial expertise component	0.2767*	0.0007	-0.0015	0.0018
	(0.1421)	(0.0015)	(0.0019)	(0.0023)
Governance expertise component	0.2222	-0.0035*	-0.0018	-0.0011
	(0.1527)	(0.0019)	(0.0020)	(0.0025)
Independence component	-0.1588	0.0017	0.0017	-0.0013
	(0.6334)	(0.0015)	(0.0019)	(0.0023)
Activity component	-0.3999***	-0.0017	-0.0014	-0.0011
	(0.1495)	(0.0018)	(0.0020)	(0.0025)
Diversity component	-0.3038***	-0.0001	0.0012	-0.0007
	(0.0922)	(0.0017)	(0.0017)	(0.0024)
EATYPE	-1.8510	-0.0175	-0.0040	-0.0805**
	(1.4291)	(0.0149)	(0.0094)	(0.0350)

Table 6: Regression estimates of the moderating effect of tone at the top on audit committee effectiveness (continued)

	(1) Fraud[1] *FSM_FRAUD*	(2) Absolute discretionary accruals[2] *FSM_EMABS*	(3) Income-increasing discretionary accruals[3] *FSM_EMINC*	(4) Income-decreasing discretionary accruals[2] *FSM_EMDEC*
OPCASH	-5.1238*	0.0150	-0.1617***	0.2129***
	(2.9684)	(0.0402)	(0.0537)	(0.0525)
NEGATIVE	-1.3129	0.0101	-0.0082	0.0173*
	(1.2565)	(0.0064)	(0.0075)	(0.0095)
LEV	0.0876	0.0523*	-0.0090	0.1193***
	(1.7985)	(0.0275)	(0.0172)	(0.0423)
SIZE	1.2067***	0.0024	-0.0007	0.0001
	(0.3386)	(0.0046)	(0.0017)	(0.0064)
GROW	-2.0667	0.0000	0.0008	-0.0075
	(1.2837)	(0.0043)	(0.0028)	(0.0069)
JOINTCEO[4]		0.0082*	0.0153	
		(0.0042)	(0.0124)	
Constant	-21.8382***	0.0035	0.0828***	0.0459
	(4.7319)	(0.0666)	(0.0238)	(0.0946)
Observations	1 080	953	476	477
Clusters	196	179	162	163
Chi-squared	150.980***		46.330***	
F		3.220***		4.007***
Pseudo R2	0.363			
R-squared		0.3545		0.5408
Adjusted R-squared		0.1806		0.2488
Between R-squared			0.126	

[1] Pooled logit regression with clustered standard errors was applied, as the dependent variable was binary.
[2] A fixed effects panel regression model was applied based on the outcome of the Hausman test.
[3] A random effects panel regression model was applied based on the Hausman test outcome.
[4] JOINTCEO was excluded from the fraud regression, on account of perfect prediction. It was excluded from the income-decreasing discretionary accruals, as it was non-zero for only one cluster.
Cluster robust standard errors are presented in parenthesis to address heteroskedasticity and autocorrelation.
*** p<.01, ** p<.05, * p<.1
(Source: Own)

5 CONCLUSION

Recent corporate frauds and scandals have led researchers to focus on the audit committee's role in ensuring the quality of financial statements. The results of empirical studies in this area, vary. This study hypothesised that these mixed results might be ascribed to prior studies not considering the role of a company's tone at the top. Using 1 080 firm-year observations, this study tested the moderating effect of two composite tones (a certain, pessimistic tone and a realistic, diverse tone) on the relationship between audit committee effectiveness—

measured as financial expertise, governance expertise, independence, activity and diversity—and FSM.

Contrary to the expectations of agency theory, this study found that governance expertise and independence were positively associated with FSM. Higher governance expertise might signify that directors are too familiar with the company to constrain FSM effectively, whilst independent directors may suffer from information disadvantages. In line with agency- and resource dependency theories, activity was negatively related to FSM, indicating that active committees constrain FSM. The tone components showed no independent association with FSM.

The study found that tone at the top did moderate the relationship between audit committee effectiveness and FSM. This moderating effect was more pronounced for the fraud measure than the discretionary accruals measure. Stakeholders, in a company where the top management displayed a certain, pessimistic tone, would prefer an audit committee that has greater financial expertise and independence, as these characteristics constrain fraud more effectively. However, under such a tone, stakeholders would seek lower activity and diversity, as its moderation was associated with reduced ability to curb fraud. Conversely, stakeholders in a company with a realistic, diverse top management tone, would favour higher activity and diversity levels, as the positive impact of these on fraud prevention was enhanced under such a tone, however, such stakeholders would prefer lower financial expertise. When considering discretionary accruals, the results showed weaker explanatory power. A certain, pessimistic tone showed evidence of inhibiting activity. On the other hand, a realistic, diverse tone enhanced governance expertise.

These findings contribute to the existing literature in several ways. Firstly, the study corroborated the major audit committee characteristics currently used in the literature, i.e., expertise, independence, activity and diversity. By developing composite measures, the study showed how the various proxies for these characteristics fit together and complement each other. Secondly, the results showed how the committee is either empowered or overpowered by different tones at the top. Audit committee members must be more aware of the company's tone at the top and how it may compromise their effectiveness. Likewise, investors must be mindful of a company's tone at the top and what type of directors would best serve on the committee, in order to constrain FSM. Finally, auditors should pay more

attention to the interaction between the company's audit committee characteristics and tone at the top, when assessing company risk and setting audit procedures.

This study was not without limitations. The unbalanced nature of fraud and non-fraud observations might have led to biased inferences. Consequently, future research could use other FSM measures of fraud risk. The study was also limited to measuring fraud and discretionary accruals. Future studies should incorporate real-earnings management measures. The study also used audit committee characteristics that were observable from integrated reports. Audit committees are complex, thus, observable characteristics may not provide the entire picture. Future research may consider more nuanced aspects of the audit committee and its members. Furthermore, the study used an automated bag-of-words approach to identify the tone at the top. Whilst such methods are helpful, they do not consider the word's context, possible double meanings, and negation words. Future studies could use manual analysis and apply domain-specific wordlists, to overcome this. The final limitation was that tone at the top was measured based on CEO statements in the integrated reports. Such statements are carefully planned and not spontaneous, therefore, their tone may not reflect the company's true tone at the top. Future studies should consider more spontaneous methods of communication from which to derive tone at the top.

Appendix 1: Summary of variables used in the study

VARIABLE	ACRONYM	OPERATIONALISATION	DATA SOURCE
Dependent variable			
Financial statement manipulation	FSM_FRAUD	*Financial statement fraud:* Dummy variable assigned the value of one if the firm-year observation was subject to an FSCA enforcement action, FRIP restatement or qualified audit opinion (due to an IFRS violation).	FSCA website, IRESS database and company annual reports.
	FSM_EMABS FSM_EMINC FSM_EMDEC	*Discretionary accruals:* Measured using the cross-sectional Kothari model and operationalised as absolute discretionary accruals (*FSM_EMABS*), income-increasing discretionary accruals (*FSM_EMINC*) and income-decreasing discretionary accruals.	Underlying financial data obtained from the Standard and Poor's Capital IQ and Bloomberg databases.
Independent variables ***Tone at the top characteristics***			
Activity	ACT	[Aggression + Accomplishment + Communication + Motion] – [Cognition + Passivity + Embellishment]	Hand collected from company annual reports and analysed using DICTION 7.1.5
Optimism	OPT	[Praise + Satisfaction + Inspiration] – [Blame + Hardship + Denial]	Hand collected from company annual reports and analysed using DICTION 7.1.5
Certainty	CER	[Tenacity + Leveling terms + Collectives + Insistence] – [Numerical terms + Ambivalence + Self reference + Variety]	Hand collected from company annual reports and analysed using DICTION 7.1.5
Realism	REAL	[Familiarity + Spatial terms + Temporal terms + Present concern + Human interest + Concreteness] – [Past concern + Complexity]	Hand collected from company annual reports and analysed using DICTION 7.1.5
Commonality	COMM	[Centrality + Cooperation + Rapport] – [Diversity + Exclusion + Liberation]	Hand collected from company annual reports and analysed using DICTION 7.1.5

Appendix 1: Summary of variables used in the study (continued)

VARIABLE	ACRONYM	OPERATIONALISATION	DATA SOURCE
Audit committee characteristics			
Financial expertise	ACFINEXP	The proportion of financial experts on the audit committee.	Hand collected from company annual reports.
Governance expertise	ACGOVEXP	Average outside directorships held by the audit committee.	Hand collected from company annual reports.
Firm expertise	ACFIRMEXP	Average board tenure of the audit committee.	Hand collected from company annual reports.
Independence	ACIND	The proportion of independent directors on the audit committee.	Hand collected from company annual reports.
Share ownership	ACOWN	Total percentage shareholding of the audit committee.	Hand collected from company annual reports.
CEO/Chair presence	ACCHAIR	A dummy variable assigned the value of one if either the CEO or board chairperson serves on the audit committee; otherwise, zero.	Hand collected from company annual reports.
Meeting frequency	ACMEET	The number of audit committee meetings held.	Hand collected from company annual reports.
Size	ACSIZE	The number of directors on the audit committee.	Hand collected from company annual reports.
Racial diversity	ACRACE	The proportion of non-white directors on the audit committee.	Hand collected from company annual reports.
Gender diversity	ACGENDER	The proportion of female directors on the audit committee.	Hand collected from company annual reports.
Control variables			
External auditor type	EATYPE	A dummy variable assigned the value of one if the auditor is a member of the Big Four; otherwise, zero.	Hand collected from company annual reports.
Operating cash to total assets	OPCASH	Operating cash flows divided by total assets.	Underlying financial data was obtained from the Standard and Poor's Capital IQ and Bloomberg databases.
Negative earnings	NEGATIVE	A dummy variable assigned the value of one if the company recorded negative net profit; otherwise, zero.	Underlying financial data was obtained from the Standard and Poor's Capital IQ and Bloomberg databases.

Appendix 1: Summary of variables used in the study (continued)

VARIABLE	ACRONYM	OPERATIONALISATION	DATA SOURCE
Debt to assets	LEV	Total liabilities divided by total assets.	Underlying financial data was obtained from the Standard and Poor's Capital IQ and Bloomberg databases.
Firm size	SIZE	Natural log of market capitalisation.	Underlying financial data was obtained from the Standard and Poor's Capital IQ and Bloomberg databases.
Growth	GROW	Market capitalisation divided by the book value of total assets.	Underlying financial data was obtained from the Standard and Poor's Capital IQ and Bloomberg databases.
Joint CEO	JOINTCEO	A dummy variable assigned the value of one if the company has joint CEOs; otherwise, zero.	Hand collected from company annual reports.

(Source: Own)

CHAPTER 4: AUDIT QUALITY AND FINANCIAL STATEMENT MANIPULATION: THE MODERATING EFFECT OF TONE AT THE TOP

4.1 Paper outline

Chapter 4 presents a paper that addressed Objectives 2 and 4. While this paper again considered the relationship between tone at the top and financial statement manipulation, it differs from the paper in Chapter 3 by focusing on the external auditor and how tone moderates the relationship between the external auditor and financial statement manipulation. This paper used the same methodology as the paper in Chapter 3 to extract the dominant autocratic and pragmatic tones. Thereafter, principal component analysis was used to develop indices for external auditor quality related to independence and competence.

Panel regression analysis confirmed the results from Chapter 3, that tone at the top is not directly related to financial statement manipulation. However, the autocratic tone enhances the auditors' competence in reducing financial statement fraud. This reveals that competent auditors respond to an increased fraud risk by autocratic leaders. However, competent auditors under an autocratic leadership tone are associated with higher levels of income-increasing accruals-based earnings management, indicating that while competent auditors address the fraud risk, they still allow management to push the boundaries of acceptable accounting practices. Therefore, shareholders and audit committees must show increased support to competent auditors in the presence of autocratic management. This is particularly with respect to the appropriate treatment of accruals to ensure the financial statements fairly present a company's financial position and performance.

4.2 Statement of author contribution

The University of KwaZulu-Natal, College of Law and Management Studies, offers a PhD by Publication that aligns with international practice. This declaration confirms that the paper presented in Chapter 4 of this thesis, "Audit quality and financial statement manipulation: The moderating effect of tone at the top", is the doctoral candidate's original work, as stated in Declaration 2: Publications.

Signed: Mr AM Marais

4.3 Paper as published in International Journal of Economics and Financial Issues

Section 4.3 presents the paper in its published form. The reference list has been removed, as the reference list to this thesis represents an amalgamation of all references used in all chapters of this thesis.

Citation:

Marais, A. 2023. Audit quality and financial statement manipulation: The moderating effect of tone at the top. *International Journal of Economics and Financial Issues, 14*(5), 220-232, DOI: https://doi.org/10.32479/ijefi.16409.

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Appendix D

Audit Quality and Financial Statement Manipulation: The Moderating Effect of Tone at the Top

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Abstract

South Africa has recently fallen victim to numerous major corporate frauds. This has called into question South Africa's audit quality, as indicated by its loss of the number one place for auditing and reporting standard strength, according to the World Economic Forum. This study examined the moderating effect of tone at the top on the relationship between audit quality and financial statement manipulation. Using a South African sample of 829 firm-year observations from 2011 until 2018, principal component analysis was used to construct two audit quality variables (competence and independence) and two tone at the top variables (autocratic and pragmatic). Financial statement manipulation was measured using fraud and discretionary accruals. The findings revealed that while an autocratic tone strengthened the negative relationship between audit quality and fraud, it also resulted in higher income-increasing discretionary accruals. This study contributes to the audit quality literature in South Africa by revealing how the tone at the top can affect the auditor's ability to conduct a quality audit. The results will interest auditors and shareholders seeking to reduce fraud and earnings management.

Keywords: Audit Quality, Financial Statement Manipulation, Discretionary Accruals, Fraud, Tone at the Top, South Africa

JEL Classifications: G340, M410, M420

1. Introduction

The audit function aims to ensure that financial statements are free from material misstatement and error (DeFond and Zhang, 2014). However, numerous corporate scandals (such as Enron and Worldcom) have occurred despite this fundamental role. Various regulatory reforms have been introduced to address this issue, of which the Sarbanes-Oxley Act (SOX) in the United States (US) is one of the most well-known and influential worldwide. SOX marked a shift from a self-regulating audit profession in the US to a government-regulated one. Similarly, South Africa has recently been affected by large corporate fraud (such as Tongaat-Hulett and Steinhoff). South Africa implemented the new Companies Act, No. 71 of 2008 (effective 2011) and developed a series of world-renowned governance codes (referred to as the King codes) (Mokoaleli-Mokoteli and Iatridis, 2017). These regulatory reforms have reshaped the audit environment, intending to improve audit quality (DeFond and Zhang, 2014). Despite these reforms, South Africa has recently been the victim of major corporate frauds such as Steinhoff and Tongaat-Hulett. Consequently, as a result of the governance reforms and continued corporate frauds globally, there has been a surge in academic research focusing on audit quality (Baatwah et al., 2018).

Audit quality is the auditor's ability to identify and report on manipulations of financial statements (DeAngelo, 1981). Prior literature identifies two auditor attributes required to produce high-quality audits: Competence and independence (Harber and Marx, 2020). Competence is the auditor's ability to identify violations and is commonly proxied by auditor type (Yasser and Soliman, 2018), industry specialisation (Baatwah et al., 2018) and joint auditors (Piot and Janin, 2005). Independence relates to reporting such violations and proxies include auditor size (Mokoaleli-Mokoteli and Iatridis, 2017), auditor tenure (Mukhlasin, 2018), and the provision of non-audit services (Hohenfels and Quick, 2020). Despite extensive research, empirical evidence on the relationship between audit quality and financial statement manipulation (FSM) remains mixed. This may be because the proxies are considered individually. The individual variables may reflect different aspects of audit quality, providing an incomplete picture (Singh et al., 2019). Therefore, a composite variable may better represent the construct by considering the orthogonal relationships between the proxies (Sun and Cahan, 2009).

Additionally, mixed evidence may result from failing to consider the moderating effect of tone at the top, which is the foundation of a company's internal control environment (Garrett

et al., 2022). Management may manipulate the extent and quality of the information provided to the auditors (Lisic et al., 2016). Therefore, auditing standards require auditors to assess management characteristics such as tone at the top (Greiner et al., 2020). An ethical tone would enable the auditor to modify audit procedures nature, timing and extent and rely more on management representations (Garrett et al., 2022). When assessing tone at the top, Schmidt (2014) notes three biases which work against auditors. Firstly, prior mental representations of management (which are more likely to be positive) will impact current assessments and audit judgements. Secondly, the tone at the top evidence is more likely to reflect favourably on management rather than unfavourably. Thirdly, audit procedures are designed to find positive rather than negative evidence. Despite these concerns, Zengin-Karaibrahimoglu et al. (2021) showed that auditors adjust their risk assessments for top management narcissism. However, the tone at the top's impact on auditor competence and independence is yet to be explored.

This study investigates the moderating effect of tone at the top on the relationship between audit quality and FSM for non-financial companies in South Africa. South Africa poses a unique context for this investigation. Firstly, because as a developing country with a dual economy, the country shares aspects of both developed and developing countries (Wesson, 2021). With their predominant focus on developed economies, existing studies on audit quality or tone are not generalizable to developing economies with lower investor protection (Bicudo de Castro et al., 2019; Makhlouf et al., 2021). Secondly, South Africa held the top position for auditing and reporting standard strength from 2010 to 2016 (Wesson, 2021), a ranking that subsequently dropped to 30th following revelations of various economic crimes (Mnguni and Subban, 2022). Thirdly, South African literature on auditor quality is limited, predominantly due to a lack of data availability (Wesson, 2021). Recent audit quality research has focused on the Independent Regulatory Board for Auditor's decision to enforce mandatory audit firm rotation (see, for example, Harber and Marx, 2020). Consequently, this is the first study to investigate the moderating effect of tone at the top on audit quality in South Africa.

This study contributes to the literature in several ways. Firstly, it extends the research on audit quality effect on FSM by considering a comprehensive set of audit quality measures. Unlike prior research, I built composite variables to account for the relationships between individual proxies using principal component analysis (PCA). My results identify two composite audit quality variables: competence and independence. While competence does not

reveal any association with FSM, independence is associated with larger absolute discretionary accruals driven by larger income-decreasing accruals. A second contribution of the study is its addition to the literature by considering the moderating effect of tone at the top on the relationship between audit quality and FSM. Bicudo de Castro et al. (2019) note that the impact of tone on auditor risk assessments requires further exploration, while Makhlouf et al. (2021) call for including moderator variables within studies. My results indicate that the interaction between an autocratic tone and auditor competence is negatively associated with fraud. However, this interaction is associated with more income-increasing discretionary accruals. Finally, the study corroborates prior literature by showing that tone at the top improves the ability to explain financial statement manipulation.

The remainder of this study is arranged as follows. The next section presents the literature review. Herein, I define FSM before reviewing the prior evidence around the audit quality proxies. Following this, I explain the research methodology, present the results and draw conclusions.

2. Literature review

2.1. Defining Financial Statement Manipulation

Financial statement fraud is "a deliberate attempt by corporations to deceive or mislead users of published financial statements, especially investors and creditors, by preparing and disseminating materially misstated financial statements" (Rezaee, 2005, p. 279). Financial statement fraud violates acceptable accounting frameworks (Dechow and Skinner, 2000). Earnings management occurs when management uses the flexibility allowed within the accounting frameworks to mislead financial statement users (Dechow and Skinner, 2000). Thus, both financial statement fraud and earnings management are intended to deceive the user, but fraud violates the accounting frameworks while earnings management does not. I broadly define FSM to incorporate both concepts.

2.2. Agency Theory and Audit Quality

The separation of ownership and control creates an agency relationship between the shareholder and management (Jensen and Meckling, 1976). This relationship creates information asymmetries, allowing management to act in their own best interests (Makhlouf et al., 2021). Consequently, agency costs are incurred to align management and shareholder interests. Credible financial statements reduce information asymmetry, allowing shareholders

to monitor management (DeFond and Zhang, 2014). However, they require independent assurance of these financial statements, generally provided by external auditors (Mukhlasin, 2018). A high-quality audit, therefore, mitigates opportunistic FSM (Lin and Hwang, 2010). The provision of a high-quality audit depends on two key auditor attributes discussed below: competence and independence (Harber and Marx, 2020). Given the large volume of literature, for brevity, I focus only on selected studies.

2.2.1. Auditor competence

Auditor competence reflects the auditor's ability to detect FSM. As such, I hypothesise that:

H_1: Greater auditor competence is associated with lower FSM.

Auditor competence is proxied using auditor type, industry specialisation and joint auditors. Auditor type is commonly proxied by Big N membership (DeFond and Zhang, 2014). The Big N companies, namely Deloitte, EY, KPMG and PWC, are larger in size and face greater litigation risk. Consequently, they attract greater accounting expertise, have greater exposure to different industries, offer better training and have more resources to monitor audit quality, resulting in higher-quality audits (Baatwah et al., 2018). The empirical evidence, however, is mixed. In line with expectations, Mokoaleli-Mokoteli and Iatridis (2017) and Makhlouf et al. (2021) found that auditor type was associated with lower FSM. However, studies conducted in countries with lower investor protection found that auditor type was associated with higher FSM (such as Baatwah et al., 2018; and Bala et al., 2020), while others found no association between auditor type and FSM (Magnis and Iatridis, 2017; Selahudin et al., 2018; Sellami and Slimi, 2016; Yasser and Soliman, 2018).

Industry specialists have greater knowledge of a particular industry and its accounting practices (Baatwah et al., 2018) and have more reputational capital at stake. Therefore, they should provide higher-quality audits (DeFond and Zhang, 2014). While the empirical evidence is mixed, it favours industry specialisation being associated with lower FSM levels (Balsam et al., 2003; Inaam and Khamoussi, 2016; Krishnan, 2003; Mukhlasin, 2018). However, other studies find no such relationship (Yasser and Soliman, 2018), or that industry specialisation results in more FSM (Baatwah et al., 2018).

Finally, joint auditors offer reciprocal checks on each other's diligence, improving competence (Piot and Janin, 2005). Collusion between the auditor and management is also less likely to occur, increasing independence (Marmousez, 2009). Few studies consider joint

audits due to their rarity in practice. Marmousez (2009) found that, in France, joint auditors increased FSM. She attributed this to one auditor's over-reliance on the other's work, thus reducing effort. Alternatively, Bisogno and De Luca (2016) and Zerni et al. (2012) found that Italian and Swedish companies that voluntarily engaged joint auditors had less FSM.

2.2.2. Auditor independence

Auditor independence relates to reporting FSM. Consequently, I hypothesise that:

H_2: Greater auditor independence is associated with lower FSM.

Common proxies for auditor independence include auditor size, auditor tenure and the provision of non-audit services. Joint auditors, discussed earlier, also enhance the auditor's independence.

Auditor size, like auditor type, is proxied as Big N membership. Big N firms have a larger customer base and more financial resources, resulting in lower dependence on one client than smaller firms. As discussed under auditor type, the empirical evidence on auditor size is mixed. The literature does not attempt to disentangle the Big N effects between competence and independence (DeFond and Zhang, 2014).

Audit tenure has become increasingly topical, with several countries introducing mandatory audit firm rotation. One argument is that longer audit tenure increases familiarity with the client, reducing independence (Harber and Marx, 2020). Alternatively, longer audit tenure improves client knowledge, increasing audit quality (Nugrahanti and Puspitasari, 2018). The empirical evidence on tenure is mixed. Al-Thuneibat et al. (2011) found that longer tenure resulted in higher FSM levels. Conversely, El Guindy and Basuony (2018) and Mukhlasin (2018) found that longer tenure reduced FSM. Finally, Özcan (2019) and Nugrahanti and Puspitasari (2018) found no association between audit tenure and FSM levels.

Non-audit services threaten independence in two ways. In the first, the auditor may end up making decisions for the client. In the second, the auditor may become financially dependent on the client (DeFond and Zhang, 2014). Conversely, non-audit services provide the auditor with greater insight into the client's operations, allowing for higher-quality audits (DeFond and Zhang, 2014). Hohenfels and Quick (2020) found that non-audit services increased FSM levels, whereas Svanström (2013) found that non-audit services reduced the extent of FSM. It may be that different non-audit services affect the FSM level differently. In further analysis,

Hohenfels and Quick (2020) found that other assurance and consultancy services increased FSM, while tax services had no effect.

2.3. Tone at the Top, Audit Quality and Financial Statement Manipulation

Tone at the top is the ethical culture a company's top management creates through their language and actions. It forms the foundation of a company's internal control system (Schmidt, 2014) and influences employees' ethical behaviour (Noviyanti and Winata, 2015). Tone at the top is apparent in top management language, as it enables them to create a company's identity and manage others' expectations (Patelli and Pedrini, 2015). Consequently, tone at the top may be conveyed through the CEO and chairperson's letters in the financial statements, financial press appearances, and other similar sources (Amernic et al., 2010). Thus, linguistic analysis of these communication types provides insight into a company's tone at the top.

Amernic et al. (2010) investigated linguistic analysis in measuring the tone at the top. Given the severity of recent corporate frauds, they noted that a more holistic approach to understanding financial information is necessary, with a greater appreciation of top management narratives. Following this, increased attention has been given to the linguistic analysis of top management narratives and their relationship to FSM.

Early studies relied on human coders to perform linguistic analysis. While this has greater precision, it is hampered by smaller samples and low replicability (Li, 2010). Technological advances have enabled automated approaches. These can be either statistical (such as Naïve Bayesian algorithms used by Li, 2010) or dictionary-based. Initially, the statistical approach was superior, as no dictionary was explicitly developed for the corporate setting (Li, 2010). Since then, however, domain-specific wordlists (such as Henry, 2008; Loughran and McDonald, 2011) have been developed and successfully used along with general wordlists such as Harvard General Inquirer (GI), Linguistic Inquiry and Word Count (LIWC) and DICTION. Consequently, the dictionary approach has gained favour.

Hope and Wang (2018) and Larcker and Zakolyukina (2012) applied the LIWC dictionary in the US context. The DICTION software was used in Australia by Alshorman (2016) and in the US by Patelli and Pedrini (2015). Abou-El-Sood and El-Sayed (2022) applied Henry's (2008) wordlist in the Middle East and North Africa region. Finally, Huang et al. (2018) and Kayed and Meqbal (2024) applied the Loughran and McDonald (2011) wordlist to companies in the US, UK and US-listed Chinese companies, respectively. All these studies found that

linguistic analysis of top management narratives provided incremental value in identifying FSM.

Most linguistic analysis studies have been performed in developed economies (Bicudo de Castro et al., 2019). In South Africa, linguistic analysis usage is limited, focusing on analyst stock recommendations (Caglio et al., 2020), integrated reporting (Mokoaleli-Mokoteli et al., 2009) and impressions management (Nel et al., 2022; Totowa and Mokoaleli-Mokoteli, 2021) rather than FSM. Thus, there is a gap in South African literature. Based on the international findings, I draw the following non-directional hypothesis:

H_3: Tone at the top is associated with FSM.

Given their position within a company, top management has an information advantage over a company's external stakeholders. Top management, therefore, has the power to determine what information is shared, how it is shared and when it is shared (Zengin-Karaibrahimoglu et al., 2021), consequently they may manipulate the evidence provided to the external auditor (Greiner et al., 2020). This may be achieved by using narratives to justify manipulated numbers and mitigate concerns (Abou-El-Sood and El-Sayed, 2022). To address this risk, the auditor must evaluate a company's tone at the top (International Auditing and Assurance Standards Board, 2019). Prior studies by Greiner et al. (2020), Rose et al. (2021) and Zengin-Karaibrahimoglu et al. (2021) have shown that auditors adjust their risk assessment to account for inappropriate tone in US and Dutch companies. However, internationally, there remains a gap considering how tone at the top moderates the external auditors ability to restrain FSM. Thus, I draw the following non-directional hypothesis:

H_4: Tone at the top moderates the relationship between audit quality and FSM.

3. Methodology

3.1. Sample

The initial sample comprised all 278 non-financial companies listed on the Johannesburg Stock Exchange between 2011 and 2018, representing 1673 firm years. Financial companies were excluded due to different regulations impacting that industry (Makhlouf et al., 2021). The 2011 year represents the 1st year that King III was effective in South Africa, ensuring adequate disclosure. The sample ended in 2018 to ensure sufficient time for regulators to identify and publish enforcement actions against fraudulent companies. Karpoff et al. (2017) noted the median time from fraud to first enforcement account in the US was 2.41 years.

Given that regulators in developing economies are not as advanced and well-resourced as their developed country counterparts (Rabin, 2016), 5 years (2019 to 2023) was deemed acceptable. This, however, is shorter than the period that Steinhoff and Tongaat-Hulett (two companies found guilty of FSM in South Africa) were identified as having committed FSM before they were discovered, being nine and 8 years, respectively.

I removed 52 firm years due to year-end changes and a further 488 firm years that did not contain separate CEO statements. Not all companies disclosed the required auditor data; consequently, I removed 279 firm years with missing data. Finally, 25 firm years were removed for companies with only one observation. A final sample of 829 firm years, representing 151 unique companies, remained. Table 1 presents a breakdown of the sample by industry.

Table 1: Sample by industry

Industry	Number of companies	Number of firm years
Basic material	43	246
Consumer goods	18	93
Consumer services	27	154
Healthcare	6	34
Industrials	45	233
Oil and gas	2	9
Technology	10	43
Telecommunications	3	17
Total	154[1]	829

[1]*The number of companies per industry (154) exceeds the number of unique companies in the sample (151). During the period, three companies changed industry classifications and have been included in both industries. However, the number of firm years only represents the years the three companies spent in each sector.*
(Source: Researcher's own construction)

3.2. Measuring Financial Statement Manipulation

DeFond and Zhang (2014) recommend using multiple measures of FSM. Therefore, I used two measures: fraud and discretionary accruals. In South Africa, two bodies investigate financial non-compliance. Thus, I identified fraud as companies found guilty through an applicable Financial Sector Conduct Authority (FSCA) enforcement action or forced Financial Reporting Investigation Panel (FRIP) restatement. In addition, I included qualified

audit opinions[17] within the fraud sample. Fraud is then measured as a dummy variable assigned the value of one if the company was guilty and zero otherwise (Marais et al., 2023).

I measured discretionary accruals using Kothari et al.'s (2005) cross-sectional, performance-adjusted model as defined in equation (1). This model improves upon the modified Jones model by including a performance and constant term, increasing the model power and reducing misspecification (Kothari et al., 2005).

$$\frac{TAC_{it}}{TA_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{it-1}}\right) + \alpha_2\left(\frac{\Delta \text{SALES}_{it} - \Delta REC_{it}}{TA_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{TA_{it-1}}\right) + \alpha_4 ROA_{it} + \varepsilon_{i,t} \quad (1)$$

Where TAC_{it} represents total accruals for company i in year t, TA represents total assets, $\Delta SALES$ is the change in sales, and ΔREC is the change in receivables, PPE is the gross book value of property, plant and equipment, and ROA is the return on assets. Discretionary accruals are measured as the residual in the equation, represented by the error term Ɛ. Discretionary accruals are calculated by performing separate regressions for each industry with more than ten observations in a financial year (Kothari et al., 2005). As a result, I excluded the healthcare, oil and gas, telecommunications and some years of the technology industry from these calculations. Consistent with Singh et al. (2019), I measured the magnitude of the discretionary accruals as the absolute value. I further partitioned the discretionary accruals into income-increasing and income-decreasing discretionary accruals.

3.3. Measuring Audit Quality

The prior literature uses a range of variables to measure the competence and independence attributes of audit quality. The proxies for auditor competence included in this study are auditor type, industry specialisation and joint auditors. Auditor type (*AUDTYPE*) is a dummy variable assigned the value of one if the auditor is a Big N auditor and zero otherwise (Baatwah et al., 2018). I measured industry specialisation (*AUDSPEC*) as the auditor's market share (based on the number of clients) in each industry (Balsam et al., 2003; Chin and Chi, 2009). Finally, joint auditors (*AUDJOINT*) is a dummy variable assigned the value of one if joint auditors audit the company and zero otherwise (Bisogno and De Luca, 2016).

I proxied auditor independence using auditor size, audit tenure and non-audit services. Like auditor type, auditor size is proxied by Big N membership. Audit tenure (*AUDTEN*) is the number of consecutive years a company is audited by the same auditor (Hohenfels, 2016). I

[17] I only included qualified audit opinions relating to fraud or an IFRS violation. Qualifications based on issues such as going concern were not included within the fraud sample.

measured audit fees (*AUDFEES*) as the ratio of audit service fees to total auditor fees (Hohenfels and Quick, 2020).

3.4. Measuring Tone at the Top

I measured tone at the top by extracting CEO statements from the company integrated reports. Although such CEO statements are carefully planned and not always directly written by the CEO, they are heavily involved in the process (Craig and Amernic, 2018). In South Africa, alternatives such as earnings conference calls are not available.

Following Patelli and Pedrini (2015), I applied a dictionary approach when analysing CEO statements. Although domain-specific wordlists are considered superior when analysing financial documents (Loughran and McDonald, 2011), they tend to identify only positive, negative or modal words, making them ill-suited to measuring tone at the top. Therefore, I used DICTION to measure tone at the top, consistent with Patelli and Pedrini (2015) and Totowa and Mokoaleli-Mokoteli (2021).

I used DICTION's five themes of activity, certainty, commonality, optimism and realism. Activity (*TONEACT*) refers to movement, change and avoiding inertia (Hart and Carroll, 2015). An active tone emphasises accomplishments, overconfidence and risk-taking (Greiner et al., 2020) and undermines credibility (Patelli and Pedrini, 2015). Certainty (*TONECER*) indicates determination, rigidity, completeness and authoritative speech (Hart and Carroll, 2015). It is a trait of transactional leaders (Patelli and Pedrini, 2015) and undermines verifiability and credibility (Greiner et al., 2020). Commonality (*TONECOM*) relates to group engagement and cooperation (Greiner et al., 2020). It creates a sense of community but may undermine independence (Alshorman, 2016). Optimism (*TONEOPT*) highlights the positive attributes of a person or group (Hart and Carroll, 2015). An optimistic tone tends to obscure failure while emphasising success (Greiner et al., 2020) and represents a form of impression management, reducing the quality of financial reporting (Alshorman, 2016; Patelli and Pedrini, 2015). An overly optimistic tone may portray the CEO as naïve (Wunderley et al., 1998). Finally, realism (*TONEREAL*) represents language dealing with real, day-to-day issues (Hart and Carroll, 2015). Increased realism is associated with greater transparency (Patelli and Pedrini, 2015), but is also a characteristic of a pragmatic leader (Alshorman, 2016). A pragmatic leader may be willing to manipulate financial statements to achieve an efficient outcome (Alshorman, 2016).

3.5. Developing Composite Variables for Audit Quality and Tone at the Top

Using individual variables to proxy for audit quality and tone at the top does not capture the orthogonal relationships between the variables (Tarchouna et al., 2017). I used PCA to create composite variables to address this. In addition, PCA reduces measurement error and potential multicollinearity, resulting in the composite variables having a greater impact than the individual variables (Biswas et al., 2022).

I retained audit quality and tone at the top components with eigenvalues greater than one (Larcker et al., 2007). After performing a varimax rotation, I used variables with absolute loading factors exceeding 0.40 to describe the component (Larcker et al., 2007). Finally, Bartlett's sphericity and the Kaiser-Meyer- Olkin test were used to determine the data's sufficiency for PCA (Biswas et al., 2022).

Table 2 presents the development of the PCA components. I retained two components for both audit quality and tone at the top. For audit quality (panel A), the first component comprises auditor type, auditor specialisation and joint auditors. I label this component as *COMPETENCE*. A Big N auditor (*AUDTYPE*) attracts better expertise and has access to more resources, resulting in greater competence. A specialist auditor has greater knowledge of the company's industry, while joint auditors may bring more resources. The second component consists of auditor type, audit tenure and audit fees. I label this component as *INDEPENDENCE*[18]. A longer audit tenure creates greater familiarity with management. Audit fees load negatively into this component. A lower proportion of non-audit services creates less financial dependence on the client. Auditor type also features in component 2 because Big N auditors are expected to be more independent due to greater reputational capital and a lower likelihood of financial dependence on clients. However, the positive loading appears to indicate lower independence. This anomaly may arise because the prior literature fails to distinguish between the competence and independence aspects of Big N auditors (DeFond and Zhang, 2014). Consequently, this conundrum needs to be resolved through further research.

Table 2 Panel B presents the tone at the top components. Component 1 comprises activity, certainty and optimism. This grouping is consistent with prior studies by Cho et al. (2010) and Totowa and Mokoaleli-Mokoteli (2021), who found that these tones were indicators of

[18] In component 2, longer audit tenure loaded positively, while higher audit fees (i.e. lower non-audit fees) loaded negatively. Hence, this component represented less independence. Consequently, component 2 was multiplied by negative one to represent independence.

impression management. The negative loading of optimism is consistent with Cho et al. (2010), who found that optimism and certainty had opposite loadings, and optimism made a CEO look naïve (Wunderley et al., 1998). Such tones are associated with confidence and authority, so I label component 1 as *AUTOCRATIC TONE*. Component 2 comprises commonality, optimism and realism. Commonality loads negatively into the component, indicating that the component focuses on greater diversity (Hart and Carroll, 2015). Given South Africa's history, a realistic leader is more likely to accommodate diversity, as it features highly in South Africa's governance codes (Institute of Directors in Southern Africa, 2016). Realism speaks to day-to-day issues, transparency and pragmatic leadership, while optimism's inclusion may indicate motivational leadership. Consequently, I label component 2 as a *PRAGMATIC TONE*.

Table 2: Development of audit quality and tone at the top principal component analysis components

Variable	Component 1; competence	Component 2; independence
Panel A: Audit quality		
AUDTYPE	0.4385	0.4243
AUDSPEC	0.6825	
AUDTEN		0.5997
AUDFEES		-0.6086
AUDJOINT	0.5808	
Variable	**Component 1; autocratic tone**	**Component 2; pragmatic tone**
Panel B: Tone at the top		
TONEACT	0.4571	
TONECER	0.6310	
TONECOM		-0.4913
TONEOPT	-0.4835	0.4676
TONEREAL		0.7111

Components were determined using PCA with varimax rotation. Only components with eigenvalues greater than one were retained. The table reports loadings that exceeded 0.4. Statistics for the sufficiency of the audit quality and tone at the top data for PCA included the Bartlett test of sphericity of 284.152 (P<0.01) and 235.405 (P<0.01), respectively, as well as the Kaiser-Meyer-Olkin measure of sampling adequacy of 0.536 and 0.543, respectively. This indicated sufficiency to conduct PCA (Biswas et al., 2022). A rho of 0.5427 was obtained for audit quality while a rho of 0.5468 was obtained for tone at the top. PCA: Principal component analysis.

(Source: Researcher's own construction)

3.6. Control Variables

I included seven control variables from the literature which affect FSM. I measured audit committee independence (*ACIND*) as the proportion of independent directors on the audit committee (Bicudo de Castro et al., 2019). I included operating cash flows to total assets

(*OPCASH*) (Sellami and Slimi, 2016) and a dummy variable assigned the value of one if the company experienced negative earnings in the current year and zero otherwise (*LOSS*) (Nugrahanti and Puspitasari, 2018). I measured leverage (*LEVER*) as debt to total assets (Singh et al., 2019), while firm size was calculated as the natural log of market capitalisation (*SIZE*) (Sun et al., 2014). Growth opportunities (*GROWTH*) were measured as the market-to-book ratio (Singh et al., 2019), and, finally, I included a dummy variable assigned the value of one if the company had joint CEOs and zero otherwise (*JOINTCEO*).

3.7. Regression Models

I used the following pooled logit and panel regression models[19] to test the relationship between audit quality, tone at the top and FSM:

$$FSM_{it} = \beta_0 + \beta_1 AUDPCA_{it} + \beta_2 TONEPCA_{it} + \beta_3 ACIND_{it} + \beta_4 OPCASH_{it} + \beta_5 LOSS_{it} + \beta_6 LEVER_{it} + \beta_7 SIZE_{it} + \beta_8 GROWTH_{it} + \beta_9 JOINTCEO_{it} + \varepsilon_{it} \quad (3)$$

Where *AUDPCA* and *TONEPCA* represent the vector of composite variables developed during the PCA, and all other variables are defined above.

I used the following model to test the moderating effect of tone at the top on the relationship between audit quality and FSM:

$$FSM_{it} = \beta_0 + \beta_1 AUDPCA_{it} + \beta_2 TONEPCA_{it} + \beta_3 AUDPCA_{it} \times TONEPCA_{it} + \beta_4 ACIND_{it} + \beta_5 OPCASH_{it} + \beta_6 LOSS_{it} + \beta_7 LEVER_{it} + \beta_8 SIZE_{it} + \beta_9 GROWTH_{it} + \beta_{10} JOINTCEO_{it} + \varepsilon_{it} \quad (4)$$

All continuous variables were winsorised at the first and ninety-ninth percentiles to address extreme outliers. I used cluster robust standard errors to address heteroskedasticity and autocorrelation (Hoechle, 2007).

4. Results and discussion

4.1. Descriptive Statistics

Table 3 presents the descriptive statistics. For brevity, I focus on the main variables used in this study (i.e. FSM, audit quality and tone at the top). I found that 1.93% of observations were fraudulent. Although this is higher than the 0.98% identified by Marais et al. (2023), the current sample covers a shorter period in which more corporate scandals were identified. Absolute discretionary accruals amount to 5.39% of total assets. Income-increasing

[19] The pooled logit model was used for the fraud measure of audit quality. Due to the lack of variability in the dependent variables within and across firms, panel logit was not feasible. The Hausman test was used to determine the appropriateness of fixed or random effects for discretionary accruals.

discretionary accruals are 5.43% of total assets, which is similar in value to the income-decreasing discretionary accruals of 5.34%. This closeness of value aligns with the reversing nature of accruals. Concernedly, the highest income-increasing discretionary accruals were reported at 72.7% of total assets (slightly lower than the 76.7% reported by Eloff and Steenkamp (2022) in South Africa over a similar period), while the maximum income-decreasing is only 47.52%.

Table 3: Descriptive statistics

Variable	Observations	Mean	Median	SD	Minimum	Maximum
Financial statement manipulation variables						
Fraud	829	0.0193	0.0000	0.1377	0.0000	1.0000
Absolute discretionary accruals	750[1]	0.0539	0.0366	0.0628	0.0000	0.7270
Income-increasing discretionary accruals	367	0.0543	0.0401	0.0648	0.0000	0.7270
Income-decreasing discretionary accruals	383	0.0534	0.0352	0.0609	0.0001	0.4752
Audit quality variables						
Auditor type (*AUDTYPE*)	829	0.8770	1.0000	0.3287	0.0000	1.0000
Audit specialisation (*AUDSPEC*)	829	0.2390	0.2308	0.1275	0.0149	0.7500
Audit tenure (*AUDTEN*)	829	22.7214	14.0000	23.1444	1.0000	103.0000
Audit fees ratio (*AUDFEES*)	829	0.8720	0.9021	0.1281	0.1954	1.0000
Joint auditors (*AUDJOINT*)	829	0.0133	0.0000	0.1145	0.0000	1.0000
Tone at the top variables						
Activity (*TONEACT*)	829	49.5399	49.66	1.9873	38.65	61.90
Certainty (*TONECER*)	829	46.6869	47.55	4.7665	-6.68	63.38
Commonality (*TONECOM*)	829	49.2946	49.40	1.9990	34.34	61.87
Optimism (*TONEOPT*)	829	54.8771	54.61	3.3524	45.01	69.84
Realism (*TONEREAL*)	829	52.3092	52.35	2.9279	41.64	85.51
Control variables						
Audit committee independence (*ACIND*)	829	0.9547	1.0000	0.1520	0.0000	1.0000
Operating cash flows (*OPCASH*)	829	0.0864	0.0857	0.1016	-0.6622	0.7410
Negative earnings (*LOSS*)	829	0.1737	0.0000	0.3791	0.0000	1.0000
Leverage (*LEVER*)	829	0.4813	0.4750	0.1686	0.0286	1.1653
Firm size (*SIZE*)	829	15.6949	15.8041	2.1915	10.2753	21.4349
Growth (*GROWTH*)	829	1.0867	0.7377	1.0581	0.0234	8.3679
Joint CEOs (*JOINTCEO*)	829	0.0205	0.0000	0.1418	0.0000	1.0000

[1]*The number of observations for the absolute discretionary accruals is less than the actual sample as the healthcare, oil and gas, technology, and telecommunications industries had fewer than the prerequisite ten observations per industry-year combination (Kothari et al., 2005). Consequently, I excluded 79 firm-year observations. AUDTYPE: Auditor type, AUDSPEC: Audit specialization, JOINTCEO: Joint CEOs, AUDTEN: Audit tenure, AUDFEES: Audit fees ratio, AUDJOINT: Joint auditors, ACIND: Audit committee independence, OPCASH: Operating cash flows, LOSS: Negative earnings, SD: Standard deviation*

(Source: Researcher's own construction)

Considering the audit quality variables, 87.7% of firm-year observations were audited by big-4 companies. This exceeds the concentration Wesson (2021) reported from 2010 to 2018, which ranged from 62.66% to 70.04%. My study excludes financial companies, while Wesson (2021) excludes non-South African engagement partners and joint auditors. Moreover, this study excludes companies with missing data. Had such companies been included, the proportion of observations audited by the big-4 would decrease to 76.45%, indicating that non-big-4 auditors are less likely to disclose all auditor information. Audit tenure indicates a mean of 22.72 years. This is longer than the 17 to 17.6 years reported by Wesson (2021). However, Wesson (2021) only reports audit tenure from 2016 until 2018. I found that 1.33% of companies have joint auditors, slightly more than the 0.98% of companies reported by Wesson (2021). Her proportion is based on the number of companies, while mine is based on firm-year observations. The auditor specialisation mean is 23.9%. This means that, on average, each company's auditor audited 23.9% of the companies in the related industry. Audit fees average 87.2% of total fees, leaving, on average, 12.8% for non-audit fees. This finding aligns with South African regulations that do not prohibit all non-audit services.

For the tone at the top variables, certainty has the lowest mean of 46.69, while optimism has the highest of 54.88. The means of activity, certainty and commonality all fall within the normal ranges provided by DICTION. The means of optimism and realism exceed the DICTION ranges, indicating that South African CEO statements are more optimistic and realistic than the Fortune 500 companies used to develop the DICTION ranges. However, given their different context, Fortune 500 companies may not be comparable to JSE-listed companies. Few South African studies have used linguistic analysis, DICTION in particular. Despite this, the means of activity, optimism and certainty are comparable to those obtained by Totowa and Mokoaleli-Mokoteli (2021), while the mean for commonality aligns with that obtained by Nel et al. (2022). Of the South African studies identified as using DICTION, only Nel et al. (2022) reported a score for realism. While their score was lower than the current study, it may have been driven by a smaller sample size and shorter study period.

4.2. Audit Quality and Tone at the Top Results

Table 4 presents the regression results for audit quality and tone at the top. All models have significant explanatory power for FSM. Auditor competence reveals no relationship with the fraud or discretionary accrual measures of FSM. While contrary to the theoretical

expectations, this aligns with studies by Magnis and Iatridis (2017), Sellami and Slimi (2016) and Yasser and Soliman (2018), who found that the underlying variables of auditor competence are unrelated to FSM. Thus, I found no support for H_1, that greater auditor competence is associated with lower FSM levels.

Auditor independence also reveals no statistically significant relationship with fraud. However, a positive association ($P < 0.05$) was found with absolute discretionary accruals. This appears to be driven by independence's association with higher levels of income-decreasing discretionary accruals ($P < 0.05$). To protect their independence, auditors may favour management decisions which decrease earnings (Bédard et al., 2004). Thus, I found no support for H_2 that greater auditor independence is associated with lower FSM levels. Instead, the evidence supports that independence is associated with higher income-decreasing discretionary accruals.

The autocratic tone shows no association with any measure of FSM. This is contrary to the majority of studies, which found that tone at the top provided incremental value in detecting FSM (Hope and Wang, 2018; Kayed and Meqbal, 2024; Patelli and Pedrini, 2015). This contrary finding may result from most studies considering individual tone variables, ignoring the relationships between such tones. Of the DICTION-specific studies, Alshorman (2016) found that activity, certainty and optimism are all positively associated with FSM, while Patelli and Pedrini (2015) only found certainty positively associated with FSM. I note that optimism loaded negatively in the PCA while activity and certainty loaded positively, indicating a potential offsetting of effects which was not considered by prior studies. In untabulated results considering the individual variables, I found that activity, certainty and optimism display no relationship with discretionary accruals. However, certainty and optimism have positive, significant associations with fraud (at the 1% and 5% levels, respectively). As these load in opposite directions in the PCA, this confirms that their effects offset, resulting in the composite autocratic tone variable revealing no relationship with fraud.

Table 4: Regression estimates of audit quality and tone at the top

Variable	(1) Fraud[1]	(2) Absolute discretionary accruals[2]	(3) Income-increasing discretionary accruals[3]	(4) Income-decreasing discretionary accruals[2]
Auditor competence	-0.4045 (0.5782)	0.0059 (0.0036)	0.0007 (0.0038)	0.0057 (0.0042)
Auditor independence	0.3620 (0.4364)	0.0111** (0.0050)	-0.0033 (0.0027)	0.0203** (0.0079)
Autocratic tone	-0.1079 (0.1730)	0.0024 (0.0016)	-0.0003 (0.0016)	0.0033 (0.0025)
Pragmatic tone	-0.1970 (0.2006)	-0.0016 (0.0020)	0.0016 (0.0022)	-0.0047* (0.0028)
ACIND[4]		-0.0093 (0.0179)	0.0294* (0.0167)	-0.0158 (0.0178)
OPCASH	-6.9934** (2.9876)	0.0593* (0.0337)	-0.1682*** (0.0558)	0.2171*** (0.0527)
LOSS	-1.9396 (1.2533)	0.0169** (0.0067)	-0.0011 (0.0078)	0.0222** (0.0107)
LEVER	2.0397** (0.9960)	0.0354 (0.0266)	-0.0205 (0.0192)	0.0561* (0.0329)
SIZE	0.3426* (0.1997)	-0.0065 (0.0054)	-0.0017 (0.0015)	-0.0180*** (0.0069)
GROWTH	-1.0992 (0.7424)	0.0015 (0.0041)	0.0011 (0.0029)	0.0008 (0.0063)
JOINTCEO[5]		0.0003 (0.0108)	0.0032 (0.0065)	
Constant	-9.0363*** (2.7141)	0.1350* (0.0796)	0.0703*** (0.0268)	0.2947*** (0.1012)
Observations	829	750	367	383
Number of companies	151	141	132	128
χ^2	69.67***		27.70***	
F		2.377***		5.457***
Pseudo R^2	0.139			
R^2		0.3657		0.5197
Adjusted R^2		0.2055		0.2510
Between R^2			0.127	

****P<0.01, **P<0.05, *P<0.1, [1]Pooled logit regression with clustered standard errors was applied as the dependent variable was binary, [2]A fixed effects panel regression model was applied based on the outcome of the Hausman test, [3]A random effects panel regression model was applied based on the Hausman test outcome, [4]ACIND was excluded from the fraud regression due to perfect prediction, [5]JOINTCEO was excluded from the fraud regression due to perfect prediction. It was excluded from the income-decreasing discretionary accruals because it was non-zero for only one cluster.*

Cluster robust standard errors are presented in parenthesis to address heteroskedasticity and autocorrelation. Based on the correlation matrix, I identified no issues with multicollinearity.

(Source: Researcher's own construction)

The pragmatic tone also shows no relationship with fraud. However, a negative association with income-decreasing discretionary accruals was identified, indicating that the pragmatic tone is associated with lower discretionary accruals. Alshorman (2016) found that only optimism is positively associated with FSM, while commonality and realism are not. Alternatively, Patelli and Pedrini (2015) found that commonality and realism are negatively associated with FSM. Untabulated results show no significant relationship between the individual variables with discretionary accruals. However, realism shows a negative association with fraud, while optimism shows a positive relationship. As these loaded in the same direction in the PCA, their effects would offset.

Generally, the tone at the top variables show no relationship with FSM. Thus, these results predominantly do not support H_3, that there is a relationship between tone at the top and FSM. An exception is that a pragmatic tone is associated with lower income-decreasing discretionary accruals. The findings for H_1 to H_3 are robust for different panel regression models.

Finally, I consider the control variables. Audit committee independence shows no relationship with absolute discretionary accruals and income-decreasing discretionary accruals. However, a positive relationship ($P < 0.1$) exists with income-increasing discretionary accruals. This positive relationship may result from information disadvantages due to the audit committee's independence from the company (Chen et al., 2020). Operating cash shows statistically negative relationships with fraud and income-increasing discretionary accruals and statistically significant positive associations with absolute and income-decreasing discretionary accruals. Although the discretionary accruals appear to have different signs, the overall indication is that higher operating cash is associated with downward earnings management (either through lower income-increasing or higher income-decreasing discretionary accruals). These findings contradict Sellami and Slimi (2016), who found no relationship. Companies incurring losses are associated with larger absolute discretionary accruals, driven by higher income-decreasing discretionary accrual levels. Companies experiencing losses may take big baths by managing their earnings downwards to reflect improved performance in future years (Jordan and Clark, 2004). Higher leverage is an alternative monitoring mechanism (Sellami and Slimi, 2016). Surprisingly, I found that higher leverage is positively associated with fraud. Liu et al. (2010) found that companies issuing new debt manage earnings upwards to achieve lower borrowing costs. Companies with higher debt levels may commit fraud for similar gains and to ensure covenants are met.

Higher leverage is also positively associated with greater income-decreasing discretionary accruals levels. Companies with more debt may act more conservatively to avoid the attention of debt holders. Firm size is positively associated with fraud. I also found a statistically significant negative relationship between size and income-decreasing accruals, indicating that larger firms are less likely to manage earnings downwards. Growth opportunities reveal no significant association with any measure of FSM, consistent with Sellami and Slimi (2016). Finally, the presence of joint CEOs also indicates no relationships.

4.3. The Moderating effect of Tone at the Top on Audit Quality

Table 5 presents the regression results that include the interaction between audit quality and tone at the top. The significance of the individual audit quality and tone at the top variables remain unchanged from Table 4, except for auditor competence. Competence now shows a statistically significant positive relationship with absolute discretionary accruals, indicating that the standalone auditor competence is associated with higher discretionary accruals when the interaction terms are included. Although the income-increasing and decreasing components do not reveal significant relationships, the direction of the coefficient signs (negative for income-increasing and positive for income-decreasing) may suggest the companies audited by more competent auditors manage their earnings downwards. There are three changes in the control variable results. Audit committee independence no longer shows a significant relationship with income-increasing discretionary accruals, while operating cash no longer reveals a significant relationship with absolute discretionary accruals. These were previously statistically significant, but only at the 10% level. The last change in the control variables is that companies experiencing losses reflect a statistically significant negative relationship with fraud ($P < 0.1$).

The interaction between an autocratic tone and auditor competence indicates a negative association with fraud and a positive relationship with income-increasing discretionary accruals. The components of the autocratic tone (activity, certainty and pessimism) are associated with authority, self-confidence and rigid thinking, which would increase audit risk (Alshorman, 2016; Patelli and Pedrini, 2015). The negative relationship with fraud confirms Zengin-Karaibrahimoglu et al.'s (2021) findings that competent auditors would increase their audit risk assessment, resulting in a commensurate adjustment to audit procedures. This adjustment outweighs the higher risk associated with the autocratic tone, thereby being associated with lower fraud. However, discretionary accruals are discretionary and fall within

the bounds of accepted accounting frameworks (Dechow and Skinner, 2000). Therefore, auditors may be less able to challenge or influence management's judgements. An autocratic leader with rigid thinking would be less willing to consider alternatives offered by the auditor.

The remaining interaction between an autocratic tone and independence, as well as a pragmatic tone and both competence and independence, reveal no statistically significant relationships with any measure of FSM. The lack of significant relationships for the remaining interaction terms has several possible explanations. On the one hand, South African auditors may not consider tone at the top as a material risk related to fraud and discretionary accruals and thus do not adjust their risk assessment. This appears to be justified, given the lack of statistically significant relationships found in this study between the tone at the top variables and FSM. Alternatively, auditors may not consider management's overall tone but only focus on certain tone aspects. Such an argument could explain why a relationship is only found with the autocratic tone, as the few prior South African studies using DICTION have focused on the activity, certainty and optimism components while excluding the commonality and realism tones (Caglio et al., 2020; Mokoaleli- Mokoteli et al., 2009; Totowa and Mokoaleli-Mokoteli, 2021). Furthermore, the major domain-specific wordlists for financial language (such as Henry, 2008; Loughran and McDonald, 2011) focus predominantly on the positive-negative tone relationship. Given the extensive research on this positive-negative tone, auditors may concentrate more on it while neglecting other tones. A final explanation may be that auditors do adjust their risk assessments based on the tone at the top (as found by Greiner et al., 2020; Rose et al., 2021; and Zengin-Karaibrahimoglu et al., 2021). This risk adjustment then almost perfectly offsets the risk effects (either positive or negative) of management's tone, resulting in an insignificant relationship to FSM. This explanation is less likely in South Africa, given that the individual tone variables already do not show any significant relationship with the FSM measures.

Consequently, I found only partial support for H_4, that tone at the top moderates the relationship between audit quality and FSM. Specifically, this partial support applies to the interaction between an autocratic tone and auditor competence. This finding for H_4 is robust for different panel regression models. Given the lack of support for H_4, I ran a Chi-squared test of the joint significance of the tone and interaction variables. The findings (presented in Table 5) reveal that the explanatory power of the models (excluding income-decreasing

discretionary accruals) is significantly improved by including the tone variables. This confirms the findings of prior studies that inclusion of tone at the top provides incremental value in identifying FSM (Hope and Wang, 2018; Patelli and Pedrini, 2015).

Table 5: Regression estimates of the moderating effect of tone at the top on audit quality

Variable	(1) Fraud[1]	(2) Absolute discretionary accruals[2]	(3) Income-increasing discretionary accruals[3]	(4) Income-decreasing discretionary accruals[2]
Auditor competence	-0.4223 (0.4903)	0.0074** (0.0034)	-0.0010 (0.0036)	0.0058 (0.0040)
Auditor independence	0.4419 (0.4017)	0.0111** (0.0049)	-0.0036 (0.0025)	0.0192** (0.0082)
Autocratic tone	-0.1496 (0.1675)	0.0025 (0.0016)	0.0005 (0.0016)	0.0032 (0.0028)
Pragmatic tone	-0.2122 (0.2476)	-0.0013 (0.0020)	0.0019 (0.0023)	-0.0053* (0.0031)
Interaction of autocratic tone with:				
Auditor competence	-0.2487* (0.1366)	0.0039 (0.0027)	0.0077*** (0.0024)	-0.0006 (0.0044)
Auditor independence	0.0816 (0.0849)	0.0014 (0.0018)	-0.0004 (0.0018)	0.0033 (0.0034)
Interaction of pragmatic tone with:				
Auditor competence	0.3641 (0.2673)	-0.0019 (0.0025)	-0.0001 (0.0025)	-0.0041 (0.0040)
Auditor independence	0.0347 (0.0936)	-0.0018 (0.0013)	-0.0015 (0.0018)	0.0017 (0.0020)
ACIND[4]		-0.0062 (0.0183)	0.0246 (0.0160)	-0.0145 (0.0181)
OPCASH	-7.5011** (3.1613)	0.0552 (0.0342)	-0.1632*** (0.0563)	0.2162*** (0.0521)
LOSS	-1.9725* (1.1633)	0.0162** (0.0065)	-0.0018 (0.0081)	0.0207* (0.0106)
LEVER	2.4504** (0.9869)	0.0353 (0.0256)	-0.0243 (0.0188)	0.0644** (0.0323)
SIZE	0.3816* (0.2175)	-0.0059 (0.0053)	-0.0020 (0.0015)	-0.0180** (0.0069)
GROWTH	-1.1686 (0.7821)	0.0013 (0.0041)	0.0003 (0.0028)	0.0007 (0.0066)
JOINTCEO[5]		0.0015 (0.0111)	0.0036 (0.0070)	
Constant	-9.9550*** (3.0565)	0.1238 (0.0786)	0.0829*** (0.0266)	0.2904*** (0.1030)
Observations	829	750	367	383
Number of companies	151	141	132	128
χ^2	90.95***		40.61***	
F		2.386***		4.470***
Pseudo R^2	0.1585			
R^2		0.3720		0.5251

Table 5: Regression estimates of the moderating effect of tone at the top on audit quality (continued)

Variable	(1) Fraud[1]	(2) Absolute discretionary accruals[2]	(3) Income-increasing discretionary accruals[3]	(4) Income-decreasing discretionary accruals[2]
Adjusted R^2		0.2081		0.2473
Between R^2			0.1654	
χ^2 for joint test of tone	18.74***	1.92*	19.31***	1.52

****P<0.01, **P<0.05, *P<0.1. [1]Pooled logit regression with clustered standard errors was applied as the dependent variable was binary, [2]A fixed effects panel regression model was applied based on the outcome of the Hausman test, [3]A random effects panel regression model was applied based on the Hausman test outcome, [4]ACIND was excluded from the fraud regression due to perfect prediction, [5]JOINTCEO was excluded from the fraud regression due to perfect prediction. It was excluded from the income-decreasing discretionary accruals because it was non-zero for only one cluster.*

Cluster robust standard errors are presented in parenthesis to address heteroskedasticity and autocorrelation. Based on the correlation matrix, I identified no issues with multicollinearity.

(Source: Researcher's own construction)

5. Conclusion

Given recent corporate scandals in South Africa (such as Steinhoff and Tongaat-Hulett) and the mixed evidence on the auditors' ability to detect and report on FSM, this study aimed to identify the moderating effect that tone at the top has on the relationship between audit quality and FSM. Using a sample of 829 firm-year observations, I used PCA to develop two comprehensive audit quality measures (competence and independence) and two comprehensive tone measures (autocratic and pragmatic). FSM was measured using identified fraud cases and discretionary accruals.

As individual variables, I found that auditor independence results in higher absolute discretionary accruals. This is driven by larger income-decreasing discretionary accruals indicating that firms who use more independent auditors tend to manage their earnings down. Stakeholders should, therefore, be aware that more independent auditors are likely to act more conservatively. Auditor competence failed to reveal any relationship with FSM. Independently, neither the autocratic nor pragmatic tones reveal an association with FSM. Regarding the interactions, an autocratic tone strengthens the negative association between fraud and audit competence, but also results in a more positive relationship between income-increasing discretionary accruals and auditor competence. Thus, stakeholders in a company with an autocratic tone should feel comforted by greater auditor competence, as it is associated with reduced fraud, but they should be aware that management may attempt to push the boundaries of acceptable accounting standards. Other than this, tone at the top was shown to have no moderating effect on the relationship between audit quality and FSM.

This study contributes to the existing literature in several ways. Firstly, it corroborates the critical traits of auditor quality used in the literature: Competence and independence. Using PCA to develop composite measures from an array of observable characteristics allows an understanding of how these characteristics work together and either complement or act as substitutes. Secondly, the study reveals how tone at the top moderates the audit quality. Although three of the four interaction terms show insignificant relationships, the findings still reveal areas where management could push the boundaries with competent auditors to inflate earnings within the scope of acceptable accounting frameworks. Finally, the study confirms the findings of the international literature that accounting for tone improves the ability to explain FSM in South Africa.

To conclude, the study has some limitations. Despite making an interesting contribution to the limited literature on tone at the top in developing countries, this may not be generalisable due to the focus on South Africa. Future studies should consider further research in alternative geographical locations or across country boundaries. Moreover, I only considered fraud and discretionary accruals as measures of FSM. The unbalanced nature of fraud and non-fraud observations may make it difficult to identify predictors of fraud. Discretionary accruals are also only one manner in which management may manipulate earnings. Future research should consider alternative measures of fraud risk, including real-earnings management measures and impression management measures. Another consideration is that tone at the top was measured using an automated bag-of-words approach using a general dictionary on planned CEO statements. While this method has various strengths, it does not consider domain-specific language and the carefully planned nature of CEO statements in the integrated reports. In the future, spontaneous communication methods should be used together with manual analysis of tone or domain-specific wordlists. Finally, audit quality is a complex construct. The observable characteristics used may not present a complete picture. Therefore, future research should identify more nuanced methods to proxy for audit quality.

CHAPTER 5: DOES TOP MANAGEMENT TONE MODERATE MARKET REACTION TO EARNINGS MANAGEMENT IN SOUTH AFRICA?

5.1 Paper outline

Chapter 5 presents this study's final paper, investigating Objective 5: how tone at the top moderates the market's reaction to financial statement manipulation. The market reaction is measured using cumulative abnormal returns, calculated using an event study methodology over eleven event windows ranging from two to forty-two days. Consistent with the papers presented in Chapters 3 and 4, the dominant tones extracted from the CEO statements are autocratic and pragmatic. For financial statement manipulation, the paper focused on accruals-based earnings management. Financial statement fraud is excluded, as it is not possible to detect in financial statements in South Africa using detection models, as shown in the paper presented in Chapter 2. Rather, it may only be revealed many years after the fraud has begun. For example, while the Steinhoff fraud was detected in December 2017, irregularities had begun in 2009 (FSCA, 2020a). Similarly, while the Tongaat-Hulett fraud was identified in 2018, the FSCA noted that the "prior period errors extended back over the past six years" (FSCA, 2020b: 2). Consequently, given the retrospective nature of fraud discovery, it is not possible for the market to contemporaneously know that fraud is being committed. Therefore, the market cannot react to the fraud and any discovered relationship would not be valid due to the market's lack of information. Rather, warning signs must be used, such as earnings management, which is considered a precursor to financial statement fraud (Mishra and Malhotra, 2016).

Panel regression analysis found that the market responds positively to an autocratic tone, suggesting that the South African market prefers certain, authoritative leadership. The market does not react to evidence of earnings management or the pragmatic tone. However, the market responds negatively to the interaction between the autocratic tone and earnings management. This implies that while the market appears unconcerned by individual signals indicating potential manipulation (i.e. high levels of earnings management and autocratic leadership on their own), the market does express concern through a suppressed market reaction when multiple fraud red flags are present.

5.2 Statement of author contribution

The University of KwaZulu-Natal, College of Law and Management Studies, offers a PhD by Publication that aligns with international practice. This declaration confirms that the paper

presented in Chapter 5 of this thesis, “Does top management tone moderate market reaction to earnings management in South Africa?” is the doctoral candidate’s original work, as stated in Declaration 2: Publications.

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Signed: Mr AM Marais

5.3 Paper as submitted to the Journal of Accounting, Finance and Auditing Studies

Section 5.3 presents the paper as submitted to the Journal of Accounting, Finance and Auditing Studies. The reference list has been removed, as the reference list to this thesis represents an amalgamation of all references used in all chapters of this thesis.

Does top management tone moderate market reaction to earnings management in South Africa?

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Abstract

This study investigated the South African market reaction to the interactive effect of top management tone and earnings management. A short-window event study methodology was used on 944 firm-year observations from 2011 until 2018 to measure the market response to earnings management and top management tone. The market response was measured using cumulative abnormal returns derived from the market model. The level of earnings management was determined using the Kothari model, while top management tone was measured by analysing the CEO statements using textual analysis software and principal component analysis. The study found that while the market did not react to earnings management independently, there was a significant adverse reaction when earnings management was paired with an autocratic tone. Consequently, this study creates an awareness of the market reaction to the combined effects of earnings and tone management. Investors, regulators and market analysts must be alert to potential manipulation by management through both mechanisms and incorporate these factors into their decision-making and risk-assessment models. This study adds to the limited literature on stock market reaction to earnings and tone management in South Africa. Specifically, it is the first study to consider the combined effects of these forms of manipulation.

Keywords: CEO statements; DICTION; Earnings management; Market reaction; Top management tone

JEL Classifications: G14, M14, M40

1. Introduction

Share price is a crucial indicator of company performance, reflecting a company's actual value. Rising prices indicate wealth creation, attracting investors to a company, whereas falling prices reveal a decline in investor confidence, threatening the company's survival (Darmawan et al., 2019). To protect the company's value, company leadership may influence stakeholder perceptions by engaging in earnings or tone management in corporate documents (Boudt & Thewissen, 2019).

Earnings management occurs when management uses judgment in preparing the financial statements to deceive the user (Healy & Wahlen, 1999). Manipulating the financial statements is challenging, however, as they must comply with accounting frameworks and be audited. An increased push for voluntary disclosures enables investors to protect themselves from earnings management by providing additional insights (Baber et al., 2006; Price et al., 2012). These voluntary disclosures give context to the financial statements and aid their interpretation (Lo et al., 2017). They also allow management to express their sentiments freely and convey private information (Craig & Amernic, 2018; Luo & Zhou, 2017). While these disclosures help stakeholders by decreasing information asymmetries, increasing evidence shows that they are used to mislead investors through impression management (Boudt & Thewissen, 2019). Consequently, this research used an events study to investigate how the tone used by the CEO in voluntary disclosures moderates the market reaction to earnings management contained in the annual financial statements in South Africa.

South Africa provides a unique context for the study given the severity of corporate scandals, such as Steinhoff and Tongaat-Hulett, despite the country being acknowledged as a leader in corporate governance and its strength in accounting and auditing practices (Janse van Vuuren et al., 2023; Wesson, 2021). Therefore, understanding how investors are manipulated through earnings and tone management is essential. However, South African research on these topics is limited, and earnings management and top management tone have only been studied separately. Rabin and Negash (2015) investigated the market reaction to earnings management on the Johannesburg Stock Exchange (JSE). They found that although the market adjusts for discretionary accruals (a tool used in earnings management), it could not distinguish between earnings-managed and non-earnings-managed companies. Alternatively, Totowa and Mokoaleli-Mokoteli (2021) investigated factors influencing impression

management in chairperson letters, while Nel et al. (2022) studied the association between optimism and future firm performance.

Overall, this study makes several contributions to the existing research. First, the study combines two distinct yet related areas of research: the market reaction to earnings management (see Kwag & Stephens, 2010; Latif & Yang, 2012; Rabin & Negash, 2015) and the market reaction to management tone (see Brockman et al., 2017; Rahman, 2019; Tonin & Scherer, 2022). Second, this study uses a broader range of tone measures. Prior studies (such as Brockman et al., 2017; Rahman, 2019; Tonin & Scherer, 2022; Yekini et al., 2016) have predominantly focused on the positive-negative spread (optimism). However, this provides a narrow analysis, and there is a need for more comprehensive studies, as investors may be influenced by a broader range of tones (Patelli & Pedrini, 2015). A third contribution is the study's extension of the work of Totowa and Mokoaleli-Mokoteli (2021) by considering the link between impression management and earnings management and answering the call to investigate the market reaction. Finally, the study explores an African economy in a research field dominated by the United States, Europe and Asia.

The following section reviews the prior literature, the third section describes the methodology employed, the fourth presents the results, and the final section concludes.

2. Literature review

This section reviews the theoretical framework and prior empirical literature used to develop the hypotheses for this research.

2.1 Theoretical framework

The theoretical framework for this research rested on the agency and signalling theories. Under agency theory, shareholders employ managers to run a business and increase its value (Darmawan et al., 2019). This separation of ownership and control means managers have greater insights into the company than the shareholders, leading to information asymmetries (Price et al., 2012). Management may use financial statements or voluntary disclosures to signal the market, reducing information asymmetries (Davis et al., 2012; Healy & Wahlen, 1999). On the one hand, signalling theory suggests that management may act in good faith and signal the company's prospects to the market. Good news will be responded to positively, increasing the company's value (Darmawan et al., 2019). On the other hand, management

may be motivated by selfish goals. Then, any signals would be interpreted as a consequence of the agency problem, leading to an adverse market reaction (Latif & Yang, 2012).

2.2 The market reaction to earnings management

Earnings management occurs when managers use the judgement allowed in accepted accounting frameworks to mislead stakeholders about a company's performance (Healy & Wahlen, 1999). Simple earnings management practices can mislead the market and, if undetected, exploit the information asymmetry problem, resulting in share mispricing (Rabin & Negash, 2015). This is because the market assumes that the managed earnings reflect the actual performance (Darmawan et al., 2019).

Numerous studies have considered market reaction to earnings management, especially in the United States. Baber et al. (2006) and Gavious (2007) studied the short-term market reaction to earnings management for quarterly earnings announcements and annual financial statements, respectively. They found that the market could adjust for earnings management when provided with sufficient supplementary information. Kwag and Stephens (2010), however, found that investors tended to under-adjust in highly managed firms. Latif and Yang (2012) found that, contrary to the expectation of the market punishing firms for managing earnings, earnings aggressiveness and smoothing helped to buffer the share price against negative news.

Outside the United States, Rabin and Negash (2015) studied listed non-financial South African companies. They found that investors negatively priced discretionary accruals but could not differentiate between earnings-managed and non-earnings-managed companies. In Indonesia, Darmawan et al. (2019) and Susanto (2017) considered the effect of earnings management on firm value, while Rahmawati and Irnawati (2024) considered earnings management's effect on share returns. Darmawan et al. (2019) found that accruals-based earnings management did not affect firm value, while real-earnings management negatively affected firm value. Susanto (2017) similarly found that real-earnings management was negatively associated with firm value but that accruals-based earnings management positively affected company value. When studying a single company, Rahmawati and Irnawati (2024) found that earnings management did not affect share returns. Finally, Al-Shattarat (2021) found that short-term accruals-based earnings management was not value-relevant in Saudi Arabia. However, if the earnings management continued into the long-term, it negatively influenced firm value.

In line with prior South African findings by Rabin and Negash (2015), the first hypothesis was:

H_1: The market reacts negatively to higher levels of earnings management.

2.3 The market reaction to top management tone

Voluntary disclosures allow top management to express themselves freely as they are not audited or subject to regulatory requirements (Rahman 2019). Given the absence of regulation, management can use the tone of voluntary disclosures to either enhance or impair a stakeholder's ability to understand a company's financial performance (Rahman 2019). Voluntary disclosure theory suggests that management will only voluntarily present data that shows the company in a favourable light (Price et al. 2012). In addition, the language used in the voluntary disclosures is likely to affect the investors' ability to appraise the reliability of the company's financial performance (Davis et al. 2012).

Prior research has focused on optimism (commonly measured as the positive-negative spread) to measure the market reaction to the sentiment of voluntary disclosures. Short window studies using cumulative abnormal returns by Brockman et al. (2017), Davis et al. (2012), Doran et al. (2012), Luo and Zhou (2017), Price et al. (2012), Tonin and Scherer (2022), and Yekini et al. (2016) all showed that a positive tone in either the annual report, qualitative disclosures or conference calls was associated with a positive market reaction. Doran et al. (2012) noted that a positive tone was sufficient to offset negative earnings surprises. Using a longer-term measure of firm value, Alshorman and Shanahan (2021) and Wu et al. (2021) found that CEO optimism was positively correlated with firm value. Given the tones covered by domain-specific wordlists, some research between certainty and the market response has also been conducted. However, studies by Cookson et al. (2022), Druz et al. (2015) and Pagliarussi et al. (2016) have found conflicting results.

Language characteristics other than optimism and certainty may influence stakeholders (Davis et al. 2012). Thus, Patelli and Pedrini (2015) call for a more comprehensive approach to analysing tone in corporate narratives. It is, therefore, useful to explore the market reaction to different tones expressed in the voluntary disclosures. To answer this call, following Patelli and Pedrini (2015) and Nel et al. (2022), this study uses the DICTION software and its five master variables (activity, certainty, commonality, optimism and realism), which are discussed under the methods.

While the market reaction to optimism and certainty have been explored, the response to the other tones (including composite tones) has not. As such, the following non-directional hypothesis was drawn:

H_2: Top management's tone in voluntary disclosures is associated with a market reaction.

2.4 The moderating effect of top management tone on the market reaction to earnings management

While additional disclosures help investors protect themselves from earnings management, the tone of these narratives could mask earnings management from stakeholders (Baber et al., 2006; Lo et al., 2017). Top management's word choices in voluntary disclosures may, therefore, either provide more information to stakeholders or exploit them (Tonin & Scherer, 2022). Top management may use alternative methods to manipulate shareholders, meaning earnings and tone manipulation may be employed as substitutes or complements to deceive stakeholders (Boudt & Thewissen, 2019; Paul & Sharma, 2023).

While the prior literature has not directly studied the moderating effect of top management tone on market reaction to earnings management, two studies have, to an extent, considered their interaction. Boudt and Thewissen (2019) found that earnings and tone management are complementary, as the CEO letter must agree with investors' prior knowledge to enhance reader comprehension. Narratives that do not agree reduce the financial statement's credibility. Similarly, Paul and Sharma (2023) found that top managers use various textual strategies to hide earnings management.

Given that tone may be used as either a substitute for or a complement to earnings management, the third non-directional hypothesis was formulated as follows:

H_3: Top management tone in voluntary disclosures impacts market reaction to earnings management.

3. Methodology

This study investigated how earnings management and top management's tone interact to influence the market by looking at the market reactions to earnings management in the financial statements, to top management's tone and to the interactive effect of top management's tone and earnings management.

3.1 Sampling

The initial sample comprised all non-financial companies listed on the JSE from 1 January 2011 until 31 December 2018, resulting in 278 companies representing 1 673 firm-years. Financial companies were excluded due to unique regulations and disclosure requirements (Orazalin & Akhmetzhanov, 2019). The starting date represented the first full year after implementing the King Report on Governance for South Africa 2009, which fundamentally changed how companies are governed, thus creating a breakpoint. The end date of 31 December 2018 was chosen to remove the adverse effects of the COVID-19 pandemic on the South African stock market, which significantly impacted market returns and increased market volatility due to investor uncertainty around the pandemic lockdown extensions (Mokoena & Nomlala, 2022). To minimise survivorship bias, companies that were delisted during the period were kept in the sample for as long as data was available.

Of the total, 52 firm-years were removed due to changes in year-end. A further 488 firm-years were excluded, as their annual reports did not include separate CEO reports. This study calculated discretionary accruals using the Kothari et al. (2005) model, which requires at least ten observations for each industry-year combination. For the JSE, the healthcare, oil and gas, telecommunications and specific years in the technology sector failed to meet this criterion. Consequently, 134 firm-years were removed. Insufficient share data to perform the event study resulted in a further 22 firm-years being removed. Finally, 33 companies were removed, as only one firm-year observation remained in the sample. The final sample, therefore, consisted of 944 firm-year observations (173 unique companies). A summary of the sampling process and the industry breakdown are presented in Appendix 1.

3.2 Econometric model specification

The following panel regression model was used to examine the individual and interaction effects of earnings management and tone at the top on the market reaction:

$$CAR_{it} = \beta_0 + \beta_1 EM_{it} + \beta_2 Tone_{it} + \beta_3 EM_{it} * Tone_{it} + Controls_{it} + \varepsilon_{it} \quad (1)$$

Where CAR_{it} represents the cumulative abnormal returns for company i measured over a specific window in year t, EM_{it} represents the level of earnings management, $Tone_{it}$ represents a vector of top management tone components, EM_{it} * $Tone_{it}$ represents the interaction between *EM* and *Tone* and, finally, $Controls_{it}$ represents a vector of control

variables. All variable measurements are described in the next section. Continuous variables were winsorised at the first and ninety-ninth percentiles to address outliers.

When interpreting the coefficients, β_1 represents the independent effect of earnings management on the cumulative abnormal returns under a neutral tone. A negative, statistically significant value would indicate support for H_1. Likewise, β_2 represents the independent effect of top management tone in the absence of earnings management. A statistically significant value would show support for H_2. Finally, the interaction coefficient, β_3, indicates how the slopes of earnings management (β_1) and top management tone (β_2) differ in the presence of each other. If β_3 is statistically significant, it would indicate support for H_3.

3.3 Variable measurement

3.3.1 Market response

The market response was measured using a short-window event study methodology to determine a share's cumulative abnormal return, representing the sum of the abnormal returns generated by an event. Abnormal returns were calculated as the difference between actual and expected returns using the conventional market model, which is widely used in event studies (Boudt & Thewissen, 2019; Nyandeni et al., 2024).

The estimation and event windows are key elements in calculating the cumulative abnormal returns. The prior literature has used estimation windows ranging from more than 200 days to less than 100 (Tonin & Scherer, 2022; Yekini et al., 2016). Consequently, following South African studies by Bhana (2007) and Watson and Rossouw (2012), this study used a 160-day estimation window ending 40 days before the annual financial statement release date to exclude the market reaction to trading statements and earnings announcements (Rabin, 2016).

Regarding the event window, following studies by Gavious (2007) and Rabin and Negash (2015), this study used a range of event windows from two days [-1;0] to 42 days [-1;40], allowing the study to determine if investors react to the event, how long they take to respond, and how quickly the effect dissipates.

3.3.2 Earnings management

Earnings management was measured using the absolute value of discretionary accruals, calculated as the residual of the model suggested by Kothari et al. (2005):

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \alpha_4 ROA_{it} + \varepsilon_{it} \quad (2)$$

NDA_{it} represents the non-discretionary accruals for company i in year t scaled by the prior year's total assets (A_{it-1}). ΔREV_{it} and ΔREC_{it} represent the change in revenue and receivables between the periods t and $t-1$. PPE_{it} represents the gross property, plant and equipment, while ROA_{it} represents the return on assets.

3.3.3 Top management tone

Top management tone was measured by analysing the CEO statement in the annual financial statements, using the five master variables of the DICTION 7.1 software. Although CEO statements are not spontaneous, they are readily available in South Africa. Furthermore, these statements are critically important when making investment decisions (Boudt & Thewissen, 2019). Further, CEOs are free to express their opinions in these statements as they are not subject to audit (Boudt & Thewissen, 2019). An important consideration is whether CEOs write their statements. Craig and Amernic (2011) argue that even if CEOs do not personally write their statements, they are heavily involved in the statement's development so that it will reflect their views and sentiments.

Prior research primarily uses a spread of positive and negative words to measure sentiment (Boudt & Thewissen, 2019). However, CEO statements may express sentiments other than optimism. Consequently, this research used the DICTION software developed by Professors Roderick Hart and Craig Carroll, as it captures multiple tones. This software follows a bag-of-words approach based on 31 dictionaries containing over 10,000 words. These words are assigned to 35 categories to develop five thematic tones: activity, certainty, commonality, optimism and realism (Hart & Carroll, 2015).

Activity represents movement, change and idea implementation (Hart & Carroll, 2015). It is associated with success and emphasises accomplishments and self-promotion, conveying narcissism and overconfidence (Boudt & Thewissen, 2019; Patelli & Pedrini, 2015). *Certainty* represents "resoluteness, inflexibility, and completeness and a tendency to speak ex cathedra" (Hart & Carroll, 2015:6). It is a trait of a transactional and autocratic leader (Alshorman, 2016; Patelli & Pedrini, 2015). *Commonality* refers to language highlighting group values instead of individual engagement methods (Hart & Carroll, 2015). Commonality represents a CEO's attempt to establish rapport with shareholders by reflecting their values (Alshorman, 2016). *Optimism* highlights the positive attributes of a person,

group, concept or event (Hart & Carroll, 2015). Optimism is associated with less anxiety, achieving higher goals, favourable outcomes, and greater confidence in one's ability, but negatively, it is associated with overconfidence, hubris and risky behaviour (Alshorman & Shanahan, 2021). CEOs may use optimism to emphasise achievements and downplay failures (Patelli & Pedrini, 2015). Finally, *realism* describes "tangible, immediate, recognisable matters that affect people's everyday lives" (Hart & Carroll, 2015:9). High realism indicates a pragmatic approach (Alshorman, 2016).

Similar to Price et al. (2012), this research used principal component analysis to develop components based on the above five master variables. PCA is beneficial as it incorporates the orthogonal relationships between variables, reduces measurement error and reduces multicollinearity, resulting in the components having a greater impact. In developing the top management tone components, all components with eigenvalues greater than one were retained after a varimax rotation was applied (Larcker et al., 2007).

Based on the PCA results (presented in Appendix 2), two components were developed. The first tone component comprised activity, certainty, and a negative loading for optimism. Activity and certainty represent confidence and authority (Patelli & Pedrini, 2015). The negative loading of optimism is consistent in this regard, as optimism makes an autocratic CEO look naïve (Wunderley et al., 1998). Consequently, the first tone component was labelled an autocratic tone. The second tone component comprised realism and a negative loading for commonality, representing diversity. Realism deals with day-to-day issues and is characteristic of a pragmatic leader (Alshorman, 2016). Given South Africa's past, diversity is an everyday issue that features highly in the country's corporate governance codes and legislation. Consequently, the second tone component was labelled a pragmatic tone.

3.3.4 Control variables

Prior academic research identified several additional variables that affect the market reaction. Consequently, seven control variables were included: operating cash flows were calculated as operating cash scaled by total assets. Negative earnings were measured as a dummy variable assigned the value of one if the company incurred a loss and zero otherwise (Rahman, 2019). Leverage was calculated as total debt to total assets (Alshorman & Shanahan, 2021). Firm profitability was measured as the return on assets before extraordinary items (Alshorman & Shanahan, 2021), while earnings surprises were calculated as the increase in earnings per share from the prior year, scaled by the opening share price (Tonin & Scherer, 2022). Firm

size was measured as the natural log of market capitalisation (Rahman, 2019). Finally, growth opportunities were measured as the market-to-book ratio (Price et al., 2012).

4. Results and discussion

4.1 Descriptive results

The descriptive statistics are presented in Table 1. The statistics of only the dependent and primary control variables are discussed for brevity. These statistics show that the market initially reacts only slightly to the release of the financial statements, as measured by cumulative abnormal returns (day zero, mean CAR[-1;0]=0.0017). The cumulative abnormal returns peak around day ten (CAR[-1;10]=0.0144), after which they begin to dissipate. While inconsistent with the efficient market hypothesis, prior studies have shown that it takes time for investors to understand the value relevance of information (Gavious, 2007; Rabin & Negash, 2015).

Regarding the primary independent variables, the earnings management measure reveals that, on average, discretionary accruals represent 5.37% of total assets. This is similar to that found in South Africa over a comparable period by Eloff and Steenkamp (2022). Regarding the individual DICTION tones, the means for activity, optimism and certainty align with prior South African research by Nel et al. (2022) and Totowa and Mokoaleli-Mokoteli (2021). Only Nel et al. (2022) reported means for commonality and realism in South Africa. While the mean for commonality was similar, Nel et al. (2022) reported a lower realism score, which may be driven by the smaller sample size and shorter reporting period. The means of the composite tones (autocratic and pragmatic) are zero, indicating neutrality. The median values, however, are above zero, meaning that more than 50% of CEO letters tend to be autocratic and pragmatic.

The independent variable correlations and variation inflation factors (VIF) are presented in Appendix 3. As all correlation coefficients are below the benchmark of 0.8000 and all VIFs are below ten, multicollinearity is not a concern (Alshorman, 2016).

Table 1 Descriptive statistics

Variable	Mean	Median	Standard deviation	Minimum	Maximum
Dependent variable					
CAR [-1; 0]	0.0017	0.0008	0.0420	-0.1590	0.1572
CAR [-1; 1]	0.0072	0.0028	0.0531	-0.1469	0.2046
CAR [-1; 3]	0.0128	0.0071	0.0693	-0.1612	0.2961
CAR [-1; 5]	0.0134	0.0074	0.0805	-0.1985	0.3410
CAR [-1; 10]	0.0144	0.0115	0.1028	-0.2828	0.4113
CAR [-1; 15]	0.0121	0.0079	0.1186	-0.3566	0.4841
CAR [-1; 20]	0.0097	0.0058	0.1327	-0.3988	0.5215
CAR [-1; 25]	0.0093	0.0059	0.1445	-0.4897	0.5775
CAR [-1; 30]	0.0080	0.0043	0.1569	-0.4950	0.5754
CAR [-1; 35]	0.0044	0.0056	0.1671	-0.5657	0.5802
CAR [-1; 40]	0.0037	0.0023	0.1748	-0.5524	0.5872
Primary independent variables					
Earnings management	0.0537	0.0368	0.0528	0.0000	0.2637
Activity	49.5863	49.7300	1.8330	43.4900	53.8900
Optimism	54.7357	54.5150	3.2946	48.4300	64.8000
Certainty	46.4976	47.3200	4.3304	30.3500	53.5900
Realism	52.2870	52.3300	2.6682	43.1900	58.2600
Commonality	49.3619	49.4600	1.9245	44.1100	56.4000
Autocratic tone	0.0000	0.1362	1.2299	-5.2327	3.3137
Pragmatic tone	0.0000	0.0327	1.1104	-5.2265	3.2320
Control variables					
Operating cash on assets	0.0784	0.0804	0.0934	-0.3049	0.3023
Negative earnings	0.2002	0.0000	0.4004	0.0000	1.0000
Leverage	0.4780	0.4765	0.1700	0.1273	0.8512
Return on assets	0.0750	0.0773	0.1200	-0.4420	0.4159
Earnings surprises	0.0219	0.0053	0.2913	-0.9563	1.7551
Firm size	15.2440	15.2253	2.2861	10.5911	20.6601
Growth	1.0001	0.6629	0.9913	0.0503	5.4857

(Source: This table was prepared by the author)

Figures 1 to 3 graphically illustrate how cumulative abnormal returns vary with earnings management and tone. The levels of earnings management and tone are split into quintiles. The cumulative abnormal returns of the top and bottom quintiles are graphed against the overall average cumulative abnormal returns for comparative purposes.

4.1.1. The market reaction to earnings management

Regarding market reaction to earnings management (hypothesis 1), Figure 1 shows an immediate response to releasing the financial statements. Until day three, the graphs move together, indicating similar reactions. After this, companies with the highest levels of earnings management experience lower cumulative abnormal returns. This persists across the

40 days, with cumulative abnormal returns dissipating by day 25. In contrast, companies in the bottom quintile of earnings management move with the average until approximately day 14, after which they outperform the average until day 34. By day 39, the cumulative abnormal returns for the bottom quintile have dissipated. This indicates that the market reacts more favourably to lower earnings management levels and unfavourably to higher levels. However, these effects dissipate after 40 days.

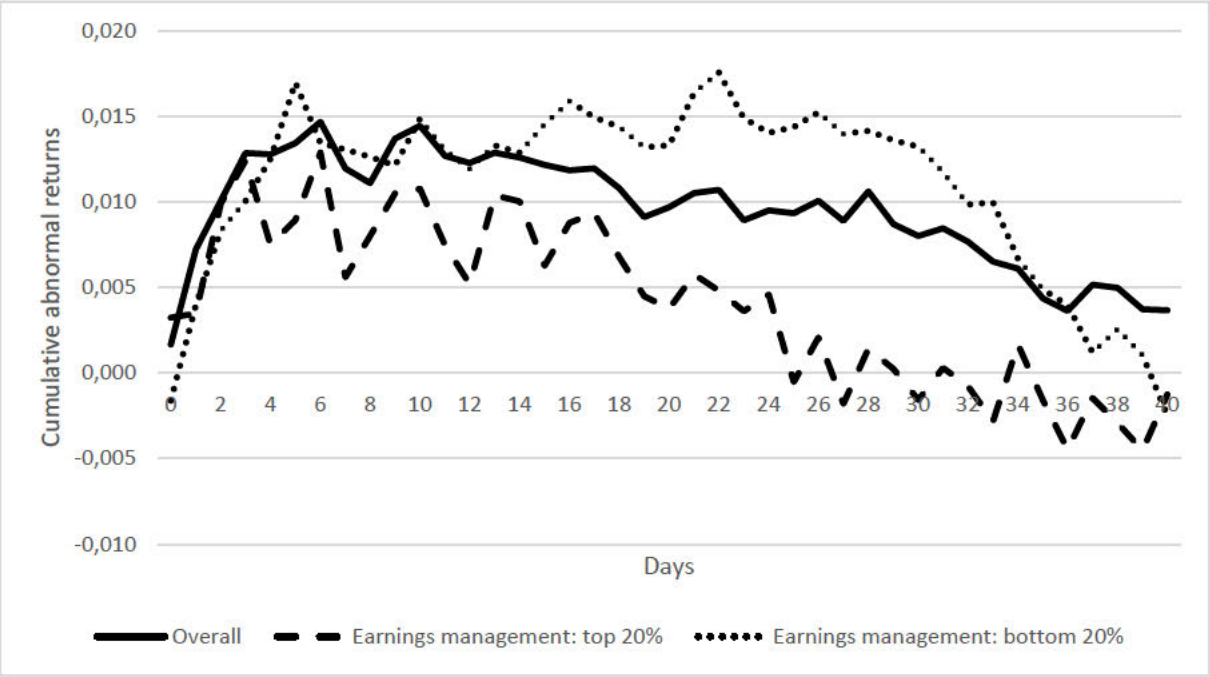

Figure 1 Cumulative abnormal returns split based on absolute earnings management quintiles

(Source: This figure was prepared by the author)

4.1.2. The market reaction to top management tone

Regarding the market reaction to an autocratic tone (hypothesis 2), Figure 2 reveals that the top quintile of autocratic tone has larger immediate cumulative abnormal returns than the sample average. In contrast, the bottom quintile experiences a smaller effect. These differences persist over the 40 days. For the top quintile, the autocratic tone effects align with the sample average between days 35 and 40. However, the bottom quintile does not align with the sample average and generates neutral cumulative abnormal returns between days 18 and 28 and negative cumulative abnormal returns from day 28 onwards. This shows that the market has a favourable reaction to a more autocratic tone.

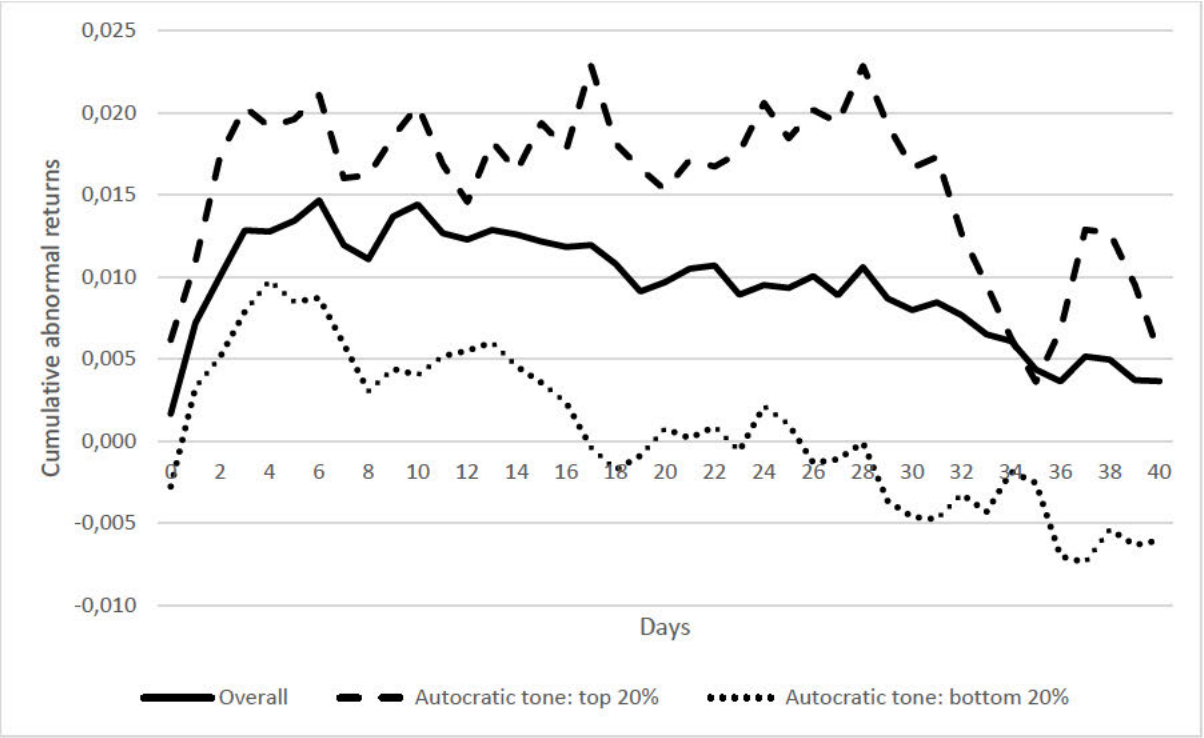

Figure 2 Cumulative abnormal returns split based on autocratic tone quintiles

(Source: This figure was prepared by the author)

Figure 3 presents the market reaction to the pragmatic tone (hypothesis 2). Initially, the top pragmatic quintile shows a higher reaction, while the bottom quintile shows a lower response. This difference persists throughout the 40 days. From day 14 onwards, the effects in the lowest quintile have dissipated. However, the cumulative abnormal returns continue over the 40 days for the top quintile. Unlike the bottom earnings management quintile and the top autocratic tone quintile, the cumulative abnormal returns for the top pragmatic tone quintile show no indication of dissipating by day 40. Thus, it appears that the market favours a pragmatic tone.

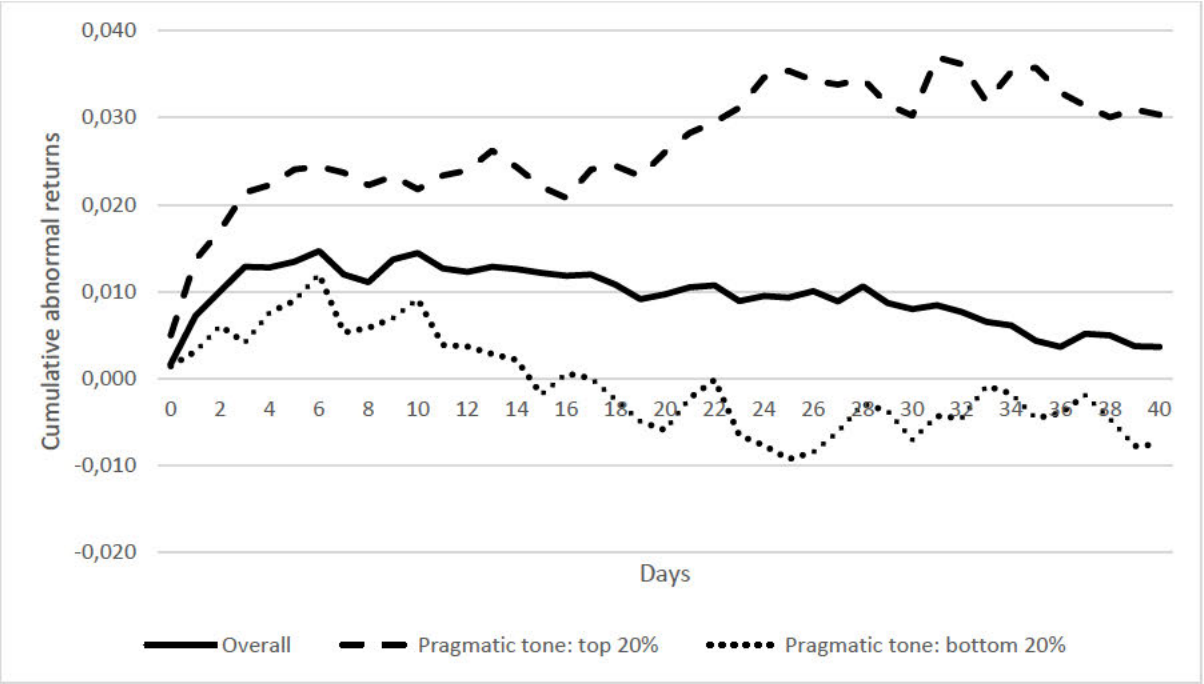

Figure 3 Cumulative abnormal returns split based on pragmatic tone quintiles

(Source: This figure was prepared by the author)

Figures 1 to 3 indicate that the earnings management level and top management tones contain value-relevant information. The statistical significance of this value-relevant information and how the factors interact to influence the market reaction are explored in the next section.

4.2 Regression results

Regression analysis was used to evaluate the market reaction to earnings management, top management tone, and their interaction. The regression results are presented in Table 2. For all models, the Hausman test favoured fixed effects over random effects. However, for the [-1;10], [-1;15] and [-1;20] models, the F-test indicated that a pooled model was preferred over the fixed effects. For consistency, all models in Table 2 used fixed effects. The comparative pooled regressions are available upon request. While the major findings do not vary substantially, the pooled results tended to show higher levels of statistical significance. Thus, using fixed effects is more conservative.

Considering the model's overall significance, only after ten days do the models have statistically significant explanatory power. In South Africa, this finding is consistent with Rabin (2016). The low adjusted R-squared values across the models are consistent with prior studies such as Price et al. (2012) and Yekini et al. (2016). Nonetheless, there are statistically significant variables in all models.

Table 2: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.0458	0.0138	0.0494	-0.0481	-0.0484	-0.0820	-0.1082	-0.1566	-0.1719	-0.1153	-0.0500
	(0.0351)	(0.0434)	(0.0544)	(0.0626)	(0.0868)	(0.0943)	(0.1120)	(0.1180)	(0.1186)	(0.1253)	(0.1353)
Autocratic tone	0.0033	0.0037	0.0044	0.0058*	0.0104**	0.0082*	0.0100*	0.0116*	0.0103	0.0064	0.0053
	(0.0020)	(0.0023)	(0.0029)	(0.0032)	(0.0046)	(0.0049)	(0.0060)	(0.0067)	(0.0077)	(0.0080)	(0.0082)
Pragmatic tone	0.0007	-0.0014	-0.0018	-0.0044	-0.0029	-0.0008	0.0029	0.0023	-0.0020	-0.0007	-0.0061
	(0.0022)	(0.0025)	(0.0036)	(0.0044)	(0.0055)	(0.0058)	(0.0071)	(0.0084)	(0.0091)	(0.0089)	(0.0098)
Earnings management interacted with:											
Autocratic tone	-0.0653**	-0.0577*	-0.0716	-0.0882*	-0.2190***	-0.1802**	-0.2116*	-0.2213	-0.2229*	-0.2465*	-0.1986
	(0.0282)	(0.0341)	(0.0471)	(0.0496)	(0.0688)	(0.0768)	(0.1187)	(0.1394)	(0.1285)	(0.1368)	(0.1357)
Pragmatic tone	0.0135	0.0293	0.0637	0.0840	0.0345	0.0964	0.0705	0.1050	0.1700	0.1593	0.2757**
	(0.0269)	(0.0315)	(0.0458)	(0.0525)	(0.0779)	(0.0840)	(0.1065)	(0.1212)	(0.1250)	(0.1306)	(0.1298)
Control variables and constant[1]	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Observations	944	944	944	944	944	944	944	944	944	944	944
Number of Companies	173	173	173	173	173	173	173	173	173	173	173
F	1.667*	0.740	1.529	1.488	2.607***	2.786***	2.461***	3.722***	4.195***	5.174***	4.232***
R-squared	0.2503	0.2287	0.2384	0.2234	0.2158	0.2232	0.2225	0.2475	0.2607	0.2669	0.2573
Adjusted R-squared	0.0686	0.0417	0.0538	0.0351	0.0257	0.0349	0.0340	0.0650	0.0814	0.0892	0.0773

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
[1] The full results of the control variables and constant are available upon request.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

4.2.1 Market reaction to earnings management

Earnings management has a positive relationship with returns until day three, after which it becomes negative, in line with hypothesis one. This indicates that the market takes time to digest the financial statement content before reacting negatively. However, none of the coefficients are statistically significant, meaning that the market does not react to earnings management in the presence of a neutral tone. This aligns with Darmawan et al.'s (2019) finding that accruals-based earnings management does not affect firm value. Likewise, in South Africa, this aligns with Rabin's (2016) finding that the market could not distinguish between earnings-managed and non-earnings-managed companies. Consequently, hypothesis one, that higher levels of earnings management are associated with a negative market reaction is rejected. This finding implies that investors in South African companies either cannot identify earnings management in the short-term and, therefore, do not react to it, or they do not perceive it as a risk factor on its own and first require additional warning signs before reacting.

4.2.2 Market reaction to top management tone

Initially, in the absence of earnings management, the autocratic tone has no statistically significant association with the market reaction. However, there is a positive association from day five, indicating that investors take time to digest the narrative content and react. This association dissipates by day 25. Given the lack of comparable studies that use a composite tone, the underlying components are compared to prior studies. The autocratic tone comprises activity, pessimism and certainty. While the market reaction to an active tone remains unexplored, it does indicate overconfidence. Overconfident CEOs believe their companies are undervalued and will convey signals to increase the firm value (Jang & Lee, 2024). The pessimism aspect contradicts the findings of Brockman et al. (2017), Price et al. (2012) and Tonin and Scherer (2022), who all found that optimism (rather than pessimism) is associated with a positive market reaction. However, general wordlists (such as DICTION) may understate optimism in a financial context. Finally, regarding certainty, prior studies by Cookson et al. (2022), Druz et al. (2015), and Pagliarussi et al. (2016) found conflicting results.

There is no market reaction across the 40 days of the study associated with using a pragmatic tone in the absence of earnings management. As with the autocratic tone, there is a lack of comparable studies which use a composite tone. Moreover, the components of commonality

and realism's association with the market reaction also remain unexplored. Prior South African studies which employed DICTION ignored the commonality and realism tones (Mokoaleli-Mokoteli et al., 2009; Totowa & Mokoaleli-Mokoteli, 2021), while Nel et al. (2022) found insignificant results for these tones in the CEO statement in relation to firm future performance.

Thus, in summary, for top management tone, a positive association is found between the market reaction and an autocratic tone between days five and twenty-five. However, no association with a pragmatic tone is found. Thus, partial support for hypothesis two is found, specifically for the autocratic tone. While this finding may be surprising, as autocratic leadership styles are typically associated with worse performance than more participatory styles, studies have found autocratic leaders outperform in certain situations (Elenwo, 2024; Pizzolitto et al., 2023). Using a systematic literature review, Pizzolitto et al. (2023) found that autocratic leadership positively affects performance compared to participatory leadership styles in high-stress environments and where hierarchies are well accepted. Both of these situations apply to South African companies. Further, Harris et al. (2022) note that the autocratic leader is more likely to be viewed as a stereotypical strong leader. This is in contrast to Crayne and Medeiros (2021), who found that pragmatic leaders struggle to perform in the short term and require more time to become effective. Consequently, investors may be more comfortable with leadership that demonstrates autocratic rather than pragmatic traits.

4.2.3 The moderating effect of top management tone on the relationship between earnings management and the market reaction

Considering the interaction between earnings management and top management tone, a significant negative moderating effect is noted between earnings management and the autocratic tone. This moderating effect persists for the majority of the event window. Thus, the market does not react to earnings management when there is a neutral tone, but under an autocratic tone, the market reacts negatively. An autocratic CEO is considered a red flag for fraud (Sanchez & Dunne, 2017); they may be driven to fraud from fear of losing their status and the dark personality traits associated with this leadership style (Harris et al., 2022; Rohmatin et al., 2021). Further corroborating this increased risk are findings related to the underlying components of the autocratic tone. Alshorman (2016) found that the activity component was associated with higher levels of earnings management, while Patelli and

Pedrini (2015) found that the certainty component was associated with more aggressive financial reporting. Thus, while investors have no reaction to earnings management on its own, possibly not identifying it or not considering it a risk factor, this study found that the additional red flag of autocratic leadership resulted in an adverse market reaction.

The pragmatic tone does not moderate market reaction to earnings management for the study period. An exception is at the end, where a positive moderation effect is shown. Further investigation with a longer study period is required to determine if this positive effect persists. While Alshorman (2016) argues that a pragmatic CEO commits more fraud, the evidence related to the underlying components does not support this. Alshorman (2016) found no relationship between commonality and realism and the level of earnings management, while Patelli and Pedrini (2015) found that both commonality and realism had a negative association with aggressive financial reporting. Thus, while earnings management may be considered a precursor to fraud and a fraud risk factor, a pragmatic tone does not moderate the market reaction to earnings management.

Thus, this study partially supports hypothesis three, specifically, that the autocratic tone intensifies the market reaction to earnings management, likely due to the dark personality traits associated with this leadership style and it being considered a red flag for fraud.

4.2.4 Control variables

Regarding the control variables, only firm size showed an independent and statistically significant negative relationship with the market reaction. This implies that larger firms exhibit lower cumulative abnormal returns.

4.3 Additional tests

Several additional tests were performed to test the robustness of the above results. First, time-fixed effects were included. Second, the firm-fixed effects were replaced with industry-fixed effects. A Chi-squared test of the joint significance of the time- and industry-fixed effects showed that the additional fixed effects did not improve the explanatory power of the models. Further, including time- and industry-fixed effects did not substantially change the original results.

Next, the analysis was repeated using the individual DICTION themes (rather than the composite variables) and their interactions with earnings management. Neither the individual tones nor their interactions revealed a statistically significant trend, highlighting the

importance of considering composite tones rather than focusing on individual tones, as done in prior studies. Interestingly, while not statistically significant, the direction of the effect of the individual tones typically supported the results of the PCA.

Finally, industry-specific analyses were performed for the basic material, consumer goods, consumer services, and industrial sectors. No separate analysis was performed for the technology sector, as too few firms resulted in insufficient degrees of freedom. In line with the overall results presented in Table 2, earnings management, the pragmatic tone, and the interaction between the pragmatic tone and earnings management were predominantly statistically insignificant across the four industries. Contrary to the overall results, none of the sectors showed a market reaction to the autocratic tone. Finally, regarding the interaction between the autocratic tone and earnings management, the basic materials sector aligned with the overall results by revealing a negative, statistically significant relationship for most of the study period. While the consumer goods sector predominantly displayed a negative relationship for this interaction, it was only statistically significant from day 25 onwards. Interestingly, the consumer services sector revealed a negative relationship during the earlier part of the event window, but this swapped to a positive, statistically significant relationship from day 20 onwards. Finally, the industrial sector revealed no statistically significant relationship for the interaction between the autocratic tone and earnings management. These findings suggest that market sectors react differently, and future research should consider analysing the sectors separately.

The results of the additional tests are available in Appendices 4 to 10.

5. Conclusion

This study investigated how top management tone moderates the market reaction to earnings management in the annual report using a sample of 944 firm-year observations in South Africa. The study showed that the South African market does not respond to evidence of earnings management in the annual report. However, an autocratic tone negatively impacted the relationship between earnings management and the market reaction. Thus, while earnings management is not interpreted by investors as a fraud risk factor by itself, when paired with autocratic leadership, red flags are raised, and the market responds negatively. In contrast, the study found that the pragmatic tone does not moderate the market reaction to earnings management. Additionally, the market reacted positively to an autocratic tone between five and 25 days after the release of the annual report, in the absence of earnings management, but

it did not respond to the pragmatic tone. It was further note, in line with prior research by Doran et al. (2012), that the South African market takes time to digest and respond to new information. This indicates that the South African market is not efficient.

These findings would interest analysts, regulators and investors as they show how the stock market reacts to earnings and tone management. Thus, these factors should be built into models for decision-making, risk-assessment and financial analysis by market analysts on behalf of their clients, and greater emphasis should be placed on a range of tones rather than just the positive-negative spread. The inclusion of tone could be through the use of specialised software, publicly available wordlists and dictionaries, the use of artificial intelligence and machine learning, or through close reading of executive directors' statements and observations of their actions and interactions with others.

This study contributes to the literature in several ways. Firstly, it uses PCA to develop composite measures of management tone based on a broader range of underlying tone variables. The study, therefore, shows how different management tones fit together to form the overall tone at the top, thereby extending the existing literature that predominantly focuses on optimism. Secondly, the study extends the current literature on the market reaction by considering the link between earnings management and impression management. Prior South African studies have expressed concern that South African investors cannot distinguish between earnings-managed and non-earnings-managed companies. However, this study reveals that, while South African investors do not react to earnings management by itself, they take note of an additional red flag of autocratic leadership before acting. Finally, the study provides insight into the operation of an African economy, an under-researched geographical area to which the findings from developed economies may not apply.

This study was not without limitations. Firstly, top management tone was measured using CEO statements in the annual report. These statements are carefully planned and not spontaneous. Should spontaneous methods of communication become readily available in South Africa, future studies could analyse these to obtain a more insightful measure of top management tone. Secondly, the study measured top management tone using a general wordlist. While this approach is useful and allows for large quantities of data to be analysed, it does not consider the context or communicative intent of the word's usage. Future studies could use domain-specific or manual content analysis to address these issues. Finally, this study did not consider sentiment positioning within the CEO statement. Sentiments expressed

at the start or end of the report may be recalled better by investors and have a greater impact on the market reaction. Future studies can consider sentiment changes within the report and how these affect the market reaction.

Appendix 1: Sample size calculation and industry breakdown

	No. of unique companies	No. of firm-year observations
Population	278	1 673
Change of year-end	(2)	(52)
No separate CEO statement or letter	(52)	(488)
Insufficient industry-year observations to estimate discretionary accruals	(18)	(134)
Insufficient share data to perform event study	(0)	(22)
Companies with only one observation	(33)	(33)
Sample size	173	944
Breakdown per industry[a]		
- Basic materials	55	319
- Consumer goods	20	109
- Consumer services	36	206
- Industrials	55	284
- Technology	10	26

[a] The total number of companies per industry exceeds the number of unique companies in the sample, as three companies changed industry classifications during the study period. These three companies have been included under both classifications for the industry breakdown analysis.
(Source: This table was prepared by the author)

Appendix 2: Development of top management tone components

Variable	**Tone 1 Autocratic tone**	**Tone 2 Pragmatic tone**
ACTIVITY	0.4259	
OPTIMISM	-0.5732	
CERTAINTY	0.6342	
REALISM		0.6787
COMMONALITY		-0.6027

The top management tone PCA reported a Bartlett test of sphericity of 267.088 ($p<.01$) and a Kaiser-Meyer-Olkin measure of sampling adequacy of 0.524, indicating sufficiency to conduct PCA (Biswas et al., 2022). A rho of 0.5492 was reported.
(Source: This table was prepared by the author)

Appendix 3: Correlations and variation inflation factor

	Earnings management	Autocratic tone	Pragmatic tone	Operating cash on assets	Negative earnings	Leverage	Return on assets	Earnings surprises
Earnings management	1.0000							
Autocratic tone	0.0448	1.0000						
Pragmatic tone	-0.0504	-0.0172	1.0000					
Operating cash on assets	-0.2111***	-0.1023***	0.1357***	1.0000				
Negative earnings	0.2176***	0.0052	-0.1168***	-0.4210***	1.0000			
Leverage	0.1068***	-0.0362	0.1355***	-0.1236***	0.0709**	1.0000		
Return on assets	-0.2048***	-0.0534	0.1748***	0.7063***	-0.6045***	-0.1947***	1.0000	
Earnings surprises	0.0503	0.0240	-0.0022	-0.0046	-0.1975***	-0.0032	0.0797**	1.0000
Firm size	-0.2337***	-0.0819**	0.1270***	0.3651***	-0.2387***	0.0411	0.3410***	-0.0317
Growth	-0.1108***	-0.0962***	0.1654***	0.3858***	-0.2671***	-0.1554***	0.5232***	-0.0184

	Firm size	Growth	VIF
Earnings management			1.1200
Autocratic tone			1.0200
Pragmatic tone			1.0800
Operating cash on assets			2.1000
Negative earnings			1.6800
Leverage			1.1200
Return on assets			3.0800
Earnings surprises			1.0600
Firm size	1.0000		1.3300
Growth	0.3875***	1.0000	1.5300

*** p<0.01, ** p<0.05, * p<0.1

(Source: This table was prepared by the author)

Appendix 4: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.0458	0.0138	0.0494	-0.0481	-0.0484	-0.0820	-0.1082	-0.1566	-0.1719	-0.1153	-0.0500
	(0.0351)	(0.0434)	(0.0544)	(0.0626)	(0.0868)	(0.0943)	(0.1120)	(0.1180)	(0.1186)	(0.1253)	(0.1353)
Autocratic tone	0.0033	0.0037	0.0044	0.0058*	0.0104**	0.0082*	0.0100*	0.0116*	0.0103	0.0064	0.0053
	(0.0020)	(0.0023)	(0.0029)	(0.0032)	(0.0046)	(0.0049)	(0.0060)	(0.0067)	(0.0077)	(0.0080)	(0.0082)
Pragmatic tone	0.0007	-0.0014	-0.0018	-0.0044	-0.0029	-0.0008	0.0029	0.0023	-0.0020	-0.0007	-0.0061
	(0.0022)	(0.0025)	(0.0036)	(0.0044)	(0.0055)	(0.0058)	(0.0071)	(0.0084)	(0.0091)	(0.0089)	(0.0098)
Earnings management interacted with:											
Autocratic tone	-0.0653**	-0.0577*	-0.0716	-0.0882*	-0.2190***	-0.1802**	-0.2116*	-0.2213	-0.2229*	-0.2465*	-0.1986
	(0.0282)	(0.0341)	(0.0471)	(0.0496)	(0.0688)	(0.0768)	(0.1187)	(0.1394)	(0.1285)	(0.1368)	(0.1357)
Pragmatic tone	0.0135	0.0293	0.0637	0.0840	0.0345	0.0964	0.0705	0.1050	0.1700	0.1593	0.2757**
	(0.0269)	(0.0315)	(0.0458)	(0.0525)	(0.0779)	(0.0840)	(0.1065)	(0.1212)	(0.1250)	(0.1306)	(0.1298)
Operating cash / assets	-0.0016	0.0044	0.0171	0.0220	0.0294	0.0646	0.0971	-0.0029	-0.0325	0.0882	0.0925
	(0.0357)	(0.0506)	(0.0633)	(0.0683)	(0.0945)	(0.1118)	(0.1281)	(0.1439)	(0.1449)	(0.1481)	(0.1569)
Negative	0.0037	-0.0030	0.0021	0.0024	0.0112	0.0099	0.0255	0.0191	0.0251	0.0364	0.0250
	(0.0066)	(0.0079)	(0.0107)	(0.0131)	(0.0195)	(0.0224)	(0.0256)	(0.0264)	(0.0279)	(0.0272)	(0.0298)
Leverage	0.0394	0.0292	0.0263	0.0664	0.0751	0.0471	0.0657	0.0422	0.0338	0.0351	0.0472
	(0.0256)	(0.0367)	(0.0411)	(0.0449)	(0.0617)	(0.0676)	(0.0738)	(0.0784)	(0.0871)	(0.0807)	(0.0854)
Earnings surprise	-0.0044	-0.0060	0.0029	0.0055	-0.0051	-0.0019	-0.0144	-0.0418	-0.0512	-0.0517	-0.0564
	(0.0071)	(0.0090)	(0.0142)	(0.0158)	(0.0227)	(0.0360)	(0.0459)	(0.0429)	(0.0462)	(0.0480)	(0.0497)
Firm size	-0.0085**	-0.0075	-0.0201**	-0.0262***	-0.0411***	-0.0538***	-0.0577***	-0.0770***	-0.0872***	-0.0815***	-0.0847***
	(0.0042)	(0.0068)	(0.0082)	(0.0091)	(0.0106)	(0.0127)	(0.0141)	(0.0149)	(0.0157)	(0.0160)	(0.0182)
Growth	0.0007	-0.0001	0.0036	0.0067	0.0108	0.0210**	0.0102	0.0086	0.0122	0.0095	0.0101
	(0.0039)	(0.0047)	(0.0060)	(0.0069)	(0.0087)	(0.0101)	(0.0109)	(0.0125)	(0.0152)	(0.0160)	(0.0175)

Appendix 4: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
ROA	0.0358	-0.0366	-0.0103	0.0209	0.0638	-0.1568	-0.0853	0.1140	0.1978	0.1575	0.0421
	(0.0548)	(0.0588)	(0.0751)	(0.0848)	(0.1106)	(0.1168)	(0.1283)	(0.1454)	(0.1522)	(0.1528)	(0.1891)
Constant	0.1064*	0.1104	0.3004**	0.3735***	0.5885***	0.7991***	0.8488***	1.1529***	1.3028***	1.2030***	1.2514***
	(0.0609)	(0.0960)	(0.1190)	(0.1319)	(0.1552)	(0.1853)	(0.2109)	(0.2328)	(0.2440)	(0.2553)	(0.2799)
Observations	944	944	944	944	944	944	944	944	944	944	944
Number of Companies	173	173	173	173	173	173	173	173	173	173	173
F	1.667*	0.740	1.529	1.488	2.607***	2.786***	2.461***	3.722***	4.195***	5.174***	4.232***
R-squared	0.2503	0.2287	0.2384	0.2234	0.2158	0.2232	0.2225	0.2475	0.2607	0.2669	0.2573
Adjusted R-squared	0.0686	0.0417	0.0538	0.0351	0.0257	0.0349	0.0340	0.0650	0.0814	0.0892	0.0773

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: Researcher's own)

Appendix 5: Pooled regression estimates of the moderating effect of top management tone on the market reaction to earnings management

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.0361	-0.0035	0.0059	-0.0542	-0.0863	-0.1264	-0.1662	-0.1896	-0.2394*	-0.1778	-0.1440
	(0.0311)	(0.0393)	(0.0505)	(0.0566)	(0.0773)	(0.0879)	(0.1072)	(0.1175)	(0.1256)	(0.1337)	(0.1330)
Autocratic tone	0.0044**	0.0033*	0.0056**	0.0064**	0.0124***	0.0104**	0.0101*	0.0129**	0.0136**	0.0115*	0.0107
	(0.0017)	(0.0019)	(0.0025)	(0.0029)	(0.0038)	(0.0044)	(0.0052)	(0.0057)	(0.0058)	(0.0064)	(0.0068)
Pragmatic tone	0.0007	0.0005	0.0019	-0.0006	-0.0018	-0.0012	0.0020	0.0010	-0.0021	-0.0010	-0.0049
	(0.0017)	(0.0021)	(0.0030)	(0.0037)	(0.0046)	(0.0052)	(0.0060)	(0.0070)	(0.0073)	(0.0077)	(0.0083)
Earnings management interacted with:											
Autocratic tone	-0.0377*	-0.0237	-0.0575	-0.0750*	-0.1768***	-0.1371**	-0.1430*	-0.1773*	-0.1892**	-0.1920**	-0.1438
	(0.0217)	(0.0258)	(0.0394)	(0.0445)	(0.0516)	(0.0682)	(0.0853)	(0.0908)	(0.0905)	(0.0975)	(0.1014)
Pragmatic tone	0.0020	0.0173	0.0302	0.0570	0.0250	0.0819	0.0624	0.1232	0.1352	0.1592	0.2487**
	(0.0217)	(0.0274)	(0.0365)	(0.0459)	(0.0623)	(0.0765)	(0.0981)	(0.1175)	(0.1110)	(0.1222)	(0.1236)
Operating cash / assets	0.0005	0.0147	0.0327	0.0245	0.0719	0.0923	0.1068	0.0889	0.0514	0.1452	0.1222
	(0.0219)	(0.0313)	(0.0395)	(0.0483)	(0.0649)	(0.0744)	(0.0901)	(0.0983)	(0.1008)	(0.1039)	(0.1091)
Negative	0.0099*	0.0045	0.0094	0.0071	0.0158	0.0090	0.0239	0.0331*	0.0400*	0.0489**	0.0307
	(0.0053)	(0.0064)	(0.0082)	(0.0103)	(0.0134)	(0.0156)	(0.0176)	(0.0193)	(0.0206)	(0.0213)	(0.0226)
Leverage	0.0053	0.0067	0.0227	0.0374**	0.0654***	0.0773***	0.0862***	0.0864***	0.0750**	0.0544	0.0307
	(0.0094)	(0.0127)	(0.0158)	(0.0179)	(0.0229)	(0.0254)	(0.0294)	(0.0313)	(0.0344)	(0.0353)	(0.0379)
Earnings surprise	0.0036	-0.0014	0.0035	0.0026	-0.0047	-0.0174	-0.0305	-0.0422	-0.0495*	-0.0534*	-0.0677**
	(0.0073)	(0.0090)	(0.0109)	(0.0121)	(0.0161)	(0.0230)	(0.0274)	(0.0278)	(0.0292)	(0.0308)	(0.0323)
Firm size	-0.0001	-0.0014*	-0.0026**	-0.0026**	-0.0034**	-0.0039**	-0.0049**	-0.0058***	-0.0059**	-0.0065***	-0.0077***
	(0.0007)	(0.0008)	(0.0011)	(0.0012)	(0.0016)	(0.0018)	(0.0020)	(0.0021)	(0.0023)	(0.0025)	(0.0026)
Growth	-0.0009	-0.0014	-0.0019	0.0023	0.0001	0.0019	-0.0014	-0.0006	0.0015	0.0011	0.0086
	(0.0016)	(0.0020)	(0.0025)	(0.0028)	(0.0042)	(0.0046)	(0.0056)	(0.0056)	(0.0063)	(0.0066)	(0.0064)
ROA	0.0160	0.0022	0.0213	-0.0099	0.0041	-0.0695	-0.0307	0.0143	0.0584	0.0155	-0.0756
	(0.0258)	(0.0327)	(0.0401)	(0.0518)	(0.0694)	(0.0814)	(0.0945)	(0.1011)	(0.1063)	(0.1099)	(0.1176)

APPENDIX 5: Pooled regression estimates of the moderating effect of top management tone on the market reaction to earnings management (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Constant	-0.0028	0.0249*	0.0379**	0.0337	0.0315	0.0373	0.0433	0.0538	0.0586	0.0661	0.0982**
	(0.0111)	(0.0131)	(0.0187)	(0.0206)	(0.0267)	(0.0288)	(0.0314)	(0.0341)	(0.0379)	(0.0407)	(0.0415)
Observations	944	944	944	944	944	944	944	944	944	944	944
F	1.373	0.945	1.786**	1.345	2.304***	2.261***	2.912***	3.250***	2.783***	2.934***	2.463***
R-squared	0.0188	0.0105	0.0213	0.0191	0.0306	0.0329	0.0396	0.0469	0.0424	0.0431	0.0435
Adjusted R-squared	0.0062	-0.0023	0.0087	0.0065	0.0181	0.0204	0.0272	0.0346	0.0301	0.0308	0.0311

All models presented above use pooled OLS regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

Appendix 6: Panel regression estimates of the moderating effect of individual DICTION tones on the market reaction to earnings management

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	1.5892	2.6336	0.2282	-0.2646	-0.0051	1.1776	-2.9210	-3.4508	-10.0626*	-13.8525**	-6.0141
	(1.8976)	(2.2433)	(2.9261)	(3.3024)	(4.3878)	(4.5443)	(5.4291)	(6.6984)	(6.0346)	(6.8993)	(6.6233)
Activity	0.0011	0.0014	-0.0009	-0.0013	0.0034	0.0008	-0.0015	-0.0006	-0.0045	-0.0085**	-0.0045
	(0.0012)	(0.0014)	(0.0018)	(0.0022)	(0.0029)	(0.0033)	(0.0037)	(0.0039)	(0.0041)	(0.0042)	(0.0042)
Optimism	-0.0004	-0.0012	-0.0018	-0.0030**	-0.0026	-0.0016	-0.0012	-0.0024	-0.0043	-0.0014	-0.0005
	(0.0008)	(0.0009)	(0.0012)	(0.0015)	(0.0021)	(0.0023)	(0.0025)	(0.0028)	(0.0031)	(0.0032)	(0.0034)
Certainty	0.0004	-0.0000	0.0006	0.0004	0.0006	0.0014	0.0025	0.0020	0.0013	0.0029	0.0025
	(0.0006)	(0.0007)	(0.0009)	(0.0011)	(0.0013)	(0.0014)	(0.0017)	(0.0019)	(0.0023)	(0.0024)	(0.0024)
Realism	-0.0003	-0.0006	0.0006	0.0005	-0.0017	0.0000	0.0001	0.0004	0.0007	0.0003	-0.0013
	(0.0011)	(0.0013)	(0.0018)	(0.0021)	(0.0026)	(0.0026)	(0.0031)	(0.0036)	(0.0039)	(0.0040)	(0.0044)
Commonality	-0.0010	-0.0004	-0.0003	0.0000	-0.0012	-0.0005	-0.0041	-0.0044	-0.0044	-0.0045	0.0002
	(0.0013)	(0.0016)	(0.0022)	(0.0024)	(0.0032)	(0.0034)	(0.0041)	(0.0046)	(0.0049)	(0.0051)	(0.0052)
Earnings management interacted with:											
Activity	-0.0273	-0.0441	0.0094	0.0138	-0.0668	-0.0357	0.0112	0.0159	0.0835	0.1470**	0.1039
	(0.0228)	(0.0292)	(0.0331)	(0.0370)	(0.0520)	(0.0594)	(0.0611)	(0.0695)	(0.0705)	(0.0673)	(0.0708)
Optimism	0.0073	-0.0011	0.0144	0.0311	0.0308	0.0167	0.0464	0.0604	0.0817	0.0825	0.0448
	(0.0119)	(0.0160)	(0.0216)	(0.0254)	(0.0337)	(0.0390)	(0.0458)	(0.0516)	(0.0531)	(0.0541)	(0.0609)
Certainty	-0.0126	-0.0123	-0.0214*	-0.0199	-0.0318*	-0.0419**	-0.0412	-0.0392	-0.0353	-0.0510	-0.0646*
	(0.0083)	(0.0111)	(0.0125)	(0.0134)	(0.0177)	(0.0202)	(0.0293)	(0.0338)	(0.0351)	(0.0351)	(0.0358)
Realism	0.0069	0.0210	0.0090	-0.0001	0.0379	0.0469	0.0159	0.0140	0.0284	0.0255	0.0662
	(0.0138)	(0.0178)	(0.0248)	(0.0291)	(0.0376)	(0.0390)	(0.0456)	(0.0528)	(0.0540)	(0.0572)	(0.0644)
Commonality	-0.0075	-0.0181	-0.0187	-0.0254	0.0220	-0.0184	0.0159	0.0055	0.0288	0.0598	-0.0429
	(0.0167)	(0.0202)	(0.0276)	(0.0291)	(0.0433)	(0.0405)	(0.0643)	(0.0789)	(0.0687)	(0.0825)	(0.0764)
Operating cash / assets	-0.0035	0.0029	0.0177	0.0217	0.0306	0.0656	0.0952	-0.0044	-0.0291	0.0932	0.0972
	(0.0358)	(0.0507)	(0.0629)	(0.0678)	(0.0952)	(0.1126)	(0.1308)	(0.1474)	(0.1473)	(0.1524)	(0.1594)

Appendix 6: Panel regression estimates of the moderating effect of individual DICTION tones on the market reaction to earnings management (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Negative	0.0040	-0.0026	0.0022	0.0024	0.0116	0.0103	0.0258	0.0194	0.0253	0.0366	0.0258
	(0.0066)	(0.0078)	(0.0108)	(0.0130)	(0.0193)	(0.0223)	(0.0253)	(0.0261)	(0.0279)	(0.0270)	(0.0297)
Leverage	0.0350	0.0189	0.0252	0.0669	0.0695	0.0393	0.0686	0.0466	0.0468	0.0605	0.0599
	(0.0250)	(0.0364)	(0.0415)	(0.0459)	(0.0602)	(0.0668)	(0.0742)	(0.0782)	(0.0866)	(0.0796)	(0.0889)
Earnings surprise	-0.0036	-0.0035	0.0041	0.0062	-0.0036	0.0009	-0.0155	-0.0430	-0.0539	-0.0575	-0.0577
	(0.0070)	(0.0090)	(0.0143)	(0.0156)	(0.0225)	(0.0361)	(0.0451)	(0.0422)	(0.0457)	(0.0474)	(0.0496)
Firm size	-0.0089**	-0.0077	-0.0203**	-0.0263***	-0.0408***	-0.0542***	-0.0580***	-0.0771***	-0.0859***	-0.0806***	-0.0856***
	(0.0042)	(0.0067)	(0.0081)	(0.0089)	(0.0107)	(0.0128)	(0.0142)	(0.0151)	(0.0159)	(0.0161)	(0.0181)
Growth	0.0008	-0.0008	0.0034	0.0066	0.0101	0.0203*	0.0111	0.0095	0.0127	0.0115	0.0115
	(0.0038)	(0.0046)	(0.0059)	(0.0068)	(0.0086)	(0.0103)	(0.0112)	(0.0125)	(0.0151)	(0.0157)	(0.0174)
ROA	0.0384	-0.0323	-0.0091	0.0215	0.0670	-0.1535	-0.0904	0.1105	0.1854	0.1388	0.0427
	(0.0552)	(0.0572)	(0.0733)	(0.0832)	(0.1098)	(0.1152)	(0.1288)	(0.1454)	(0.1513)	(0.1509)	(0.1860)
Constant	0.1257	0.1698	0.4000*	0.5580**	0.6835**	0.8181**	1.0670**	1.4157***	1.8534***	1.7486***	1.4582**
	(0.1324)	(0.1691)	(0.2325)	(0.2801)	(0.3459)	(0.3728)	(0.4282)	(0.4850)	(0.4895)	(0.5454)	(0.5623)
Observations	944	944	944	944	944	944	944	944	944	944	944
Number of Companies	173	173	173	173	173	173	173	173	173	173	173
F	1.299	1.038	1.656*	1.434	1.858**	2.184***	1.759**	2.664***	3.294***	4.403***	3.653***
R-squared	0.2531	0.2364	0.2421	0.2274	0.2173	0.2255	0.2244	0.2492	0.2643	0.2742	0.2607
Adjusted R-squared	0.0646	0.0437	0.0508	0.0324	0.0198	0.0301	0.0287	0.0597	0.0787	0.0910	0.0742

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

Appendix 7: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Basic Materials sector

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.1155	0.0411	0.0772	-0.0585	-0.1692	-0.1380	-0.3170	-0.3756	-0.4223*	-0.4965*	-0.3548
	(0.0781)	(0.0994)	(0.1125)	(0.1223)	(0.1790)	(0.1937)	(0.2278)	(0.2460)	(0.2350)	(0.2589)	(0.2633)
Autocratic tone	0.0062	0.0047	0.0059	0.0098	0.0153	0.0048	0.0157	0.0172	0.0209	0.0173	0.0128
	(0.0049)	(0.0050)	(0.0064)	(0.0079)	(0.0106)	(0.0125)	(0.0160)	(0.0165)	(0.0180)	(0.0213)	(0.0218)
Pragmatic tone	0.0019	0.0014	0.0033	-0.0005	0.0099	0.0107	0.0258	0.0207	0.0207	0.0247	0.0236
	(0.0045)	(0.0050)	(0.0075)	(0.0097)	(0.0129)	(0.0143)	(0.0167)	(0.0202)	(0.0202)	(0.0200)	(0.0227)
Earnings management interacted with:											
Autocratic tone	-0.1147**	-0.1152*	-0.1180	-0.1354	-0.3818***	-0.3158**	-0.5555***	-0.5871***	-0.5769**	-0.6677***	-0.6017**
	(0.0491)	(0.0615)	(0.0803)	(0.0974)	(0.1335)	(0.1529)	(0.1865)	(0.2074)	(0.2290)	(0.2461)	(0.2451)
Pragmatic tone	0.0253	0.0189	0.0137	0.0353	-0.1574	0.0625	-0.1964	-0.1100	-0.0780	-0.1537	-0.0094
	(0.0687)	(0.0751)	(0.0927)	(0.1109)	(0.1728)	(0.1940)	(0.2203)	(0.2435)	(0.2445)	(0.2430)	(0.2324)
Operating cash / assets	0.0098	0.0033	-0.0046	0.0102	0.0055	0.0455	0.0853	-0.0302	-0.1302	-0.0044	0.0305
	(0.0767)	(0.1045)	(0.1256)	(0.1391)	(0.1976)	(0.2407)	(0.2402)	(0.2474)	(0.2946)	(0.2694)	(0.2827)
Negative	0.0019	-0.0089	-0.0001	-0.0003	-0.0038	-0.0175	0.0054	-0.0074	0.0125	0.0196	-0.0010
	(0.0109)	(0.0120)	(0.0150)	(0.0194)	(0.0283)	(0.0326)	(0.0376)	(0.0415)	(0.0447)	(0.0418)	(0.0446)
Leverage	0.0349	0.0343	0.0006	0.0555	0.0633	0.0559	0.0180	-0.0139	-0.0736	-0.0826	-0.0030
	(0.0464)	(0.0642)	(0.0693)	(0.0745)	(0.1037)	(0.1102)	(0.1193)	(0.1306)	(0.1457)	(0.1373)	(0.1430)
Earnings surprise	-0.0049	-0.0056	0.0153	0.0174	0.0164	0.0102	0.0125	-0.0231	-0.0205	-0.0268	-0.0337
	(0.0088)	(0.0116)	(0.0164)	(0.0182)	(0.0255)	(0.0432)	(0.0552)	(0.0541)	(0.0568)	(0.0583)	(0.0615)
Firm size	-0.0109	-0.0036	-0.0136	-0.0271	-0.0493**	-0.0564**	-0.0682**	-0.1037***	-0.1042***	-0.1187***	-0.1172***
	(0.0075)	(0.0115)	(0.0152)	(0.0167)	(0.0200)	(0.0260)	(0.0274)	(0.0311)	(0.0312)	(0.0326)	(0.0372)
Growth	-0.0001	-0.0090	0.0009	0.0111	0.0158	0.0335*	0.0065	0.0257	0.0164	0.0254	0.0200
	(0.0072)	(0.0075)	(0.0081)	(0.0143)	(0.0209)	(0.0187)	(0.0311)	(0.0329)	(0.0466)	(0.0460)	(0.0483)
ROA	0.0343	-0.1072	-0.0739	-0.0177	-0.0322	-0.3197**	-0.2366	0.0406	0.1464	0.0767	0.0028
	(0.0845)	(0.0888)	(0.1130)	(0.1243)	(0.1422)	(0.1517)	(0.1675)	(0.2026)	(0.2159)	(0.2136)	(0.2744)

Appendix 7: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Basic Materials sector (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Constant	0.1476	0.0564	0.2159	0.3998	0.7462**	0.8539**	1.0676**	1.6251***	1.6642***	1.8790***	1.8205***
	(0.1149)	(0.1689)	(0.2308)	(0.2585)	(0.3094)	(0.3988)	(0.4281)	(0.4999)	(0.5029)	(0.5234)	(0.5855)
Observations	319	319	319	319	319	319	319	319	319	319	319
Number of Companies	55	55	55	55	55	55	55	55	55	55	55
F	1.351	1.620	0.762	0.840	1.842*	3.117***	3.112***	3.323***	2.495**	3.605***	3.075***
R-squared	0.2442	0.2127	0.2159	0.2076	0.2385	0.2450	0.2627	0.3007	0.3124	0.3410	0.3253
Adjusted R-squared	0.0463	0.0065	0.0105	0.0001	0.0391	0.0473	0.0697	0.1175	0.1323	0.1684	0.1487

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

Appendix 8: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Consumer Goods sector

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.0140	0.0548	0.1171	0.1336	0.3408	0.3623	0.2072	0.1839	0.1605	0.3182	0.2849
	(0.0716)	(0.0957)	(0.1658)	(0.1613)	(0.2158)	(0.2643)	(0.2681)	(0.2526)	(0.2928)	(0.3128)	(0.3661)
Autocratic tone	-0.0009	-0.0043	-0.0053	-0.0035	0.0088	0.0098	0.0086	0.0162	0.0196	0.0179	0.0200
	(0.0027)	(0.0035)	(0.0045)	(0.0067)	(0.0125)	(0.0130)	(0.0118)	(0.0168)	(0.0168)	(0.0148)	(0.0163)
Pragmatic tone	-0.0043	-0.0062	-0.0160	-0.0123	-0.0162	-0.0300	-0.0246	-0.0230	-0.0332	-0.0306	-0.0282
	(0.0059)	(0.0077)	(0.0118)	(0.0150)	(0.0178)	(0.0212)	(0.0234)	(0.0256)	(0.0263)	(0.0270)	(0.0293)
Earnings management interacted with:											
Autocratic tone	-0.0673	0.0428	0.0969	-0.0699	-0.4332	-0.4844	-0.4839	-0.6098*	-0.6338*	-0.7794**	-0.9705**
	(0.0582)	(0.1126)	(0.1727)	(0.2220)	(0.2740)	(0.3100)	(0.2886)	(0.3420)	(0.3069)	(0.3207)	(0.3600)
Pragmatic tone	0.1480	0.2031	0.3659	0.2677	0.4157	0.5510	0.4338	0.4647	0.5844	0.4317	0.4566
	(0.0994)	(0.1819)	(0.2218)	(0.2624)	(0.3256)	(0.4205)	(0.4422)	(0.4815)	(0.5150)	(0.5262)	(0.6248)
Operating cash / assets	0.0549	0.0844	0.1274	0.1895	0.4158***	0.4855*	0.8096**	0.8648***	0.8621***	0.8007**	0.8426**
	(0.0356)	(0.0626)	(0.1169)	(0.1130)	(0.1382)	(0.2436)	(0.3339)	(0.2847)	(0.2532)	(0.3151)	(0.3491)
Negative	-0.0047	0.0016	0.0391	0.0507	0.0705	0.0426	0.1201**	0.1317**	0.1651***	0.2085**	0.2011**
	(0.0174)	(0.0279)	(0.0234)	(0.0377)	(0.0448)	(0.0430)	(0.0484)	(0.0572)	(0.0564)	(0.0797)	(0.0782)
Leverage	-0.0185	0.0229	-0.0232	-0.0299	-0.1703	-0.2986*	-0.3277*	-0.3957**	-0.4758**	-0.4710**	-0.4410**
	(0.0369)	(0.0613)	(0.0759)	(0.0829)	(0.1124)	(0.1556)	(0.1638)	(0.1835)	(0.1857)	(0.1951)	(0.2088)
Earnings surprise	0.0500	0.0172	0.0303	-0.0189	0.0122	0.0233	0.0089	0.0923	0.0189	-0.0032	0.0115
	(0.0358)	(0.0532)	(0.0691)	(0.0828)	(0.1216)	(0.1221)	(0.1430)	(0.1608)	(0.1990)	(0.1931)	(0.1926)
Firm size	0.0055	0.0110	-0.0155	-0.0246	-0.0428	-0.0298	-0.0608**	-0.0665**	-0.0871**	-0.0976**	-0.1124***
	(0.0114)	(0.0122)	(0.0207)	(0.0311)	(0.0272)	(0.0260)	(0.0284)	(0.0301)	(0.0351)	(0.0354)	(0.0365)
Growth	0.0069	-0.0030	-0.0014	-0.0116	0.0002	-0.0129	-0.0274	-0.0378	-0.0386	-0.0354	-0.0431
	(0.0087)	(0.0119)	(0.0164)	(0.0281)	(0.0303)	(0.0300)	(0.0272)	(0.0272)	(0.0338)	(0.0371)	(0.0434)
ROA	-0.1408	0.0636	-0.1054	-0.1044	-0.4379	-0.5089	-0.5498	-0.5183	-0.5694	-0.6149	-0.5531
	(0.1434)	(0.1720)	(0.2878)	(0.4137)	(0.5134)	(0.5731)	(0.5869)	(0.5876)	(0.6594)	(0.6992)	(0.6535)

Appendix 8: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Consumer Goods sector (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Constant	-0.0750	-0.1943	0.2678	0.4320	0.7910	0.6641	1.1744**	1.3087**	1.6942**	1.8533***	2.0863***
	(0.1819)	(0.2000)	(0.3356)	(0.4972)	(0.4779)	(0.4862)	(0.5225)	(0.5603)	(0.6398)	(0.6364)	(0.6495)
Observations	109	109	109	109	109	109	109	109	109	109	109
Number of Companies	20	20	20	20	20	20	20	20	20	20	20
F	2.940**	3.747***	12.080**	5.200**	4.465***	4.403***	9.426***	8.387***	15.56***	5.886***	13.16***
R-squared	0.3126	0.2563	0.2779	0.2267	0.2705	0.3071	0.3664	0.3703	0.4028	0.3590	0.3958
Adjusted R-squared	0.0359	-0.0430	-0.0128	-0.0847	-0.0232	0.0282	0.1114	0.11.68	0.1624	0.1010	0.1525

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

Appendix 9: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Consumer Services sector

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	0.0122	-0.0118	0.1082	0.0700	0.0694	0.1625	0.1084	0.0885	0.1450	0.1739	0.2948
	(0.0445)	(0.0683)	(0.1128)	(0.1147)	(0.1351)	(0.1704)	(0.2272)	(0.2334)	(0.2162)	(0.2391)	(0.2782)
Autocratic tone	0.0025	0.0031	0.0071	0.0083	0.0094	0.0045	0.0043	0.0023	-0.0007	-0.0022	-0.0008
	(0.0029)	(0.0041)	(0.0053)	(0.0049)	(0.0071)	(0.0070)	(0.0087)	(0.0081)	(0.0095)	(0.0105)	(0.0116)
Pragmatic tone	-0.0028	-0.0041	-0.0053	-0.0049	-0.0045	-0.0021	-0.0023	-0.0024	-0.0100	-0.0004	-0.0085
	(0.0053)	(0.0062)	(0.0090)	(0.0091)	(0.0101)	(0.0103)	(0.0122)	(0.0128)	(0.0146)	(0.0147)	(0.0140)
Earnings management interacted with:											
Autocratic tone	-0.0152	0.0041	-0.1262*	-0.1310*	-0.0554	0.0769	0.3299***	0.3531***	0.2490**	0.2569**	0.2180*
	(0.0347)	(0.0431)	(0.0651)	(0.0696)	(0.0788)	(0.1072)	(0.0999)	(0.0953)	(0.1044)	(0.1037)	(0.1241)
Pragmatic tone	0.1033**	0.1053	0.1190	0.0528	0.0218	-0.0635	0.0785	0.1102	0.1866	0.1374	0.2787
	(0.0440)	(0.0687)	(0.1030)	(0.1158)	(0.1434)	(0.1500)	(0.1919)	(0.2003)	(0.2039)	(0.2294)	(0.2437)
Operating cash / assets	-0.0116	0.0027	-0.0066	-0.0055	-0.0047	-0.0352	-0.0654	-0.2090	-0.0923	-0.1268	-0.1340
	(0.0301)	(0.0584)	(0.1119)	(0.1413)	(0.1700)	(0.1777)	(0.2117)	(0.2675)	(0.2286)	(0.2247)	(0.2512)
Negative	-0.0173	-0.0057	-0.0074	-0.0079	-0.0067	-0.0201	0.0030	0.0214	-0.0248	0.0205	0.0501
	(0.0115)	(0.0099)	(0.0289)	(0.0311)	(0.0486)	(0.0530)	(0.0512)	(0.0464)	(0.0428)	(0.0525)	(0.0555)
Leverage	-0.0532	-0.0368	0.0496	0.0431	0.0943	0.0443	-0.1027	-0.0868	0.0927	0.0227	-0.0422
	(0.0475)	(0.0685)	(0.0905)	(0.0902)	(0.1230)	(0.1291)	(0.1608)	(0.1464)	(0.1647)	(0.1234)	(0.1696)
Earnings surprise	-0.0452	0.0396	0.0848	-0.0138	0.0498	0.1067	-0.0741	-0.1345	-0.1428	-0.0004	0.0791
	(0.0282)	(0.0370)	(0.1173)	(0.1065)	(0.1417)	(0.1678)	(0.1207)	(0.1258)	(0.1468)	(0.1987)	(0.1420)
Firm size	0.0011	-0.0000	-0.0002	-0.0027	-0.0155	-0.0366*	-0.0350	-0.0661**	-0.0801**	-0.0811**	-0.0802**
	(0.0069)	(0.0101)	(0.0157)	(0.0165)	(0.0178)	(0.0199)	(0.0223)	(0.0249)	(0.0350)	(0.0355)	(0.0297)
Growth	-0.0104**	-0.0096	-0.0096	-0.0067	-0.0113	0.0030	-0.0071	-0.0048	-0.0033	-0.0052	-0.0004
	(0.0051)	(0.0072)	(0.0129)	(0.0133)	(0.0114)	(0.0116)	(0.0133)	(0.0150)	(0.0196)	(0.0212)	(0.0220)
ROA	0.1241	0.1124	0.2680*	0.2684**	0.5084***	0.2160	0.2201	0.2762	0.6418*	0.5808**	0.3561
	(0.0844)	(0.1163)	(0.1538)	(0.1290)	(0.1824)	(0.2083)	(0.2601)	(0.2644)	(0.3582)	(0.2247)	(0.2780)

Appendix 9: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Consumer Services sector (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Constant	0.0128	0.0247	-0.0326	0.0129	0.1656	0.5335	0.5983	1.0813**	1.1427*	1.1959**	1.2280***
	(0.1002)	(0.1405)	(0.2578)	(0.2408)	(0.2725)	(0.3162)	(0.3655)	(0.4086)	(0.5934)	(0.5363)	(0.4413)
Observations	206	206	206	206	206	206	206	206	206	206	206
Number of Companies	36	36	36	36	36	36	36	36	36	36	36
F	2.508**	2.588**	6.162***	2.868***	3.103***	2.400**	8.054***	5.605***	4.765***	7.307***	4.057***
R-squared	0.1970	0.2079	0.2494	0.2207	0.2581	0.2161	0.2851	0.2812	0.2669	0.2411	0.2306
Adjusted R-squared	-0.0419	-0.0277	0.0261	-0.0111	0.0374	-0.0171	0.0724	0.0674	0.0489	0.0153	0.0018

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

Appendix 10: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Industrials sector

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Earnings management	-0.0385	-0.0453	-0.0309	-0.1412	-0.0769	-0.0928	-0.0559	-0.0504	0.0444	0.2245	0.1690
	(0.0631)	(0.0955)	(0.1169)	(0.1317)	(0.1565)	(0.1591)	(0.1676)	(0.1603)	(0.1799)	(0.1699)	(0.1713)
Autocratic tone	0.0032	0.0065*	0.0029	0.0027	0.0030	0.0052	0.0036	0.0041	-0.0020	-0.0051	-0.0047
	(0.0035)	(0.0038)	(0.0047)	(0.0055)	(0.0070)	(0.0071)	(0.0094)	(0.0101)	(0.0118)	(0.0120)	(0.0122)
Pragmatic tone	-0.0017	-0.0039	-0.0028	-0.0041	-0.0044	0.0073	0.0082	0.0162	0.0156	0.0109	-0.0037
	(0.0041)	(0.0050)	(0.0060)	(0.0081)	(0.0091)	(0.0098)	(0.0113)	(0.0108)	(0.0138)	(0.0132)	(0.0134)
Earnings management interacted with:											
Autocratic tone	-0.0594	-0.0843	-0.0273	-0.0592	-0.0919	-0.0986	-0.1236	-0.0760	-0.0354	0.0216	0.1107
	(0.0476)	(0.0606)	(0.0577)	(0.0714)	(0.1035)	(0.1410)	(0.1473)	(0.1431)	(0.1454)	(0.1830)	(0.1742)
Pragmatic tone	-0.0036	-0.0118	0.0612	0.0738	0.0435	-0.0518	0.0041	-0.0265	-0.0383	-0.0365	0.1236
	(0.0286)	(0.0448)	(0.0586)	(0.0687)	(0.0970)	(0.1049)	(0.1050)	(0.1156)	(0.1401)	(0.1571)	(0.1548)
Operating cash / assets	-0.0181	-0.0208	0.0334	0.0528	0.0359	0.0472	0.1824	0.1360	0.0050	0.3032	0.2894
	(0.0653)	(0.0922)	(0.0978)	(0.1014)	(0.1347)	(0.1520)	(0.1583)	(0.1286)	(0.1420)	(0.2113)	(0.2059)
Negative	0.0084	-0.0028	-0.0029	0.0027	0.0400	0.0607*	0.0332	0.0307	0.0354	0.0362	0.0388
	(0.0117)	(0.0144)	(0.0187)	(0.0222)	(0.0344)	(0.0361)	(0.0396)	(0.0342)	(0.0401)	(0.0378)	(0.0439)
Leverage	0.0727**	0.0440	0.0335	0.0778	0.0428	0.0530	0.2174	0.2272*	0.2357	0.3127**	0.2294
	(0.0329)	(0.0564)	(0.0607)	(0.0945)	(0.0990)	(0.1153)	(0.1349)	(0.1353)	(0.1481)	(0.1308)	(0.1949)
Earnings surprise	-0.0022	-0.0129	-0.0330*	-0.0239	-0.0476	-0.0390	-0.0869*	-0.1013**	-0.1181**	-0.1174**	-0.1239***
	(0.0136)	(0.0150)	(0.0171)	(0.0218)	(0.0299)	(0.0346)	(0.0471)	(0.0388)	(0.0517)	(0.0504)	(0.0458)
Firm size	-0.0149**	-0.0161	-0.0456***	-0.0498**	-0.0610**	-0.0785***	-0.0816**	-0.1000***	-0.1142***	-0.0856***	-0.0834**
	(0.0073)	(0.0133)	(0.0152)	(0.0206)	(0.0236)	(0.0248)	(0.0310)	(0.0302)	(0.0315)	(0.0247)	(0.0320)
Growth	0.0168	0.0102	0.0160	0.0149	0.0033	0.0079	-0.0058	-0.0043	0.0345	-0.0052	-0.0015
	(0.0150)	(0.0192)	(0.0245)	(0.0294)	(0.0314)	(0.0361)	(0.0409)	(0.0426)	(0.0474)	(0.0452)	(0.0577)
ROA	0.0757	0.0684	0.1147	0.2273	0.4784	0.4420	0.4715	0.6504	0.6287	0.7316*	0.5202
	(0.1411)	(0.1547)	(0.2112)	(0.2694)	(0.3243)	(0.3166)	(0.3829)	(0.4160)	(0.4384)	(0.4210)	(0.5565)

Appendix 10: Panel regression estimates of the moderating effect of top management tone on the market reaction to earnings management in the Industrials sector (continued)

VARIABLES	(1) CAR0	(2) CAR1	(3) CAR3	(4) CAR5	(5) CAR10	(6) CAR15	(7) CAR20	(8) CAR25	(9) CAR30	(10) CAR35	(11) CAR40
Constant	0.1628	0.2120	0.6405***	0.6691**	0.8299**	1.0735***	1.0329**	1.2867***	1.4653***	0.9992***	1.0271**
	(0.1016)	(0.1789)	(0.2048)	(0.2710)	(0.3117)	(0.3333)	(0.4048)	(0.4000)	(0.4139)	(0.3230)	(0.4026)
Observations	284	284	284	284	284	284	284	284	284	284	284
Number of Companies	55	55	55	55	55	55	55	55	55	55	55
F	2.792***	0.829	1.262	0.779	1.239	2.478**	1.211	2.180**	2.114**	3.431***	3.535***
R-squared	0.3373	0.3085	0.3343	0.3106	0.2892	0.3152	0.3172	0.3284	0.3176	0.3257	0.2804
Adjusted R-squared	0.1357	0.0981	0.1318	0.1009	0.0731	0.1069	0.1095	0.1241	0.1100	0.1206	0.0616

All models presented above use firm fixed effects panel regression. Cluster robust standard errors are presented in parentheses to correct for heteroskedasticity and autocorrelation.
*** p<0.01, ** p<0.05, * p<0.1
(Source: This table was prepared by the author)

CHAPTER 6: CONCLUSIONS

6.1 Introduction

This dissertation aimed to determine tone at the top's role in detecting and preventing financial statement manipulation in South Africa. To achieve this, the individual papers presented in this dissertation investigated the relationship between tone at the top and financial statement manipulation, focusing on how tone at the top moderates the relationship between financial statement manipulation and three crucial monitoring mechanisms: the audit committee, the external auditor, and the stock market.

Chapter 1 of this dissertation presented the study's background and provided a definition and measurement overview of financial statement manipulation. Then the chapter discussed the agency and signalling theories which underpin the study, before discussing the role of each of the three monitoring mechanisms in detecting and preventing financial statement manipulation, together with an overview of their measurement. Finally, the chapter laid out the role of tone at the top in shaping a company's values, culture and internal control environment, before describing its theoretical influence on financial statement manipulation and the three monitoring mechanisms. Chapter 2 explored the usefulness of alternative measures to detect financial statement manipulation, given the lack of a detailed list of offenders. Chapters 3 to 5 considered the relationship between tone at the top and financial statement manipulation and how tone at the top moderates the effectiveness of the three monitoring mechanisms under review. This chapter summarises the results and the contributions of this dissertation. Following this, it highlights various limitations and possible areas of future research.

6.2 Summary of findings and implications

This section summarises the findings related to each objective of this study and the implications thereof.

6.2.1 Objective 1: Investigate the usefulness of financial statement manipulation detection models in South Africa and determine if they can be modified to suit South Africa better

Objective 1 was explored in the paper presented in Chapter 2. While this objective does not directly address the overarching research question of the study, it is critical that an appropriate measure of financial statement manipulation in South Africa is identified. Specifically, the paper investigated the Beneish (1999) M-score and the Dechow et al. (2011)

F-score to determine their suitability in South Africa. Both of these models were developed in the United States of America and have been applied globally. However, despite the models' prior usage in Africa, their suitability has never been determined. Consequently, this paper set out to test the validity of these two fraud detection models in an emerging African context using recent data.

The paper found that both the Beneish (1999) M-score and the Dechow et al. (2011) F-score performed poorly in correctly classifying manipulators and non-manipulators. This result was primarily driven by the inability of the scores' underlying variables to classify manipulating companies. However, the study found that the false positives detected by the models tended to show similar or higher levels of discretionary accruals compared to the manipulator sample, indicating that the models may have been classifying observations based on high levels of accruals-based earnings management. Finally, the study attempted to make the models more suitable for South Africa by updating the underlying variable coefficients using up-to-date South African data. While this approach did improve certain aspects of the models, it worsened other aspects. Consequently, the models (even when updated) are unsuitable for use in South Africa.

In conclusion, due to their poor performance, neither the M- nor F-score could be used as a proxy for the risk of financial statement fraud in the subsequent papers in the study. While this dissertation's initial objective was to focus on financial statement fraud, this was not possible, given the small sample of fraudulent companies. Therefore, the study's scope was extended to focus on a broader definition of financial statement manipulation, including financial statement fraud and accruals-based earnings management.

6.2.2 Objective 2: Determining the relationship between tone at the top and financial statement manipulation

Objective 2 was explored in Chapters 3 and 4. Tone at the top was measured by applying the DICTION themes of activity, certainty, commonality, optimism and realism to the CEO letters in the annual reports. Principal component analysis was then applied to develop composite measures of tone. Although each paper[20] used a slightly different sample size due to the various data requirements of each research focus area, the grouping of DICTION themes remained consistent, with activity, certainty and optimism (negative loading) forming

[20] Chapter 5 also used the same process as Chapters 3 and 4 to develop the tone components. Thus, the results of Chapter 5 in this regard are included here while discussing the tone components.

the first tone component and commonality (negative loading) and realism forming the second tone component. These tone components were labelled as autocratic and pragmatic, respectively.

Both chapters consistently found no independent association between autocratic tone and financial statement manipulation[21]. While both chapters found no association between the pragmatic tone and financial statement fraud, Chapter 4 found a small negative association between the pragmatic tone and income-decreasing discretionary accruals. However, this association was only significant at the 10% level.

Thus, the overall finding of this study regarding objective 2 is that, for the most part, tone at the top does not have a direct relationship with financial statement manipulation. This implies that South African CEOs do not use tone to enhance or impede financial statement manipulation directly. However, tone at the top was found to have indirect relationships through the moderation of various monitoring mechanisms, which are summarised in sections 6.2.3 to 6.2.5.

6.2.3 Objective 3: Determining the moderating effect of tone at the top on audit committee effectiveness

Chapter 3 investigated objective 3, in which five audit committee proxies (representing financial expertise, governance expertise, independence, activity and diversity) were first developed by reducing ten underlying variables using principal component analysis. Then the relationship between the five proxies and financial statement manipulation was determined. After this, tone at the top was introduced as a moderating variable.

In the initial analysis, greater audit committee governance expertise was associated with increased financial statement manipulation, while greater committee activity was associated with less financial statement manipulation. Furthermore, greater independence was associated with a greater chance of fraud happening. On the other hand, neither the audit committee's financial expertise nor diversity revealed a relationship with financial statement manipulation.

These findings on the individual audit committee proxies are important to regulators, shareholders, audit committee members and external auditors. They confirm regulators'

[21] For the purposes of this summary section, the term financial statement manipulation refers to both fraud and earnings management. Should only one element be affected (i.e. only fraud or earnings management), then it will be referred to separately.

concerns with the effectiveness and performance of long-serving and busy directors (governance expertise), justifying guidance to limit their length of service and total number of directorships, especially those serving on audit committees. While the study's findings regarding independence may suggest that this characteristic is not as important as initially thought, the findings may be a result of management misleading independent committees through information asymmetries (Lisic et al., 2016; Zengin-Karaibrahimoglu et al., 2021). Rather than remove or downplay committee independence criteria, there should be an increased focus on the committees' activity levels, which show a negative association with financial statement manipulation. Greater activity levels can reduce the information asymmetries experienced by independent directors, thereby helping them to prevent and detect financial statement manipulation. Likewise, while financial experience was not associated with financial statement manipulation, this may indicate that a formal qualification[22] is not as crucial as overall experience with finances. Overall, these findings concur with Brennan (2021), who notes that audit committees may not be as effective as envisaged because of their limited time and reliance on management for information.

When introducing the tone at the top variables as moderators, the moderating effect was shown to be more pronounced for fraud than earnings management measures. Specifically, an autocratic tone enhances the ability of a financially competent and independent audit committee to prevent financial statement fraud. However, the autocratic tone inhibits the effectiveness of an active and diverse audit committee in preventing fraud. Contrary to this, under a pragmatic tone, the activity and diversity characteristics ability to prevent financial statement fraud are enhanced, while the committee's financial expertise aspect is inhibited. Under the pragmatic tone, governance expertise is also enhanced in relation to absolute discretionary accruals.

Thus, the overall finding of this study regarding objective 3 is that tone at the top does moderate the relationship between audit committee effectiveness and financial statement fraud. This finding is consistent with related studies by Lisic et al. (2016) and Zengin-Karaibrahimoglu et al. (2021), who found that CEO power and narcissism moderated the audit committee's effectiveness. The different tones of autocratic and pragmatic generally have opposite moderating effects on the audit committee characteristics.

[22] For the purposes of this study, financial expertise was measured by the director having a formal accounting or financial qualification. It did not consider the directors informal experience or education in these fields. The nuances of measuring audit committee effectiveness is raised as a limitation in section 6.4.4.

6.2.4 Objective 4: Determining the moderating effect of tone at the top on external auditor quality

Objective 4 was investigated in Chapter 4, following a similar structure to Chapter 3 in that it first used principal component analysis to develop two auditor quality components: competence and independence. The relationship between the two components and financial statement manipulation was then tested before introducing tone at the top as a moderating variable.

In the initial analysis, auditor competence showed no relationship with any measure of financial statement manipulation. However, greater auditor independence is associated with higher absolute discretionary accruals, driven by a significant relationship with income-decreasing discretionary accruals, indicating that auditors prefer conservative accounting choices.

The findings regarding the individual external auditor characteristics would interest shareholders and audit committees. Competent auditors (indicated by large audit firms, industry specialists and joint auditors) have been shown to charge expert fee premiums (Bicudo de Castro et al., 2019; DeFond and Zhang, 2014). However, such benefits do not translate into reduced financial statement manipulation. Therefore, when audit committees nominate external auditors and shareholders vote on the auditor, they should consider whether they can save money by selecting a non-specialist firm. However, as this study only considered the effect of competence on financial statement manipulation, consideration needs to be given to potential lost benefits, such as industry-specific knowledge, which bring advantages to the company. A further consideration for audit committees and shareholders, is the awareness that more independent auditors are likely to push for more conservative accounting practices, possibly as an attempt to address information asymmetries and reputational risks.

Notably, when tone at the top was introduced as a moderating variable, an autocratic tone strengthened the negative association between auditor competence and financial statement fraud. However, what is concerning is that it resulted in a more positive relationship between auditor competence and income-increasing discretionary accruals. The autocratic tone does not moderate the relationship between auditor independence and financial statement manipulation, nor does the pragmatic tone moderate the relationship between either audit quality component and financial statement manipulation.

Thus, the overall finding concerning objective 4 is that an autocratic tone does moderate the relationship between auditor competence and financial statement manipulation. This finding would particularly interest investors, audit committees and regulators. These parties would be pleased that competent auditors are better equipped to address the fraud risks associated with autocratic leadership styles. However, these parties should be concerned that competent auditors may allow management to push the boundaries of accounting standards.

6.2.5 Objective 5: Determining the moderating effect of tone at the top on the market's reaction to financial statement manipulation

Objective 5 was explored in Chapter 5, using an event study methodology. The market response was measured using cumulative abnormal returns over multiple window periods ranging from two to forty-two days. When measuring financial statement manipulation, only earnings management was considered. The market's reaction to earnings management was then tested, after which the moderating effect of tone at the top was introduced. Like Chapters 3 and 4, tone at the top was measured by extracting the principal components from DICTION's five master variables.

Considering the stand-alone variables, until day three, the market reacted positively to earnings management, after which it became negative. However, throughout the forty-two-day window, this relationship was not statistically significant. Regarding the stand-alone tone variables, an autocratic tone was associated with a positive market reaction from day five until day twenty-five. There was no market reaction associated with the pragmatic tone over the forty-two-day period.

When investigating the moderating effect of tone at the top on the relationship between earnings management and the market reaction, the autocratic tone demonstrated a statistically significant negative moderation effect on the relationship for most of the study period. In contrast, the pragmatic tone showed a positive moderating effect, although this was not statistically significant until day forty.

Thus, the overall finding of this study regarding objective 5 is that an autocratic tone negatively moderates the market's reaction to financial statement manipulation. This information would be of interest to autocratic company leaders, who should understand that the market will punish them if they engage in earnings management practices. The findings would also interest analysts and regulators, as they reveal that South African investors require more than one warning sign before responding to fraud risk factors.

6.2.6 Overall research question: What is the role of tone at the top in detecting and preventing financial statement manipulation in South Africa?

Overall, this study sought to investigate the role of tone at the top in detecting and preventing financial statement manipulation in South Africa. While the study found that tone at the top, on its own, is not directly associated with financial statement manipulation, there is evidence that tone at the top does indirectly impact the detection and prevention of financial statement manipulation by moderating the effectiveness of three crucial monitoring mechanisms: the audit committee, the external auditor and the market reaction. Thus, while management may appear to be complying with the best governance practices, if management sets an inappropriate company tone, governance practices will be ineffective, to the detriment of the company's stakeholders. Alternatively, if management sets an ethical company tone, the governance mechanisms will be supported, enhancing their usefulness.

6.3 Practical recommendations arising from the findings

Several practical recommendations can be drawn from this study's findings. In Chapter 2, the two internationally developed fraud prediction models were found to be ineffective in South Africa. This shows that researchers and analysts should use caution when applying fraud prediction models developed outside the country under study, as they may not accurately represent the study country's unique context. Therefore, researchers and analysts should first determine the models' applicability to the country under study before using them. Alternatively, country-specific measures to gauge the extent of financial statement manipulation more accurately should be developed. This could be done by adapting existing models or using more advanced methods incorporating machine learning and artificial intelligence.

In Chapter 3, the relationship between audit committee effectiveness and financial statement manipulation was initially tested, raising several actionable points. Firstly, given the findings related to governance expertise (long-serving and busy directors), shareholders and those charged with governance should more thoroughly question the benefits of having long-serving and busy directors sit on the audit committee and lobby for their replacement if they are found to be ineffective. Secondly, the study's findings suggested that director independence may be detrimental because of information asymmetries. Rather than downplay committee independence criteria, stakeholders should lobby for greater audit committee activity and access to financial information to help overcome the information asymmetries.

Thirdly, financial experience (measured as a formal qualification) was not associated with financial statement manipulation. Given this finding, interested parties should not only concern themselves with formal education requirements but also with the director's overall experience and acumen with accounting and finance. Finally, as suggested by Brennan (2021), academics and regulators should develop a more nuanced understanding of the role and workings of audit committees, particularly regarding their role in addressing financial statement manipulation.

Chapter 3 then extended the analysis to test the moderating effect of tone at the top on financial statement manipulation, finding that tone at the top does moderate this crucial relationship. Consequently, when shareholders elect directors to serve on the audit committee, they should pay acute attention to the traits these individuals possess and whether the company tone will support or undermine those traits when preventing and detecting financial statement manipulation. Similarly, when external auditors perform their risk assessments, they must assess the audit committee characteristics and overall tone at the top together and not only independently. These findings also indicate that CEOs (together with top leadership) need to reflect on the overall corporate tone they are creating and whether it is enabling financial statement manipulation. Finally, while regulators should continue to develop best practices in terms of governance mechanisms, such as the audit committee, greater emphasis needs to be placed on concrete steps to improve the overall ethical tone of the company, which can render these mechanisms ineffective. Unlike the audit committee's expertise, independence, activity and diversity, which an external party can easily assess (at least superficially), determining and improving the overall corporate tone is extremely difficult, even with the guidance provided in governance codes such as King IV.

Chapter 4 investigated the moderating effect of tone at the top on the relationship between external auditor quality and financial statement manipulation. Here, it was found that competent auditors may allow autocratic management to push the boundaries of accounting standards. Thus, investors and audit committees should lobby competent external auditors with autocratic clients to change their audit procedures' nature, timing and extent to address income-increasing discretionary accruals better.

Chapter 5 found that an autocratic tone negatively moderated the market's reaction to financial statement manipulation. Consequently, financial analysts and decision-makers must factor top management tone into their analyses and decision-making models. Further, they

should consider a range of tones (as done in this research) rather than just the positive-negative spread (as was done in prior research). This could be done using specialised software (such as DICTION used in this study or Azure machine learning available in Excel), publicly available wordlists (such as Loughran and McDonald (2011)), artificial intelligence and machine learning models, or through close reading of CEO and other executive directors' statements and observing their actions and interactions with other stakeholders.

Overall, this study found that tone at the top does moderate the effectiveness of key governance mechanisms designed to prevent and detect financial statement manipulation. Therefore, company stakeholders need to be cognisant of the role tone at the top plays and incorporate this factor into their actions and decisions. Specifically, regulators must consider tone at the top when establishing governance frameworks and legislation. The emphasis cannot only be on measurable characteristics of the governance mechanisms, which can be manipulated and rendered ineffective by an inappropriate corporate tone. Similarly, shareholders and those charged with governance need to be aware of the role tone plays. They should pay close attention to the underlying characteristics of the governance mechanisms and determine if the tone will support or undermine the effective functioning of the mechanism. Finally, audit committees and external auditors may need to adjust their processes to better address the risks associated with the corporate tone in the companies they serve.

6.4 Summary of original contributions and implications

The following sections summarise this study's original contributions.

6.4.1 The usefulness of existing fraud detection models in South Africa

The study explored the usefulness of popular fraud detection models outside of their original development contexts. Although these models have been widely used outside the United States, this study found that they are ineffective in South Africa in detecting fraud. Instead, the models appeared to identify cases of more extensive accruals-based earnings management, which does not always equate to fraud. This nuance is essential to understand, as it clarifies what the models are detecting, thereby shedding further light on the research findings that have used these models outside the United States. These findings suggest that researchers should be cautious when using fraud detection models outside their original contexts. A model's effectiveness should be tested in the context in which it is being applied, before relying on its output.

6.4.2 The importance of considering tone at the top beyond the positive-negative spread

Most prior research on tone at the top has focused on using a positive tone. The focus of domain-specific wordlists on positive and negative words predominantly drives this approach. Only a few studies have explored tone beyond this focus, and these studies have shown that a diverse range of tones are influential on various business decisions and transactions, showing that measuring tone more holistically is important. Unfortunately, despite tone at the top being complex and multidimensional, these studies have only considered individual tones and ignored composite tones. Therefore, this study contributed to the literature by exploring tones outside the standard positive-negative spread and building composite tones, showing that different tones influence the effectiveness of monitoring mechanisms and that the market reacts to this diversity. Consequently, company stakeholders must incorporate complex tones beyond positive and negative into their decision-making and risk assessment models.

6.4.3 Corroboration of the critical components of audit committees and external auditors

By using principal component analysis, the study corroborated the critical characteristics of audit committee effectiveness (financial expertise, governance expertise, independence, activity and diversity) and external auditor quality (competence and independence) that were identified by prior studies such as Bédard et al. (2004) and Harber and Marx (2020). Even though audit committees and external auditors are complex, multidimensional governance mechanisms, with no individual proxy providing a complete representation, most studies (as seen in Chapters 3 and 4) only consider individual traits of these governance mechanisms. Only a few studies have attempted to develop composite measures for specific governance mechanisms[23]. These composite proxies incorporate the orthogonal relationships between the governance mechanism's individual, measurable characteristics, thereby providing a more holistic understanding of how they work together to create an effective audit committee or high-quality external auditor. Future research will be able to develop these critical components further.

[23] While other studies such as Biswas et al. (2022) and Tarchouna et al. (2017) have also employed principal component analysis and other techniques to develop indices, these are typically aimed at overall governance measures, rather than specific aspects of governance.

6.4.4 Understanding the relationship between tone at the top and monitoring mechanisms with financial statement manipulation in South Africa

The study contributed to the existing literature by exploring four relationships in the South African context:

1. Tone at the top and financial statement manipulation
2. Audit committee effectiveness and financial statement manipulation
3. External auditor quality and financial statement manipulation
4. The market reaction to financial statement manipulation

While these relationships have been explored extensively in the United States, Europe and Asia with mixed results, this study examined these relationships in South Africa, an emerging economy and a leader in corporate governance. Currently, South African research in these fields is minimal. Thus, this study adds a fresh geographical perspective to the international literature while extending the literature in South Africa. Understanding these relationships will help South African regulators, investors, audit committee members, and external auditors better respond to the threat of financial statement manipulation.

6.4.5 Understanding how tone at the top impacts the effectiveness of monitoring mechanisms in preventing and detecting financial statement manipulation

This study extended the international literature on the relationships mentioned in section 6.3.4 by introducing tone at the top as a moderating variable to explain the mixed results obtained in prior studies. To the best of the researcher's knowledge, this is the first study to evaluate how tone at the top moderates the relationship between governance mechanisms and financial statement manipulation.

While regulators have used legislation and codes to guide and, in some instances, enforce governance structures, this study has highlighted how tone at the top moderates the effectiveness of these regulated interventions. In setting regulations, policymakers need to be cognisant of how different tones enhance or hinder the guidance provided and offer alternative guidance to accommodate different corporate contexts.

Likewise, audit committees, external auditors, and market analysts need to evaluate the overall corporate culture and value set, which are shaped by top management's tone. Based on this understanding, monitoring structures should assess how the tone at the top may compromise their effectiveness in analysing the company's financial statements so that they can respond appropriately.

Finally, in terms of the Companies Act, No. 71 of 2008, South African shareholders are ultimately responsible for appointing the audit committee and the external auditor through voting at the annual general meeting (refer to sections 90 and 94). Therefore, they need to be cognisant of the company's tone at the top and whether it enhances or inhibits the characteristics of the audit committee members and external auditor they appoint. In addition, investors should pay attention to the tone used in the annual report and how it affects their reaction to a company's financial results and suspected manipulation of its financial performance.

The evidence suggests that stakeholders should ensure that executive management sets an appropriate corporate tone. Without a proper tone, it becomes difficult to rely on monitoring mechanisms, both internal and external, whether regulated or not, as they may be unduly influenced by company leadership, rendering them ineffective in detecting and preventing financial statement manipulation.

6.5 Limitations of the study and areas of future research

While this study has made meaningful contributions to the existing literature, it is not without limitations. This section highlights these and points to related future research areas.

6.5.1 Geographical and industrial scope of the study

The dissertation's geographical and industrial scope was limited to non-financial companies in South Africa. Consequently, the results may not be generalisable to other contexts. The importance of a study's context was highlighted in Paper 1, where it became apparent that the results produced in one context (i.e. the United States pre-2005) do not necessarily apply everywhere. Future studies should explore similar relationships to those tested in this study in other geographical contexts and financial companies.

6.5.2 Detecting financial statement manipulation

Detecting financial statement manipulation is difficult, as perpetrators do not want it discovered. Consequently, this study used two methods to identify financial statement manipulation: known fraud cases identified through FSCA enforcement actions, FRIP restatements and qualified audit opinions (based on fraud), and accruals-based earnings management using established methods from the literature.

The fraud sample was small in size. Consequently, the unbalanced nature of the fraud sample to the non-fraud sample may lead to biased inferences. Propensity score matching was not performed due to the small resultant sample size. Although other fraud detection methods (the Beneish (1999) M-score and Dechow et al. (2011) F-score) were considered in an attempt to identify fraudulent observations that may have gone undetected, Paper 1 showed that these are ineffective in South Africa. Although this study used the longest possible data set based on FSCA enforcement actions, future research can attempt to expand the sample size by updating it as time progresses or developing effective fraud detection models for South Africa.

Regarding the earnings management measure, the study only considered accruals-based earnings management. While it predominantly used the popular model proposed by Kothari et al. (2005), a wide range of accruals-based earnings management models exist in the literature, with no clear evidence on whether any one is superior (Orazalin and Akhmetzhanov, 2019). Future research should consider using different accruals-based earnings management models and compare their power. Additionally, future research may consider incorporating real earnings management as an alternative method of financial statement manipulation.

6.5.3 Measuring tone at the top

Throughout this dissertation, tone at the top was measured using a dictionary approach based on a general wordlist (the DICTION software) applied to the CEO statement in the annual report. While this approach is consistent with numerous empirical studies (see, for example, Alshorman (2016), Alshorman and Shanahan (2021), Amernic et al. (2010), Craig and Amernic (2011, 2018), Nel et al. (2022), Patelli and Pedrini (2015)), and accommodates data availability in South Africa, it does present several limitations.

First, a dictionary approach was used to improve resource efficiency, objectivity and replicability (Hope and Wang, 2018). However, this approach may fail to consider multiple meanings of words, the context of the word and the use of negative modifiers (Larcker and Zakolyukina, 2012; Li, 2010). Future research may consider performing manual analysis to address these issues, although, due to resource constraints, the sample size is likely to be smaller. A further alternative would be to perform the analysis using artificial intelligence tools as these become more sophisticated and better able to recognise language usage and context.

Second, a general wordlist was used to perform the analysis. This was done because domain-specific wordlists are limited in tone identification (generally to a positive-negative spread). Using the DICTION software allowed for a broader range of tones to be considered (Enslin et al., 2023; Marais et al., 2024), although it may have misclassified words based on domain-specific usage and thus resulted in a weaker analysis (Loughran and McDonald, 2011). Future research may consider extending the development of domain-specific wordlists to incorporate the analysis of a broader range of tones.

Third, the tone at the top measure reflects only the CEO position. While the CEO is the highest position within the company and should, therefore, have the most influence on tone at the top (Craig and Amernic, 2018; Hope and Wang, 2018; Nel et al., 2022), other positions within the company would also influence tone at the top. Particularly with financial statement manipulation, the CFO may substantially influence the tone. Similarly, other influential individuals within the company (such as the board chairperson, the audit committee chairperson, and the head of internal audit) may influence a company's overall tone at the top. Thus, future research should develop methods to measure the role of additional influential individuals when measuring tone at the top and incorporate these in the analysis. A composite tone could also be developed to incorporate these additional influential individuals into one measure.

Fourth, tone at the top was measured using the CEO statement in the annual report. While it may be questioned whether CEOs write their letters, their involvement in the document's development was extensively discussed in section 1.7.4. A limitation when using this document, is that it is a formal, planned document and may, therefore, reflect a manipulated tone at the top rather than a company's actual tone at the top. The use of this document is justified in that it is readily available in South Africa, while other forms of communication are not. Future research is encouraged to use spontaneous narratives or follow international trends of using earnings conference calls (should these become readily available in South Africa) to develop a more realistically accurate tone at the top for a company.

A final limitation of this study's tone at the top measure is that it may not be easily replicable to investors and other stakeholders as it used specialised software (DICTION) and complex statistical techniques (principal component analysis). Although linguistic software is becoming more easily accessible (for example, Azure machine learning) and domain-specific wordlists, such as Loughran and McDonald (2011), are publicly available, an area of future

research would be identifying how tone at the top can be measured practically to ensure that stakeholders can benefit from the findings of this research.

6.5.4 Measuring audit committee effectiveness

In measuring audit committee effectiveness, this dissertation used ten observable characteristics available in the annual reports, determined based on the prior literature. Although this study used a more comprehensive set of characteristics than is typically used in the literature, attempting to capture the multidimensional nature of audit committees through principal component analysis, it may nonetheless provide an incomplete picture, as audit committee effectiveness is complex and inherently unobservable. Future research should consider more nuanced and detailed proxies for audit committee effectiveness, especially as disclosure of the committees' activities improves. In addition, qualitative research on audit committees would benefit the understanding of how they work and achieve their designated roles.

6.5.5 Measuring external auditor quality

As with audit committee effectiveness, this dissertation used five observable characteristics of external auditors to measure external auditor quality. DeFond and Zhang (2014) note that observable attributes of the external auditor can be split into input characteristics (i.e. auditor characteristics such as size, tenure, independence, and fees) and output characteristics (i.e. reporting issues such as misstatements, auditor communications and reporting quality). This dissertation focused on input characteristics, as financial statement manipulation could be linked to the output measures. As with audit committee effectiveness, external auditor quality is complex, multidimensional, and unobservable. Therefore, only considering observable characteristics may result in an incomplete proxy (Singh et al., 2019). Future research should again consider more nuanced proxies for external auditor quality, although available disclosures currently limit this. Moreover, qualitative research on external auditor quality may also better identify proxies for future use.

6.6 Conclusion

Corporate frauds and collapses, globally and in South Africa, have renewed interest in mechanisms to detect and prevent financial statement manipulation. Given the cost of these frauds and collapses, regulators have introduced and strengthened corporate governance codes and regulations. Despite these reforms, financial statement manipulation has continued,

with academic literature finding mixed results on the effectiveness of the governance mechanisms.

This dissertation investigated how tone at the top moderates the effectiveness of the mechanism designed to prevent and detect financial statement manipulation. While this study's results showed that tone at the top does not significantly influence financial statement manipulation independently, it showed that tone at the top does moderate the ability of the audit committee, external auditor and the market to prevent and detect financial statement manipulation.

These results suggest that corporate culture, as created by top management, does matter for the effectiveness of monitoring mechanisms. Understanding that top management may use tone to influence governance mechanisms, which can appear to comply with best practice and regulations, is critical to preventing and detecting further instances of inappropriate financial statement manipulation, which are costly to society. Investors, regulators, audit committee members, external auditors and other stakeholders must actively assess the corporate culture and tone of the companies they are involved in so that they can adapt their processes, thereby mitigating the risk that they will be unduly influenced by management. In the quest to eradicate financial statement manipulation, key stakeholders must first ensure that a company's top leadership sets an appropriate tone, before relying on monitoring mechanisms to successfully prevent and detect financial statement manipulation.

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Dear Mr Alastair Malcolm Marais,

Original application number: 00025201
Project title: Tone at the top's role in the detection and prevention of financial statement manipulation in South Africa

Exemption from Ethics Review

In response to your application received on 19 March 2024 , your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Mabutho Sibanda
Academic Leader Research
School Of Acc Economics&Fin

Note: The original exemption from ethics review was granted on 13 August 2019 (protocol reference number: 00002888), with the title amendment approved in March 2024 shown here.