NARRATIVE DISCLOSURES IN CORPORATE ANNUAL REPORTS: A SYNTACTICAL COMPLEXITY PERSPECTIVE

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

The Financial Reporting Council of the United Kingdom launched the Complexity project in 2008 to investigate the causes of complexity in annual reports, given increased concerns on the increasing size, complexity and the declining relevance of annual reports. However, to date, there is still limited academic evidence on the determinants and consequence of the complexity of annual reports, though annual reports remain increasingly complex. This thesis specifically investigates what determines the syntactical complexity of narratives in annual reports, and what is the consequence of syntactical complexity in annual report narratives. It does this by assessing in three empirical chapters (i) what firm characteristics determine the syntactical complexity in narratives, (ii) what board characteristics determine syntactical complexity in narratives, and (iii) what role do narratives play when investors react to earnings information. Syntactical complexity of narratives is measured using the fog index readability formula from computational linguistics, and the tone index measure, both widely used in assessing narratives in accounting research.

The results reported in the first empirical chapter of the thesis indicate that specific characteristics of a firm determine the level of syntactical complexity of narratives. It shows that the performance of the firm, size of the firm, age of the firm, and the operations of the firm, play a role in the complexity of annual report narratives. The results reported in the second empirical chapter indicate that board composition factors determine the level of syntactical complexity of narratives. It shows that the age of directors, size of the board, percentage of female directors in the board, average board tenure and the number of nationalities in the board play a role in the level of complexity of annual report narratives. The third empirical chapter presents results indicating that the syntactical complexity of narratives increases with the Post Earnings Announcement Drift. It shows that the movement of post earnings

return, in the direction of unexpected earnings, increases when management provide narratives with a more positive outlook.

Overall, the results reported in this study indicate that the characteristics of the firm and the composition of the board of directors play a role in the level of complexity of annual report narratives. In addition, the results indicate that the syntactical complexity of annual report narratives, influences investors' reaction to earnings information. These results are important for policy makers and regulatory bodies that are seeking to reduce the complexity and increase the relevance of annual reports. The results are consistent with the view that firm specific factors and the governance of the firm, are important in the narrative communication process, and that complexity of narrative communication affects resource allocation decisions.

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List of Abbreviations

CEO - Chief Executive Officer

DTR - Disclosure and Transparency Rule

EPS - Earnings Per Share

FCA – Financial Conduct Authority

FERF - Financial Executive Research Foundation

FRC – Financial Reporting Council

FSA – Financial Service Authority

FTALSH - FTSE ALL SHARE

FTSE – Financial Times and Stock Exchange

IAS – International Accounting Standards

IASB – International Accounting Standard Board

ICAS – The Institute of Chartered Accountants of Scotland

ICB – Industry Classification Benchmark

MD&A – Management Discussion and Analysis

PDF – Portable Document format

PEAD – Post Earnings Announcement Drift

SEC – Security and Exchange Commission

UK – United Kingdom

UKLA - United Kingdom Listing Authority

USA - United States of America

1 Introduction

1.1 Introduction

This thesis is an empirical analysis of the syntactical complexity of narratives in annual reports. It investigates the economic determinants and the economic consequence of the syntactical complexity of corporate annual report narratives. The main motivation for this study emanates from the increasing size and complexity of annual reports and thus their declining relevance for investor communication (FRC 2009; Deloitte 2009). Figure 1.1 provides evidence of the increase in the size of annual reports from years 2000 to 2011 (over 50% increase from 2000 to 2010), indicating the amount of information investors need to sieve through to obtain value relevant company information.

Figure 1-1: Yearly Analysis of Size of Annual Reports
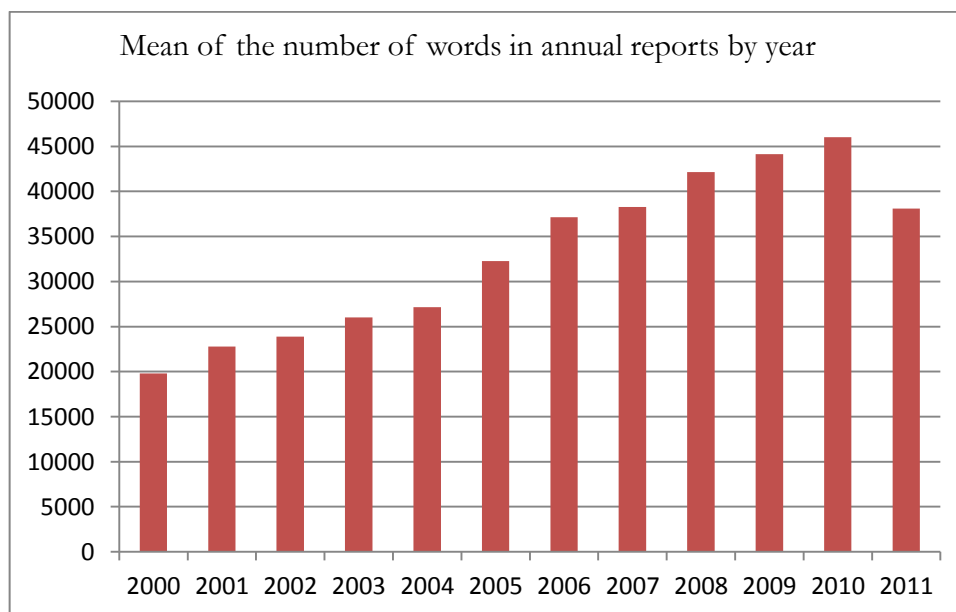
Accounting information exists to solve agency issues and the information asymmetry problem. Its purpose is to aid the users of accounting information to make informed decisions. Annual reports are the medium of which the managers inform the users of accounting information on the value of the firm. It is an accountant's means of communicating a firm's accounting information. While annual reports are to inform every user of accounting information, several studies have highlighted that the language of annual reports narrative explanation of firm value remain syntactically complex and difficult to read (Baker and Kare 1992; Linsley and Lawrence 2007; Courtis 2004). Regulators of accounting information have also noted the inaccessibility of accounting narrative information in annual reports, providing regulations and measures that will make this information easy to read by the interested audience (for example the United States Securities and Exchange Commission (SEC) Plain English rule). Obscurity of information in annual reports can be an agency issue that causes persistent information asymmetry, or exist because of the accountant's traditional perspective of information presentation.

The debate on complexity aims to determine what factors are increasing the size and complexity of annual reports and what effect it has on investor communication. This study contributes to this debate by identifying the reading difficulty and the tone of annual reports narrative discussions as two narrative measures that increase the syntactical complexity of annual reports. Following this identification, the thesis empirically performs tests of what firm characteristics and board characteristics determine the reading difficulty and tone of annual reports. Finally, the study assesses the consequence of syntactical complexity by empirically analysing how the tone of annual report narrative communication to investors influences investors' reaction to earnings news.

1.2 Motivation for Studying Syntactical Complexity in Narrative Reporting

The increasing size and complexity of company reports is a growing concern amongst regulators and investors. In 2008, the Financial Reporting Council (FRC)[1] launched a complexity project to investigate the causes of complexity and provide recommendations on how to reduce complexity in company reports[2]. This project resulted in the 2009 discussion paper titled "Louder than words". Amongst its other findings, the discussion paper noted that users of company reports were concerned that information in reports are obscure and companies are not communicating openly and honestly; the paper recommended providing a balanced explanation of results (good news and bad news) and the use of plain language for clear communication in annual reports (FRC 2009). Supporting this view, other stakeholders in financial reporting have documented on both the reading difficulty of annual reports (ICAS 2010), and the increasing length of annual reports (Deloitte 2009). Reading difficulty and tone are contributing to complexity to the extent that they increase the obscurity and imbalance of management communications in annual reports.

Recent advances in technology have provided increased access to annual reports. Firms can now use company websites to publish annual reports thus, reaching out to a wider range of both investors and potential investors. These methods provide investors formerly excluded, and those deterred by voluminous documents, with cheaper and unlimited access to the textual information in the annual reports. These advances have enhanced the importance of management narrative communications for the reason that instant access means it is often used to substantiate the accounting

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[1] *"The FRC is the UK's independent regulator responsible for promoting high quality corporate governance and reporting to foster investment. The FRC sets the framework of codes and standards for the accounting, auditing, actuarial and investor communities and oversees the conduct of the professionals involved."* FRC. 2012. *Financial Reporting Council [online].* *[Accessed 13/05/13]. Available from: http://www.frc.co.uk/Home.aspx.*
[2] FRC-PRESS. 2008. *FRC launches Complexity Project* United Kingdom: Financial Reporting Council

numbers and to provide perspectives on company current and future values. Management narrative communications appear in both the notes to accounts, which directly explain the numbers reported and in the other narratives in the report. Other narratives in the report will include discussions, which provide a contextual background for the reported results e.g. the Chairman's statement, and explanations on adherence to regulations e.g. satisfying recommendations of the United Kingdom (UK) 'Comply or explain' corporate governance principle.

Remarkably, given the importance of narrative disclosures, as a vehicle for regulatory compliance and adequate capital market allocations, and thus an opportunity to contextualise results, there is limited large sample empirical evidence on the determinants of the linguistic features of annual reports. Merkl-Davies and Brennan (2007) document studies on corporate narratives and Jones and Shoemaker (1994) provide a review of research in this area. It is therefore an empirical question what determines the size and complexity of annual reports and what is its economic consequence. According to the FRC discussion paper 'Louder than words' there is a need to see a project on disclosure that investigates the characteristics of useful disclosures (FRC 2009). This study sets out to contribute to the investigation of the characteristics of narrative disclosures, by examining narrative disclosures in annual reports. Specifically, it investigates the reading difficulty and tone of narrative disclosures and contributes to the debate on what determines these complexities in annual report narrative disclosures and what are the consequences of these complexities.

1.3 Research Objectives

In line with the introduction and motivation of this study, the main objective of this research is to investigate the syntactical complexity of narrative disclosures in corporate annual reports. The study investigates the syntactical complexity of annual reports by assessing what are the economic determinants and consequences of

syntactical complexity attributes in annual reports. The attributes used as measures of syntactical complexity are the readability and tone of annual reports. Readability of annual report narratives is measured by estimating the reading difficulty of annual report using the fog index measure of readability from computational linguistics. Tone of annual report is measured by estimating the positive slant of the document using the negative word list of the financial dictionary developed by Loughran and McDonald (2011).

The study tests two broad determinants of syntactical complexity. The first is the characteristics of the firm, identified as firm performance, size, age, volatility of operations, and complexity of operations. The second is the characteristics of the board of directors of the firm, identified as size of the board, age of members, percentage of female members, average tenure of members and the number of nationalities in the board. The study tests the economic consequence of the syntactical complexity of annual reports by assessing if the Post Earnings Announcement Drift increases with an increase in the positive slant of annual reports.

1.4   Specific Objectives of the Thesis and Research Gap

This section indicates the specific objectives of the thesis. In addition, it shows how these objectives achieve the aim of the thesis and fills the research gap in the literature. The section is discussed in sections based on the three empirical studies carried out in the empirical analysis of this study.

1.4.1 Role of Firm Characteristics in Annual Report Syntactical Complexity

The first empirical chapter sets out to analyse firm specific characteristics as determinants of the syntactical complexity of narrative communication in annual reports. Two studies have contributed to research on the determinants of readability and tone of annual reports. Li (2008) studies the determinants of the readability of annual report, while Li (2010) studies the determinants of the tone of annual report narratives. However, two things differentiate the analysis in the current study; first the test of the determinants of tone using an estimated measure of tone called slant; second, identifying unexpected performance i.e. abnormal earnings as a potential determinant of readability and tone. In addition, differentiating this study is the investigation of the determinants of readability and tone in a different regulatory regime. While the two studies above provide US based evidence, this study provides UK based evidence. UK as opposed to the US applies a principles based system, which relies extensively on disclosures in annual report for ensuring best practice. This can provide motivations to increase the complexity of narrative disclosures in annual reports.

Agency theory explains that due to management self-serving motives, accountability to shareholders would be based on management opportunistic actions, which changes with the nature of the firm. The model developed identifies abnormal earnings, firm size, firm age, volatility of operations and complexity of operations as potential determinants of the syntactical complexity of a firm's annual report narratives. This chapter aims to contribute to the literature by identifying the role of these firm specific factors in the syntactical complexity of narrative communication to investors.

1.4.2 Role of Board Composition factors in Annual Report Syntactical Complexity

Based on the role of governance mechanisms in enhancing accountability to shareholders by improving the financial reporting process, this chapter introduces board composition factors as potential determinants of the syntactical complexity of annual report narratives. It identifies specific board characteristics and board member characteristics as potential determinants of the syntactical complexity of annual report narratives. The model developed assesses if the size of the board, the percentage of female members in the board, the average age, average tenure, and number of nationalities of board members determine the level of syntactical complexity in annual report narratives. To the best of the knowledge to date, this is the first study that assesses if board factors determine the readability and the tone of annual reports. This study expects to contribute to the literature on readability and tone of narratives by identifying the role of the board, a governance mechanism in the syntactical complexity of narrative communication to investors.

1.4.3 The Interaction of Tone and the Post Earnings Announcement Drift

The third chapter investigates the economic consequence of complexity in annual report narratives. It does this by empirically analysing the impact of the tone of narrative communication on investors' behaviour. Specifically, it assesses if the tone of disclosures influences investors' reaction to earnings news. Motivating this chapter is the identified Post Earnings Announcement Drift in the accounting literature, which explains that returns tend to move in the direction of unexpected earnings in the periods following earnings announcement. In addition, based on the evidence in the first two empirical chapters showing that when abnormal earnings are positive, the tone of narrative communication tends to move towards a more positive outlook, the study investigates what is the consequence of tone in narratives for the earnings return relationship. The chapter aims to contribute to the literature by identifying if an increase in the positive slant of annual report narratives

increases the identified Post Earnings Announcement Drift in the accounting literature.

To the best of knowledge to date, the current study is the first study to analyse the significance of the slant of the annual report in a regulatory market that is principled based. The principles based system of corporate governance relies on disclosures in annual report to identify non-compliance to regulations. Therefore, this is of importance because investors have to rely on annual report communications to punish lack of compliance to specific guidelines under the 'comply or explain' corporate governance regime. In addition, the current study as opposed to other studies assesses the consequences of complexity using the complete annual report document as opposed to other studies using specific sections of the report such as the MD&A. While it is important that the impact of specific sections be analysed, knowledge on the impact of the whole report will contribute to the debate on if the annual report as a document is losing its relevance to investors.

1.5 Structure of the Thesis

The thesis is organised as follows:

- As a background to the study, Chapter 2 discusses critical issues in readability research. It aims to present the relevance of the Annual report for the study, the theoretical construct of the fog index readability formula, and how syntactical complexity affects disclosure communication.
- Chapter 3 provides a historical review of the Annual report readability literature and the measures of syntactical complexity, providing a review of tone as a measure of syntactical complexity.
- Chapter 4 explains the methodology for computing the readability and tone scores used in the analysis in the empirical chapters. The chapter also introduces the sample and provides descriptions of the narrative

characteristics of the data. The following three chapters are of an empirical nature.

- Chapter 5 empirically tests for specific firm characteristics that are associated with the readability and tone of annual report narratives.

- Chapter 6 empirically tests for specific board composition factors that are associated with the readability and tone of annual reports

- Chapter 7 is an empirical analysis of tone and the Post Earnings Announcement Drift

- Chapter 8 provides the conclusions, policy implications, and limitations of the thesis. This chapter also provides guidance towards directions for further research.

2 A Typology of Critical Issues in Annual Report Readability Research

2.1 Introduction

This thesis assesses the syntactical complexity of annual reports. It applies a readability formula to measure the syntactical complexity of annual reports. Accounting research applies formulas developed in readability studies to measure attributes of narrative accounting information, for instance, Courtis (1998) uses a readability formula to assess if management narrative communication is obfuscated. Readability formulas provide a quantifiable measure that explains the textual composition of management reported narrative communication by measuring the reading difficulty of a document. In assessing the reading difficulty of a document, the formulas measure the syntactical complexity of the text in a document.

Borrowing language from the Oxford Dictionary, syntactic in this study refers to the study of words and phrases that are put together to form a sentence. In this study, the term syntactic will exclude exogenous effects such as the rules of grammar that affect the make-up of the sentences. On the other hand, complexity as defined by the FRC refers to anything that makes the report difficult to understand or analyse, obscuring the overall picture (FRC 2009). These definitions suggest that syntactical complexity can be evaluated with respect to a breakdown of the components of the words and other identifiable parts that make-up the sentences in a document, which potentially increases the obscurity of information in the narratives.

Consistent with this definition of syntactical complexity, this study applies a readability formula, the fog index to measure the average syllable count per word

and the average word count per sentence in a document. The study measures syntactical complexity by estimating the syllables and words that make-up a sentence. The readability formulas and their application in accounting research have been a subject of debate in the accounting literature. It is important to note though that these formulas have persisted and appear to provide a robust indication of the attributes of text that the formulas are set to measure. Recent trends in accounting research have provided empirical evidence of the importance of these formulas for accounting research. For instance Li (2008) applies the fog index readability formula and shows that annual report communication with a high fog index is associated with firms that have persistent poor performance. Likewise Callen, Khan and Lu (2011) shows the fog index of company reports is associated with stock price delay.

This chapter aims to contribute to the debate on the application of the readability formula in accounting research by providing a typology of critical issues to be considered in applying the fog index in annual report readability research. Using the fog index as a construct for syntactical complexity of annual reports, it shows that an application of the formula as such enables its contribution in the measuring of the complexity of annual report narratives. The chapter also highlights the importance of a syntactical complexity measure for accounting disclosure communication research. The next section discusses the relevance of the corporate annual report, following this, the third section discusses the readability formula as a measure of syntactical complexity, and the fourth section brings these two together and discusses how syntactical complexity affects disclosure communication in annual reports. The fifth section theoretically develops the critical issues in annual report readability research using an analysis of the knowledge production process to assess annual report readability research, and the sixth section concludes.

2.2   Corpus Analysis: The Corporate Annual Report

What is interesting about the corporate annual report as a corpus for narrative analysis is that it is a document likely to contain technical writing but needs to be accessible to both the expert and non-expert audience. Narratives in annual reports are all the more critical in this aspect because it provides additional explanation of the technical information in the financial statements and in addition should aid non-experts by providing communications that are useful for decision-making. Narratives have been argued to be valuable for business writing because of its ability to read faster, be persuasive and engaging, and remembered better, thus going beyond information processing of for instance the numbers (Rentz 1992). Corporate annual reports are valuable both for management to inform and persuade the investors and for current and potential investors to stay adequately informed.

2.2.1   Objectives of Narratives in Annual report

The aim of financial reporting is amongst others to facilitate "the raising of new capital, keep the cost of capital low and prevent takeover bids" (Flower and Ebbers 2002). Investors use the information in annual reports to make informed decisions on the ability of the firm to keep safe and improve on money invested in the firm. Information obtained from annual reports will inform investors on the safety of their investments and at the same time assist the firm to raise new capital for the firm. While the firm managers desire to raise capital for the firm, they need to convince the investor that the firm can grow the capital they have invested in it even at times of low growth and even losses. The annual report narratives serves as an opportunity for managers to present the firm satisfactorily to investors even when the numbers are not satisfactory through management explanations of the firm's position. This function of the annual report narratives makes it a significant player in the interpretation of the numbers disclosed in annual reports. This section sets out the objectives of annual report narratives highlighting the relevance of the narrative sections.

The objectives of financial statements as stated by the International Accounting Standards Board (IASB) framework are to show the financial position, financial performance, and the changes in financial performance/position of the firm (IAS 1). Qualitative characteristics of financial statements include understandability, relevance, reliability, and comparability [3]. Narratives (Management detailed explanations) in annual reports presented with financial statements aid the understandability (based on users knowledge) of financial statements (i.e. through the reading of the narratives). The IASB framework explains that any information influencing the economic decisions of users has the quality of relevance, while the IASB focuses on the impact of the numbers[4] this study investigates the effect of the relevant information provided alongside the numbers on investors' evaluation of events.

Likewise, annual report narrative qualities of readability and tone[5] can influence the quality of reliability, defined as information free from error or bias. Information that is difficult to read mitigates communication of relevant information and information with a tone slant may provide a biased disposition towards the investors' evaluation of the critical figures. Furthermore, the narratives qualities may inhibit the qualities of reliability such as neutrality, as financial statements may not be free from bias if the presentation of narratives aims to influence the user to achieve a predetermined outcome (Tone). The objectives of narratives, which is to clarify to investors information that is not clear in the accounting figures cannot be achieved if the narratives are difficult to read and provides bias that militates against the objectives and qualitative characteristics of financial statements.

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[3] This study is conducted before the release of the amended conceptual framework, which was a result of the joint IASB-FASB project. Hence, this study refers to the conceptual framework existing between the sample periods of this study.

[4] The IASB has also issued a practice statement for management commentary; however, it is not a standard. (IASB)., I. A. S. B. December 2010. *IFRS Practice Statement. Management Commentary A framework for presentation.* London, United Kingdom.

[5] In addition to the readability of disclosures, this study assesses the determinants and consequences of the tone of disclosures: Review of tone as a measure of syntactical complexity is in chapter 3. This chapter focuses on the theoretical development of Annual Report Readability.

2.2.2 Policies governing the publication of UK annual report setting out the objectives of narrative sections

Chapter 4 of the disclosure and transparency rules in the Financial Service Authority (FSA) handbook published by the United Kingdom Listing Authority (UKLA) states that a company must make public its annual report at the latest four months after the end of each financial year (FSA Feb. 2012):

The FSA recommended contents of the annual financial report are:
(1) The audited financial statements;
(2) A management report; and
(3) Responsibility statements.

From the recommended contents above, the narrative sections are the management report, responsibility statements and the notes to the audited financial statements, which is part of the audited financial statements listed in (1) above. The notes to the financial statements provide a more detailed analysis of the information in the financial statements. The responsibility statements in (3) above, aims to ensure that management take responsibility for the information disclosed in the report, stating in the report that it is according to the relevant code/rule/standard. The management report (2) above, usually comprises more than 50% of narratives in the annual report. The objective of the management report as stated by the FSA handbook is to inform investors of the state of their investment in the company. The extract below from the FSA handbook shows the typical contents and objectives of sections in the management report.

"Content of the management report[6]

4.1.8 The management report must contain:

(1) A fair review of the issuer's business – this informs the investor of the state of the business as at the release of the report

(2) A description of the principal risks and uncertainties facing the issuer- This informs the investor of the risks that exist pertaining to his investment." (FSA Feb. 2012)

The content of the management report as defined by the FSA largely corresponds with the contents of the directors' report as defined by the companies Act (CA 2006). These two sections contain majority of the narratives in the annual report analysed in this study[7]. The FSA handbook guides the contents of the information in annual report communicated to investors in the listed companies. It does this by defining the expected contents of the report and the objectives of the contents. The expectation as seen above is that investors can use information disclosed in these sections to make informed decisions. The management report as prescribed by the FSA contains key information that will be relevant to investors' decision making. In addition to the above, it is expected to inform the investors of important events and decisions occurring in the year such as likely future development, research and development expenditure, own share acquisition, branches of issuer and financial instruments (FSA Feb. 2012). These are major sources of information on the riskiness of investments in the firm as they highlight potential assets and/or liabilities of the issuer. The information is expected to enhance the decision process of investors.

The Disclosure and transparency rule on periodic financial reporting goes further to state the expected characteristics of the review section of the management report.

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[6] This is extracted from the periodic and financial reporting section of the disclosure and transparency rules in the FSA handbook.

[7] This section focuses on the recommendations of the disclosure and transparency rules as this directly regulates a firm's response to investors. However, the recommendations of the Companies Act and the FSA with respect to the objectives of this study are largely similar.

"4.1.9 The review required by DTR 4.1.8 R must:

(1) Be a balanced and comprehensive analysis of

(a) The development and performance of the issuer's business during the financial year; and

(b) The position of the issuer's business at the end of that year, consistent with the size and complexity of the business;

(3) Include references to, and additional explanations of, amounts included in the issuer's annual financial statements, where appropriate." (FSA Feb. 2012).

From the above, a balanced view of the narratives expects the narrative to provide an unbiased view of the business while a comprehensive view expects complete disclosure of all relevant information. Characteristics of the contents of the narratives as stated by the FSA handbook expects the information in narrative to be such that it is not prejudiced and it is to be complete.

2.2.3   Relevance of the Corporate Annual Report for this Study

Annual report readability research measures readability as a characteristic of the narratives disclosed in annual report. Readability is a quality of narratives or text that defines the ease of the reader in reading the text/narrative provided. Reading is the first step that will eventually lead to comprehension. The investor has to be able to read the report easily to comprehend it. This study uses test of the readability of the annual report to assess the reading difficulty of the report, thus, assessing its ability to explain management decisions in the reporting process and investors' interpretation of the information reported. A balanced report assumes the words used in the report should be such that it provides an accurate proportional representation of the facts of the business as at when the report is prepared. Tone of the report can provide either a balanced view or a prejudiced one. This study uses the test of the tone of the report to assess the effect of the positive slant of the report on investors' subsequent predisposition i.e. if the tone of the report will mitigate the objective of providing a balanced view with the narratives.

This study tests the readability of corporate annual reports because of its relevance in the management and investor communication process. Investors rely on management communication to be better informed of the information presented in financial statements. Corporate annual reports are required for all listed companies in the United Kingdom and contain a significant amount[8] of narrative information that allow for interpretation of information provided. Narrative information acts as qualitative information because it qualifies the disclosed numbers. It is likely to be forward looking aiding in the interpretation of numbers and cash flow prediction (Callen, Khan and Lu 2011). Studies have documented the effect of the narrative on investors specifically in cases where they are more complex and difficult to read (You and Zhang 2009; Miller 2010).

Difficult to read annual report affects the disclosure communication process by either increasing the information gap between management and investors or increasing information processing costs. An increase in information processing costs is because investors have to bear the costs of searching for information from other sources. These reasons make the corporate annual report an interesting corpus for investigating how the readability of its narratives affects communication between the firms and its investors. Further, the FSA disclosure and transparency rule require that listed companies provide information in narratives to enhance the decision making process of investors. DTR 7.2 'Corporate Governance Statements' (FCA 2013b)[9] require that firms include in the narratives corporate governance statements that state what corporate governance code they comply with and what aspects of the code they have not complied with. This statement aims to assist investors in their decisions on their level of confidence in the governance of the firm. However, if these disclosures are too complex and difficult for investors to read, it may thus be unable to serve its purpose.

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[8] Narrative information in the front half represents more than 50% of the annual report disclosures DELOITTE. 2009. *A telling performance Surveying narrative reporting in annual reports*. London: The Creative Studio at Deloitte.

[9] The Financial Service Authority has become two separate regulatory authorities: The Financial Conduct Authority (FCA) and the Prudential Regulatory Authority (PRA) FSA. 2012. [online]. [Accessed 13/05/]. Available from: http://www.fsa.gov.uk/.. The new FCA and PRA handbooks came into force from 1 April 2013 FCA. 2013a. [online]. [Accessed 13/05/]. Available from: http://www.fca.org.uk/handbook.

2.3   Theoretical   Construct   of   the   Fog   Index   Readability Formula

This section examines three factors relevant to the theoretical construct of the fog index as a measure of syntactical complexity. First, it defines the components of the fog index, second it discusses the fog index as a measure of syntactical complexity and hence reading difficulty, and third it discusses the validity issues existent in the accounting literature on the use of the readability formulas. This study uses the fog index readability formula, therefore; all discussions, which may be common to most readability formulas, are discussed with respect to the fog index readability formula.

2.3.1   Observable Components of the Fog index Readability Formula

This section defines the two components of the fog index. These are the word complexity measure and the sentence complexity measure.

<u>Word Complexity</u>

Word complexity in this study is the percentage of the number of complex words in the document based on the total number of words. This measure posits that words with more than three syllables are complex words. Crane (1963) cited by Klare (1974) finds that the best single predictors of reading difficulty are words with three or more syllables. Words complexity is a component of the fog index that measures the complexity of the document in terms of the words that the reader has to read that are more likely to be difficult words. These words will either deter the reader from reading the document or increase the time the reader needs to complete the reading. The increase in time is because it is expected that reading a document with complex

words will require time both to investigate the words and to read, as the document is more likely to be a longer document.

<u>Sentence Complexity</u>

Sentence complexity in this study is the average word per sentence. Klare (1974) provides a good review of the readability formulas and documents that sentence length correlates very highly with complexity. Klare (1974) highlights that sentence complexity measure makes an important contribution to measuring complexity and reading difficulty, because sentence length is highly correlated with the complexity measures of sentences in a document. Similar to the word complexity variable, sentence complexity will increase the time and hence cost of reading information in narrative disclosures. This is because longer sentences will contain more words and will thus, require time to investigate and read the words. The next section assesses the fog index as a measure of syntactical complexity.

2.3.2 The Fog index as a measure of Reading Difficulty

As a measure of reading difficulty, the fog index measures the syntactical complexity of the text that contributes to the difficulty in reading a document. Syntactical complexity as defined in linguistics refers to the range and the degree of sophistication of the forms that surface in language production (Ortega 2003). This study investigates two forms of syntactical complexity measures: word length, and sentence length. It uses the fog index to obtain a measure of these indices. Research on linguistics has investigated what constitutes syntactical complexity. According to Stone et al. (2004), the seminal work of Chomsky (1965) led to the theoretical and empirical investigation of the determinants of syntactical complexity. Stone et al. (2004) notes that the features of open class words (such as nouns and verbs), and the length of sentences contribute to the syntactical complexity of a sentence.

Features of words used to measure syntactical complexity in this study is the syllables that make up the words in the sentence. On the other hand, the features of sentence used to measure syntactical complexity are the words that make up each sentence in the document. Klare (1974) note that there is conclusive evidence that word and sentence variables are satisfactory predictors and good indices of reading difficulty. Word and sentence complexity provide a robust indication of the complexity of a narrative, while they are not the only cause of reading difficulty, they are a sign of complexity in the written document. Martiniello (2008) identifies sentence and word length measures as syntactic features of a sentence. The theoretical explanation is that the length of a sentence provides an estimate of the number of meaningful ideas that needs to be interrelated to interpret a sentence, as words increase in a sentence, the decoding process becomes more complex, and this process is critical for sentence comprehension (Martiniello 2008).

Comprehension difficulty of words and sentences have been shown to be determined by integration and storage cost (Warren and Gibson 2002). Word complexity and sentence complexity will directly increase the cost of integrating and storing information while reading. This is because longer words and longer sentences will increase the reading time needed to adequately read and comprehend narratives in an annual report. This links to the idea of processing fluency of which Rennekamp (2012) explains as a subjective feeling of how easy it is for one to process information. This means that processing fluency is a distinctive attribute to the extent that word and sentence vocabulary differs between individuals and will influence the degree of complexity for each individual differently.

However, individuals will assess a phenomenon based on the ease with which they can access their memory. Hirshleifer and Teoh (2003) document that attention biases can affect beliefs to the extent that it is the facts that are more salient that are more likely to be available in the human memory. Limited attention and the tendency for individuals to focus on clearer issues remains a common factor to all individuals, therefore, word complexity and sentence complexity will affect the individual's

interpretation of syntactical complexity either directly through reading difficulty or indirectly through limited attention.

Word frequency and sentence length have been used to assess syntactic complexity. The strength of these variables as indicators of textual complexity is supported by a verbal efficiency theory in which reading is constrained by readers' limited processing capacity. Complexity increases reading difficulty because reading involves the accumulation of information in narratives. To comprehend each sentence, involves the process of integrating new input words into an existing structure (Gibson 1998). Both the syllables in the words and the words in the sentence, increase the inputs needed, and the longer the existing syntactic structure for instance sentence length the more input the reader needs to keep in memory in order to comprehend the sentence. More complex and longer sentences will require longer processing time and can cause reader comprehension to break down (Williamson, Fitzgerald and Stenner 2013).

Word and sentence variables have been shown to predict up to 94% of the variance in reader's comprehension when encountering text and are shown to be highly correlated with most cohesive devices that binds the meaning across a sentence (Williamson, Fitzgerald and Stenner 2013). Word and sentence complexity measure syntactical complexity of a text and syntactical complexity increases the reading difficulty of a text. While individual abilities are important, psychological theories show that the limited capacity of humans makes these attributes a robust measure in assessing the reading difficulty of a sentence. Syntactical complexity will increase reading time, increase integration and storage cost and will affect the subjective feeling that the users of the narrative have on how easy it is to process the information.

2.3.3   Critical Issues: Validity

The section provides theoretical evidence of the validity of the readability formulas. It discusses the section based on validity issues raised in the accounting literature concerning the application of the readability formulas in accounting research.

<u>Face Validity</u>

The main question of face validity is if the readability formula measures what it purports to measure. The underlying argument is that readability formulas are a weak measure of readability because they do not measure understandabilty. The studies tend to rely on assessing the ability of the formulas to measure readability by asking if it measures understandability. The conclusion from the critical readability literature is that readability formulas as a theoretical construct of understandability provides weak evidence (Jones and Shoemaker 1994), noting however, the need to differentiate the two constructs. Therefore, it is important to note the difference between understandability and readability.

Readable means the text is clear and easy to read. Understandable means to know or realize the meaning of words. In as much as a text is easy to read it could be difficult to understand as understandability depends on the abilities of the reader. Readability formulas test readability to the extent that the formulas are able to assess the syntactical complexity of the written narratives in the document, which affects how clear and easy it is to read the text. It is a theoretical construct of syntactical complexity and provides a prediction of how difficult it is to read the text based on the complexity of the words and sentences. The measure as a measure of syntactical complexity has been discussed in section 2.3.2. Most annual report readability studies apply the readability formula as a measure of syntactical complexity for instance Lehavy, Feng and Merkley (2011).

Content Validity

The main question of content validity is if the components of the readability formula fit with the operationalization. This assesses if the components of the readability formula are such that they are measuring what the formula is purporting to measure. This has been discussed in section 2.3.2, which shows word complexity and sentence complexity as satisfactory predictors of reading difficulty. Klare (1974) documents that a 2-variable formula where one is a word variable and the other is a sentence variable is sufficient for a readability test with additional factors offering little predictive value.

Not Suitable for Business Writing

The validity issue is that the readability formula is not suitable for use in improving the readability of technical or business writing or materials for adults. Gunning (1969) stated that the fog index is a tool not a rule for clear writing, it serves as an effective warning system that avoids drifting into excessive complexity of text, it is needed by beginning writers, business writers and other professional writers because there should be limits to long words and sentences, which the writer should not go beyond (Gunning 1969). The fog index does not advise writing simply without variety and art as most suggest that sentences will make no sense even with a low fog index. It is a warning system to deter from complex communication. This is because it uses syllable and word count, which are a basic construct for the development of text.

In the article on the achievements of the fog index by Gunning (1969), it is observed that large corporations appear to have the biggest communication problems. What is interesting is that this study tests relative readability, which is suitable for an analysis of corporate reports. This is because given a scenario where all the companies inadvertently have complex words, a firm that replaces complex words, and complex sentences for simpler ones where possible will differentiate itself from a firm with an annual report with more complex words and sentences. As evidenced in Li (2008) the times magazine appear to be more readable than the corporate report.

Gunning (1969) noted while magazine have to be readable to sell, corporations can keep disclosing texts whether it is readable or not.

The fog index offers several advantages; it is an objective measure not influenced by subjectivity and directly examines the syntactical complexity of written communication in annual reports. In addition, it allows this study to be able to analyse quantitatively a large sample of text. The ability to analyse a large sample of text is as well largely due to the application of computational linguistics methodologies in accounting research to measure disclosure quality as proposed by Core (2001).

2.4 How does syntactical complexity affect disclosure communication?

2.4.1 The Information and Agency Problem

According to Gunning (1969) the fog index has been applied in the military services and likewise to help both press and business writers. It is applied in other areas such as Health services, warranties, jury instructions and research (Lehavy, Feng and Merkley 2011). It has been specifically identified as a tool to measure complexity of communication which could be used to judge compliance with the United States plain English rules recommended for disclosures (Cox 2007). The fog index as a measure of syntactical complexity has been applied in accounting research to inform on two major issues in accounting research; the information problem and the agency problem.

The information problem arises where investors are unable to distinguish between the well performing and the poor performing firms because the poor performing firms are presenting themselves as worth their investment. Accounting literature provides optimal solutions to the information problem to help reduce this information asymmetry between investors and entrepreneurs. This includes regulation, financial intermediaries and financial reports (Healy and Palepu 2001). The corporate annual report is one of the optimal solutions to the information problem however, if information asymmetry is increased in the form of annual report narratives that are syntactically complex, it does not appear to be an optimal solution.

Evidence of this is shown in the study of Lehavy, Feng and Merkley (2011) and (Miller 2010) they both show that difficult to read reports affects both the professional investors (Lehavy, Feng and Merkley 2011) and small investors (Miller 2010). It creates an additional layer of information asymmetry between management and investors. Consequently, it makes a disclosure medium which exist to reduce the information problem a medium for increasing the information gap. This is because investors are affected by the complexity of the information provided and have no other public medium to obtain similar information because the information is already seen as publicly available.

The agency problem arises because of the incentives that exist for managers of firms to expropriate investors' funds. Optimal solutions to the agency problem include disclosure and corporate governance amongst others. (Healy and Palepu 2001). For instance, in the UK, corporate governance statements that ensure adherence to corporate governance are disclosed in corporate annual reports. If investors are unable to read the reports or are deterred from reading the report, they will not be able to punish for lack of disclosure or inconsistencies in following the provisions as expected in the 'comply or explain' process[10].

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[10] FRC. September, 2012. *The UK Corporate Governance Code*. London: Financial Reporting Council.

The comply or explain process requires that companies explain clearly and carefully to shareholders where alternatives to the provisions have been followed and that investors make their judgement based on these explanations (FRC September, 2012) This further shows that complex information in the corporate annual report will mitigate the opportunity to be able to utilize effectively the 'comply or explain' process. When disclosures are less readable they are more difficult to interpret and process, requiring more time and effort to extract relevant information (Bloomfield 2002) hence, increasing agency costs. Syntactical complexity as measured by readability increases these costs for investors.

The information and agency problem raises the question of what factors affect management decisions on the readability of disclosures and if these are voluntary or involuntary aspects of disclosure. According to Bloomfield (2008) syntactical complexity of language can result from obfuscation, ontology, attribution and misdirection of information in the communication network, and this factors will increase the information problem. While obfuscation and misdirection are mainly voluntary discretionary components of disclosure, ontology and attribution can be voluntary or mandatory components of disclosure. Mandatory components because annual reports may have more complex words and sentences because of the required disclosures and required management explanations of disclosed numbers. Voluntary components because management can voluntarily use word and sentence complexity to either obfuscate information or cause misdirection. This occurs if managers use complex words and complex sentences to make the information in annual reports more difficult to read. These are potential causes of syntactical complexity on the disclosure communication process. However, this study does not differentiate between these voluntary and mandatory components of narrative disclosure.

2.4.2 Expectation and Ability of users of corporate disclosures

The incomplete revelation hypothesis of Bloomfield (2002) developed from Grossman and Stiglitz (1980) theory on markets, explains the economic effects of complexities in disclosure communication. Complexity in annual reporting makes it difficult for uninformed individual investors to make informed decisions, making it such that the informed professional investor receives compensation from private information. An increase in noise reduces the informativeness and increases the returns to information for investors with an information advantage (Grossman and Stiglitz 1980). As evidenced in Miller (2010) more complex reports appear to be too costly for small investors to process. This provides a connection between syntactical complexity and disclosure communication indicating that it is likely to provide information advantage to a set of investors better positioned to process complex disclosures. Libby, Bloomfield and Nelson (2002) show that given a scenario where information is made of high quality, novice decision makers will tend to perform as expert decision makers. This indicates that there will be a level playing field given less complex disclosures.

Likewise, there is an argument in the literature that difficult to read reports can only be a constraint to individual investors and not the professional ones. Therefore, since market prices are based on overall trading there is ultimately no adverse effect of textually complex disclosures. However, as noted earlier limited attention is not selective of investor status and Li (2008) finds that managers may have gains from difficult to read reports as they make their reports more difficult to read when performance is poor. Disclosures that are more complex affect investors through time, cost of time, cost of using information intermediaries, and the losses from unaffordable opportunities. Therefore, there are advantages of providing information that is less complex to all investors.

Consequently, in cases with an information advantage for the expert investors it does not mean a zero effect of complex information on these investors. The concept of limited attention investigated by Hirshleifer and Teoh (2003) show that the vast

amount of information available is likely to lead to limited attention due to the limits of information processing power of individuals. The readability case is significant here because expert investors despite their ability to decode complex disclosures are more likely to extract less from complex disclosures because of the extra capacity needed to encode and process ideas consciously. It has been noted that limited information is existent in all cycles of an expert's decision making process; limited information to base judgements on, limited ability to retain, retrieve and process information and limited insight (Libby, Bloomfield and Nelson 2002). This shows that there is a connection between syntactical complexity and disclosure communication indicating it also has an effect on the professional investors.

The changes and the increase in complexity of accounting information have increased the amount of disclosures required from management. While, technological advancement such as in financial engineering makes it even more challenging for management to communicate information to the users of financial reports. These has increased concerns that management communications is not effective and interested investors may have serious setbacks in making informed decisions (Lehavy, Feng and Merkley 2011). Less readable disclosures will further reduce the ability and even willingness of investors to extract this complex information from the reports. Rennekamp (2012) finds that readability will affect investors even where it does not affect their willingness or ability because clarity of presentation of information affects reader's feelings of processing fluency and have consequential impact on related judgements and decisions.

2.5 Critical Issues: Knowledge Production Process and Annual Report Readability Research

Li (2008) published a large sample evidence supporting the obfuscation hypothesis that managers make their reports difficult to read when earnings are poor. However, prior to the Li (2008) study the obfuscation hypothesis was tested by Courtis (1998)

also using a readability formula. Both studies have significantly contributed to the readability literature; however, what is pertinent to this section is the difference in the sampling methods of these two studies. Courtis (1998) uses 100-word passages chosen from strategic sections of the Chairman's statement to estimate the readability scores of the passages in the chairman's statement. Li (2008) on the other hand calculates readability scores of the annual report using all the narrative text in the annual report rather than 100-word sections and calculates the readability of the MD&A using all the words in the section rather than 100-word sections. Annual reports are large document and calculating readability using all the text will require the capacity to do this.

Consequently, following the Li (2008) study there has been an increase in the publication of large sample evidence of annual report readability research and this is encouraging a good debate on the impact of annual report readability in the accounting literature. This section critically assesses the factors that affect the knowledge production process in an academic discipline. Section 2.5.1 applies the concept of social influence pressure in the knowledge production process. Section 2.5.2 reviews the critical accounting literature on the knowledge production process. Section 2.5.3 explores the impact of organisational factors on the knowledge production process. Section 2.5.4 explores what factors are predominant in the development of annual report readability research given the knowledge production process. The discussion aims to provide additional context to the relevance of annual report readability research and inform the reader on the underlying trends of research on annual report readability.

2.5.1   Impact of Social Influence Pressure in the Knowledge Production Process

Social influence pressure is of two forms, obedience pressure, and conformity pressure. The concept of social influence pressure provides a framework to explain existing behavioural relationships that influence the knowledge production process. Obedience pressure is the expectation that the superiors' decision will influence

subordinates behaviour. Studies apply this theory in the accounting literature, for instance, Lord and Todd DeZoort (2001) uses auditor settings to show that auditors can act contrary to audit rules where there is an inappropriate influence from superiors. Similarly applying obedience pressure Davis (2002) show that management accountants will create budgetary slack when faced with pressure from their superiors. This section applies obedience pressure in the knowledge production process. From the critical accounting view, obedience pressure exists in the knowledge production process because there is a tendency for academics to be easily swayed towards the current trend of research of other academics seen to be superiors in the field. Another argument is that it is the ability of superiors to reward or punish that restricts development in other research areas that are of relevance but not necessarily the superior's preferred area (Lord and Todd DeZoort 2001). These factors will limit the production of knowledge in an academic discipline.

Superiors in the academic community can reward or punish because of the organisation factors in place that encourage obedience pressure. For instance, rules that inability to publish in reputational journals may lead to career stagnation (punishment) or promotions (rewards). As prescribed by the obedience theory, academics will make a psychological break from an autonomous state and move to a state removed from responsibility and act without introspection, exhibiting behaviours inconsistent with their attitudes, beliefs, and values (Lord and Todd DeZoort 2001). This plays out a situation with academics focusing on research areas of the superiors rather than those of relevance or suited to personal skill thus, strengthening the specific research paradigms. This is because academics given obedience pressure follow superiors' instructions and pursue the research scope of superiors.

Conformity pressure on the other hand, refers to individuals acting according to the behaviours set by equals or peers, it does not have the hierarchical influence in obedience pressure and may therefore have a lesser effect (Lord and Todd DeZoort 2001). The underpinning theory behind this is that individuals do not want to appear to act differently from their peers and will not want to stand out from the crowd. The

motivations that allow conformity pressure to thrive are not rewards and punishments like those in obedience pressure. They are the set-ups in the organisation such as peer performance evaluations and recommendations from peers that will likely influence individual behaviour and increase conformity pressure.

Accounting research has shown the negative consequences of conformity pressure. It says auditors will conform to pressure from peers to act contrary to standards in order to avoid making their performance look deficient and to be part of the team. For similar reasons, extending the theory to accounting knowledge production, academics will conform to peer pressure to avoid the consequences of providing work that will look deficient because it does not conform to the scope of their peers. Likewise, if peers apply a research paradigm due to obedience pressure, conformity pressure will further increase the focus on the same research paradigm. Ultimately, academics that want to keep their jobs and develop their reputation or survive in the research community will have to play as part of the team to avoid negative performance evaluations.

The organization of the research community and the research environment will determine the degree of the obedience and conformity pressure effect. Although social influence pressure operationalizes with individualistic variables such as organizational commitment, moral development and professional commitment as examined in Lord and Todd DeZoort (2001), the nature of definitions and allowances in the environments defines the extent of the influences of these variables on the obedience and conformity pressure effect. By assessing the organizational and environmental factors in section 2.5.3, the study is able to explain the impact of organizational factors on the scope of annual report readability literature given these theories.

2.5.2 A Review of Critical Perspectives on the Knowledge Production Process

There are several critical perspectives in accounting that provide supporting evidence of the obedience and conformity pressure. There is the argument that controversies are not welcomed hence it is difficult to thrive with research that does not have popular support. Apparently, because public recognition of research work encourages research to thrive research that is non-reputational is found to be neglected (Williams, Jenkins and Ingraham 2006). Applying this to readability research, there are two reasons why the readability research may appear to be non-reputational and hence difficult to thrive. First is the argument that in the era of positive accounting theory, it is difficult to publish studies on behavioural accounting research (Williams, Jenkins and Ingraham 2006). Readability literature is seen to be proposing that management actions and statements rather than the numbers explain information in disclosures. The second is a technological factor. The inability of researchers to find ways of assessing a large amount of text, made it difficult for research in this area to be reputational as it significantly lacked scientific validity (Jones and Shoemaker 1994).

From the obedience and conformity pressure analysis, it is observed that research work will be carried out in areas seen to be accepted by the authorities and the peers. This brings in the term elite, explained as the selected few dominant reputational publishers in a research area. Chan, Chen and Cheng (2007) demonstrates the impact of the elite effect in the accounting literature showing that there is a concentration of elites and elite institutions in the 'top journal' and these journals are the source for publicly recognised accounting knowledge. The argument is that this elite concentration causes a monopoly which narrows the scope of knowledge in accounting research; limited scope evidenced by the limited use of published accounting literature in practice (Williams and Rodgers 1995).

It can be argued that the impact of this on the readability literature is that it was unable to thrive because it was not in the acceptable scope and thus, not publicly

recognised knowledge. Supporting this view, the Li (2008) paper published in a reputational journal has regenerated a new interest in this area of research, evidence from on-following readability publications. It is important to note though as mentioned earlier sampling for readability scores differs in Li (2008) from the readability studies prior to it. Hence, in as much as the elites are determining the acceptable knowledge, it appears that research that can be seen to be robust is acceptable. It is important that accounting researchers are persistent in their areas of research and seek innovative ways to ensure that research done can contribute to the research questions in accounting.

While the elite effect immensely contributes to the advancement of research in accounting, in transferring similar research scope between countries, application of research design developed for a country specific study may differ when applying it to another country. Reiter and Williams (2002) note that there are significant flaws in the background assumptions of certain studies because the practice of United States accounting does not consider country specific issues that will cause the predetermined assumptions to be violated. They highlight that the observed 'scientisation' of accounting ignores accounting as a social science. Similarly, using the seminal work of Beaver (1968), Smith Bamber, Christensen and Gaver (2000) showed that there is a tendency in accounting research for the over generalisation of seminal work without carefully considering the research design choices affecting the inferences drawn. Smith Bamber, Christensen and Gaver (2000) test the Kuhnian view, which advocates that adherents of a paradigm will tend to ignore later anomalous evidence, hence the tendency to reject inconsistent findings.

Smith Bamber, Christensen and Gaver (2000) provides some evidence that show that over generalisation of work and biases in the system will affect the knowledge production process. If accounting research tends to follow only the current trend in research, it is more likely that innovative areas of research that can solve accounting research questions could be neglected. Current research on annual report readability are motivated by the large sample evidence of Li (2008), however, comparative to the observation of Smith Bamber, Christensen and Gaver (2000) there is consistently

an advancement in this area of research aimed at using methodologies that will provide inferences that cannot be drawn from the Li (2008) research design by improving the research design for testing readability. While factors observed in the critical accounting literature may have delayed the progress of the annual report readability literature, these factors have also strengthened the research area by accepting the large sample evidence, which has strengthened the debate that is currently on going in the literature.

2.5.3   Impact of Organisational Factors

Organizational creativity is a function of the creative outputs of its component groups and contextual influences for instance organizational culture, reward systems, resource constraints, and the larger environment outside the system. This section explains a framework developed by Whitley (2000) for comparing differences between the sciences based on the developments and factors that affect the organization of an academic discipline. It uses this framework to assess predominant factors in the development of the readability literature in section 2.5.4. It provides further organisational evidence that shows the development of a discipline as influenced by the social influence pressure is not solely due to the elite effect but that environmental and organizational factors do significantly contribute. The Whitley (2000) framework explains that the degree of mutual independence and the degree of task uncertainty will influence how environmental and organisational factors affect the organisation of an academic discipline.

The degree to which employers assessments for promotions and rewards are governed by reputational elite groups will influence the degree of obedience and conformity to the standards and field for research set by the research elite groups. If control over how research is conducted is being shared between employers and academic elites with elites having a larger share of control as evidenced by the diminishing participation of practitioners in academic accounting research agendas (Lee 1995), then it follows that the elites will determine research fields for promotions and rewards. For example, with the system of publish or perish,

promotions and rewards will be based on acceptance of work by the elite group. On the other hand, despite the diminishing participation of employers in setting research agendas, they are not disengaged from the organization and direction of research. This is because of the developments of distinct labour market for separate disciplines unifying the production of skills with the production of knowledge. Employer demands have generated systematic training and certifications, which partly defines what the elites choose as subjects for research.

The degree of mutual dependence between researchers will influence the degree of obedience and conformity to the direction of research set by the elite group. An increasing degree of mutual dependence is characterised by increased dependence on a specific group of colleagues to obtain reputations, which mediate access to material rewards. For example, publishing in a reputational journal can lead to promotions and increased salaries. This implies that researchers have to follow the standards and norms of the elite group to become competent. A case of an increasing degree of functional dependence means researchers use specific results, and procedures of fellow specialists to construct knowledge that can be regarded as competent and useful contribution. A case of an increasing degree of strategic dependence implies coordination of the implications of research strategies and results. The contextual factors that determine the degree of mutual dependence will be the ability of elites to control standards and resources for knowledge production and the plurality and diversity of the audience.

The degree of task uncertainty in the accounting discipline will determine the extent of obedience and conformity to the direction of research of the elite group. High levels of technical tasks uncertainty is increased visibility, uniformity, and stability of task outcomes and it limits the size of reputational organization allowing for direct control of research. High levels of strategic task uncertainty implies increased uniformity, stability and integration of research strategies and goals, it is associated with reductions in the degree of central control over research. High technical task uncertainty occurs where lay audiences can influence standards for competence.

High strategic task uncertainty occurs where there is a variety of funding agencies and as a result, there is no hierarchy in the resource allocation system.

2.5.4 Predominant factors in the Development of Annual Report Readability Research

Having discussed the literature and the organisational factors, this section discusses the predominant factors influencing the present nature of research direction in accounting research and thus, annual report readability research by incorporating the evidence in 2.5.2 and 2.5.3.

Accounting research does not exist on its own but it is interdependent with other disciplines. The degree of mutual dependence between accounting research and other disciplines has contributed to the development of accounting research and this has had a significant impact in the readability literature. It has shown the strengths in the annual report readability literature which could have been developed earlier. Two factors have significantly contributed to the recent trends in annual report readability research. First, the advancement in technology, and second the ability of accounting researchers to import methodologies from other relevant research areas that provided more opportunities for readability research to thrive in the accounting discipline.

Evidence from the critical accounting literature show that the research system excludes knowledge that is not the dominant view and works for dominant views to thrive. This is because knowledge has to be scrutinized to be accepted in the body of knowledge and while accepted knowledge is valid, the ones not accepted are invalid (Tinker and Puxty 1995). In this instance, this gate keeping will cause the ideology of the gatekeepers to prevail, debates are silenced, and contrary results are rejected with no self-criticism within the dominant group (Tinker and Puxty, 1994). The

process remains continuous as the future leaders are trained to use the dominant view.

With these structures, it becomes impossible to improve on literature that is not of the dominant view. Readability research in this instance appears to tick the boxes of another view. This is because it appeared to be unscientific having seen from the organisational evidence that research that appeared to be scientific received more funds for progress. In addition, readability did not satisfy all the qualities of positive accounting research, which is the dominant view of the accounting elites. This made it rather difficult for this research to be sustainable and improved upon. Subsequently this research appears to return into the topics in accounting research. This can be due to several factors such as; its appearance in an elite journal, which makes it valid knowledge, or the application of a scientific approach using a robust research design.

However, observing from the two studies mentioned earlier in section 2.5 the Courtis (1998) paper and the Li (2008) paper both testing the obfuscation hypothesis using the readability literature, this study notes two factors that have contributed to the advancement of annual report readability research. The first is the advancement in technology which enabled the Li (2008) paper to perform an analysis of annual report readability using a large sample of firms, and be able to retrieve readability scores using all texts in the annual report. The difference is that while most studies prior to this annual report readability paper in 2008 used a sample of 100-word from sections of the annual report, Li (2008) used all the text in the annual report to estimate the readability of the annual reports. Jones and Shoemaker (1994) noted in annual report readability research up to 1994, sampling methodology had little scientific validity because the sample was not representative of the texts. Consequently, the advancement of technology has provided the capacity for robust research in accounting narratives.

Second, supporting the recommendation of Core (2001) applying methods in computational linguistics has provided robust research methodology for application in assessing disclosure quality using accounting narratives. For instance, in this study following Li (2008), the fog index is used to test readability and it is able to apply modules from the PERL programming language largely used in computational linguistics research to estimate the fog index of the annual reports. While social influence pressure and other factors as evidenced from the critical accounting literature have been in existent and has swayed accounting researchers from investing their time in readability research, readability research has remained persistent. The advancement in technology and interdepartmental research has provided an opportunity for research in this area to advance and hence contribute to solving critical questions in accounting research.

2.6 Conclusion

This thesis studies the process of reporting financial information and the reported financial information by assessing the syntactical complexity of the narratives in corporate annual reports. It uses the fog index to assess the syntactical complexity of the reported financial information. This chapter has shown that the annual report as a corpus for this study is a relevant vehicle for assessing syntactical complexity of annual reports. It has discussed the theoretical construct of the fog index as a measure of syntactical complexity of annual reports, showing that the fog index measures reading difficulty by assessing the syntactical complexity of the words and sentences in a document. In addition, the chapter has shown how syntactical complexity affects disclosure communication in annual reports.

The fourth section of this chapter uses a critical accounting perspective to identify factors likely to influence the knowledge production process. It shows that these factors have played a role in the development of the annual report readability literature. However, it goes further to show that annual report readability research have persisted and the advancement in technology and importation of research

methodologies from computational linguistic has largely supported the ability to perform robust research in this area. Following the assessment of readability in this chapter, the next chapter provides a historical review of annual report readability research. This will show how the changes in readability have advanced research on annual report readability. In addition, the chapter reviews other measures of syntactical complexity in the readability literature and introduces tone as an additional measure of syntactical complexity used in this study.

3 A Review of Annual Report Readability Research and the Measures of Syntactical Complexity

3.1 Introduction

This thesis assesses the syntactical complexity of annual reports, measuring syntactical complexity using readability and tone measures applied in the accounting literature. The readability literature has undergone significant changes in the accounting research literature; therefore, this chapter provides a historical review of readability literature with an aim to provide an understanding of the relevance of the state of the annual report readability literature to the current study. In addition, this chapter introduces the measure of tone applied in this study as an additional measure of syntactical complexity. The review of tone focuses on literature providing evidence of tone as a measure of syntactical complexity. The aim is to provide an understanding of tone as a measure of syntactical complexity in the accounting literature and its relevance for the current study highlighting the additional complexity attributes it measures in addition to the readability formula.

The next two sections provide a discussion of the research on the readability of annual report narrative. The accounting literature in this area has been developing since the 1950s with several studies assessing the readability of annual reports. Section 3.2 discusses the motivation and relevance of research in annual report narratives, with supporting evidence from annual report readability studies. Section 3.3 reviews the developments in annual report readability research. Section 3.4 presents a review of the measures that test syntactical complexity; it reviews readability formulas, other syntactical methods applied in annual report readability

research and the tone index as a measure of syntactical complexity. This review aims to assess the measures of syntactical complexity in annual report narrative research and uses the developments to explore the current state of the annual report readability literature.

3.2 Motivation and Relevance of Annual report readability

Annual report readability defines the ease of accessibility of narrative information in annual reports. Dale and Chall (1958) defines readability as all elements in a piece of work that affects the success readers have with it (DuBay 2004). The purpose of a readable annual report is to improve accessibility of narrative information to the public. However, a global problem in annual report construction has been how to make it understandable and more widely read (Pashalian and Crissy 1950). An attempt to solve this problem was the United States 1983 FERF (Financial Executive Research Foundation) proposal for companies to produce summary reporting to make reports more readable than the conventional annual report, which produced the first summary annual report approved by the SEC in 1987 (Schroeder and Gibson 1992). Supporting the need for clarity, accounting regulators have stated that the objectives of presenting regulated and standardized accounting information is to inform all users of accounting information in a fair manner. The regulators have provided regulations that will work towards achieving this objective (for example IAS 1 that provides guidelines for presentation of financial statements). Likewise, the United Kingdom Accounting Standard Board introduced the Operating and Financial Review recommending that it "should be written in a clear style and as succinctly as possible" (cited in Rutherford, 2003)[11].

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[11] The Operating and financial Review has now been formally withdrawn as a statutory requirement for quoted companies FRC. 2008. Operating and financial review [online]. [Accessed 21/03/2013]. Available from: http://www.frc.org.uk/Our-Work/Codes-Standards/Accounting-and-Reporting-Policy/Reporting-statements/Operating-and-financial-review.aspx.

Despite these regulatory requirements on simple English, the presentation of information in annual report narratives still appear to be difficult to read and survey shows they are becoming thicker with an increase in complexity of information (FFSA December 2007). One reason for this could be attributable to the annual report construction problem earlier mentioned. Several researchers have highlighted the construction of the annual reports as an accountant's problem that has existed for several numbers of years (Pashalian and Crissy 1952; Soper and Dolphin Jr 1964). Another reason for this inaccessibility is the controversial debate in defining the target audience for annual report communication. The debate of who are the target audience for financial reports have been on for several years, one side has the sophisticated technical investors and the other, has the average reader who has to rely on the annual report as their only source of firm information. In an attempt to resolve this issue, Worthington (1978) from an analysis of litigation cases finds that the court decides that information in reports should be made clear even to the unsophisticated, ordinary and uninformed investor.

In a similar manner, despite regulatory issues on fair disclosure and true and fair information, there remains some ignorance by regulators of the manipulation of texts that occurs in corporate public information. While several researchers have investigated the issue of obfuscation in texts and produced mixed results, it does not make trivial the consequences of biased disclosure that leaves investors completely uninformed of the consequences of their decisions. To understand the power of textual manipulations in company disclosure, we take for example company advertisements or contractual agreements. In these documents, the favourable terms of the contracts/adverts to the audience are in larger fonts, while the unattractive terms of the contracts/adverts are in small prints. While, the documents contain all the information required by regulation, the customer/investor is still at a loss because they find it difficult to take in all the information they need to make a balanced decision.

Several studies show the relevance and importance of annual report narratives. Studies show that the Chairman's statement is the most widely read section of the

report (Courtis 1986; Subramanian, Insley and Blackwell 1993), information in analysts' reports consists mostly of information from narratives (Rogers and Grant 1997) and there is a greater proportion of investors' under reaction when narratives are complex (You and Zhang 2009). The purpose of narratives in reports is the effective communication of the value of the firm; it provides explanations of the financial statements and of the implications of the reported figures in the accounts. "Most researchers agree that effective communication involves writing in a style that is easy to understand" (Subramanian, Insley and Blackwell 1993). Therefore, investigating the syntactical complexity of firms narrative disclosures will inform us of the difficulties investors will have in reading these disclosures. It is potentially an investigation of impression management and strategic reporting existing in annual report writing given the assumption that management are voluntarily making reports complex.

3.3 Developments in Annual report readability research

Readability research dominates research on the syntactic complexity of corporate disclosures. Research on annual report readability assesses the syntactical complexity of a document that makes the document difficult to read. Jones and Shoemaker (1994) published a review on narrative disclosures with detailed analysis of research on annual report readability. The paper critically analyses the use and interpretation of readability formulas in readability research (Jones and Shoemaker 1994). Their review covers both the thematic and syntactic approach to narrative research. This study focuses on the syntactic approach. For a better understanding of the developments, this section first reports the developments in the pre-1994 period and next the post 1994 period. It uses this approach to show the progress in readability research and its contribution to accounting knowledge.

3.3.1 Pre 1994

Annual report readability research dates back to the 1950s. This era included a paper by (Pashalian and Crissy 1950) assessing the readability of annual report using the flesch reading ease index. It was published first in a psychology journal in 1950 and later in an Accounting journal in 1952. The motivating factor for this research as stated by the authors was the development of the Flesch Reading Ease index. This index, gave researchers a ray of hope for the standardization of annual report language, said to be a tool that used with other literature hints, will "strengthen the annual reports as the most important single written communication between management and stockholders, employees, and the general public" (Pashalian and Crissy 1950).

Over a decade later, other studies on annual report readability research followed with research on annual reports in USA, UK and New Zealand all using the flesch reading ease index (e.g. Soper and Dolphin Jr 1964; Smith and Smith 1971). The introduction of other formulas into the annual report readability research was with the Dale Chall index in 1971 (Smith and Smith 1971), the Cloze procedure in 1979 (Adelberg 1979) and later the fog index in 1982 (Parker 1982). Other measures of readability in use up to 1994 included the readability grade level, use of the passive voice, average word length and average sentence length (Subramanian, Insley and Blackwell 1993; Gibson and Schroeder 1994). Other measures used more sparingly are the Fry, Smog, Lix and Rix tests (Courtis 1987; Smith and Taffler 1992b).

In 1977, annual report readability research began to focus on specific sections of the report, for instance, the readability of footnotes in corporate reports (Smith and Smith 1971). Prior to 1977, most readability research used samples from different sections of the corporate annual report with no focus on specific parts of the report. The motivation for using the footnotes in Smith and Smith (1971) was that footnotes was an integral part of the financial statement certified by the certified public accountant and standardized by the Accounting Standards Board. Worthington (1978) assessed the auditors' reports together with other specific sections of the

report as well. Other parts of the annual report analysed in readability studies prior to 1994 include the Chairman's Statement (Smith and Taffler 1992b), Operations Review (Parker 1982) President letters (Heath and Phelps 1984), Management Discussion and Analysis (Schroeder and Gibson 1990; Gibson and Schroeder 1994), and Management Letter to the Shareholders (Subramanian, Insley and Blackwell 1993; Gibson and Schroeder 1994).

Majority of readability research done within this period was mainly to assess the reading ease of corporate annual reports. The conclusions from this research are that annual reports are difficult and in some cases very difficult to read (Pashalian and Crissy 1950; Smith and Smith 1971). Studies assessing the change in reading difficulty over the years conclude that readability has declined over time (Barnett and Leoffler 1979). Other readability studies assessed the relationship between readability of the report and other variables for example readability and stock holder reactions to the report (Means 1981), readability and risk/profitability (Courtis 1986). Another area of analysis in readability research is comparisons of different sections and documents. Studies compared readability of different parts of the reports; Operations review and footnotes (Parker 1982), report overview and whole report (Hoskins 1984), President Letters, MD&A and footnotes (Schroeder and Gibson 1990). Other studies compare annual report readability with the readability of other documents/annual report, for instance, annual report and business publications (Heath and Phelps 1984) and reports of bad performers and good performers (Subramanian, Insley and Blackwell 1993).

Annual report readability within this period was mostly novel. It was a research area providing new insights into the textual informativeness of narrative disclosures in annual reports. Predictably, the research design and methodologies were mostly simplistic and not robust. Jones and Shoemaker (1994) highlighted this could be because the readability formulas were already measurement models formulated from statistical regressions. Likewise, issues with the robustness of the research design may have been due to similar dependence on the readability formulas and/or the naivety in the field of applying the formulas in the accounting literature. In

conclusion, it was a welcome development in accounting research but it probably delivered less than was expected.

3.3.2 Post 1994

Following the review of research on annual report readability (Jones and Shoemaker 1994), discussions of research on annual report readability highlighted the need for further research on the annual report readability research design. It raised such issues as providing a clear link between readability and understandability (Jones 1994a; Jones and Shoemaker 1994; Jones 1996), the need to contextualize readability research (Jones 1996; Jones 1994b), readability and profitability (Jones 1994) and the need for robust explanations on what determines the length and readability of annual reports (Bloomfield 2008). In addition to this, arguments on what the readability formulas do actually measure have questioned the foundations of annual report readability research.

Notwithstanding these limitations and unanswered questions research on annual report readability continued post 1994 using the flesch index, fog index and other previously used readability formulas. Some of the studies conducting readability research introduced other methods of measuring readability to contribute to the annual report readability debate. In 1999, Sydserff and Weetman (1999), introduced a new readability formula called the texture index approach. This approach used six indexicals, which describe attributes of the narrative (topicality, intertextuality, conjunction, connectivity, information category shift, and specificity). It further developed detailed rules for classification of text units and applied them to short extracts. They propose that the method is advantageous relative to readability formulas because it is not associated with readability formulas and it captures a richer set of text characteristics (Sydserff and Weetman 1999).

Other studies used new measures of measuring readability to compliment the readability formulas and provide a better measure of readability. These measures

include variability in reading ease (Courtis 2004; Linsley and Lawrence 2007; Clarke, Hrasky and Tan 2009), use of passive words (Clarke, Hrasky and Tan 2009), word count (You and Zhang 2009), Plain English readability index (Loughran and McDonald 2010; Miller 2010) and text classification algorithms based on support vector machines (Balakrishnan, Qiu and Srinivasan 2010). The aim of these new measures was to capture properties of readability that makes obvious the difficulties in the process of information communication in annual reports. However, Most researchers using the readability formulas after the criticism in 1994 explain that despite its limitations, the formula has been tested to be correlated with basic comprehension tests and are interpreted as a measure of textual complexity (Rutherford 2003) and syntactical complexity (Lehavy, Feng and Merkley 2011).

A differentiating feature of later research on annual report readability from the earlier, is the sample size. Sample size saw an increase from as little as 10 firm years (Parker 1982) to over 55,000 firm years (Li 2008). This can be attributed to the introduction of and familiarization with computer programs that can calculate readability formulas. In the pre-1994 period formulas where mostly manually calculated. This post 1994 era appears to have overcome the constraints raised in (Jones and Shoemaker 1994) that the predictive validity of readability formulas is inhibited because of the small sample sizes tested.

The motivation and research questions in readability research post 1994 were mostly diverse. This included assessing report readability (Courtis 1995), report readability variability (Courtis 1998), determinants of report readability variability (Clatworthy and Jones 2001), relationship between report readability and firm performance (Li 2008). Other motivations were difference between complexity of report and other documents (Clarke, Hrasky and Tan 2009), market reaction to report readability (You and Zhang 2009), impact of report readability on analysts behaviour (Lehavy, Feng and Merkley 2011), impact of readability on investor trading (Miller 2010) and the predictive value of report readability (Balakrishnan, Qiu and Srinivasan 2010).

Another dimension of annual report readability research in this period is the use of annual report readability as a qualifying measure for other variables. Biddle, Hilary and Verdi (2009), applied it as a measure to capture a forward looking aspect of financial reporting quality, Callen, Khan and Lu (2011) applied it as a measure for accounting quality, while Li (2010) uses annual report readability as one of the determinants of future performance in an analysis of the implications of forward looking statements for future performance. Similarly, given the variations in the research questions of post 1994 annual report readability research, the conclusions from the research are also largely varied. The results from these studies show that reports that are easy to read have more forward looking statements (Li 2010), and are more informative (Loughran and McDonald 2010). It showed that difficult to read reports have less overall trading by small investors and a stronger investors' under reaction (Miller 2010; You and Zhang 2009), it showed lower future earnings persistence and a reduction in earnings forecast accuracy with hard to read reports (Li 2008; Lehavy, Feng and Merkley 2011). In relation to its use as a proxy for accounting quality, they show that poor accounting quality (hard to read reports) is associated with delayed price adjustment information (Callen, Khan and Lu 2011) and high financial reporting quality (easy to read reports) increases investment efficiency (Biddle, Hilary and Verdi 2009). Similar to the pre 1994 studies, other studies show that annual reports are difficult to read and variability in reading ease is pervasive (Courtis 2004; Courtis 1998).

3.3.3   Significant Changes in Annual Report Readability Research

<u>Sampling and Methodology</u>

The procedure of randomly selecting 100-word samples from the annual report was the dominant sampling method in readability research pre 1994 (e.g. Schroeder and Gibson 1992; Jones 1988). This is as recommended by Flesch Rudolf in his procedure for applying the flesch reading ease (Flesch 1948). A few applied the formulas using the whole narrative with very small sample sizes e.g. (Smith and Taffler, 1992 cited in Jones and Shoemaker, 1994). Post 1994 and in particular

studies that are more recent use the whole narrative texts for its text sampling with large sample sizes (Li 2008; Biddle, Hilary and Verdi 2009).

In these recent studies, in estimating the reading difficulty of a document, the studies use computer programs that can read all the text in the specific narratives and calculate the readability scores of the document. For instance Li (2008) calculates the fog index of the MD&A using all the words written in the MD&A of each annual report and calculates the fog index of the annual report using all the text written in the annual report. While the earlier method of 100-word samples of a text was recommended as a method of estimating the readability index of a document, it may not have been representative of all the text in the document. This is particularly true for annual reports as they usually are written with variety of purpose for each section. However, as noted in the earlier chapter 100-word samples were more likely to be suitable because the scoring had to be done manually. The current study estimates readability scores of the annual report using all the text in the annual report. It is able to provide scores that are estimated using all the texts in the annual report and is therefore representative of the reading difficulty of the annual report tested.

Pre 1994 methodologies employed in analysing the relationship of the readability formulas with other financial variables are mostly descriptive statistics dominated with means test (Courtis 1987). A few of the studies use the wilcoxon rank tests, mann whitney U tests, regression analysis, ANOVA and t tests for further analysis (Jones 1988; Courtis 1986; Parker 1982; Heath and Phelps 1984). Post 1994 dominant methodologies are mostly multivariate and univariate analysis with more detailed statistical measures. They provide a much-needed improvement to the research design in readability studies, which is an attempt to answer the questions on the validity of readability research. The current study adds to the literature by assessing readability of the annual reports using both univariate and multivariate analysis; further discussion of the methods and application is in the empirical chapters.

Reports are to communicate information to shareholders. This has motivated many researchers to assess how readable the write-ups in reports are, to assess the success of the communication process. In particular, reports that annual reports are too technical for readers has motivated researchers to determine the reading difficulty of annual reports and possibly prescribe measures to make reports more readable. The general conclusions from research on annual report readability pre and post 1994 is that reports are difficult to read and mostly unsuitable for the target audience. For example Hoskins (1984) provides evidence of the high reading difficulty of the overview section of the report, which should be a quick view for the less sophisticated reader with reading difficulty levels similar to the whole annual report.

The writers of annual reports have raised concerns; first on the relevance of the readability formulas to annual reports and second, that the target audience for report writing is not the individual lay shareholders but the large institutional shareholders and the analysts who will find their reports readable (Hoskins 1984). They have also stated that reports are not packaged for reading but for a glance through that will equip the investors with key facts (Gulf official cited in Hoskins 1984). The first concern dominates the annual report readability literature as researchers are consistently finding new and more efficient ways of measuring annual report readability and providing robust evidence on what the readability measures do actually measure. The current study contributes to this by providing further evidence of the fog index readability formula as a measure of syntactical complexity as discussed in chapter two. The second concern only raises further questions, which are; do the shareholders get all relevant information for investment from glancing through the reports? Are the stated target audience efficiently extracting information from these difficult to read reports without causing market inefficiencies? If the answer is no to these questions, the third question follows: Is there a more efficient way of informing investors by producing reports that they can actually read?

These questions have been the focal point of readability research pre and post 1994. Pre 1994 provided answers by assessing the relationship between readability and

stockholder reaction to annual report (Means 1981), and showing that difficult to read reports are inaccessible by a large number of the population (Parker 1982; Courtis 1987). These studies attempt to provide answers to the question on if users of report are extracting information from narratives in reports without inefficiencies caused by difficult to read reports. Research in this period also provides evidence that reports are not as readable as business publications and assess inefficiencies by showing that annual report of bad performers are less readable than the report of good performers (Subramanian, Insley and Blackwell 1993).

The focus of the pre 1994 research is mainly the first two questions, but the post 1994 research in providing answers to the first two questions also attempts to provide answers to the third questions. While some studies have provided evidence of other methods that will measure the reading difficulty of a document (Miller 2010; Rennekamp 2012), other studies provide evidence of applying the readability formulas as a measure of syntactical complexity, which affects reading difficulty (Lehavy, Feng and Merkley 2011). The main conclusions from the evidence in the post 1994 studies are that annual reports are difficult to read (Courtis 1998), investors will miss relevant information from this difficulty (Li 2008; Courtis and Hassan 2002; Miller 2010; Balakrishnan, Qiu and Srinivasan 2010) and market inefficiencies will occur from this difficulty (Lehavy, Feng and Merkley 2011; You and Zhang 2009; Balakrishnan, Qiu and Srinivasan 2010).

In addition, the post 1994 studies provide other measures that can measure other characteristics of readability (Loughran and McDonald 2010; Clarke, Hrasky and Tan 2009; Balakrishnan, Qiu and Srinivasan 2010). This study adds to the annual report readability literature by using a syntactical complexity approach to assess the determinants and consequence of complexity in the annual report. It uses a readability formula to measure syntactical complexity of annual reports, thereby contributing to the annual report readability literature by showing what the readability formulas do actually measure and how an understanding of the construct of the readability formula adds to understanding of narratives in annual reports.

Application of this framework can help produce reports that investors can actually read.

3.4 Measures of Syntactical Complexity

This section discusses the measures of syntactical complexity in the accounting literature. Section 3.4.1 discusses the readability formulas. The fog index used in measuring syntactical complexity in the current study is one of the readability formula. This section provides a review of these formulas as measures of syntactical complexity. The next chapter on narrative methodology goes further to explain the relevance of the fog index for the current study. Section 3.4.2 discusses other measures of syntactical complexity in the readability literature. Section 3.4.3 provides a review of the tone as a measure of syntactical complexity. This study uses the tone index of the annual reports as an additional measure of syntactical complexity.

3.4.1 Readability Formulas

Readability formulas are created for the purpose of objectively measuring the ease of reading a writing, they provide immediate feedback to the writer on their writing (Smith and Smith 1971). They apply a measure of word length and sentence length. Word length is word choice for the writer and speed of recognition for the reader, whereas, sentence length refers to sentence construction for the writer and recall of words in the immediate memory for the reader (Schroeder and Gibson 1990; Smith and Taffler 1992b). Readability formulas have been used since the 1930's, and their construction and validation process provide evidence of its associations with such style elements as sentence length, word length, vocabulary, and other readability

estimates (e.g. reading comprehension scores, extent of readership, or expert judgment) (Barnett and Leoffler 1979).

Despite the fact that readability formulas assess documents based on word and sentence length, altering word and sentence length will not provide assurance of improving readability because the formulas are predictors of reading difficulty not a formula for achieving readable writing (Klare 1974). They are an objective measure of text characteristics that will ignore abstraction and will not take into account the background of the reader (Adelberg 1983). These formulas will not assess the writer reader communication such as motivation, consider the differing background and knowledge of different readers and will not acknowledge other factors that aid to improve reading in a document such as organization, cohesion etc. (Courtis 1986). On the other hand, a study highlights that when applied carefully with a clear understanding of what it does, it will assess the readers' success (Courtis 1986).

The popularity of readability formulas could be attributable to its objectivity in assessing text without human subjectivity. Other measures such as judgements of reading difficulty by experts and text specific test of individual comprehension will require participation by the readers, this will increase validity threats and will make the study difficult to replicate (Subramanian, Insley and Blackwell 1993). When assessing the validity of readability formulas, computers have been applied to predict readability formulas quite adequately, further eliminating replication problems (Klare, 1976 cited in Subramanian, Insley and Blackwell 1993). Most researchers justify the use of readability formulas because it has been successfully applied in other similar studies (accounting research) and its popular use as a standard for evaluating the readability of reading materials such as newspapers, manuals and scientific journals (Subramanian, Insley and Blackwell 1993).

Studies highlight that the limitations that will influence the interpretation of these formulas when used in annual report readability research is the "predominant focus on word-level and sentence-level features of the narrative and not on whole-text

aspects, a lack of regard for the interests and motivation of the reader" (Sydserff and Weetman 1999). It is important to note that these formulas do not test how individual readers will understand the text but provides information on the accessibility of the textual information provided. Hence, it is not designed to assess the interest of the reader. It provides a level playing field to assess syntactical complexity of a document. It assesses complexity of words and complexity of sentence measured in terms of length, which will, inform on measures such as time used to access all information provided in the text, and cost in cases in which the complexity of information will require special paid services to extract relevant information from complex text.

Various studies have acknowledged the strength of readability formulas in objectivity and reliability (Jones and Shoemaker 1994; Sydserff and Weetman 1999). Nonetheless, studies propose that these formulas may be unsuitable for adult materials because it does not measure other readability qualities such as organization and reinforcement (Clatworthy and Jones 2001; Courtis 1998). The readability formulas use word metrics and sentence metrics associations in their development stages and these are the foundation of writing at every level for both adults and children. What is more, these formulas are associated with syntactical complexity and provide a hint of the neglect of old journalistic traditions of simplicity and consideration to the reader (Clatworthy and Jones 2001).

There are a large number of readability formulas. The table below provides characteristics of three readability formulas used in accounting research. These are the Flesch, Fog and the Dale-Chall formulas. The table provides the formulas for calculating each of them and their basic assumptions.

Table 3-1 : Readability Formulas

Readability Index	Formula	Basic Assumptions	Interpretation
Flesch Index	Flesch Reading ease Score = 206.835 - 0.846wl - 1.015sl wl - number of syllables per 100 words sl - average number of words per sentence	The Flesch test uses sentence length and a syllable count as determinants of passage difficulty. Variability in the reading ease of a document i.e. the score of different sections has also been used to measure obfuscation (Linsley and Lawrence 2007)	The higher the reading ease score, the more readable the text.
Fog Index	Fog = (words_per_sentence + percent_of_complex_words) * 0.4	The Fog index uses percentage of polysyllabic words as a measure of word difficulty. It uses number of words per sentence to measure sentence difficulty. An increase in the number of words with three or more syllables or an increase in the number of words per sentence makes a document harder to read (Li 2008)	The score indicates the number of years of formal education the reader will need to read the text once successfully, the higher the score the more difficult it is to read the text
Dale-Chall Index	US Grade = *(0.1579 x % UFMWDS)* *+ (0.0496 x WDS/SEN)* *+ 3.6365* Where: *% UFMWDS =* percentage of unfamiliar words *WDS/SEN =* average number of words per sentence	This applies a combination of unfamiliar words and sentence length to predict vocabulary difficulty. Using a word list of commonly occurring words, an increase in the words in the passage which do not appear on the list interprets to an increase in the reading difficulty of the passage (Jones and Shoemaker 1994).	The result is expressed in terms of US Grades, i.e. the grade level at which a particular American student would be expected to be at, to be able to read a given passage.

3.4.2 Other Measures of Syntactical Complexity in the Annual Report Readability Literature

Cloze Procedure

The principle of Gestalt psychology provides the basis for the cloze procedure developed by Taylor (1953) (cited in Adelberg 1979). This is another division of the approach to measuring textual difficulty which involves ``sophisticated psycholinguistic and socio-linguistic techniques such as Cloze, multidimensional scaling, association analysis, and classification analysis'' (Courtis 1998; Clatworthy and Jones 2001). The aim of this approach was to provide a readability score which measures understandability (Clatworthy and Jones 2001). The assumption for the application of this formula is that given corresponding language semantic and syntactic rules between writer and reader, the reader will be able to provide a large number of correct fill in for missing words in a text (Adelberg 1979). Cloze procedure provides fifty deletions in a document for the test audience to read the document and fill in the deleted words, the developer recommends fifty-word deletions to prevent time and fatigue influencing the results (Adelberg 1979).

The cloze procedure appeared to be an adequate alternative to readability formulas, as it did not rely on words and syllable complexity. Like other readability formulas, it is highly correlated with reading comprehension tests and it has the advantage of eliminating the subjectivity of the investigator and relying on the readers' understanding. The cloze procedure unlike readability formulas, is dependent on both text and subject factors (Smith and Taffler 1992b). Its limitations lie in the difficulty of applying it at sentence level because of the requirement for fifty-word deletions. It is also subject to the influence of individual personality factors on test performance, this increases subjectivity. Furthermore, the procedure for applying the cloze test, makes it difficult to practice and use in the accounting profession, and the deletion of the nth word makes it a mechanical process (Adelberg 1979). As found in Bormuth's research, the cloze scores are most valid when they are used in differentiating individual reading abilities and in assessing the comprehension difficulties of passages (Adelberg 1979; Adelberg 1983).

Text Categorization

This approach to assessing textual complexity of narratives provides an objective measure that does not require human judgement. It is not very popular in accounting narrative research but serves as a narrative analysis method that will provide more insights to annual report narratives as it does in application in other subject areas. This method also appears as an answer to the call by Core (2001) for the use of computational linguistics methods to measure disclosure quality in accounting. It is adopted from the linguistics literature and has been used to assess value relevance of textual disclosures in accounting research (Balakrishnan, Qiu and Srinivasan 2010).

This method develops an algorithm that distinguishes the narrative disclosures of firms based on the textual complexity of the document. It employs methods of text classification derived from machine learning a sub field of artificial intelligence. The most widely used system to classify the document is the "bag of words" approach. This approach identifies documents with words frequent in the document and specific to the document. They describe the most descriptive term of a given document as words occurring frequently in the document (TF) but not very often in other documents (IDF) (Balakrishnan, Qiu and Srinivasan 2010). The documents narrative disclosures are quantifiably represented based on the construction of the TF*IDF weights.

Similarly, a vocabulary- based naĬves bayes classifier formula has been applied in health information studies, to complement the use of readability formulas in assessing public health information. The researcher develops three categories of easy, intermediate and difficult in Java and the classifier assesses the probability that a document belongs to a particular category. The classifier calculates three hypotheses of easy, intermediate, and difficult for each document (Leroy et al, 2008). The naĬves bayes classifier calculates the probability that a document belongs to a certain expected category. The goal of the classifier is to group a sentence into a category from a set of all possible categories (Li 2010) It does this by testing the

probability of a specific hypothesis being true with given specific evidence using this Bayes theorem calculation (Leroy et al. 2008).

$$p(h/e) = \frac{(p(e/h) * p(h))}{p(e)}$$

The final probability is calculated for each category, this is done by multiplying for all the words in the document the probability for occurrence in a specific class (Leroy et al. 2008).

$$p(Doc\backslash Cat_j) = \prod_i p(word_i\backslash Cat_j)$$

The statistical language model is associated with this approach; it assesses the content of a document while also assessing the linguistic features of a document. They predict the probability that a particular word sequence will occur. Tanaka-Ishii, Tezuka and Terada (2010) applies a similar model but provides a method of sorting a document's readability by locating its rank in a given number of documents using a comparator.

Plain English Rules

Researchers have attempted to sieve out specific textual qualities that affect comprehension levels to analyse the writing of narratives in annual report. This is a method of assessing the textual complexity of corporate disclosures using the SEC's Plain English guidelines, as these guidelines have recently provided specific textual qualities of narratives, motivating researchers to test narratives for compliance with these qualities. The components of texts measured include; Sentence length, Average word length, Passive, legalese, Personal pronouns, and others, which include negative phrases, superfluous phrases and occurrence of the word respectively (Loughran and McDonald 2010). Miller (2010) identifies specific Plain English problems highlighted by the SEC and matches each problem to the measure

as identified in StyleWriter (the software used to provide the Plain English score). Below table 3-2 showing the identified Plain English measures with the matching measure as identified by StyleWriter.

Table 3-2 *Plain English Factors*

Plain English Writing Factors

SEC Plain English Problems	StyleWriter Plain English Measure
Passive voice	Passive verbs
Weak/Hidden verbs	Hidden verbs
Superfluous words	Overwriting (overuse of qualifying words)
Legal and financial jargon	Legal words and Jargon/Abstract words
Numerous defined terms	NA
Abstract words	Jargon/Abstract words
Unnecessary details	Tautologies/Overwriting
Long sentences	Number of words/Avg. sentence length
Unreadable design and layout	NA

3.4.3 Tone as a Syntactical Measure of Disclosure Complexity

This study defines the tone of disclosures as the slant of the narratives disclosures in the annual report towards a positive direction. It follows the definition of tone slant in Gurun and Butler (2012), by estimating positive slant based on the proportion of negative words in a document. The study applies a dictionary approach in estimating the tone of disclosure, it uses the Loughran and McDonald (2011) financial dictionary developed for application in a financial context. This section reviews the evidence that supports tone as a measure of syntactical complexity in annual reports.

The motivation for using the tone of disclosure as an additional measure for disclosure syntactical complexity lies in the importance of word type for investor communication. Davis, Piger and Sedor (2012) motivates its study on the language of earnings press release by recognizing that the increase in the sheer number of words used in earnings press release raises the question of if the motivation for such increases lies in the expected effect on market reaction or if it is informative to the extent that it signals management expectations to investors. Therefore, with the evidence of continuous increase in the number of words in annual reports, the effect of these increases, which remains an open research question, will depend on the type of words that management uses to communicate to investors. Tone increases complexity of words to the extent that it increases the imbalance of information and obscures relevant details in the report, following the definition of complexity by the FRC.

In addition, from the definition of syntactical complexity in chapter two, it was noted that syntactical complexity is measured with respect to a breakdown of the parts of the text in a document. Assessing tone as a measure of syntactical complexity extends the test of syntactical complexity in this study to the types of words that make-up the sentence. However, tone differs from readability in the disclosure measurement literature. While both readability and tone measure complexity to the extent that they estimate word characteristics that obscure information disclosed, tone is sentiment based and is therefore, more likely to form the investors' opinion rather than only defining the information gap. Henry (2008) studying the tone of disclosures, defines tone as the feeling of a communication. While tone provides a document score using a pre-defined word characteristic similar to the readability measure, tone also measures what information is likely to be portrayed in the document. Hence, tone can define investors' perception of management communication.

Strategic reporting assumptions increase the complexities in management communication. This is because, while management propose to make information

public in other to reduce the information gap, expectations of agency theory assumptions are that management will disclose information in a form that favours management self-interest. Assessing from a strategic view Davis and Tama-Sweet (2012) motivate their study of tone by hypothesising that the tone of disclosure will change with the disclosure outlet, therefore, management are more likely to strategically include more negative disclosures in the 10-K reports than in earnings press release. Davis and Tama-Sweet (2012) is a study on tone that attempts to directly test management use of tone as a vehicle for strategic reporting. They develop the hypothesis based on the premise that management motivations for such strategic behaviour is because they expect a larger market reaction at the timing of earnings press release than at the release of the 10-K filing. Management use of tone increases the complexities in disclosure communication because it obscures relevant information that investors need to extract to make useful resource allocation decisions.

From the theory of limited attention, it is more likely that information that is more salient is processed by investors and investors will use information in the form that it is displayed (Hirshleifer and Teoh 2003). Tone can be used either to reduce the information gap or to strategically communicate towards achieving management interest. However, because it is usually more salient than other neutral information, it is likely to shape investors' opinion. It is because of the tendency for the tone of management communication to affect the interpretation of disclosures that the tone will increase the complexity of disclosures. This is because it increases the noise in the interpretation of disclosure. Tone as a measure of disclosure complexity is important, as narrative disclosures from management are usually likely to be the only source of information for some investors. This is because the owners and potential investors in a firm usually do not directly observe the firm activities and thus have to rely on second hand information (Tetlock, Saar-Tsechansky and Macskassy 2008). This indicates that management can potentially manage the impressions of this group of investors through tone.

Kothari, Li and Short (2009) presents an argument that shows that tone increases disclosure complexity, by arguing that while management's positive disclosures are not likely to be credible, negative disclosures are more likely to be believable but not timely. This is because existing incentives of management are more likely to lead to skewed positive disclosures to the users of the annual report, while due to management aversion to negative disclosures; they are more likely to release negative discussions only if they are credible (Kothari, Li and Short 2009). This situation gets complex because even with the existence of litigation, what is more likely is that the subjectivity of narratives reduces the risk of litigation when compared with risk with respect to the disclosed numbers. Increasing the complexity in the tone of narrative disclosures, is if litigation risk will cause management to provide more timely negative discussions, or whether career concerns of management will encourage delay of these discussions. However, what remains paramount is that investors are unable to extract reliable or timely information from narratives if tone is difficult to construe.

Further evidence of tone as a measure of disclosure complexity is in its impact on portfolio drift returns. Feldman et al. (2010) show that changing the tone of management disclosures adds significantly to drift returns. This indicates tone adds noise to disclosure communication, which causes the market to underreact to earnings information. Similarly, evidence that tone influences investors' reactions uses prospect theory to theorise that framing financial communication in positive terms will cause the users of the information to think about it in increases. In addition, Li (2010) exhibits the complexities of the tone of disclosure in assessing its effect on the mispricing of accruals, indicating that manipulating the tone of disclosure can lead to the mispricing of accruals as the evidence shows that the MD&A tone mitigates the mispricing of accruals. Tone increases disclosure complexity by increasing the noise in the disclosure communication process.

Tone of disclosure increases the difficulty in processing and interpreting qualitative disclosures. This is because given a high positive tone in management discussions, users are sceptical as to the credibility of discussions and given a negative tone,

users will expect the discussions to be more believable but are faced with the choice as to if the information is timely and can be acted on. Further evidence is that at longer horizons qualitative information measured using tone, has more predictability for asset prices beyond the predictability of quantitative information (Engelberg 2008). This indicates that it takes time for users of the report to decompose information in narratives, which is as a result of the complexities in narrative disclosure communication such as tone that will increase noise in the process of information extraction.

3.5 Conclusions

In conclusion, this chapter reviews the literature on readability using a timeline analysis. The timeline study assesses development of readability research based on the pre-1994 and the post-1994 periods. Using the time line analysis, the review aimed to identify if the studies have achieved their objectives, assessing if the research design and methodologies provide answers to critical issues in readability research. The review identifies the developments in readability research highlighting the significant changes in annual report readability research. In addition, the chapter reviews the measures of syntactical complexity used in this study and other readability studies, providing background information on narrative disclosure methods that test syntactical complexity.

Finally, the chapter provides a review of the tone of disclosure an additional measure of syntactical complexity used in this study. It shows that while the fog index readability formula and tone index both test syntactical complexity using word characteristics, tone is sentiment based and therefore potentially measures the user's perception of the text. Following a review of the measures of syntactical complexity, the next chapter discusses the methods applied in retrieving the narrative scores for the annual reports. The next chapter focuses on the fog index and the tone index

used as measures of narrative disclosure in this study. The chapter also introduces the data and provides a description of the data.

4 Narrative Methodology and Data Description

4.1 Introduction

This thesis assesses the syntactical complexity of annual report narratives by empirically examining the relationship between predetermined quantifiable qualities of narrative disclosures and the accounting numbers in the annual report. The study specifically uses narrative qualities identified as the fog index and tone index measure of annual report narratives, which measure the syntactical complexity of the narratives reported. This chapter describes the methods applied to retrieve the narrative measures of the annual reports and introduces the sample analysed in subsequent empirical chapters. It provides description of the sample's narrative characteristics based on firm years, association between the narrative measures and industry data. The chapter is organised as follows: The next section describes the methodology applied in retrieving the narrative disclosure measures, stating the disclosure measures used and providing descriptive statistics of its measurement rule. Following this, the chapter discusses the sample selection process and the description of the sample.

4.2 Narrative Methods

Syntactic Analysis of corporate narratives aims to "analyse and quantify the difficulty of reading the message" written in the reports (Jones and Shoemaker 1994). The current study investigates the syntactical complexity of narrative disclosure by assessing the readability and the tone of the disclosures. Studies in accounting use the fog index to measure the reading difficulty of accounting

narratives (for instance Lee 2011) and recently the financial dictionary, a dictionary developed to measure the tone in financial texts (for instance Rogers, Buskirk and Zechman 2011). These are the two measures applied to test syntactical complexity by assessing the reading difficulty and tone of accounting narratives in this study. Other measures identified and used to measure the reading difficulty and tone of accounting text include text classification methods, cloze procedure, and the Plain English approach for testing readability of disclosure; the naive bayes approach and other dictionary approaches for testing the tone of disclosure.

Knowledge of narrative disclosure measures is relevant for accounting research. This is because as highlighted by several policies (e.g. the SEC Plain English rule, 1998), there is the need for users of accounting information to use narratives in reports to understand the significance of the accounting numbers reported. The ability of accounting researchers to accurately measure narratives in annual reports will inform on how best to present corporate report narratives for effective decision-making. The adoption of text analysis measures from other academic fields can significantly lower the cost of measuring disclosure. It is expected to provide more accurate narrative measures that will advance accounting research (Core 2001).

Current research in Accounting on annual report narrative disclosures uses the fog index to assess the readability of disclosures (for instance Callen, Khan and Lu 2011) and the financial dictionary developed by Loughran and McDonald (2011) for testing tone of disclosures (for instance Davis and Tama-Sweet 2012). The application of these methods has provided an opportunity that allows accounting researchers to assess the impact of the written element of disclosures on the users of accounting information (Li 2008; Loughran and McDonald 2011). The use of readability formulas such as the fog index does have its criticisms. However, the results of research as observed in research using these metrics highlight that word and sentence metrics remain significantly relevant for improving the readability of a document, determining the level of human decoding of information in text. Specifically, readability researchers on the theoretical formulation of readability argue that text readability is a function of the text characteristics and the reader's

resources (Zakaluk and Samuels 1988). Using a measure of the text characteristics provides an objective assessment of the written text, which is independent of the specific user's characteristics or available resources.

This study measures annual report text characteristics using the fog index as a measure for readability of the annual report and the financial dictionary as a measure for the tone of the texts in the annual report. Section 4.2.1 gives the background information of the fog index a measure of readability, and the Fin-Neg list of the financial dictionary developed by Loughran and McDonald (2011). The Fin-Neg list is the negative word list developed from the financial dictionary. It is applied in this study to determine the tone of the annual reports. In addition, this section highlights the relevance of the measures for the study.

4.2.1   Motivations for the Indexes used in this study

This section provides information on the developments, motivations, and relevance of the use of the fog index and the financial dictionary in accounting research. See table below for a brief summary of the background information of the fog index and the Fin-Neg word list used in this study.

Table 4-1: Summary of Background Information

	Fog Index	Fin-Neg List
Index Name	The Gunning Fog Index	Financial Dictionary – Fin-Neg Word List
Developer of Index	Robert Gunning	Tim Loughran and Bill McDonald
Basis for categorization	Word and sentence length	Negative words in Financial context
Motivation for the Index	To assess Readability of English text	To assess Tone in financial text
Formula for assigning a score to a report	Fog Index = (Words per sentence + Percent complex words)*0.4.	The word list counts relative to the total number of words (Proportional weights)
Relevance of the Index in Accounting Research	Assesses the complexity of words and sentences in Financial reports	Assesses tone of disclosures in financial reports narratives

Fog Index

The fog index is a formula for testing the readability of English text. It aims to control complexity in writing of text, in its document assessment, it indicates to the reader the magnitude of word and sentence complexity, therefore aiding the writer to control the level of complexity (with regards to words and sentence) in the writing. It is an opportunity for writers to improve their writing for the sake of their readers. It approaches writing from a systematic perspective, whereby it highlights that there are limits relating to long words and long sentences in writing in which the writer consciously or unconsciously adopts in order to win its audience (the reader)

(Gunning 1969). To this purpose, it serves as a warning sign used to check if the writing is in step with that which is easy to read and understand as proven generally.

Robert Gunning developed the fog index in the 1940s. Its purpose was to serve as an effective warning system to militate against complexity in writing. It was aimed at writers as well as beginning writers and those who have to write as part of their jobs but are not primarily writers (Gunning 1969). The aim of developing the fog index was to produce a measure of readability that was "sufficiently reliable and still easy to use" (Gunning 1969). In the 1940s the Robert Gunning Associates from which the fog index was developed assisted several newspapers in improving their writing by removing the fog out of their writing, subsequently receiving reports from tests that the writings in the newspapers were greatly improved as more than half were below the danger level of reading difficulty (Gunning 1969). They also worked with several business publications to improve their writing with remarkable success.

The fog index has evidently proofed to be an objective measure of readability of English text, which is reliable and easy to use. Robert Gunning Associates approved the fog index for use by the Navy and Air force as the formula for their writing manuals. In medical research, it assesses the writing made public for patients to read. It has enabled medical research to make patients' information accessible to patients, in order to achieve the aim of the writing (Christopher et al. 2007; Mader and Playe 1997; Grossman, Piantadosi and Covahey 1994). Fog index has also played an important role in enabling readers of academic articles to access these articles easily. This is because research on the readability of journal articles has enabled researchers identify that some articles written in a complex manner are written to impress as they are not necessarily different from the easier to read ones (Armstrong 1980; Armstrong 1982; Roberts, Fletcher and Fletcher 1994).

The Fog index has proved to be suitable for assessing the readability of accounting narratives, due to its characteristics of being quantifiable and replicable. In addition, its practicality for experimental research has made it quite popular in accounting research settings. The standardization of the identification of the variables used in

the calculation of the fog index e.g. words, militates against subjectivity in interpretation during the variable identification process. It does not have to depend on human subjective interpretation of the attributes. For example, this study defines a word as a group of characters within spaces and a sentence as a group of words ending with a full stop, exclamation or a question mark. With this definition, the researcher is not subject to introducing an opinion of what the criteria for words will be for the specific study. It has a mechanism, which is clear and relevant to its purpose. The fog index does not have to depend on human test such as filling in the blanks like the cloze procedure. It clearly defines its purpose, which is to warn against complexity in writing, and achieves this in its mechanism by testing the readability of the document as the depth of proliferation of complex words and sentences.

The fog index has the advantage of being easy to understand; therefore making its application as a variable in seasoned accounting research straightforward and thus, relevant to the accounting practice. This is because researchers can apply the effect of the fog index in the interpretation of their research results without being linguistic experts. For instance in the application of a vocabulary naïve bayes method, for a study using the Bayes algorithm, the researcher has to understand the application process of the algorithm in linguistics to effectively and accurately measure the variables in an accounting research setting. In addition, using a complex variable in sophisticated accounting research makes it complicated to interpret the relevance of results and sometimes the process is impracticable.

Furthermore, in applying the naïve bayes method discussed in chapter 3, the researcher needs to obtain training data that best fits and defines the qualities that fits the purpose of the research. Training data is mainly difficult and sometimes impossible to obtain. This is because data obtained may not necessarily define the qualities that fit the purpose of the research. Furthermore, the labelling of the data trained and the data itself may not define the complete data set available to the researcher commonly due to possible bias in the training data. This will lead to logical errors in the research conducted and most times an ecological fallacy. This is

because an accounting researcher using a selected group of paragraphs in annual reports to label and train, and subsequently generalizing the labels to other annual reports may not have included other specific attributes other reports possess that may be significant. Training data needs to be drawn from same source i.e. same time period for high accuracy to be achieved as small changes in the training data can cause large changes in the parameter estimates (Manning and Schutze 2003).

Despite the high usage and acceptability of probabilities as used by the classifier, the conclusions from them are a high or low likelihood that is 'the best-case scenario'. The fog index does not depend on probabilities like the naive bayesian methods; it does not provide a 50% or 95% chance that the document is readable. It literally observes each word and sentence variable in the document, and provides readability statistics based on the contents of the documents. The accounting research models using the fog index as a measure will use the readability scores provided rather than classification groups based on probability estimates.

The fog index measures the linguistic features of the document; it does not measure the attributes of the content as most criticisms imply that it should measure. This seems reasonable as the fog index proposes to make documents easier to read per the construction of the text in the documents rather than easier to understand in terms of the sensibility of the document. "Understandability is reader-related and is determined by the reader's background, prior knowledge, the purpose of the reader, interest, and general reading ability. Readability, however, is essentially text-related and does not take these factors into account" [Stevens, 1982; Mudd, 1987].

Annual reports exist to make company information accessible to users of accounting information, the purpose of the fog index to make words easier to access by reducing complexity fits with this purpose despite the technicality of the reports. In addition, there are concerns that the fog index has a 50% dependence on multi syllable words, which are a common occurrence in business texts. Focusing on relative readability mitigates these concerns and other arguments that changes in

time will affect the readability. With respect to the effect of time changes, assessing the relative readability of the sample measures all documents on the same terms, making testing, and conclusions based on the sample consistent.

The development of the fog index and other readability measures had introduced the test of the readability of annual report narratives in accounting research, encouraging researchers to assess readability indexes of reports and highlight the need for annual reports to be less complex for the average investor to read (Pashalian and Crissy 1950; Soper and Dolphin Jr 1964). Furthermore, recent research in accounting using the fog index has evidently proven its relevance, showing that it could provide additional understanding for some accounting anomalies (Lehavy, Feng and Merkley 2011; Lee 2011). Robert Gunning in his article reflecting on twenty years of the fog index noted that writers in business specially need a warning sign in their writing as the staffs tend to use words to impress rather than to express (Gunning 1969).

The revival of the fog index in accounting research was due to developments in technology that do help mitigate most of the concerns raised by researchers concerning the fog index. Principally, researchers can conduct large sample research using the fog index, which was before now impracticable, as they had to rely on manual counting which largely reduced both the sample size and the sample representation. Using the fog index, Li (2008) examines whether annual reports of firms that are performing poorly are more difficult to read and if firms with less persistent positive earnings and more persistent negative earnings have reports that are more complex. In other words, do managers obfuscate information by making their reports unreadable when performance is bad? This assesses the management obfuscation hypothesis.

The Wheat report produced in 1969 from a SEC internal study group gave further strength to the hypothesis as it showed that the average investor could not readily understand corporate writing (prospectus in this instance) (Li 2008). This report

had led to SEC publishing specific guidelines on corporate report through the Plain English handbook. (Miller 2010) as well motivates his use of fog index from the publishing of the Wheat report. In addition, the reiterated concerns by Arthur Lewitt, 1997 adds to the motivation as he says too much information can be as much a problem as too little as more disclosure is not always better disclosure (Lewitt 1997 cited in Miller 2010)). SEC adopted the plain English regulation under Lewitt leadership, Rule 421 (d).

Li (2008) uses the fog index to contribute to the literature, he provides evidence that annual reports of public companies are at a very difficult to read level. This is evidenced from mean and median readability scores of 19.4 and 19.2 respectively. The MD&A and the notes to financial statements are easier to read than the whole report with mean fog indexes of 18.23 and 18.96 but the MD&A had a higher variation in their fog index scores. They observe a drop in the fog of annual reports in 1999 after the release of the SEC plain English disclosure policy in 1998 and an increase in fog in 2002 likely associated with the release of the SEC critical accounting policies proposal and the Sarbanes-Oxley act regulation. This indicates that testing the reading difficulty of annual reports using the fog index can provide knowledge that can assist in disclosure regulations that will improve company disclosures.

Financial Dictionary Application – Fin-Neg list

Loughran and McDonald (2011) develop a negative word list (called the Fin-Neg list) suitable for accounting research that investigates the tone of disclosure. They create a list of 2,337 words that do have negative implications in the financial context, using words appearing in financial reports for the development of the word list. The aim of their study was to provide a word list suitable for assessing the tone of financial text. Motivating the study, they provide evidence that most words identified as negative in the popularly used Harvard IV dictionary will not have

negative implications in the financial context, because words such as 'mine' will proxy for industry effects, while words such as 'taxes' are not negative in the financial context (Loughran and McDonald 2011).

Providing evidence that the word list capture useful information in annual reports, they showed that the word list they develop do have a significant relationship with firm stock returns. In addition, they provide preliminary evidence that show that the Fin-Neg word list has significance beyond the 10-K sample used, showing its significance with other business text outside the 10-K sample (Loughran and McDonald 2011). Furthermore, this word list as tested in Loughran and McDonald (2011) shows significant relationship between tone of reports and firms reporting material weaknesses in their internal control. It showed that firms reporting material weaknesses, which are more likely to have discussions that are more negative, exhibit a positive relationship with the negative word list. The Fin-Neg word list developed for assessing tone in financial reports is best suited for this study as per the study investigates the tone of financial reports.

In addition, using a negative word list overcomes the limitations of a positive word list. This is because as noted in Loughran and McDonald (2011), positive words have the likelihood of introducing noise in the analysis because companies using positive words in narrative discussions are more likely to use negation. For example, it is more common for firms to write 'not profitable' but less common for firms to write down 'did not fail' when reporting in narratives. The limitations of a positive word list and the significance of negative words in business texts have also been documented in the accounting literature (Tetlock, Saar-Tsechansky and Macskassy 2008). This study uses the list of negative words to estimate the positive slant of annual reports; this provides a robust estimation of firms that are more likely to have a positive slant in their reports.

While negative words are known to produce a negative reaction from the readers, positive words and the negation of positive words are more likely to produce a

positive or a mixed reaction when considered with the associated negation due to limited attention. Limited attention will cause investors to decipher information in an inefficient manner from the annual reports (Hirshleifer and Teoh 2003). Consistent with literature in psychology, negative words have more impact and are more likely to be thoroughly processed (Tetlock, Saar-Tsechansky and Macskassy 2008). Therefore, it is an open research question what determines an increase or decrease of negative words in the corporate annual report. This study investigates this question and uses this measure of tone to investigate the consequence of a decrease of negative words for the Post Earnings Announcement Drift.

4.2.2 Measurement Process

Earlier research in accounting measured the fog index of annual reports by using 100-word samples of text from different sections of the paragraph (Courtis 1986; Schroeder and Gibson 1992). However, with developments in technology, researchers are able to obtain a complete representation of the all the words in the text (complete text) using computer-assisted programs. For example Li (2008) uses Perl programming language to compute readability scores of annual reports including all the text in the report in computing the scores. Tone on the other hand, has incorporated the developments in accounting research in its research process for a few years. This is particularly because tone research became popular with the involvement of technology development in linguistic research e.g. the use of the Diction software. This study uses as its sample unit the narrative disclosures in annual report. It assesses the readability and tone of the complete text of a company's annual report narrative per firm year. Its recording unit are the words in each sentence and the syllables in each word.

To measure the text for readability and tone, first download the PDF files for the FTSE ALL SHARE companies. Extract all text from the PDFs by converting the PDF files to text format. This process is necessary to enable the Perl program to read

the text in the files. Following the text extraction, the next step is to edit the files for input into the Perl readability program. Following (Miller 2010) this study removes all paragraphs with more than 50% non-alphabetic characteristics. This is to ensure that the analysis does not include paragraphs with only figures or tables, which may add noise to the readability results. In addition, the process of text extraction extracts all text from the tables presenting only the text for the analysis. Further, the readability program identifies numbers and does not count them as words; therefore, not extracting numbers from the text does not change the readability results.

To parse the text for input into the readability Perl module, the researcher writes a Perl code that cleans up the text by removing text encodings and full stops between two numbers. It is important to remove the text encodings to avoid misrepresentation of the text. In addition, it is important to remove the full stop between numbers as the Perl module identifies the full stop as the end of a sentence. The next step is to remove paragraphs with more than 50% of non-alphabetic characters. To perform this, the researcher writes a Perl program that extracts out all paragraphs with more than 50% of non-alphabetic characters. As a robust check, to include all the information in the annual report in the test, this study performs two series of test for the readability of the document, one with the exclusion of the paragraphs above and one with the paragraphs included. The study uses the text not edited for its analysis because this provides results from text as read by investors without removing information that may be relevant to investors' reaction.

The next step after the file conversion and parsing process is to input each file to the Lingua EN Fathom Perl module, which reads the text files and returns the readability result. The Lingua En Fathom Perl module, used in various studies (Li 2008; Miller 2010) is a Perl code written to assess the readability of English text. It takes as input a text file and calculates various text based statistics for the input file. Its criteria for identifying words are that a word must consist of letters and at least a vowel sound. To ensure robustness in the word identification process, it does not count symbols such as & as words, and does not identify abbreviations as words. It defines a sentence as a group of words and non-words terminated with a full stop, question mark, or exclamation. This study compares the result of the Perl program to

manually calculated results and results from other studies to assess the validity of the Program.

Loughran and McDonald (2011), measure the tone of a 10-K report using proportional weights, defined as negative word counts in the annual report relative to total number of words in the annual report. To apply this formula, this study uses a bag of words approach similar to the approach used in Loughran and McDonald (2011), which requires parsing the document into vector of words and word counts. To obtain a word list count, the study needs to split the text in the report to words. To split the text to words this study employs the Perl Module, Lingua EN Splitter. This module splits a document into words by identifying words as a group of letters separated by a space or punctuation from another group of letters.

The researcher writes a Perl program that takes as input the split words, including words with hyphens as one word following Loughran and McDonald (2011). The code performs a loop through the Fin-Neg list to identify the occurrence of the words in the Fin-Neg list appearing in the annual report (split words). The code produces the total frequency count of the words in the Fin-Neg list appearing in the annual report; it also produces a word list of the words identified. The count produced relative to the total number of words appearing in the document is the tone score measure for the annual report. To validate the output of the program the researcher manually counts the word appearances and this produces the same results as that produced by the program. The next step is to transform the tone measure to a measure of positive slant by multiplying the score by -100 following Gurun and Butler (2012), this provides a range of score between -100 and 0. This enables the use of a negative word list to estimate the positive slant of annual reports, as the literature on tone shows that negative words have a higher impact on the readers than other word (Tetlock, Saar-Tsechansky and Macskassy 2008; Davis and Tama-Sweet 2012).

Section 4.2.3 is a validity analysis of the measurement process of the indexes used in this study and section 4.2.4 is a discussion of the interpretation of the indexes and their theoretical implications for accounting research.

4.2.3 Validity - Measuring Fog Readability and Tone Index using Perl Programming Language

This research uses the PERL readability module to calculate the fog index measure, which adequately deals with the concerns of measurement errors and criticisms in the readability measurement process. In earlier studies, researchers assessed the document readability by selecting 100-word paragraphs in the document and using the average readability score of these paragraphs as the readability score for the all the texts in the section assessed (Courtis and Hassan 2002; Schroeder and Gibson 1992). Using PERL programming in this study enables the study to test the readability of the complete annual report text rather than estimate the scores using 100 word selected sections. Using PERL means there is objectivity in the test process, as it does not allow the inherent subjectivity in the 100-word paragraph selection process. Subjectivity occurs in the selection process not in the calculation process as readability formulas use rules performed relatively objectively. In addition, readability scores retrieved from a test of the complete prose militates against potential ecological fallacy i.e. making aggregate level (annual report) conclusions using test results from selected paragraphs (individual level) (Garson 2002).

Selection of 100-word sections means there are inherent limitations in replicating work done by the researcher as different paragraphs could be selected, which may produce different readability scores. Further, though the process of identification of words and number of syllables are less likely to differ with each individual researcher, it may include some subjectivity. The estimation process of the fog index has been criticised for its inability to recognize non-words such as abbreviations and symbols particularly when automated. Using a Perl module that recognizes these

abbreviations and does not count them as words overcomes these limitations in automating readability test. Lack of subjectivity in the measurement process and the uniform pre-determined standards of words and syllable identification, improves the reliability of the measurement process when using the Perl program, and subsequently the results.

Concerns on face validity of readability formulas are that they do not reflect comprehension of the text (Jones and Shoemaker 1994), analysing relative readability mitigates this concern (Li 2008) as well as the accurate interpretation of the fog index measure applied in this study. Using the Perl module to test readability of a large sample size is a response to concerns of the predictive validity of readability tests. Jones and Shoemaker (1994) mention that the use of small sample sizes inhibits predictive validity; this study uses the complete text of the report and a large sample of firms in the FTSE ALL SHARE index. Loughran and McDonald (2011) study validates the tone measure applied in this study by providing evidence of its association with negative discussions in annual reports. Specifically, Loughran and McDonald (2011) evaluate the economic relevance of the word list by using two samples documenting negative events in the financial year. This study applies a Perl program to perform the test for the tone measure in order to ensure robustness in the word identification process and standardisation of the measurement process, enables accurate replication of the work done.

4.2.4 Application – Interpreting the Fog Readability and Tone Index

The fog index measures readability by providing word complexity and sentence complexity metrics that indicates the level of complexity of the document for the proposed reader. It combines two measures: a measure for the length of the document and a measure for the complexity of the document. This study uses the Lingua EN Fathom Perl module to calculate the fog index of annual reports. The Lingua EN Fathom Perl module uses the text statistics retrieved from the input file

to calculate the fog index, which measures complexity of text based on syllables per word and words per sentence. Formula for the fog index used in the Perl module:

Fog Index = (Words per sentence + Percent complex words)*0.4.

o   *Words per sentence = (num_of_words/num_of_sentences)*

o   *Percent complex words = (num_of_complex words/num_of_words) * 100*

o   *Complex words are words with three or more syllables*

The first part of the equation *'Words per sentence'* measures sentence complexity, which is the number of words per sentence. Sentence complexity measures how long it will take a reader to read a sentence. Theoretically explained, it measures the time and cost of the time the reader needs to invest to read the annual report. The second part of the equation *'Percent complex words'* measures word complexity, this measures the proportional weights of complex words in a document. This is the number of syllables per word based on the assumption that longer words make a document more difficult to read. Theoretically explained it measures the time and cost of time invested by the users of accounting information to glean the meaning of the words they read. The fog index asserts that having more syllables per word and more words per sentence will make a document more difficult to read, all other things being equal (Li 2008).

"The interpretation of the fog index is Score ≥ 18 = unreadable text, 14 - 18 = difficult text, 12 - 14 = ideal, 10 - 12 = acceptable, and 8 - 10 = childish text" (Li, 2008).

The interpretation of the scores produced by the fog index is as quoted above. A number of studies have shown that the fog index of annual reports fall in the range of the scores for the unreadable text. Literally interpreting an unreadable score of annual reports as recorded in research, using the sentence and word complexity variables; the level of complexity of words and sentences found in the annual report are practically unreadable. A report scoring above 18 has unreadable text, compared to a report that has a score falling between 14 and 18, which will be difficult to read.

The higher the score for a given text the more difficult it is to read the text i.e. a report with a fog index of 21 is more difficult to read than a report with a fog index of 20. The proposers of the fog index usually interpret the classification of the difficulty levels as grade levels, interpreted as the years of education the reader needs to attain in order to read the text comfortably at first reading. It states that for every increase in the fog index score, the reader will need the same increase of time in formal education to read the text with ease for the first time.

For example, below is an extract of a cross section of the fog index score for primary education level and academic research material. Primary education level is defined as material suitable for ages 7 to 12 years. Academic research level material is defined as materials from selected peer-reviewed journal articles.

Table 4-2: Fog Index of Primary Education level material (PR) and Academic Research level material (JR)

Name	Number of words	Fog index	Word Complexity (%)	Sentence Complexity	Length(log no_of_words)	Average fog_index
PR	1365	9.265201	3.663004	19.5	7.21891	
PR	758	8.569062	8.575198	12.84746	6.630683	
PR	13930	4.999841	4.544149	7.955454	9.5418	
PR	23842	9.308544	6.350138	16.92122	10.0792	
PR (Average)						8.035662
JR	15320	15.70907	28.54439	10.72829	9.636914	
JR	9911	17.12315	30.30976	12.49811	9.201401	
JR	16837	15.74597	28.1701	11.19481	9.731334	
JR	14201	13.77206	24.02648	10.40366	9.561068	
JR (Average)						15.58756

The primary school level material has an average fog index of 8, while the journal articles have an average fog index of 15.6. Assuming a reader comfortable with reading the primary education material, the difference of 7.6 represents the years the reader needs to have formal education to read the journal article with ease at first reading. The length shows the natural log of the number of words in each document indicating how long the document is in word terms. Word complexity as discussed in the paragraph above indicates the percentage of words with more than three syllables to the number of words; it shows how difficult the words in the document are in terms of length of the words. Sentence complexity indicates the number of words in each sentence; it measures the length of sentences in the document in terms of number of words in each sentence.

The Tone Index

To demonstrate the interpretation of the tone disclosure measure, this section adopts news articles from the Financial Times. This tone index of selected news articles is presented below. The first article titled "*RIM shares hit by analysts' doubts over new CEO and board changes*" indicates an article with negative news content. The second news article is titled *"Chesapeake leads advance for exploration companies"*.

Interpreting the numbers produced for the tone index, there is a relative assessment of the scores. For example, the scores of the Article A with nine of 278 words negative is a more negative article than Article B with five negative words relative to 334 words in total. This means that article B has a higher positive slant than article A. At the same time, Article C, which also has nine negative words, is less negative than article A. This is because article C has 520 words in the document as opposed to 278 words in article A. The tone index measures the impact of the count of negative words on a reader accessing all the words in the document. It provides the relative effects of the negative words contained in the document given all the words in the document are accessible by the reader. It informs on how much impact

the negative words in the document will have on the users (readers) of corporate financial reports.

Table 4-3: Tone of Sample Articles in the Financial Times

Article Type	Tone Index	Length	Count of Neg_Words	Total num. of words
Article A: RIM shares hit by analysts' doubts over new CEO and board changes	-3.23741	5.627621	9	278
Article B: Chesapeake leads advance for exploration companies	-1.497006	5.811141	5	334
Article C	-1.730769	6.253829	9	520
Article D	-2.29682	7.437206	39	1698
Article E	-1.351351	5.913503	5	370

4.3 Sample Selection Process

This section provides an analysis of the sample selection process with an aim to detail and inform on the steps involved and the relevance of each step in the sampling process.

4.3.1 Annual Report Narrative Data

All companies in the sample must be a constituent of the FTSE All Share (FTALSH) index to be included in the sample. The FTALSH index consist of premium listed companies as defined by the FSA, a company has to be more than 15% of the FTSE small cap total market capitalisation for it to be eligible to be included in the FTALSH index (FTSE 2011b). The FTALSH companies are large premium listed companies and the disclosure rules for the index is relevant to the research design. This is because obligations of disclosure of the FTALSH index as stated by the listing rules: Premium listing principle 4 in the FSA handbook requires a listed company to communicate information on the business to its owners and potential owners in a way that it avoids "the creation or continuation of a false market" in its listed shares (FSA Instrument 2010). The sample of companies constituting the FTALSH index following the listing rules will take care to avoid misinforming investors for the benefit of its market growth. Based on the numbers, which is usually the measure of communication of financial performance transparency it is possible that in some cases, the firms adhere to this rule. This study uses this sample to assess the effect of its narrative communication, given the disclosure environment of the FTALSH index companies, assessing the role of complexity in narrative communication in the information communication process.

The FTALSH index is a large share of the UK economy. It covers approximately 98% of the UK's market capitalisation (FTSE 2011a). Emphasizing, its effective representation of UK companies for research on narrative communication of disclosures to investors. Furthermore, these are firms in the London stock exchange adhering to strict listing rules, which makes it an opportune setting to investigate the role of narrative in disclosure communication using the financial statement numbers as the setting of disclosure communication. This is important as they face mandate audit requirement ensuring relevant regulatory compliance in the accounting numbers recognised. On the other hand, the direct effect of the new numbers recognized and disclosed, on the companies' stock market price potentially increases the pressure for management explanations of these numbers via the narrative

disclosures. In addition, the long-standing existence of the FTALSH index, which dates back to 1962 when it was known as the FT actuaries all share index, and in 1984 and 1992 when the FTSE 100 and FTSE 250 were added, makes it suitable for a firm year analysis.

In addition, with the large market capitalisation of the FTALSH in comparison with the UK full market capitalisation this index provides a representative sample of the effect of the narrative qualities of disclosure on the objectives and aims of financial reporting. The first step in the sampling process is to retrieve the list of all FTALSH constituents from the Thomson One Banker database. By logging into Thomson One Banker, selecting the indices tab and selecting the FTSE All Share index the study obtains the list of the constituents of this index. This provides an initial sample of 622 firms. This is the list as retrieved from the Thomson One Banker database when selecting constituents for the FTALSH index.

The next step in the data collection process is to retrieve the Annual report for each company in the sample of companies in the list of FTALSH as obtained from the Thomson One Banker database. The annual report files obtained in PDF files constitute the annual report for each company for each year between 2000 and 2011. Using annual reports between 2000 and 2011 provide a time series that will inform on the changing qualities of narrative given the external factors that have caused changes in financial reporting in this time series. In addition, it provides a sample that will inform on the trends in narrative reporting over the years and the effect of these trends on the objectives of financial reporting. Li (2008) using a time series provides evidence that annual reports have become difficult to read, the trend analysis aided recognition of the effects of policies over the years as it showed a drop in the reading difficulty after the establishment of the SEC Plain English rule in 1999.

4.3.2 Data Filtering

Expected sample size for 12 firm years of the 622 firms in the FTALSH list should be 7,464 firm years (622 firms with 12 years of annual reports). However, some annual reports are not obtainable and therefore, could not be downloaded. This was either due to the annual report being unavailable for download or the constituent in the FTALSH list not producing annual reports. Furthermore, due to the variation in company year-end dates, most companies in the sample do not have their 2011 annual reports released as at the time of obtaining the annual reports. This process reduces the sample of firm years expected from 7,464 firm years being annual report for each of the 622 companies for 12 years per company to 4,347 firm years. This step excludes all firms without annual reports and all firm years without annual reports.

After obtaining all available FTALSH constituents' annual report for the periods 2000 – 2011, the next step is to retrieve the text from the annual reports for the analysis process. This study uses a PERL program for the analysis of the measures of the annual report narratives. This requires preparation of the report for input into the PERL program by ensuring that it is in a form that is readable by the program. This requires extraction of all text from the PDF files. The text retrieval process ensures extraction of all the text from the report read by a user of the annual report.

To validate the text extraction process, this study excludes from the analysis all report with less than 2,000 words after extraction. Reports with inaccurate text extraction results produce texts with few words; this is because of locked PDFs for conversion. In addition, following Li (2008) in the readability analysis and Loughran and McDonald (2011) in the tone analysis they exclude reports with less than 2,000 to ensure contents not relevant to the research design such as exhibits and reports with only tabulated information are excluded from the sample. This filtering process also excludes brief analysis such as management announcements and reports

named as annual report by the firm but not comparable to the standard annual report. This process reduces the sample from 4,347, to 4,231. The process also excludes annual reports with no conversion results from the sample population.

The table below shows the process of arrival at the final sample for firms with narrative data and data for the firm level analysis after the retrieval of the readability and tone measures. Table 4-4 shows the data elimination process for firm years not meeting the requirements for the data analysis, arriving at a final sample of 4,226 firm years. Initially the study obtains financial reports of 4,347 firm years, after elimination of interim reports and reports with few words; the sample of firm years becomes 4,231. Reports with few words determined as reports with less than 2000 words following previous research on report narratives (Li, 2008). Next, after the screening of the narrative scores obtained for each report, the study excludes reports with narrative scores that have extreme values bringing the results to 4,226 firm years.

Table 4-4 : Data Elimination process for Narrative sample

Table showing the data elimination process; event explains the relevant action that produces the number of firm years; firm years after event explains the number of firm years arrived at after the relevant event.

Event	Firm Years after
Initial annual report collections/downloads	4,347
Eliminate interim report data presented as annual	4,268
Eliminate observations with less than 2000 words	4,231
Eliminate report with extreme values	4,226
Final Narrative firm year observations =	4,226

4.4 Sample Description

4.4.1 Firm Year Analysis

Table 4-5 shows the yearly frequency distribution of the final sample of 4,226 firm years from 2000 to 2011, 2009 has the highest number of Annual reports in the sample. The year 2000 has the lowest number of Annual reports. This is due to the reduced availability of historical reports for companies. Specifically as the sample period goes a year higher, the number of reports increases for the reason that most companies retain five to ten years of historical reports, only a few companies have more than ten years of historical report filings. Fewer reports are available for the year 2011; this is because at the time of data collection for this study most companies had not released their 2011 annual report.

Table 4-5 : Firm Year Analysis				
YEAR	Frequency	% Frequency	Cumulative Frequency	Cumulative %
2000	146	3.45	146	3.45
2001	200	4.73	346	8.19
2002	238	5.63	584	13.82
2003	288	6.81	872	20.63
2004	331	7.83	1203	28.47
2005	378	8.94	1581	37.41
2006	432	10.22	2013	47.63
2007	489	11.57	2502	59.2
2008	508	12.02	3010	71.23
2009	524	12.4	3534	83.63
2010	510	12.07	4044	95.69
2011	182	4.31	4226	100

Annual Report Readability Analysis

This section presents a discussion of the distribution of the readability characteristics across the sample for the period 2000 to 2011. The readability data provides an informative overview of the narrative disclosures of the FTALSH companies over this period. The graph below shows the movement of reading difficulty over the years. The graph is the plot of the average fog index per firm year. The rising trend shows that reading difficulty of annual reports has increased over the years. Annual reports appear to be easier to read in 2000, which has the lowest average fog index. Reading difficulty peaks in 2009 and 2010, which has the highest average fog index.

Figure 4-1 : Firm Year Analysis – Disclosure Readability of Annual Reports

Figure showing the mean reading difficulty of annual report narratives from 2000 to 2011
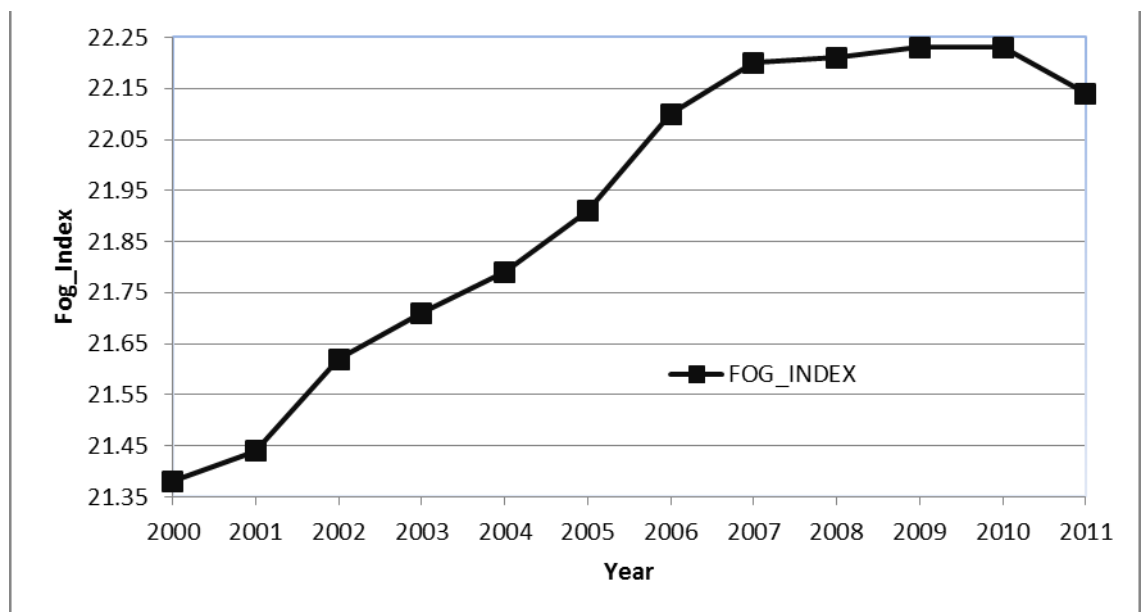
Table 4-6shows the mean fog for each year presented in the graph above and the t-test values for whether the means are significantly different from zero. All firm years have p-values of less than 0.0001 indicating that the mean readability score for each year is significantly different from zero. Table 4-7 shows t-test for the difference in mean between the firm years. The general trend indicates that mean

reading difficulty of earlier years in this study are significantly different from the mean reading difficulty of the later years. This supports the graph above showing that reading difficulty of corporate annual reports have increased over the years. Specifically, the difference between the mean readability score of year 2001 and 2010 is 0.8484 significant at the 0.01 level.

Table 4-6: Firm Year Descriptive statistics – Readability

YEAR	N Obs	Mean	t Value	Pr > |t|
2000	146	21.3794	158.45	<.0001
2001	200	21.4446	194.46	<.0001
2002	238	21.6164	219.89	<.0001
2003	288	21.7086	249.21	<.0001
2004	331	21.7899	263.26	<.0001
2005	378	21.9128	319.13	<.0001
2006	432	22.0958	367.29	<.0001
2007	489	22.1973	417.22	<.0001
2008	508	22.2143	407.16	<.0001
2009	524	22.2284	430.92	<.0001
2010	510	22.2278	414.77	<.0001
2011	182	22.1427	244.14	<.0001

Table 4-7: Test of Mean difference between firm years readability scores

This table presents the difference in the yearly mean reading difficulty of annual reports. Firm years are from 2000 to 2011. Mean difference is 'I – J'. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

I \ J	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2001	.0651										
2002	.2369	.1718									
2003	.3291	.2640	.0922								
2004	.4104	.3453	.1736	.0813							
2005	.5334***	.4682***	.2964	.2042	.						
2006	.7163***	.6512***	.4794***	.3872***	.3059***	.1829					
2007	.8179***	.7527***	.5809***	.4887***	.4074***	.2844***	.				
2008	.8348***	.7697***	.5979***	.5057***	.4244***	.3015***	.1185	.0170			
2009	.8489***	.7838***	.6120***	.5198***	.4384***	.3155***	.1326	.0310	.0140		
2010	.8484***	.7832***	.6115***	.5192***	.4379***	.3150***	.1320	.0305	.0135	.0005	
2011	.7632***	.6981***	.5264***	.4341***	.3528	.2299	.0469	-.0545	-.0716	-.0857	-.0851

To demonstrate the implications of the readability scores, this study decomposes the readability variable into two: the word complexity variable and the sentence complexity variable. The fog index measure of readability used in this study is an aggregate of the sentence complexity variable and the word complexity variable compounded by a constant (see formula for fog index in earlier section). The word complexity variable measures the percentage of complex words in the text relative to the total word count, complex words being words with three or more syllables. Assessing relative readability between corporate entities within a cross section will inform on the changes in the complexity of words used in annual reports.

Sentence complexity measures the average length of sentences in the document; it is interpreted as the mean number of words per sentence. For instance, given a document with a word complexity score of 18.0% and 18.1% between report *x*, and report *y* respectively, this means that report *y* has 0.1% more complex words than report *x*. Conversely, a sentence complexity score of 20.0 and 20.5 between report *x*, and report *y* would mean that report *y* has 0.5 more words in each sentence than report *x*. These figures will give report *y* a fog index score of *[(18 + 20)*0.4] = 15.20*; and report *x* a fog index score of *[(18.1 + 20.5)*0.4] = 15.44*, producing a difference of 0.20 between the fog index scores of report *x* and report *y*.

To place this in context, given the significant difference in fog index between 2001 and 2010 of *0.8484**** in table 4-7, there is a corresponding difference of 0.7352% and 1.1749 in word complexity and sentence complexity respectively. The interpretation of the word complexity variable is, on average annual reports filed in 2010 have 0.73% more complex words than reports filed in 2001. While for the sentence complexity variable it says that 2010 reports have on average 1.17 more words in each sentence than 2001 reports. It is important to note that the relationship between the fog index and each of its two decomposed variables is not always a direct/positive relationship. This is because the fog index aggregates these two variables therefore the movement of the fog index will depend on the overall effect

of the movement of the two variables as opposed to an effect of the movement of one part.

Figure 4-2 shows the movement of word complexity and sentence complexity over the years 2000 to 2011. Assessing the two variables, both variables appear to move with similar trends except in 2003 in which the sentence complexity variable increases by 24 decimal points while the word complexity variable decreases by 2 decimal points. Following the fog index plot above, the word complexity variable peaks in 2010, while the sentence complexity variable gently clears out it slope around this period. The trend of the sentence complexity plot line shows an increase in the number of words in each sentence in reports between 2000 and 2011, there is an observed stability in 2004 however, and following this stability is a sharp increase from 2005 to 2007. The word complexity plot line shows an increase in the relative number of complex words in annual report. The plot line for the word complexity variable indicates a slight drop in 2003 and a sharp increase between 2004 and 2006. The trends of both variables confirm the evidence of an increase in the reading difficulty of annual report over the years between 2000 and 2011.

Figure 4-2: Firm Year Analysis – Figure Complexity of Annual Reports

Figure Showing the word complexity and sentence complexity of annual reports from 2000 to 20ll
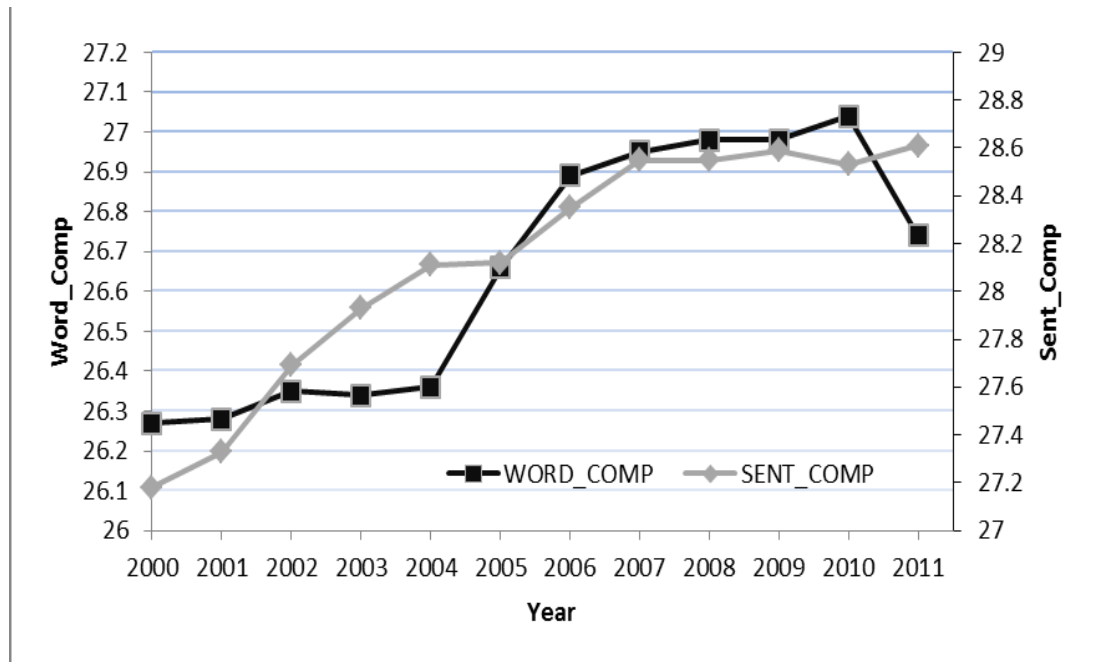
Disclosure Tone Analysis

The graph below illustrates the movement of the Annual report tone of the FTALSH index. Higher figures represent a more positive slant therefore, a rise in the line indicates more positive reports, while a drop in the graph line indicates a year with more negative reports. The tone of annual report drops twice in the sample period in 2002 and 2009, indicating that annual reports appear to be more negative in these years, with 2009 recording the highest negative score. This was quite a period with negative discussions in the annual report being around the aftermath of the financial crisis.

Figure 4-3 : Firm Year Analysis - Disclosure Tone of Annual Reports

Figure shows the positive slant of annual reports from 2000 to 2011
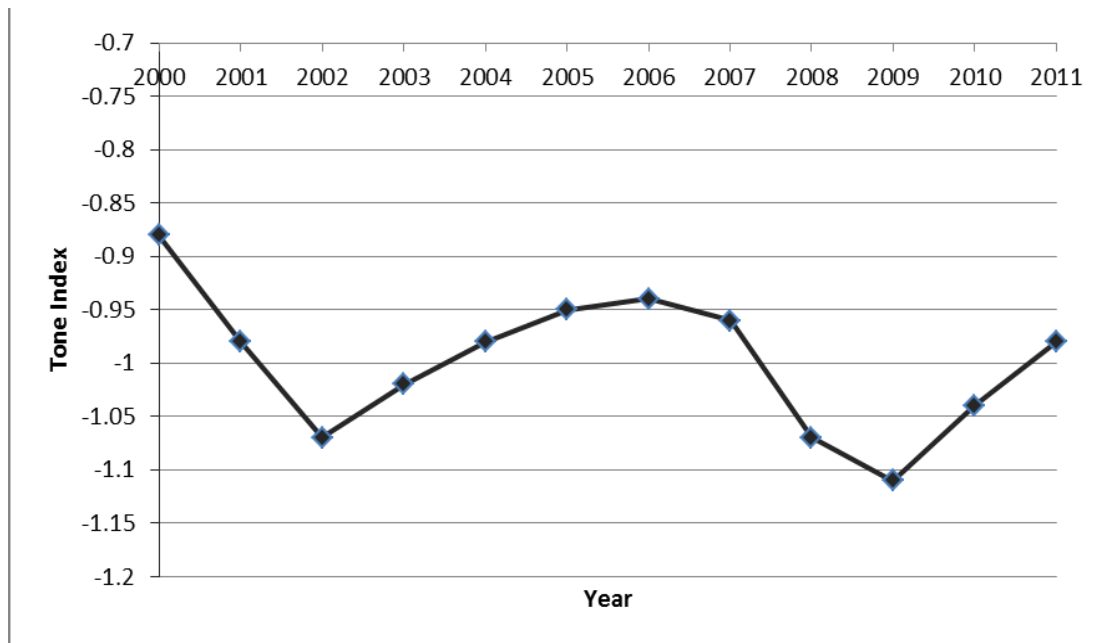
Table 4-8 shows the mean scores for each year and their p values, which indicate that each mean is significantly different from zero. Table 4-9 reports the results for the one-way ANOVA test for the difference between the means of each firm year. This shows that the means of 2002 and 2006 are significantly different, recording a difference of 0.132. For the year 2009, which has most negative reports, the mean is significantly different from 2006, with a difference of 0.169. The tone measure is a relative measure. It measures the weight of negative words in the annual reports relative to the weight of all the words in the report. Therefore in analysing the tone of annual reports from year-to-year, this shows that annual report were significantly more negative in 2002 and 2009 than in 2006 and 2000 (significant at <0.01 level). Annual reports in 2008 and 2009 are significantly more negative than reports in 2007. These results show a significant difference between consecutive years of 2007 and 2008, indicating that companies produce reports that are more negative in recessive periods, that is the 2008 financial crisis. This highlights the importance of this study, showing that management narrative discussions are informative on firm environment.

Table 4-8: Firm Year Descriptive statistics - Tone

YEAR	N Obs	Mean	t Value	Pr > |t|
2000	146	-0.88143	-47	<.0001
2001	200	-0.98056	-48.57	<.0001
2002	238	-1.06841	-60.43	<.0001
2003	288	-1.01661	-66.24	<.0001
2004	331	-0.98438	-70.17	<.0001
2005	378	-0.95117	-74.63	<.0001
2006	432	-0.93645	-81.59	<.0001
2007	489	-0.95516	-86.67	<.0001
2008	508	-1.06521	-101.89	<.0001
2009	524	-1.10595	-105.16	<.0001
2010	510	-1.03907	-101.25	<.0001
2011	182	-0.98464	-71.66	<.0001

Table 4-9: Test of the Mean Difference between Firm year Tone scores

This table presents the difference in the yearly mean tone of annual reports. Firm years are from 2000 to 2011. Mean difference is '**I –J'.** ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

I \ J	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2001	-.099**										
2002	.187***	.088**									
2003	-.135***	-.036	.052								
2004	-.103***	-.003	.084***	-.032							
2005	-.069	.029	.117***	.065**	.033						
2006	-.055	.0441	.132***	.080***	.048	.015					
2007	-.074***	.025	.113***	.061**	.029	-.004	-.019				
2008	-.184*	-.085***	.003	-.049	-.081***	-.114*	-.129***	-.110***			
2009	-.224***	-.125***	-.0375	-.089***	-.122***	-.155***	-.169***	-.151***	-.040		
2010	-.158***	-.058	.029	-.022	-.055*	-.088***	.103***	.084***	.026	-.067***	
2011	-.103***	-.004	.083***	.032	-.002	-.033	-.048	-.029	.080***	.121***	.054

4.4.2 Association between Readability and Tone Index

This section presents evidence on the association between the readability and tone index used in this study. The aim of this section is to assess whether annual reports with a lower positive slant i.e. more negative words have annual reports that are more difficult to read. There are two explanations for firms with bad news to have annual reports with a higher reading difficulty. The first is following the management obfuscation hypothesis, which argues that where performance is bad, management are more likely to obfuscate information by making annual reports more difficult to read (Li 2008). The second is that bad news may be more difficult to articulate and thus it is more likely that firms with poor performance will have more complex discussions, which increases reading difficulty (Bloomfield 2008).

To assess if there is an association between reading difficulty and bad news, for each year the sample of firms are grouped into quintile groups. The graph below shows the plot of the readability scores for firms in the highest and lowest quintile groups. The quintile q1 represents the group of firms with annual reports that have the lowest positive slant. The variable q5 represents the group of firms that have the highest positive slant. From the figure below, it is observed that annual reports of group q1 are consistently more difficult to read than annual reports of group q5. From years 2000 to 2004, there is a large gap between the reading difficulties of the annual reports of these two groups. The closest gap is in year 2008, the period of the financial crisis when most annual reports where reporting negative discussions. However, there is a persistent difference in the positive slant of the annual reports of the two groups. Table 4-10 shows that the difference in the mean of these two groups is significant at the 0.01 level. This shows that the annual reports of firms that have a lower positive slant are more likely to be more difficult to read.

Figure 4-4 : Reading Difficulty of Tone Quintile Groups – q1 and q5

Comparing the Fog index of the highest and lowest quintile Tone groups
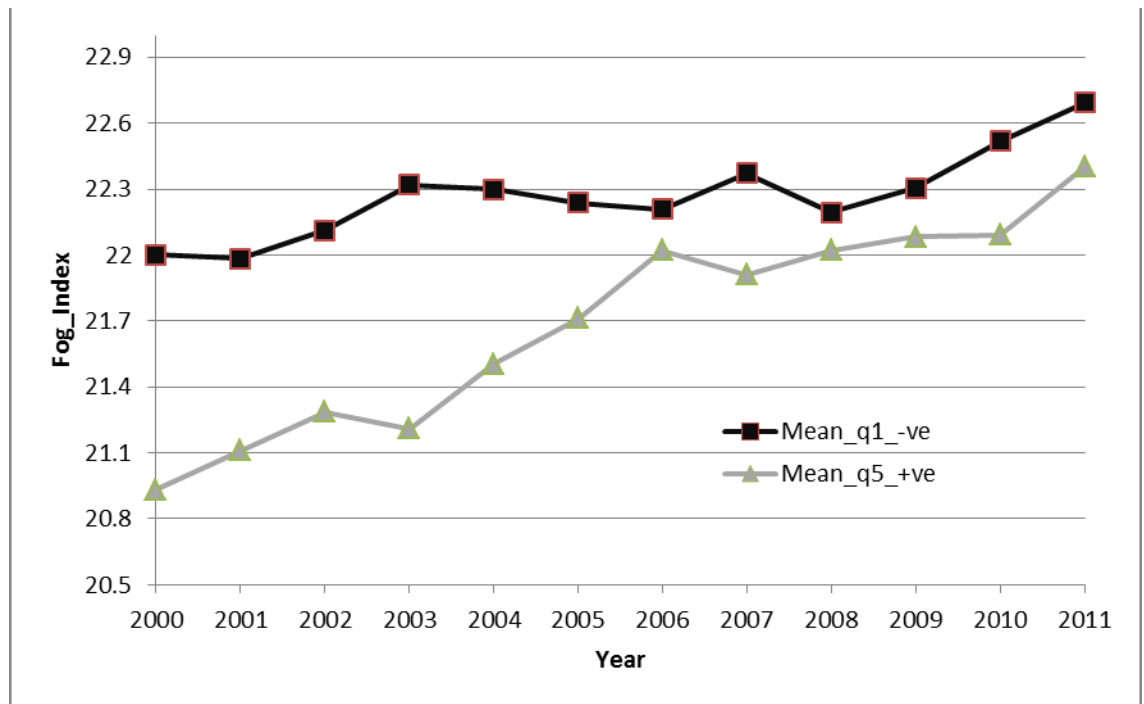
Table 4-10: Test of Mean difference of Readability scores of Tone Quintile groups

Rank for Variable TONE_SLANT	Mean
q1 most negative	22.28971
q2	22.11605
q3	21.99548
q4	21.90742
q5 most positive	21.79406
Change in Tone Quintile group annual report readability	
q1 less q5	**0.49565*****
	(7.464)

4.4.3 Industry-Level Analysis

Pashalian and Crissy (1950) analyse readability scores by industries showing that the industries with a vast and larger market (such as railroads, foods and automobiles) appeared to have lower reading ease scores than the industries with a more concentrated market (such as Machinery and Supplies and Metals and Chemicals). It is important to note that their conclusions though, are not with accompanied statistical evidence due to the small and variable sample of study. Courtis (1995) conducts tests of readability of Honk Kong Annual reports and finds the readability levels to be similar to the Western evidence, the study conducts several tests comparing readability over time, between industries, size and profitability but results are inconclusive also due to small sample sizes. There has been limited investigation on the difference between the readability and tone of narrative disclosures between industries; this section aims to answer the question if readability differs between industries by using the Kruskal Wallis mean test to rank industries and analyse if the narrative disclosures of industries are significantly different.

Due to the high variability in the industry sample frequencies, this study performs the Kruskal Wallis test for comparison of medians of more than one sample to compare if the medians of the industry are equal. This test produces a mean rank for each industry based on the index analysed. Industry classification is based on the Industry Classification Benchmark (ICB). Figure *4-5* is the chart of the industry

plotted according to the mean rank as produced by the Kruskal Wallis test. To analyse the industries further, is the plot of the mean rank of the super sectors in Figure 4-6; this plot includes the sentence complexity and the word complexity ranking for each super sector together with the fog index ranking. The super sectors are the first divisions of the industry class as prescribed by the industry classification benchmark. The horizontal axis in both plots represents the mean rank for each industry; it is obtained by ranking the medians of all the individual observations in the sample, the ranks are then placed into their industry groups. The mean rank is the mean of the rank of all the observations in the industry group.

Basic materials industry consisting of Chemicals and Basic resources super sectors (see table 4-11), has a mean rank of 2339.31. It appears to be one of the industries with the highest readability index i.e. difficult to read reports. Observing the ranking of the super sectors in Figure 4-6, the high ranking appears to be largely driven by the chemicals industry, which based on the fog index rankings has the highest mean rank in the sample of industries. This indicates that annual reports of firms in the chemical industry are difficult to read. The sub sectors of the chemical super sector are sub sectors 1353-Commodity chemicals and 1357-Specialty chemicals. On the other hand, the consumer goods industry has a lower fog index ranking; of its three super sectors, personal & household goods super sector has the lowest fog index ranking.

Consumer Services Industry has the lowest fog index mean rank when compared to the other industries. This indicates that firms in the consumer services industry on average have annual reports that are relatively easier to read when compared with annual report reading difficulty of other industries. Decomposing the Consumer Services industry to its Super Sector components, the industry consist of Retail, Media and the Travel and Leisure super sectors. From the plot of super sectors, Retail super sector has the lowest fog index rank, which is quite low at 1642 compared to the other super sectors, which all have mean ranks starting from 1900 (except for travel and leisure) and majority are above the 2000 mark. The low reading ease of these consumer services is likely due to the kind of services provided.

These services either have narratives discussions that are less complex or are less prone to obfuscation using management discussions.

The Financials industry consist of Banks, Insurance, Real estate and Financial services Super Sectors, from the super sector plot, the super sectors with the highest mean rank in the industry are the banks and the insurance super sectors. An insurance super sector has banks, non-life, and life insurance sub sectors. One of the super sectors with the lowest fog index mean ranking is from the financial industry, which is the Real Estate super sector. Health care industry has a mean that is significantly higher than the sample mean, from the super sector plot the highest is the biotechnology sub sector and the medical supplies sub sector. Industrials has a mean that is significantly lower than the sample mean, its lower super sector fog mean rank is the industrial goods and services, which includes the Waste and disposal services and the marine transportation sub sectors.

Fog mean rank of annual reports of the technology industry is significantly higher than the sample mean the sub sectors contributing to this include 9533 – computer services and the 9537 – Software, this high could be largely due to the language used in this industry. The Telecommunications industry appears to have an average ranking when compared to the ranking of the other industries in the sample, while that of utilities is significantly higher than the sample mean in both the industry and the super sector analysis. Word complexity of the financial services and the oil and gas industry are significantly higher than the other industries. It indicates that these industries use words that are more complex in the annual report narrative communications.

Figure 4-5 : Industry and Disclosure Readability
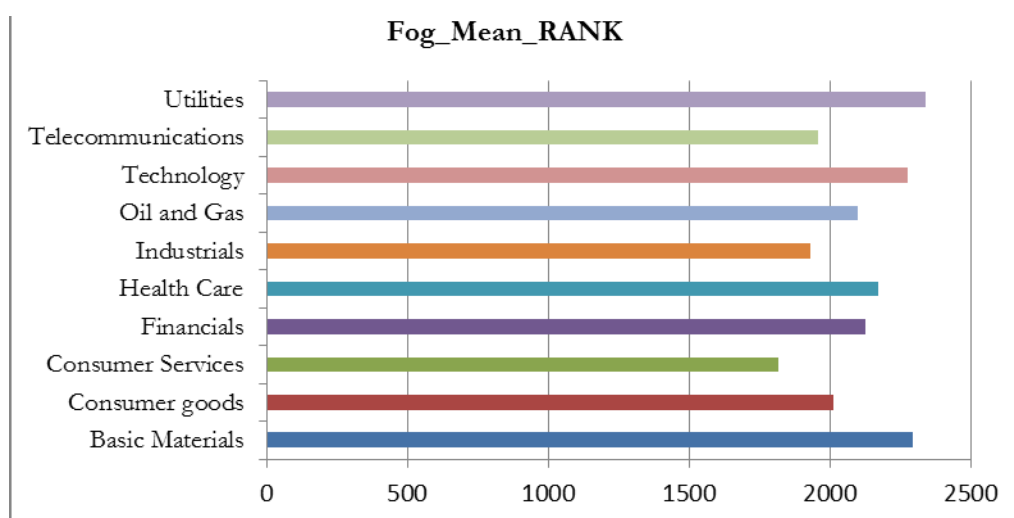
Fog_Mean_RANK

Disclosure Readability Plot using mean rank of Kruskal Wallis test; Mean rank difference significant at <0.01 level; Grouping variable = ICB Industry.

Table 4-11: Key for Industry Classification

ICB_INDUSTRY	ICB_SUPER SECTOR
Basic Materials	Basic Resources
	Chemicals
Consumer goods	Personal & Household Goods
	Food & Beverage
	Automobiles & Parts
Consumer Services	Retail
	Travel & Leisure
	Media
Financials	Other Financial Services
	Financial Services
	Banks
	Insurance
Health Care	Health Care
Industrials	Industrial Goods & Services
	Construction & Materials
Oil and Gas	Oil & Gas
Technology	Technology
Telecommunications	Telecommunications
Utilities	Utilities

Figure 4-6 : Super Sector and Disclosure Readability
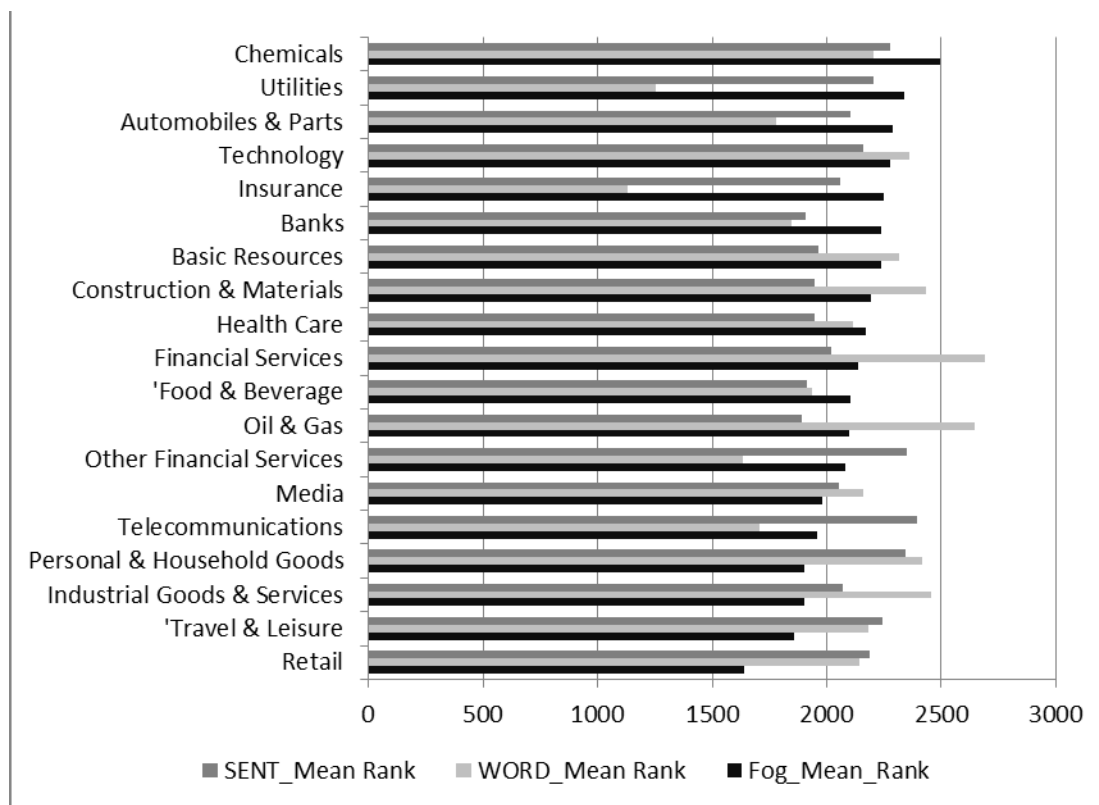
Disclosure Readability, Word complexity and Sentence complexity plot using mean rank from Kruskal Wallis test; Mean rank difference significant at <0.01 level; Grouping variable = ICB Super_Sector.

Unlike the plot on disclosure readability, Figure 4-7 plot of disclosure tone appears to have a higher variability in tone between the industries. The super sector analysis for disclosure tone in Figure 4-8 indicates a high positive mean rank of 2536.76 of the 'construction and materials' super sector and a lowest positive mean rank of 601.57 from the banks super sector, while that of readability was a range between 1600 and 2500. The plot shows the banks super sector have annual reports with more negative discussions. The insurance super sector follows the bank closely, it consist of sub sectors such as the property and casualty insurance defined as the "Companies engaged in accident, fire, automotive, marine, malpractice and other classes of nonlife insurance". The definition provides an indication, as firms in this industry are more likely to have a high proportion of negative words in their report.

'Construction and materials' and 'retail' super sectors exhibit higher mean ranks above 1900th. Higher mean ranks indicate a industries with a higher positive slant. From a sub sector analysis, the retail industry provides the lowest mean rank, specifically the specialized consumer services sub sector this sector is defined as "Providers of consumer services such as auction houses, day-care centres, dry cleaners, schools, consumer rental companies, veterinary clinics, hair salons". These firms are more likely to have annual reports with a small proportion of negative words. This is because the business line is unlikely to be affected by adverse market conditions as they consist mostly of daily necessities.

Figure 4-7: Industry and Disclosure Tone
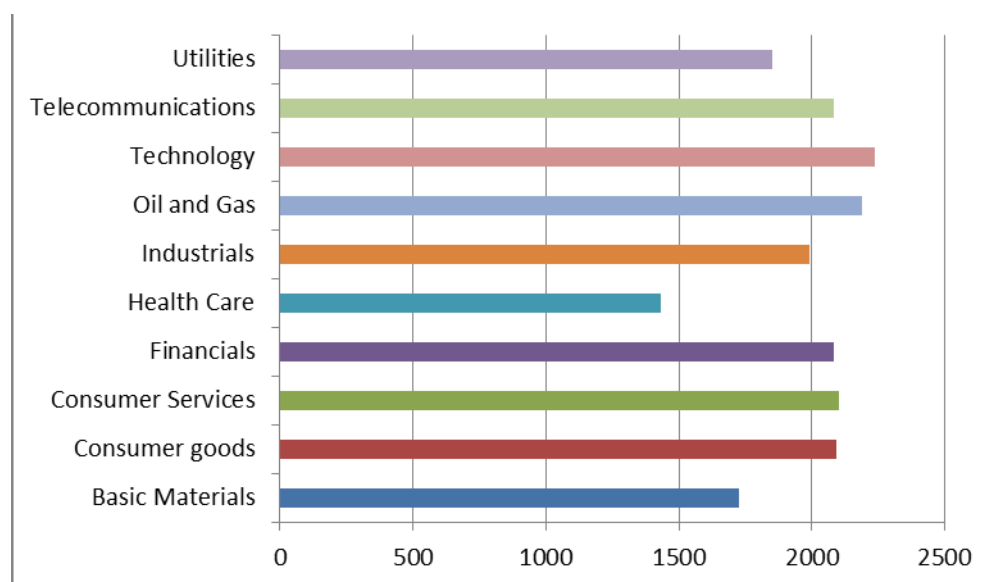
Disclosure Tone plot using mean rank from Kruskal Wallis test; Mean rank difference significant at <0.01 level; Grouping variable = ICB Industry.

Figure 4-8 : Super Sector and Disclosure Tone
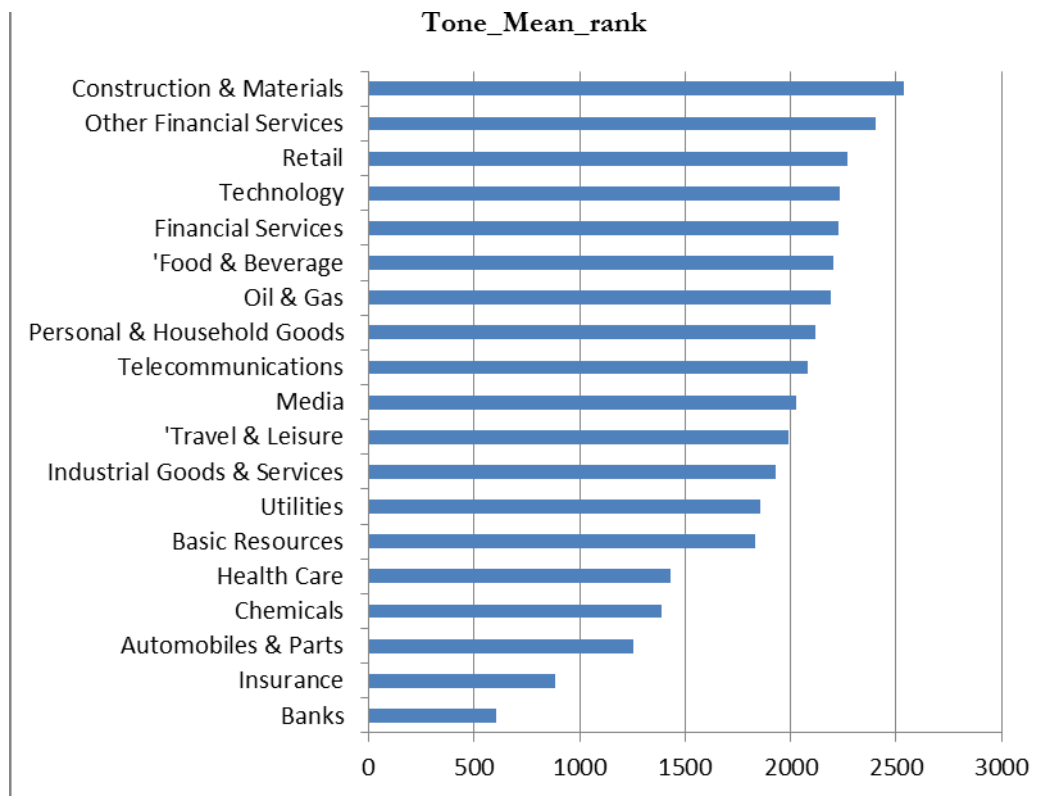
Tone_Mean_rank

Disclosure Tone plot using mean rank from Kruskal Wallis test; Mean rank difference significant at <0.01 level; Grouping variable = ICB Super_Sector.

4.5 Conclusion

This chapter explains the methods used to retrieve the narrative measures of the annual reports. It provides the motivations for the narrative measures and explains the process of measuring the fog index and positive slant of narrative disclosures. Based on the measures discussed and the measurement process, it discusses the validity of the measurement process and provides an application framework for interpreting the readability and tone indexes. Finally, this chapter also introduces the sample used in this study. It provides preliminary sample description of the changes in reading difficulty and tone of the narratives between the firm years. In addition, the chapter provides evidence of the association between the reading difficulty and

tone of the annual report narratives and presents industry level analysis that indicates the significant difference between the annual report narratives of industries.

The next chapter presents the first empirical analysis of this study. Using the data and measures of syntactical complexity discussed in this chapter, the next chapter provides empirical evidence of what firm characteristics determine the syntactical complexity of annual report narratives. Specifically, it analyses firm specific characteristics that determine the reading difficulty and the tone of disclosures. Reading difficulty and tone of annual report narratives are the two measures of syntactical complexity used in this study.

5 Determinants of Syntactical Complexity: Firm-Specific Characteristics and Annual Report Narratives

5.1 Introduction

This thesis assesses the syntactical complexity of annual report narratives by empirically analysing what determines syntactical complexity and what are the consequences of syntactical complexity in narratives. This chapter provides the first empirical analysis of this study, it assesses what determines syntactical complexity in annual report narratives, and the next chapter provides the second analysis on the determinants of complexity, while chapter 7 provides evidence of the empirical analysis on the consequences of narrative disclosures in annual reports.

Annual reports provide an annual review of a business, information of which investors use to verify the value of a firm. For instance, Hope (2003) finds that the extent of disclosures in annual reports are useful for both professional investors (improves forecast accuracy) and non-professional investors[12]. However, there has been documented concern and empirical evidence that annual reports of firms are becoming too complex for information extraction (FRC-Press 2008; Li 2008). These concerns have raised the issue of what drives complexity in annual report communication as this could be as a result of regulatory burden or firm specific characteristics that influence communication (FRC 2009).

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[12] HOPE, O.-K. 2003. Disclosure Practices, Enforcement of Accounting Standards, and Analysts' Forecast Accuracy: An International Study. *Journal of Accounting Research,* **41**(2), pp.235-272. provides evidence that annual report communication plays a greater role for firms with fewer analyst following.

This chapter studies what firm specific characteristics determine complexities in annual report communication. It investigates annual report syntactically complex communications by focussing on the reading difficulty and tone of management narrative disclosures in annual reports. It measures the reading difficulty of corporate annual reports using the fog index from computational linguistics and measures tone as the positive slant of annual reports using the word lists developed from Loughran and McDonald (2011) financial dictionary. The objective of this study is to contribute to the wider debate on why annual reports of companies are becoming more complex. Hence, the chapter studies if the performance of a firm, size of the firm, age of the firm and the volatility and complexity of a firm's operations is associated with the reading difficulty and positive slant of the report. Section 5.2 discusses the literature and hypotheses, section 5.3 discusses the variables used, and sample construction, sections 5.4 and 5.5 present the results and discussions of the result respectively, and the last section concludes.

5.2 Hypotheses Development

5.2.1 Framework for Hypothesis development

In discussing the literature and hypothesis, this study applies two perspectives: the opportunistic view (i.e. impression management) and the incremental information view (henceforth, informative view). The opportunistic view theorises that preparers of financial reports will provide biased information in the reports in order to shape investors' perceptions of the firm. They use the narratives, which explains the position of the firm to increase the investors' perception of good news and/or decrease investors' perception of bad news (Davis and Tama-Sweet 2012). Management will attempt to manage investors' impression through either biased disclosures and/or obfuscating the information in disclosures. The informative view meanwhile posits that the motivation for managers to provide disclosures in the annual report is to disclose more detailed explanations of value relevant information

that will reduce the existing information asymmetry between the management and the investor (Merkl-Davies and Brennan 2007).

What is interesting is that both views are likely to lead to similar narrative disclosure characteristics from the perspective of reading difficulty and tone. From an opportunistic view, the expectation is that obfuscation of narratives (increase in reading difficulty) and emphasis on good news (increase in positive slant) is opportunistic (Merkl-Davies and Brennan 2007). However, from an informative view, assuming managers are providing explanations as incremental information, an increase in detailed explanation will potentially lead to increase in reading difficulty because length is positively correlated with reading difficulty (Li 2008), and also an increase in explanations of good news will increase the positive slant of narratives. Thus, what differentiates both views is managements' motivation for providing the specific disclosure. In an opportunistic view, the motivation is to use the reporting process to sway investors' opinion towards management's self-interest whereas the informative view aims to improve the decision usefulness of reports for investors (Merkl-Davies and Brennan 2007; Brown et al. 2012).

Therefore, the study uses the opportunistic and informative view to develop testable hypotheses on the relationship between firm characteristics and narrative communication. The study does not test if management are opportunistic or informative, but predicts the expected direction of the hypotheses based on the opportunistic or informative views. In discussing the opportunistic and informative views, the study draws on agency theoretic explanations and argues that management motivation based on either an informative and opportunistic perspective will vary with the characteristics of the firm. However, as noted earlier, though the information and opportunistic views present conflicting views of management motives, given some firm characteristics, both views suggest the same expectation for reading difficulty and tone. The study does not presume the motives of management but applies expectations based on agency theoretic assumptions of management self-interest to discuss the impact of these motives on the reading difficulty and tone of management narratives. To the extent that reading difficulty

and tone of annual reports are viewed as discretionary components of disclosure because the contents of narrative discussions with respect to words and sentences are mostly at management's discretion i.e. not regulated/standardised. Therefore, management can employ discretion in presenting narrative disclosures. The next section discusses the literature and hypotheses using these perspectives as a framework for the discussion.

5.2.2   Readability and Positive Slant of Narrative Disclosures

The strategic positioning of narrative disclosures in annual reports has prompted studies to investigate the reading difficulty of annual reports, the impact of difficult to read reports and the effects of the tone of annual reports (Lehavy, Feng and Merkley 2011; Miller 2010; Feldman et al. 2010). The studies investigating the readability of narrative disclosures regard reading difficulty as a proxy for obfuscation whereas studies investigating tone of disclosures are mixed between tone as obfuscation and incremental information (Merkl-Davies and Brennan 2007). Li (2008) studies the relationship between readability and performance from an obfuscation perspective, however it assesses firm characteristics as factors that may non-strategically determine readability. Likewise, Li (2010) studies some firm characteristics as cross-sectional variations in the tone of narratives. These two studies assessing the determinants of readability and tone have approached it from a non-strategic view.

However, Merkl-Davies and Brennan (2007) provide a framework for studying the motivation for discretionary narrative disclosures: from an opportunistic view or an incremental information view. Narrative characteristics of readability and tone constitute discretionary disclosures to the extent that management have a choice on how readable or persuasive the document should be noting that readability and tone is a function of word choice and content (Henry 2008). Readability will be viewed as opportunistic if reading difficulty increases where there are incentives for management to obfuscate information, whereas tone will be viewed as opportunistic when it is inconsistent with the accounting numbers. However, following Li (2010)

and Li (2008) the readability and tone of narratives will be affected by other firm specific factors that are not strategically either opportunistic or informative due to inherent likelihood for discussions of these firm specific characteristics to affect word choice and content.

Readability measures the length of words and the length of sentences as the textual characteristics that increase reading difficulty. It is evident from prior research that management can manipulate these textual characters to deter investors from information extraction (Li 2008). These chapter studies if the level of a firm's abnormal earnings, size, age and operations determines the reading difficulty of the firm's annual report narrative. Readability is measured using the fog index from computational linguistics, which is calculated as the sum of the percentage of complex words, and the average sentence length in the document multiplied by 0.4. Readability scores are obtained using a PERL program Lingua EN Fathom that calculates readability scores and has been tested as suitable for computing readability scores for large documents (Li 2008).

Tone in this study measures the slant of an annual report towards a positive outlook for the firm. Whether the change in performance, firm size, age and operations significantly affects the tone of a firm's disclosure is the subject of investigation. Studies have shown the importance of tone in the accounting literature, for instance Loughran and McDonald (2011) and Li (2010) provide evidence of the implication of tone for future earnings and current earnings respectively. Tone is measured using the negative word list of the Loughran and McDonald (2011) financial dictionary. The tone scores are obtained using a program written by the researcher that extracts the negative words in annual reports and calculates scores for tone based on a defined measure for positive slant. Following Gurun and Butler (2012), the defined measure for positive slant is the relative number of negative words in the document multiplied by -100.

Notwithstanding the evidence on the effect of tone on accounting numbers, the accounting literature does not fully document the implication of firm characteristics

for the tone of a firm's disclosure. Most studies document the impact of negative tone on market factors but not evidence on the firm characteristics that determines the tone of a firm's corporate disclosures. Li (2010) investigating the determinants of a firm's corporate disclosure tone uses a measure for positive words in the firm's annual report as a measure for the tone of disclosure, using forward-looking disclosure as its corpora. It finds that certain firm specific characteristic such as firm size, performance, firm accruals, firm growth and firm volatility significantly determine the positive tone of firm's disclosures (Li 2010).

This chapter uses firm specific characteristics as potential determinants of the positive slant of narrative disclosures in the annual report to assess what firm characteristics determine the proportion of negative words in the firm's annual report. This is important as (Tetlock, Saar-Tsechansky and Macskassy 2008) shows evidence consistent with the psychological literature that negative words have more impact and is more thoroughly processed than other words. In addition, while Li (2010), assesses the determinants of forward looking disclosures, this study assesses the determinants of written narratives in annual reports. This contributes to the accounting literature on what firm characteristics determine the reading difficulty and the tone of annual reports narratives.

5.2.3 Determinants of the Syntactical Complexity of Annual Reports Narratives

Reading Difficulty

There is an on-going debate in the literature with regards to the reading difficulty of narrative disclosures and firm performance. The opportunistic view argues that poorly performing firms obfuscate the information in annual report narratives to reduce investors' reaction to bad performance (Li 2008; Henry 2008). The obfuscation hypothesis explains "that management would have a propensity to employ a writing level as a tool to enhance 'good news' and/or mask 'bad news' "

(Courtis 1998). The arguments for this view follow agency theoretic assumptions, whereby managers' self-interest will cause them to reduce the quality of information flowing to investors. A typical evidence of this would be an increase in the reading difficulty of the textual content of the narratives, which would make it difficult and time consuming for investors to read and extract information from annual reports thereby increasing agency costs; for example, the cost of processing the information is increased.

Evidence consistent with the management obfuscation hypothesis supports argument that management increase reading difficulty when performance is poor, however the existing evidence appear to be confusing and contradictory (Jones 1994c; Sydserff and Weetman 1999). Courtis (1986) finds no evidence that managers mask bad times with unreadable writing and accentuate good times with readable writing, Subramanian, Insley and Blackwell (1993) finds a difference between the mean reading difficulty levels of poor performers and bad performers with bad performers having more reports that are difficult to read. Courtis (1986) concludes that poor annual report readability may be due to the writers writing skills and the definition of their target audience, whereas Subramanian, Insley and Blackwell (1993) shows that companies specifically use passive voice to obfuscate bad news (Subramanian, Insley and Blackwell 1993).

It is important to bear in mind, however, that studies testing the obfuscation hypothesis use different variables as a measure for firm performance, and this may explain the mixed findings in supporting the obfuscation hypothesis. For instance, Jones (1988) includes turnover as a measure for performance, and finds that reading difficulty has increased over the years and that this increase is positively associated with turnover indicating that complex reporting increases reading difficulty, while Smith and Taffler (1992a) finds that reading difficulty is related to financial status (liquidity in this instance). This study uses abnormal earnings as a measure of performance to test if managers with large positive (negative) abnormal earnings have annual report narratives that are less (more) difficult to read. Abnormal earnings measure the change in expected performance. It is an important figure to management as per it directly affects investors perception of management's abilities

hence, the need to investigate if this figure motivates management to increase reading difficulty when performance is bad.

The motivation for managers to use narrative manipulation in communication largely depends on the potential for a successful strategy. Hirshleifer and Teoh (2003) show that due to limited attention, information presentation affects investors' perception. Specifically, if given two informationally equivalent disclosures, investors will have differed views depending on how the information is presented. Due to these limitations of information processing, increased reading difficulty of narrative communication will decrease the ability of investors to read information communicated in the annual report.

Providing motives for an opportunistic view, Miller (2010) show that an increase in the complexity of annual reports reduces consensus among small investors by comparing the complexity of a firms report with the investors' trading behaviour. Similarly, Lehavy, Feng and Merkley (2011) provide evidence of more dispersion in analyst opinion when reports are more difficult to read. Based on these evidence, if management will benefit from a large dispersion in analyst opinion and reduced consensus among investors, which is most beneficial, when performance is poor, then they are more likely to increase the reading difficulty of the annual reports following lower or negative abnormal earnings.

For these reasons, if investors are more likely to change the perception of disclosures when information presented is obscure, and there are benefits of managing investors' perception for example a delayed reaction to bad news, it is more likely that reading difficulty will increase when performance is poor. Therefore, from an opportunistic view lower abnormal earnings will be associated with annual report narratives that are more difficult to read, this is because reading difficulty increases the obscurity of information in the narratives and managers are more likely to act opportunistically when there is bad news. Based on this argument the first hypothesis is as follows:

H1a: Abnormal earnings and Reading Difficulty are negatively related

Further, several characteristics of the firm will affect the relationship between performance and readability, thus, will determine the level of annual report reading difficulty. Courtis (1998) find that when other variables are included in the tests such as a firm being "public"; public firms with high press coverage appear to have harder to read report consistent with the obfuscation hypothesis that firms "in the public eye appear to engage in the use of writing as a tool to manipulate readers". This argument supports an opportunistic view. Further, it is more likely that due to higher political costs for larger firms (Watts and Zimmerman 1978), larger firms are more likely to use reading difficulty to obfuscate information when performance is poor.

Larger firms have a larger amount of public disclosures aimed at reducing information asymmetry between management and investors (LaFond and Watts 2008). However, this implies that firms that are larger may be subject to more complex organisational and reporting structures (Rice and Weber 2012) and, this will increase the difficulty of reporting the position of the firm in a manner which is concise and easy to read. In addition, regulatory burden on larger firms may increase the potential for complexities in their financial communication (Li 2008; Laksmana, Tietz and Yang 2012). For instance, in the FRC discussion paper titled 'Louder than words' they observe that the regulatory burden on companies is constantly growing and contributing to the complexity of company reports (FRC 2009). Therefore, from an informative perspective, larger firms are more likely to have annual reports that are difficult to read. Thus, while the opportunistic and informative view present conflicting arguments of management motives, the sign of the hypothesis from the opportunistic and informative perspective are consistent. This study therefore proposes the following hypothesis.

H1b: Firm size and Reading difficulty are positively related.

The differing objectives of managers for producing reports make the tests of the determinants of annual report readability from an agency theory perspective

remarkably complex. This is because while some managers propose the reports are produced for professionals, some propose it is produced to meet regulatory requirements while for some it is produced to improve shareholder relations or to build corporate image, or "just ego trips for corporate executives to display glossy photographs" (Heath and Phelps 1984). The audience as defined by the preparers of the report will determine the level of reading difficulty of the report as Adelberg (1979) show that different users will comprehend the reports differently depending on their training and professions. Similarly, studies show that reading difficulty of annual reports differs with the preparers of the report. For instance, Adelberg (1979) find the reading difficulty of the auditor's report in the annual report varies with the identity of the auditor.

Older firms will have preparers of annual report that are more experienced than firms that are younger, making it easier to produce clearer reports. Supporting this is the evidence in the literature that a reduced information asymmetry exist between older firms and their investors (Li 2008). Communication in younger firms will be more difficult because higher growth potential for younger firms is more likely to increase uncertainties, which causes greater information asymmetry between younger firms and investors, due to the difficulty in communicating the future returns of the investment (Khan and Watts, 2009). This means disclosures that are more complex for younger firms. Increased reading difficulty for younger firms can be as a result of difficulty in communicating future opportunities (an informative view) or due to managers obfuscating uncertain future prospects (an opportunistic view). Therefore, this study expects that reading difficulty will increase as firm age decreases.

H2b: Firm age and reading difficulty are negatively related.

The opportunistic view supports a positive relationship between reading difficulty of disclosures and the volatility of a firm's operations. This is because firms with volatile operations are more likely to be motivated to reduce investors' reactions to uncertainty in returns by increasing the complexity of negative disclosures. This

increases the time needed for investors to process the information disclosed, thus increasing immediate short-term returns to the firm. However, complex operations in an organisation is an indication that management may have to provide more complex information in their disclosure communications (Li 2008).

Hence, from an informative view, the volatility of a firm's operations can affect the level of disclosures that a firm has to provide even in cases where management is not opportunistic. For instance, managers use language in disclosures to communicate additional value-relevant information to investors (Davis, Piger and Sedor 2012; Abrahamson and Amir 1996) thus, discussing volatile and complex discussions will increase the reading difficulty of annual report narratives. In assessing risk disclosures Linsley and Lawrence (2007) contradicts the obfuscation hypothesis by showing that management are not deliberately obfuscating no-favourable risk disclosures.

Rutherford (2003) proposes that the large body of evidence on creative accounting suggests that management seek ways of obfuscating information and this can be investigated by assessing if there is information obfuscation in annual report narrative disclosures, by assessing if syntactic complexity of reports texts is associated with high risk. Volatility of a firm's operations measures the riskiness of a firm's operations. Presumably, managers of firms with more volatile and complex operations will provide disclosures that are more complex because of the difficulty in communicating the position of the firm to the investors due the uncertainty of the firms operations (Li 2008). However, there is no conclusive evidence that reading difficulty of reporting uncertainties and complexities is either opportunistic or informative. Both positions lead to the formulation of the following hypotheses.

H1d: Volatility of operations and reading difficulty are positively related.

H1e: Complexity of operations and reading difficulty are positively related.

Tone

The literature on the tone of disclosure proposes the management of investors' impressions by selecting words that reduce the impact of poor performance or increase the impact of optimistic results (Davis and Tama-Sweet 2012). If managers have opportunistic incentives to manage investors' impression of firm value, they can use specific words to explain the financial results or position of the firm. This is because tone is a function of both the choice of words and the focus of the discussions in the report (Henry 2008). This study tests if management reduces the amount of negative words or negative discussions when performance is good giving the company report a positive slant.

This chapter, in its investigation of the tone of annual report disclosures, examines if there are firm specific characteristics that are more likely to influence the positive slant of a firm's annual report narrative disclosures. The effect of negative disclosures have been documented in the literature, for example, Kothari, Li and Short (2009), documents that negative disclosures from the business press results in increased cost of capital and return volatility. Other studies likewise document large sample evidence of the effect of disclosure tone e.g. (Gurun and Butler 2012; Li 2010; Loughran and McDonald 2011).

From the opportunistic perspective, managers will be interested in increasing positive slant with good performance. The persuasiveness of the tone distracts from independent opinion forming and, therefore, positive slant will increase the impact of good news reported. For instance, Tetlock, Saar-Tsechansky and Macskassy (2008) investigates the impact of negative news stories on firm characteristics and finds that there is a high earnings and return predictability for news stories predicting firm fundamentals. This supports the proposition that the impact of the tone of disclosures on firms is important in empirical analysis of disclosure and performance, increasing the potential for managers to use word choice in the report to influence market reaction to firm disclosures. Furthermore, the significant effect

that the tone has on predictability of earnings and future performance implies that management are motivated to use the tone of their disclosures to influence firm performance.

Furthermore, Loughran and McDonald (2011) and Dougal et al. (2012) investigate the tone of disclosures in 10-K reports and news stories respectively, they show that higher number of negative words in the annual report and news stories is associated with lower stock returns around 10-K filing and the date of the stories respectively. This provides strategic reporting incentives for managers to reduce the number of negative words when abnormal earnings are high in order to increase the positive response to reported earnings information. Twedt and Rees (2012) provides evidence that tone is important for investors because the tone and complexity of annual report narratives provide the market with incremental information beyond the quantitative information in the annual reports. While investors react to the earnings numbers, additional explanations of earnings can increase investors expected reaction. For the reason that investors react to the numbers in the first instance, this study does not expect that management will expect gains from an increase in positive slant when abnormal earnings is lower or negative. From an opportunistic perspective when managers are interested in increasing their returns from managing the firm notwithstanding the consequence of long-term reduction in shareholders' wealth, managers will increase the positive slant of narrative disclosures to increase the expected positive market reaction when performance is good. This leads to the following hypothesis.

H2a: Abnormal earnings and positive slant are positively related

Moreover, managers' narrative communications will provide more or less information depending on other factors that affect the complexity tone of their discussions. Increased agency conflicts are more likely to arise in bigger firms. This is because of the larger gap that exists between the owners and the managers. Therefore, higher political cost will cause bigger firms to be more cautious in their

narrative explanations (Li 2010). Consequently, larger firms will have narratives with a lower positive slant due to an increase in the negative discussions in the annual report narratives. This is with an aim to reduce the probability of high litigation costs for their firms.

The conservatism hypothesis supports this view, it explains that management of bigger firms are more likely to be cautious in their discussions to ensure that it is more likely that the discussions occur in the future and, thus, reduce litigation risk (Rogers, Buskirk and Zechman 2011). Applying the framework of the hypotheses development, emphasis on negative news can be opportunistic to reduce litigations for management irrespective of the cost to the firm or informative given that management are providing discussion of details inherent in firm operations, which are negative. Therefore, the study expects that larger firms are more likely to have annual report narratives with a higher proportion of negative words i.e. a lower positive slant.

H2b: Firm size and positive slant are negatively related

Further, the tone of a firm's narrative disclosure is likely to depend on the age of the firm. The accounting disclosure literature uses firm age as a control variable as per younger firms tend to have more growth options than older firms do (Li 2010). If younger firms have more growth options, this will increase the positive slant of narratives disclosures because they are more likely to have positive discussions on expected future growth. Thus, from an informative view, younger firms are more likely to have disclosures that are more positive because they will have additional value relevant positive disclosures; this would mean a higher positive slant for the annual report narratives of younger firms. From an opportunistic view, younger firms are more likely to exploit information asymmetries and manage investors' impression positively due to the existing information asymmetries between younger firms and their investors.

A typical evidence of this is increasing positive discussions, which may be inconsistent with the accounting numbers in order to boost investment in the firm. This can potentially occur because younger firms have to rely on discussing potential future growth and stability to maintain and increase investors. However, because it is difficult to verify future growth options, it makes it easier for the managers of younger firms to increase positive discussions opportunistically. Davis and Tama-Sweet (2012) provide evidence consistent with this view showing that managers are more likely to increase investors' positive reaction by using disclosure outlets strategically. This further emphasises the use of narrative disclosures to manage investors' impression of the firm. Additionally, it is more likely that older firms due to a lower growth potential will have a more negative outlook in their discussions. Therefore, we expect the following hypothesis on firm age.

H2c: Firm Age and Positive slant are negatively related

The study of the tone of disclosure assesses the consequential impact of tone on firm values, providing evidence that the tone of disclosure significantly affects firm values (Dougal et al. 2012; Henry 2008; Feldman et al. 2010). Specifically, in research assessing the tone of media disclosures about firms, Gurun and Butler (2012) finds that positive disclosure in media outlets strongly relates to firm values and the effect holds for firms with highly volatile stock. This means that firms with highly volatile stock are more likely to increase the value of the firm when the media provides positive disclosures about the firms. This provides an opportunistic motive for firms to increase positive disclosures when operations are more volatile. However, due to a higher potential for these firms to have discussions that are more negative in their report, this study expects that the narrative disclosures of these firms will have a lower positive slant.

In addition, according to Li (2010) uncertainty that exist for firms with more volatile operations will cause firms to be more cautious in their communications. Therefore, these firms will have a lower positive slant in their annual reports i.e. more negative words in their report. This study therefore expects a lower positive slant for firms

with operations that are more volatile. The complexity of a firm's operations may also determine the tone of narrative disclosures in the annual report. In the case that the relationship between abnormal earnings and narrative disclosure is persistent, firms with segments that are performing well are more likely to have narrative disclosures with a higher positive slant. However, uncertainty and cautiousness in complex disclosure communication is more likely to lead to a lower positive slant for firms with more complex operations. From a strategic reporting view, firms with more volatile and complex operations are more likely to emphasise on good news to manage investors' perceptions, however compliance to mandatory disclosures is more likely to lead to discussions of uncertainties and cautiousness leading to a reduction in positive slant. Following this, this study states the following hypotheses, which supports an informative view of management providing value relevant disclosures.

H2d: Volatility of firms operations and Positive slant are negatively related

H2e: Complexity of firms' operations and Positive slant are negatively related

5.3 **Data and Methodology**

5.3.1 Sample Construction

This study uses the sample of companies listed in the FTSE All Share (FTALSH) index. To obtain the list of companies in the FTALSH, the study uses the list obtainable from the Thomson One Banker database. This is the FTALSH list as at 2011. The FTALSH companies are large premium listed companies with strict disclosure rules to enhance investor communication. Underpinning the research design of this study is how firms communicate to investors. Specifically, included in the disclosure obligations for the FTALSH index as stated by the listing rules is 'Premium listing principle 4' requiring a listed company to communicate

information on the business to its owners and potential owners in a way that it avoids "the creation or continuation of a false market" in its listed shares (FSA Instrument 2010).

The FTALSH index is a representative sample for studies assessing the impact of disclosures on investors. This is because the index represents 98% of the United Kingdom's market capitalization (FTSE 2012). Empirical analysis using this sample provides robust results in an analysis of disclosure communication given the preparers and users. The index is designed such that it is useful as a performance benchmark (FTSE 2012). Annual reports for each firm in the FTALSH index are downloadable from Thomson One Banker and the Company websites. This study uses reports from 2000 to 2011 retrieved mainly from Thomson One Banker except instances of report being unavailable from Thomson; the company websites becomes the source to retrieve the reports. The time series 2000 to 2011 provides a sample that will inform on the changes to the complexity of annual reports over time providing robust results independent of time specific effects in the research design.

To implement the complexity models described in chapter 5, the study uses the textual content of the annual reports. In addition to this, the sampling methods and sample size have an impact on the results of these studies. Most studies investigating the narratives in the UK regulatory regime use small sample sizes, for a full review see Jones and Shoemaker (1994). This study uses a large sample of firms that are constituents of the FTSE All Share Index. The common sampling methodology of most of these studies has been the use of 100-word sections from parts of the report as the representative text for all text in the report. This may not have been representative and the result will be biased towards the sections chosen. Given advances in information technology, it has offered accounting researchers the opportunity to investigate the linguistic features of report by testing readability and tone using all the textual contents in the annual report.

In line with the methods used in the readability literature, we extract the textual content of the annual reports excluding sections with more that 50% number content

as opposed to textual content (Miller 2010; Li 2008). The data collection process excludes reports, which are interim reports but presented as annual reports. For firm year observations with annual reports that are less than 2000 words, the study eliminates these reports from the sample. After analysing the texts in the the Perl En Fathom and Perl program for tone analysis discussed in the next section, the study eliminates firm year observations that return missing or extreme values. This occurs because the Perl program is unable to read the text in the computer due to the format of the file, which does not allow the text to be computer readable. Furthermore, the study eliminates firm years with no matching financial statement data.

This produces a final sample of 1,916 firm years from the 4,347 firm years initially downloaded over the period between 2000 and 2011. Table 5-1 shows the sampling process, which produces the final sample. Table 5-2 further shows a firm year description for the final sample of 1,916 firm years.

Table 5-1: Sample Selection Process

Event	Firm Years after Event
Initial annual report collections/downloads	4,347
Eliminate interim reports presented as annual reports	4,268
Eliminate observations with less than 2000 words	4,231
Eliminate report with missing/extreme values from Perl En Fathom	4,226
Eliminate observations with no corresponding financial statement data	<u>1,916</u>
Final Narrative firm year observations =	**1,916**

Table 5-2: Firm Year Analysis including only Firms with Financial Statement Data

YEAR	Frequency	% Frequency	Cumulative Frequency	Cumulative %
2000	79	4.12	79	4.12
2001	116	6.05	195	10.18
2002	137	7.15	332	17.33
2003	164	8.56	496	25.89
2004	189	9.86	685	35.75
2005	176	9.19	861	44.94
2006	222	11.59	1083	56.52
2007	242	12.63	1325	69.15
2008	268	13.99	1593	83.14
2009	221	11.53	1814	94.68
2010	102	5.32	1916	100

5.3.2   Complexity Estimates

The Oxford dictionaries defines complexity as a state of being intricate or complicated, going further to describe intricate and complicated as having many interconnecting parts and being detailed. Company annual reports possess these characteristics of complexity and this study attempts to measure the complexity of narratives in reports using a syntactical complexity view. Thus, this study defines complexity of annual report narratives as the textual details measured as word choice and the interconnecting parts of the reports measured as the disclosure contents in the report. Word choice measures the disclosures companies make in their narrative using the specific options they choose to make these disclosures. Word choice is subject to common firm specific terms, industry wide jargon and management choices. Disclosure contents measures the information disclosed in the report. This study looks at the complexity in terms of the length of sentences and the positive slant of the content.

This study uses two measures of the complexity of the narratives in annual reports. The first measure is the fog index from the linguistic literature commonly used in the accounting literature to measure the reading difficulty of narratives in annual report (Li 2008; Lehavy, Feng and Merkley 2011; Callen, Khan and Lu 2011; Courtis 1995). While this measure has been criticised in the accounting literature as an inadequate measure for understandability of the text written (Jones and Shoemaker 1994), this study uses the fog index as a measure of the complexity of the words and the sentences used in writing the text and therefore the measure of how difficult the users of the report will find the reading. It is a measure of the management's word choice and content structure, aiding an investigation from an agency theoretic perspective of what determines these management choices. Furthermore, measuring relative readability across firms informs on firms that have words that are more complex and/or sentences that are more complex in their annual reports.

The second measure is the tone of the annual report, measured in this study as the positive slant of the text disclosed. It uses a classified dictionary to measure the tone level of a document. The dictionary classifies the words and produces a negative word list. This study uses the negative word classification of the financial dictionary developed by Loughran and McDonald (2011). Other studies performing quantitative analysis of word classifications use other dictionaries with word categorisations e.g. (Tetlock, Saar-Tsechansky and Macskassy 2008; Cho, Roberts and Patten 2010). However, financial dictionary includes classification of financial words, for an evidence of this see Loughran and McDonald (2011). This study aims to measure complexity of narratives in financial context from an agency theory perspective, which measures management choice of words and choice of content. Using a word list developed within a financial context aids with the identification of word choices given business specific words.

5.3.3 Measurement Process for Complexity Estimates

Accounting research hitherto measures the fog index of annual reports by using 100-word samples of text from different paragraphs of the relevant prose (Courtis 1986; Schroeder and Gibson 1992). However, with developments in technology, researchers are able to obtain a complete representation of the text for example, by using Perl programming language to test the readability of the text and therefore including all the text in the sample (Li 2008). Tone on the other hand, applied developments in accounting research in its research process for a few years, particularly because tone research became popular with the involvement of technology development in linguistic research e.g. the use of the Diction software. This study uses as its sample unit the narrative disclosures in annual report. It assesses the readability and tone of the complete text of a company's annual report narrative per firm year. Its recording unit are the words in each sentence and the syllables in each word.

To measure the text for readability and tone, first download the PDF files for the FTSE ALL SHARE companies. Extract all text from the PDFs by converting the PDF files to text format. This process is important as it enables the Perl program to read the text in the files. To parse the text for input into the readability Perl module, the researcher writes a Perl code that cleans up the text by removing text encodings and full stops between two numbers. It is important to remove the text encodings to avoid misrepresentation of the text file. In addition, it is important to remove the full stop between numbers as the Perl module identifies the full stop as the end of a sentence. The study analyses the text using the Perl readability program. The Perl readability program identifies numbers and does not count them as words, thus eliminating noise in the results obtained.

The next step after the file conversion and parsing process is to input each file into the Lingua EN Fathom Perl readability module, which reads the text files and returns the readability result. The Lingua En Fathom Perl module, used in various studies (Li 2008; Miller 2010; Lehavy, Feng and Merkley 2011) is a Perl code written to calculate the readability of English text. It takes as input a text file and calculates various text based statistics of the input file. Its criteria for identifying words are that a word must consist of letters and at least a vowel sound. To ensure

robustness in the word identification process, it does not count symbols such as '&' as words, and does not identify abbreviations as words. It defines a sentence as a group of words and non-words terminated with a full stop, question mark, or exclamation. This study compares the result of the Perl program to manually calculated results and results from other studies to assess the validity of the Program.

Loughran and McDonald (2011), measure the tone of a 10-K report using proportional weights, defined as negative word counts in the annual report relative to total number of words in the annual report. To apply this formula, this study uses a bag of words approach similar to the approach used in the Loughran and McDonald (2011), which requires parsing the document into vector of words and word counts. To obtain a word list count, the study needs to split the text in the report to words. To split the text to words this study uses the Perl Module, Lingua EN splitter. This module splits a document into words by identifying words as a group of letters separated by a space or punctuation from another group of letters.

The researcher writes a Perl program that takes as input the split words (results files of the EN splitter analysis) including words with hyphens as one word following Loughran and McDonald (2011). This loops through the word list to identify the occurrence of the words in the word list appearing in the annual report (split words). The code produces the total count and list of the words in the word list appearing in the annual report file. The count produced relative to the total number of words appearing in the document is the tone score measure for the annual report. To validate the output of the program the researcher manually counts the word appearances and this produces the same results as that produced by the program. The next step is to transform the tone measure to a measure of positive slant by multiplying the score by -100 following Gurun and Butler (2012), this provides a range of score of between -100 and 0. This enables the use of a negative word list to measure the positive slant of narrative disclosures, as the literature on tone shows that negative words have a higher impact than other word lists (Tetlock, Saar-Tsechansky and Macskassy 2008; Davis and Tama-Sweet 2012).

5.3.4 Variable Definitions

Table 5-3 provides the definitions of the variables used in this study, it includes the complexity estimates, the determinant variables and other variables included in the empirical analysis to estimate the determinants of annual report narrative complexity.

Table 5-3: Variable Definitions

Variable	Definitions
FOG_I	Fog index calculated as *[(Word_Complexity + Sentence_Complexity)*0.4] using Perl's Lingua En Fathom module.* *IMPLICATION: Firms with higher fog index scores have annual reports that are more difficult to read.* *"The interpretation of the fog index is Score ≥ 18 = unreadable text, 14 -18 = difficult text, 12 – 14 = ideal, 10 - 12 = acceptable, and 8 – 10 = childish text" (Li, 2008).*
WRD_ C	Word Complexity calculated as [(*Number of Complex Words in the Annual Report / Total Number of Words in the same Report)*100]. Complex words being words with three or more syllables* *IMPLICATION: Firms with higher word complexity scores have annual reports that are more complex as measured in terms of the average syllables of words used to compose the report*
SEN_C	Sentence Complexity calculated as *(Total Number of Words in the Annual Report / Total Number of Sentences in the same Report)* *IMPLICATION: As sentence complexity score increases, the annual report has a higher number of complex sentences.*
POS_S	Positive Slant calculated as *[(Total Number of Negative words in Report / Total Number of words in same Report)*-100]* *IMPLICATION: As the Positive slant increases, the negative words in the annual report are relatively decreasing. This is interpreted as a positive slant following (Gurun and Butler 2012)* *Negative Word list applied is the Loughrahn and McDonald negative word list (Loughran and McDonald 2011)*

Table 5-3: Variable Definitions

Variable	Definitions
F_AGE	Age of the firm calculated as (Date in 2012 (precisely 02/07/2012) less Date of Incorporation) *IMPLICATION: Older firms would have a higher firm age.*
P_VOL	Price Volatility defined as the measure of a stock's average annual price movement to a high and low from a mean price for each year. For example, a stock's price volatility of 20% indicates that the stock's annual high and low price has shown a historical variation of +20% to -20% from its annual average price (As defined in Thomson One Banker). *IMPLICATION: Firms with higher price volatility have share prices that are more volatile*
BUS_C	Business Complexity defined as the Natural Logarithm of the number of business segments. *IMPLICATION: Firms with a higher score for business complexity have business that is more complex as indicated by the number of business segments.*
GEO_C	Geographical Complexity defined as The Natural Logarithm of the number of Geographical segments. *IMPLICATION: Firms with a higher score for geographical complexity have structures that are more complex as indicated by the large number of geographical segments.*
E_VOL	Earnings Volatility defined as the Standard deviation of the annual earnings (operating Earnings after depreciation) of the five years prior to the year of analysis *IMPLICATION: Firms with higher earnings volatility have earnings figure that are more likely to be volatile*
EARNS	Earnings calculated as Firm's operating Income after depreciation scaled by the total assets of the firm *IMPLICATION: Firms with higher earnings figure have better firm performance as measured by operating income*
F_SIZE	The Natural Logarithm *of a firm's total assets IMPLICATION: Bigger firms in size terms have higher total assets*

Table 5-3: Variable Definitions

Variable	Definitions
EPS	Earnings per Share computed as Net Income Available to Common Shareholders divided by the Basic Weighted Average Shares outstanding. It includes the effects of all one-time, non-recurring and extraordinary gains/losses. *IMPLICATION: Firms with higher EPS have better firm performance per company share as measured by the EPS figure.*

GROUP_EARN	This is the variable for abnormal earnings
	let d_earn= income(t)-income(t-1);
	ve = sqrt(var(lag(d_earn),lag2(d_earn),lag3(d_earn)));
	ve is the standard deviation of last three year's d_earn.
	group_earn=(d_earn)/ve;
	IMPLICATION: As the value for group_earn increases, abnormal earnings increase.

5.4 Results

5.4.1 Summary Statistics

Panel A of table 5-4, presents the summary statistics of the whole sample. On average, annual reports are very difficult to read, the score is at the unreadable level as indicated by the scale of the fog index in table 5-4. The mean and median fog indexes for the annual reports in the sample are 21.87 and 21.98 respectively. To provide a benchmark, this study checks the reading difficulty of a sample of articles in top-rated academic journals and finds an average of 15 as the fog index score. This suggests that articles written for individuals at the highest level of education are much easier to read than a typical UK company annual report. The variation of reading difficulty between reports seems substantial at 1.37; the minimum fog in the sample is in the difficult level as opposed to the unreadable level.

Decomposing the fog index to its word complexity and sentence complexity components provides a better understanding of the textual characteristics that are instigating the reading difficulty of these reports. The word complexity score indicates that on average 26.56% of words in company annual reports are complex words, that is greater than a quarter of the words documented in annual report will be complex therefore increasing the complexity of the annual report for the average reader by 26.56%. The sentence complexity score indicates that on average sentences in annual report are made up of 28 words, there appears to be a large variation in the length of sentences within the sample. This could be due to the different impact that differing writers would have on the report and the likelihood of the sectional themes to affect the writing pattern.

On average, the positive slant of annual report is at -1.02, to put this in context at -1.02% tone index, a report with 50,000 words will have 500 (1%) negative words as documented in the negative word list of the Loughran and McDonald (2011) dictionary. Firms are on average 41 years with a large variation in the ages of firms; this is expected, as these firms are constituents of the FTALSH index. The average volatility of the stock prices of the firms in the sample is at approximately 30%, variation within the sample is high with a standard deviation of 10% and a maximum volatile movement as high as 76%. On average firms in sample have 2.63 business segments (LN (2.63=0.97) and 2.88 geographical segments.

Table 5-4 : Summary Statistics

Summary Statistics for the 2000 to 2011 Annual Reports Sample

This table summarizes the characteristics of the firms analysed in this paper. The sample period is from 2000 to 2011. The unit of observation is the firm-year. The first 3 variables represent the reading difficulty and complexity of words and sentences given each annual report. The variable Positive_Slant represents the proportion of occurrence of negative words given the total number of words in the annual report in year t multiplied by -100. Other variables represent the firm characteristics as defined in the table on variable definition. Panel A presents the Summary statistics for the whole sample, Panel B presents the summary statistics for firm-years ending from 1 January 2000 to 31 December 2004. Panel C presents the summary statistics for firm-years ending from 1 January 2005 to 31 December 2011.

Panel A: Whole Sample

Variables	N	Mean	Std	Max	P95	Med	P5	Min
Narrative Variables								
FOG_I	1916	21.87	1.37	32.8	23.76	21.98	19.46	14.8
WORD_C	1916	26.56	1.31	34	28.53	26.63	24.34	19.19
SENT_C	1916	28.11	3.09	55.24	32.58	28.36	22.24	12.29
POS_S	1916	-1.02	0.26	-0.17	-0.66	-0.99	-1.5	-2.97
Other Variables								
F_AGE	1781	41.29	27.71	111.98	99.89	29.79	12.27	5.07
P_VOL	1862	29.86	10.21	76.73	49.42	27.74	17.13	11.82
BUS_C	1810	0.97	0.62	2.3	1.95	1.1	0	0
GEO_C	1784	1.06	0.59	2.3	1.79	1.1	0	0
E_VOL	1912	159.28	612.73	7621.46	708.97	15.28	1.54	0.03
EARNS	1916	0.08	0.09	0.74	0.22	0.08	-0.01	-0.61
EPS	1916	0.32	1.16	14.59	1.34	0.18	-0.24	-14.62
F_SIZE	1916	6.98	2.05	14.69	10.89	6.65	4.18	1.71

Panel B: Pre 2004

'Sample = Year <=2004'

Variables	N	Mean	Std	Max	P95	Med	P5	Min
Narrative Variables								
FOG_I	685	21.48	1.48	26.64	23.6	21.65	18.77	14.8
WRD_C	685	26.12	1.26	29.72	27.94	26.25	23.97	19.19
SEN_C	685	27.59	3.54	39.06	32.71	28.02	20.77	12.29
POS_S	685	-1	0.26	-0.25	-0.62	-0.96	-1.46	-2.48

Panel B: Pre 2004

'Sample = Year <=2004'

Variables	N	Mean	Std	Max	P95	Med	P5	Min
Other Variables								
F_AGE	640	43.8	27.46	111.98	99.89	33.34	14.02	11.26
P_VOL	658	30.27	11.5	75.41	55.32	27.62	16.65	11.82
BUS_C	624	0.93	0.63	2.2	1.95	1.1	0	0
GEO_C	650	1	0.58	2.3	1.79	1.1	0	0
E_VOL	684	147.51	602.35	7090.75	587.91	11.41	1.21	0.03
EARNS	685	0.07	0.09	0.46	0.19	0.07	-0.03	-0.51
EPS	685	0.21	0.82	14.59	0.82	0.12	-0.24	-3.94
F_SIZE	685	6.67	2.1	13.41	10.95	6.34	3.67	1.71

Panel C: Post 2004

'Sample = Year >2004'

Variables	N	Mean	Std	Max	P95	Med	P5	Min
Narrative Variables								
FOG_I	1231	22.08	1.25	32.8	23.88	22.11	20.13	15.29
WRD_C	1231	26.8	1.28	34	28.63	26.88	24.62	20.92
SEN_C	1231	28.4	2.77	55.24	32.51	28.51	23.91	13.72
POS_S	1231	-1.03	0.26	-0.17	-0.69	-1	-1.52	-2.97
Other Variables								
F_AGE	1141	39.89	27.76	111.98	95.3	28.22	11.15	5.07
P_VOL	1204	29.64	9.42	76.73	47.11	27.86	17.27	13.68
BUS_C	1186	0.99	0.61	2.3	1.79	1.1	0	0
GEO_C	1134	1.09	0.59	2.3	1.95	1.1	0	0
E_VOL	1228	165.83	618.58	7621.46	794.92	17.65	1.95	0.09
EARNS	1231	0.09	0.09	0.74	0.24	0.08	0	-0.61
EPS	1231	0.38	1.3	14.33	1.62	0.23	-0.23	-14.62
F_SIZE	1231	7.15	2	14.69	10.7	6.86	4.53	2.09

Table 5-5 : Correlation Matrix : Variables are as defined in variable definition

Pearson Correlation Coefficients of the Variables used in the Regression

	FOG_I	WRD_C	SEN_C	POS_S	F_AGE	P_VOL	BUS_C	GEO_C	E_VOL	EARNS	INC	EPS	F_SIZE
FOG_I	1												
WRD_C	0.432***	1											
SEN_C	0.924***	0.054**	1										
POS_S	-0.207***	-0.230***	-0.132***	1									
F_AGE	-0.167***	-0.023	-0.174***	-0.045*	1								
P_VOL	0.054**	0.004	0.057***	-0.107***	-0.177***	1							
BUS_C	0.051**	0.102***	0.012*	-0.159***	0.004	-0.121***	1						
GEO_C	0.145***	0.246***	0.056***	-0.263***	0.002	0.028	0.316***	1					
E_VOL	0.097***	0.176***	0.033	-0.201***	-0.017	-0.064***	0.111***	0.164***	1				
EARNS	-0.041*	-0.066***	-0.018	0.161***	-0.033	-0.258***	-0.021	0.057**	-0.081***	1			
EPS	0.017	0.046**	-0.001	0.052**	-0.027	-0.134***	0.095***	0.093***	0.067***	0.100***	0.337***	1	
F_SIZE	0.110***	0.123***	0.070***	-0.244***	-0.018	-0.272***	0.381***	0.256***	0.520***	-0.095***	0.335***	0.117***	1

Panel B and Panel C of Table 5-4 presents the summary statistics of the split sample of pre 2004 and post 2004 respectively. Overall, annual reports appear to be more difficult to read post 2004 as the fog index and its decomposed parts; word complexity and sentence complexity are consistently higher post 2004. This could be due to the introduction of the International Financial reporting Standards, which may have led to increase in reporting details and explanations. The difference further confirms the trend of reading difficulty observed in the last chapter. The annual report appear to be more negative post 2004, this could be largely due to the financial crisis which seemed to cause firms to have more discussions that are negative in their annual report.

Table 5-5, presents the Pearson correlations of the narrative variables with some other firm characteristics. The table shows that the fog index and sentence complexity and the word complexity measures are significantly positively correlated. This is expected as sentence complexity and word complexity make up the fog index. However, with a correlation coefficient of 0.924 between the fog index and the sentence complexity score, the fog index is largely driven by the sentence complexity variable. Being able to decompose the parts of the fog index indicates that the complexity of the sentences in a document largely contributes to the fog more than the complexity of words. Consequently, the main evidence of what drives the word complexity and sentence complexity individually will contribute to this debate.

The fog of the annual reports is negatively correlated with the positive slant of annual report indicating that firms with a higher positive slant have annual reports that are less difficult to read; reading difficulty of annual reports increases with an increase in negative words in the report. Consistent with this is the strong correlation between the positive slant of annual report and the word complexity and sentence complexity. It appears that the number of complex words in the annual report decreases with an increase in positive slant. This either can be due to negative words being more complex (informative view) or managers increasing the use of complex words when discussions are more negative (opportunistic view).

Overall, older firms tend to have annual reports that are easier to read, as evidenced by the correlation coefficient between fog and firm age of -0.167. Bigger firms and firms with more volatile and complex operations appear to have annual reports that are difficult to read as evidenced in the positive and significant coefficients between fog index and business complexity in the correlation matrix. The reading difficulty of annual reports of big firms is driven by both an increase in complex words and an increase in complex sentences, the coefficients of firm size and word complexity, and firm size and sentence complexity are both significant at the 0.01 level. Volatility and complexity of operations tend to move in the same direction in their relationship with reading difficulty and positive slant. The correlation matrix shows that firms with more volatile and complex operations tend to have annual reports that have a higher reading difficulty and a more negative tone. This is as evidenced by the significant correlation coefficient between these variables and the narrative variables.

5.4.2 Univariate Analysis: Determinants of Reading Difficulty and Positive Slant

For the determinant univariate analysis, this study classifies firms into quintile groups for each variable predicted as a determinant of annual report readability and positive slant. To test the predictions in H1 and H2, this study performs a univariate analysis of t-test of means. Each year firms are sort into quintiles based on their values for each determinant variable, the t-test compares the mean of the narrative analysis variables for all firms in the highest and lowest quintile of the determinant variables. For instance for the GROUP_EARN class variable representing abnormal earnings and FOG_I analysis variable, which is the fog index, for each year firms are sort into quintiles based on the value of their abnormal earnings. Firms with the lowest abnormal earnings are in the group labelled *q1* and firms with the highest abnormal earnings are in the group labelled *q5*. Following this, the mean of the fog index for all firms in the same group for years 1 to 10 is calculated.

From table 5-6, there is a significant difference in the means of the positive slant of firms with positive abnormal earnings and firms with negative abnormal earnings. It shows that firms with positive abnormal earnings have annual report narratives with a higher positive slant than firms with negative abnormal earnings do. Quintile 1 and quintile 5 have a mean of -1.04 and -0.95 respectively with a significant difference between both means at the 1% level. This indicates that when firms have high abnormal earnings they tend to increase the positive slant of their annual report discussions. Based on the measurement of positive slant, this means a reduction of negative words and negative discussions in their annual reports. Hence, managers may be reducing negative words in annual report narratives to increase the positive reaction to higher positive abnormal earnings (an opportunistic view). This provides evidence that supports the hypothesis *H2a.*

In column (1), of table 5-6 reading difficulty of annual reports significantly differs with the firms' age, volatility of a firm's operations, complexity of a firm's operations and the EPS of the firm. Younger firms, firms that are more volatile and firms with more complex operations tend to have reports that are more difficult to read. However, there is no significant difference between the means of firms with more business segments, a measure of business complexity; with respect to complexity, the study finds that firms with more geographical segments have annual reports that are more difficult to read. Another significant difference occurs between the means of firms in the highest and lowest quintile of EPS, the univariate results indicates that firms with higher EPS tend to have reports that are less difficult to read. This relates to the literature on earnings management , Das and Zhang (2003) show that managers are more likely to manipulate the reported EPS number in order to report positive earnings and/or meet analyst benchmarks. From an opportunistic view if managers with positive EPS have managed their reported earnings, they are as well more likely to decrease reading difficulty of their narratives as Li (2008) show that mangers obfuscate information by making reports difficult to read when performance figures are poor.

In column 2, table 5-6 there is a significant difference in the word complexity of firms in the highest and lowest quintile of complexity of operations. It indicates that

firms with more business segments and firms with more geographical segments tend to have annual reports with more complex words. These results indicate that firms with complex operations have annual reports written with words that are more complex, this could be driven by the increase in complex communication and vocabulary, which these firms are more susceptible to in their discussions of all segments. However, this study cannot exclude an opportunistic view whereby firms with complex operations are exploiting existing information asymmetries by making communication more complex.

From column 3 of table 5-6, consistent with the fog index, younger firms and firms with more volatile operations tend to have annual reports with more complex sentences. As observed from the table firms in the higher quintile of price volatility (earnings volatility) have a higher sentence complexity mean of 28.28 (28.21) than the means of firms in the lower quintile of price (earnings) volatility of 27.47 (27.45). This indicates that firms with higher price volatility have annual reports with on average 28 and a quarter words per sentence while firms with lower price volatility will have on average 27 and a half words per sentence. Younger firms have significantly up to one word more for every sentence when compared to older firms, per sentence complexity means of 28.51 and 27.57 for younger and older firms respectively. Based on the performance measures of EPS, this study observes a significant relationship between performance and sentence complexity. The univariate result indicates that firms in the higher quintile of EPS tend to have reports with less complex sentences.

Table 5-6 : Univariate Analysis

Univariate Analysis: The Determinants of Annual Report Narrative Quality: Complexity Estimates and Positive Slant

This table reports the results of the following univariate analysis: t-test of whether *q1* = *q5*. Each year firms are sorted into quintiles based on the value of the Class Variables for the firm with *q1* = lowest quintile, and *q5* = highest quintile. Analysis variable represents the mean for all firm years per class variable given each quintile. The unit of analysis is the analysis variable. ***, **, and * represent statistical significance of the t-test at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Test Variables	FOG_I	WRD_C	SEN_C	POS_S
Class Variables				
GROUP_EARN				
q1	21.85	26.58	28.04	**-1.04***
q2	21.89	26.54	28.18	-1.05
q3	21.96	26.62	28.27	-1.03
q4	21.89	26.6	28.12	-1.03
q5	21.76	26.45	27.94	**-0.95***
F_AGE				
q1	**22.02***	26.55	**28.51***	**-1.01***
q2	22.19	26.56	28.91	-1.02
q3	21.9	26.67	28.08	-1.01
q4	21.51	26.43	27.36	-0.98
q5	**21.66***	26.58	**27.57***	**-1.07***
P_VOL				
q1	**21.67***	26.71	**27.47***	**-1.02***
q2	21.86	26.41	28.24	-1
q3	21.95	26.48	28.39	-0.99
q4	21.92	26.55	28.26	-1.03
q5	**21.96***	26.62	**28.28***	**-1.06***
BUS_C				
q1	21.85	**26.53***	28.11	**-0.95***
q2	21.76	26.35	28.05	-1
q3	21.93	26.57	28.26	-1.02
q4	21.83	26.55	28.02	-1.03
q5	21.94	**26.7***	28.15	**-1.06***

Test Variables	(1) FOG_I	(2) WRD_C	(3) SEN_C	(4) POS_S
Class Variables				
GEO_C				
q1	**21.52*****	**26.21*****	27.58	**-0.91*****
q2	21.83	26.14	28.43	-0.99
q3	21.94	26.75	28.11	-1.01
q4	22.1	26.67	28.59	-1.09
q5	**21.93*****	**26.89*****	27.92	**-1.07*****
E_VOL				
q1	**21.62*****	26.59	**27.45*****	**-0.93*****
q2	21.86	26.48	28.17	-0.96
q3	22.02	26.59	28.46	-1.03
q4	21.87	26.42	28.26	-1.06
q5	**21.97*****	26.7	**28.21*****	**-1.12*****
EPS				
q1	**22.1*****	26.63	**28.63*****	**-1.12*****
q2	21.73	26.67	27.65	-1
q3	21.89	26.53	28.19	-0.99
q4	21.85	26.48	28.14	-1
q5	**21.78*****	26.49	**27.96*****	**-1*****
F_SIZE				
q1	21.82	26.53	28.01	**-0.96*****
q2	21.51	26.53	27.26	-1
q3	22.1	26.56	28.7	-1
q4	22.08	26.52	28.68	-1.06
q5	21.83	26.65	27.91	**-1.08*****

FOG_I is the measure of the readability of the firm's Annual report. WRD_C is the measure of the complexity of words in the annual report. SEN_C is the measure of the complexity of sentences in the annual report. POS_S is the measure of the positive slant of the annual report using the Loughran and McDonald (2011) dictionary. F_AGE is the age of the firm using the incorporation date. P_VOL is the annual movement of a firm's stock price from the mean. BUS_C is the natural logarithm of the number of business segments. GEO_C is the natural logarithm of the number of geographical segments. E_VOL is the standard deviation of the annual earnings of the five years prior to the year of analysis. EPS computed as Net Income Available to Common Shareholders divided by the Basic Weighted Average Shares outstanding. F_SIZE is computed as the natural log of a firm's total assets.

5.5 Multivariate Analysis: Determinants of Annual Report Complexity and Positive slant

To test the predictions in H1 and H2 in a multivariate setting, a regression analysis of each narrative variable on the determinant variables of abnormal earnings, firm age, firm size, volatility and complexity of operations is performed. More specifically, several specifications of the following general model is estimated:

$$NAR\_VAR_{it} = Intercept + \beta_1 \, GROUP\_EARN_{it} + \beta_2 F_{AGE_i} + \beta_3 P\_VOL_{it} + \beta_4 BUS\_C_i + \beta_5 GEO\_C_i + \beta_6 \, F\_SIZE_{it} + \varepsilon_{it} \quad \text{...................................... Eq. 5-1}$$

Where NAR_VAR_{it} is the narrative variable is for firm i at time t based on the four different narrative measures; the fog index, word complexity, sentence complexity and positive slant as described in Table 5-3. $GROUP\_EARN_{it}$ represents the abnormal earnings of firm i at time t, F_AGE_i represents the age of firm i, P_VOL_{it} represents the volatility of the share price of firm i at time t, BUS_C_i represents the number of business segments of firm i, GEO_C_i represents the number of geographical segments of firm i, F_SIZE_{it} represents the size of firm i at time t and ε_{it} is the error term. All the variables are as defined in Table 5-3.

Table 5-7 presents the results of regressing the fog index, word complexity, sentence complexity and positive slant respectively on their potential determinants. In all regressions, the variables in the model described in equation 5-1 are included as the determinants of narrative quality. The model uses the White (1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. In column 1, table 5-7, the positive slant of the entire annual report is regressed on the determinant variables. Columns 2, 3 and 4 presents the results of the regression of the fog index, word complexity and sentence complexity respectively on the determinant variables.

The significant positive coefficient of the variable GROUP_EARN in column 1 indicates that firms with higher abnormal earnings have annual reports with a higher positive slant. This supports the hypothesis that firms with higher abnormal earnings are more likely to lay emphasis on good news, thus, having reports with relatively less negative words and less negative discussions. However, from columns 2, 3 and 4, the study does not observe any significant relationship between abnormal earnings and the fog, sentence and word complexity estimates. Thus, the study cannot conclude on the predictions of hypothesis H1a that firms with higher abnormal earnings will have annual reports that are easier to read. Given the results on the positive slant measure of the narrative variable, this study supports the view that given high positive abnormal earnings, managers will emphasise this good news with more positive discussions in the annual reports.

The significant negative coefficients of firm age in columns 1, 2 and 4, indicate that firm age appears to be a strong determinant of positive slant, fog index, and sentence complexity, which all have coefficients that are significant at the 1% level. In column 1, younger firms tend to have annual reports with a higher positive slant and columns 2 and 4 indicate report narratives of younger firms are more difficult to read, using sentences that are more complex. The result on tone supports the hypothesis that young firms tend to have more growth options and therefore will have discussions that are more positive in their annual report narratives.

However, the results on reading difficulty (columns 2 and 4) and firm age indicate that young firms may be strategically reporting positive discussions by making them harder to read with sentences that are more complex. It provides evidence indicating that younger firms may be obfuscating their annual reports discussions in order to make it difficult or delay investors verifying the positive disclosures in the narratives. Therefore, given the results, younger may be exploiting existing information asymmetries using narrative discussions in annual reports. However, an informative view proposes that difficulty in communicating uncertainties in growth opportunities potentially increases the reading difficulty of annual reports of younger. This results, therefore confirms hypothesis that the age of the firm determines the positive slant and reading difficulty of annual report, however.

The significant negative coefficient on price volatility indicates that firms that are more volatile, have annual reports that have a lower positive slant. This indicates that volatile firms tend to have discussions that are more negative in annual report narratives. From columns 2 and 4 of price volatility, it is observed that firms with more volatile operations have report narratives that are more difficult to read. The result of tone and price volatility supports the hypothesis that volatile firms have discussions that are more negative, which reduces the positive slant of their annual report narratives. However, the positive coefficient of fog index and price volatility shows that these disclosures are difficult to read. It indicates that the information provided in narratives is mitigated and therefore managers may be strategically reporting this value relevant information on price volatility by obfuscating the disclosures.

Similarly, columns 1, 2, 3 and 4 support this view for the complexity of a firm's operations. Indicating that while reporting on complex operations in narrative discussions reduces the positive slant of the report, the complexity of the narratives indicates that information is muffled per there is a reduction in information flow to investors and managers may be exploiting these information asymmetries. On the other hand, reporting complex discussions can lead to higher reading difficulty hence; this study does not conclude on either an opportunistic or informative perspective but shows that reading difficulty increases with volatility and complexity of operations as indicated by the significant coefficients on price volatility (*P_VOL)*, business complexity (*BUS_C)* and geographical complexity (*GEO_C)*. In addition, the study shows that the complexity and volatility of a firm's operations decreases the positive slant of the firm's annual report narratives.

Table 5-7: Multivariate Regression Analysis

Multivariate Analysis: <u>The Determinants of Annual Report Narrative Quality:</u>
<u>Complexity Estimates and Tone Slant</u>

This table reports the results of the following regression: Dependent Variable = $Intercept + \beta_1\ GROUP\_EAR_{it} + \beta_2 F\_AGE_i + \beta_3 P\_VOL_{it} + \beta_4 BUS\_C_i + \beta_5 GEO\_C_i + \beta_6\ F\_SIZE_{it} + \varepsilon_{it}$. The dependent variables are Positive slant, Fog index, Word complexity and Sentence complexity as presented in columns (1) to (4) respectively. The independent variables are as listed under the column independent variables. The unit of analysis is the dependent variable as reported for each column. The variables are defined in Table 5-3: Variable Definitions. The model uses the (White 1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. *******, ******, and ***** represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable:	*POS_S*	*FOG_I*	*WRD_C*	*SEN_C*
	(1)	**(2)**	**(3)**	**(4)**
Independent Variable:				
Intercept	**-0.60323*****	**21.363*****	**25.79047*****	**27.61703*****
	(-13.63)	**(98.41)**	**(127.81)**	**(57.44)**
GROUP_EARN	**0.01524*****	-0.01705	-0.00396	-0.03866
	(3.6)	(-0.72)	(-0.18)	(-0.71)
F_AGE	**-0.000852*****	**-0.00704*****	-0.00127	**-0.01633*****
	(-4.02)	**(-5.53)**	(-1.18)	**(-5.62)**
P_VOL	**-0.00409*****	**0.00597***	-0.00014	**0.01507***
	(-5.44)	**(1.66)**	(-0.04)	**(1.78)**
BUS_C	-0.01186	0.00876	0.04563	-0.02373
	(-1.08)	(0.16)	(0.85)	(-0.18)
GEO_C	**-0.08386*****	**0.28837*****	**0.48023*****	**0.24071***
	(-8.06)	**(4.66)**	**(8.74)**	**(1.68)**
F_SIZE	**-0.03029*****	**0.05628*****	**0.04632****	**0.09437****
	(-7.27)	**(3.04)**	**(2.53)**	**(2.4)**
R_Square	0.144	0.0592	0.0681	0.0374
Adjusted_R-Sq	**0.1407**	**0.0555**	**0.0645**	**0.0337**

The variable firm size (**F_SIZE**) appears to be a strong determinant of the narrative measures of positive slant, fog index, word complexity and sentence complexity. The negative coefficient of firm size in column 1 indicates that larger firms have annual reports with a lower positive slant. This supports the hypothesis that larger firms will strategically reduce the reporting and the discussions of positive information due to concerns of potentially incurring large litigation cost in the future. From columns 2, 3 and 4 of firm size the table shows that larger firms are more likely to have annual report narratives that are more difficult to read. This supports the hypotheses that due to higher political costs larger firms are more likely to obfuscate their annual report discussions to mitigate the information flow to investors. The results confirm the hypotheses that larger firms have narratives with a lower positive slant and higher reading difficulty. The annual report narratives of larger firms have words that are more complex and sentences that are more complex.

The results in column 1 show that abnormal earnings, firm age, price volatility, geographical complexity, and firm size are strong determinants of the positive slant of annual reports. This can be interpreted as younger firms with high abnormal earnings, lower price volatility, lower geographical complexity that are smaller have annual report narratives with a higher positive slant. On the other hand, the results in column 2 show that firm age, price volatility, business complexity, geographical complexity, and firm size are determinants of annual report reading difficulty.

Younger firms with higher price volatility, higher business and geographical complexity that are larger tend to have annual report narratives that are more difficult to read. The results of geographical complexity and firm size is supported by the significant results on both word complexity and sentence complexity, while the results on firm age and price volatility is supported by the results of sentence complexity. The r-squared of positive slant is highest of the four columns, indicating that these variables tend to explain a higher proportion of tone than the reading difficulty estimates. The next section discusses the implications of these results for the opportunistic and incremental information view of management narrative reporting.

Table 5-8 : Robust Multivariate Regression Analysis

Robust Multivariate Analysis: <u>The Determinants of Annual Report Narrative Quality: Complexity Estimates and Tone Slant</u>

This table reports the results of the following regression: $Dependent\ Variable = Intercept + \beta_1\ GROUP\_EARN_{it} + \beta_2 F\_AGE_i + \beta_3 P\_VOL_{it} + \beta_4 BUS\_C_i + \beta_5 GEO\_C_i + \beta_6\ F\_SIZE_{it} + \varepsilon_{it}$. The dependent variables are Positive slant, Fog index, Word complexity and Sentence complexity as presented in columns (1) to (4) respectively. The independent variables are as listed under the column independent variables. The unit of analysis is the dependent variable as reported for each column. The variables are defined in Table 5-3: Variable Definitions. The model includes included industry and year dummies as control variables. The model uses the (White 1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. The standard errors are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	TONE	Fog_Index	Word_Comp	Sent_Comp
Intercept	**-0.40987*** (-6.62)**	**21.1504*** (68.88)**	**26.13298*** (95.51)**	**26.74303*** (37.3)**
GROUP_EARN	**0.01666*** (4.11)**	-0.0224 (-0.97)	-0.00481 (-0.23)	-0.05119 (-0.95)
F_AGE	**-0.00096*** (-4.76)**	**-0.0056*** (-4.15)**	0.00122 (1.13)	**-0.01523*** (-4.88)**
P_VOL	**-0.00428*** (-5.81)**	0.00549 (1.44)	-0.00273 (-0.8)	**0.01644* (1.82)**
BUS_C	-0.01258 (-1.23)	-0.0457 (-0.79)	0.01245 (0.23)	-0.1267 (-0.91)
GEO_COMP	**-0.08698*** (-7.75)**	**0.29596*** (4.74)**	**0.36808*** (6.49)**	**0.37181*** (2.58)**
F_SIZE	**-0.02963*** (-6.74)**	0.02498 (1.32)	0.02424 (1.29)	0.03821 (0.91)
Year and Industry Effects	Yes	Yes	Yes	Yes
R-Square	0.2263	0.1192	0.181	0.0728
Adj R-Sq	**0.2137**	**0.1049**	**0.1677**	**0.0578**

Observing from table 5-8, the robust analysis, confirms the results observed for the group_earn variable, firm age, price volatility geographical complexity and firm size with respect to the positive slant of annual reports. This further confirms that firms with higher abnormal earnings tend to have reports that are more positive and firms that are younger, more volatile, bigger, with operations that are more complex tend to annual report narratives that are more negative. The results observed for the fog index, word complexity and sentence complexity are also further confirmed. However, the size of the firm does not appear to be a strong determinant of the fog index, word complexity and sentence complexity of annual reports.

5.6 Discussion

The results in this study reflect that the firm specific characteristics examined in this study play a role in the reading difficulty and positive slant of annual reports. The findings have confirmed a number of the hypotheses as predicted in the hypotheses development section. However, these results need to be carefully considered with respect to the framework of the hypotheses development. This study aims to establish what determines the complexity of annual report narratives and the positive slant of these narratives. It approaches this from two established perspectives using a framework from the literature on motivations for discretionary narrative disclosures: an opportunistic perspective and an informative perspective.

It expects that an increase in reading difficulty of narratives indicate that managers are obfuscating information, and therefore it provides support for an opportunistic view. On the other hand, the study notes that increase in explanations of value relevant information is likely to increase reading difficulty due to its positive correlation with length of the report; this will provide support for an informative view. It expects that from an informative perspective the positive slant of annual report will increase or decrease depending on firm performance, operations, and firm characteristics of age and size that affect the potential discussions in the

narratives. From an opportunistic view, managers will emphasise on good news to manage investors' impressions of the firm.

To provide further discursive evidence of whether these results firm performance indicate an opportunistic or informative view of management motives we draw explanations from accounting theory using the theoretical explanations of Bloomfield (2008) for management motives for narrative disclosure styles and the Merkl-Davies and Brennan (2007) framework for impression management.

5.6.1 Obfuscation

The expectation is that due to potential market reaction to bad news, managers are more likely to obfuscate information when performance is poor (Bloomfield 2008). This supports a management opportunistic view. Merkl-Davies and Brennan (2007) framework suggests that information is concealed when there is obfuscation, which will increase reading difficulty. In this study, it is observed that there is no relationship between a positive shock to investors (i.e. large positive abnormal earnings) and reading difficulty. If management is using narratives to delay market reaction by obfuscating information, narratives will be more difficult to read when there are large negative abnormal earnings. The results of no relationship appears to support an informative view to the extent that if management is not adjusting reading difficulty with performance, it indicates there is no obfuscation of information given negative abnormal earnings.

This is because if management approaches narrative communication from the informative perspective, they will provide value relevant disclosures for investors, which will be independent of performance. The annual report contains other value relevant disclosures; therefore, there are no net gains in obfuscating information as a result of poor performance. Merkl-Davies and Brennan (2007) argue that because markets are efficient, management will choose to improve their reputation and lower

their cost of capital by making information accessible to investors rather than let investors glean from other sources. Further, bad news may be more difficult to articulate (Li 2008), therefore annual reports that are difficult to read may not be due to obfuscation but due to management providing additional detailed incremental information. Supporting this view, Clatworthy and Jones (2001) find that it is the thematic structure of the report that explains variability in readability rather than management obfuscation.

5.6.2   Emphasis on Good News

The Merkl-Davies and Brennan (2007) framework show that information is concealed when there is emphasis on good news. Management would be seen as opportunistically emphasising on good news where the discussion is inconsistent with current and future performance. Supporting the view, that emphasis on good news when performance is good is concealment is the theory on mean-reversion of earnings. Mean-reversion of earnings explains that earnings are always more likely to revert to the mean therefore good performance may provide an indication for management to be more negative in the narrative discussions of future performance (Li 2010). However, because this situation is most likely when markets are efficient and therefore management will lose credible reputation by not providing this private information of the firm, and most importantly, investors can still glean from other sources, this action of management will lean towards Merkl-Davies and Brennan (2007) informative view.

Another explanation for the positive relationship between tone and performance is that momentum in firm performance will cause management to increase (decrease) positive disclosures when performance is good (bad) (Li 2010). This supports the informative view, as managers are not necessarily being opportunistic but providing additional information. A typical evidence of this will be increasing the discussions

in the narratives to explain the firm's position i.e. provide additional value relevant information. For instance, Loughran and McDonald (2011) finds a positive relationship between firms with a higher proportion of negative words in their report and the likelihood to report material weaknesses in their internal accounting control. Firms with negative news for example poor earnings or bad controls, are more likely to have disclosures that are more negative. This is because the process of reporting will naturally include a higher number of negative words.

Attribution hypothesis further explains why there is an increase in positive (negative) disclosures when performance is good (bad). In March 2013, Debenhams PLC issued a profits warning and attributed the cause of its below expectation figures to the snow (BBC 4 March 2013). Bloomfield (2008) notes that management's attempt to attribute causes of poor performance to other sources will increase the length and complexity of annual reports. If performance is poor and management is eager to blame other negative events other than poor performance then it is more likely that firms with lower abnormal earnings will have annual reports with more negative words hence a lower positive slant. Similarly, after the September 11 terrorist experience in America, most companies were seen to blame this experience for poor business performance (Barton and Mercer 2005). This further provides evidence of an increase in negative discussions when performance is poor. Using the framework of this study, this study cannot conclude on an opportunistic or informative view. Future research can investigate these views by providing a benchmark that measures if emphasis on good news was opportunistic for instance using future performance. However, the chapter provides evidence that supports the hypothesis that higher abnormal earnings leads to a higher positive slant in annual report narratives.

5.6.3 Conclusion

This chapter investigates the determinants of the reading difficulty and positive slant of annual report narratives. It provides the first large sample evidence of the determinants of the positive slant of annual report narratives. In addition, it provides the first large sample evidence of the determinants of these narrative measures given

a principles based regulatory regime of the United Kingdom. In particular, it studies the implications of firm performance, firm size, firm age, and firm operations for the reading difficulty and positive slant of annual report narratives. The first section introduces the chapter, the second section develops testable hypotheses, the third section presents the data and methods, the fourth section presents the results of the hypotheses tests, and the fifth section discusses the implications of the results. The empirical findings show that firm performance, age, size and operations are determinants of the positive slant of annual reports. In addition, the evidence shows that the firm age, and operations are determinants of annual report reading difficulty.

The study provides evidence that supports the hypothesis that firms increase the positive slant of annual report narratives given high positive abnormal earnings. Further, the evidence in this chapter indicates that older firms, bigger firms, firms with more volatile and complex operations have annual reports that have a lower positive slant. The evidence with respect to reading difficulty indicate that younger firms, firms with more complex and volatile operations have annual reports narratives that are more difficult to read. The findings in this study add to the existing body of literature on readability and tone of annual report narratives. The next chapter further investigates the determinants of annual report narratives by assessing what board composition factors determine complexity in annual reports. The aim is to assess what role the governance mechanism of a firm plays in the level of syntactical complexity in annual report narratives.

6 Board Composition as Determinants of Annual Report Narratives

6.1 Introduction

Jensen (1993) show that the board of directors is a pivotal governance mechanism for the internal control systems of a firm. The effective management of the internal control systems account for the credibility of the financial reporting process (Masulis, Wang and Xie 2012). This evidence is consistent with the concept as applied by Anderson, Mansi and Reeb (2004) that the board of directors influence the integrity of the financial reporting process. Further, the United Kingdom Financial Reporting Council (FRC) highlights the influence of the board in the process of reporting information to the owners of the firm. Specifically, in the document 'Guidance on Board Effectiveness', the FRC clearly emphasises the role of the board of directors in monitoring the financial reporting process (FRC. March, 2011).

There are two identified roles of the board of directors in the accounting literature: the monitoring and the advisory role (Masulis et al., 2012). Board of directors influence the financial reporting process through efficient monitoring of management and effective advising of management on the best reporting practice. This role of the board of directors has an impact on narrative communication in the annual report. It is expected that the board will advise management on the use of reporting practices that are more informative to shareholders and monitor management by constraining opportunistic reporting practices such as impression management.

This study accounts for the impact of the board of directors in annual report narrative communication. Specifically, it investigates if the composition of the board determines the reading difficulty and tone of annual report narratives. Assuming the size of the board, number of female members, number of member's nationalities, tenure of members and the age of board members influences the monitoring and advisory role of the board, this study test if narrative communication to investors significantly changes with respect to a change in these board characteristics.

Based on agency theoretic assumptions of management self-serving motives (Lewellen, Park and Ro 1996; Abrahamson and Park 1994), this study presumes that management will seek to use narrative communication to manage investors' impressions of the firms. Therefore, given a board combination of both independent and non-independent directors, this study hypothesises that a change in specific characteristics of the board and board members will influence management's ability to manipulate narrative communication. It follows from previous studies that presume opportunistic action of management in reporting (e.g. Li, 2008) and adds to this by accounting for the strategic influence of the board in the narrative reporting process. The next section presents the hypothesis, section 6.3 explains the data and methodology, section 6.4 presents and discusses the results, section 6.5 concludes.

6.2 Hypotheses Development

6.2.1 Board Composition and Annual Report Narrative Communication

The Board of directors in a firm oversees the process of financial reporting and communication to shareholders (Klein 2002a). This governance function is aimed at improving the reliability of the reporting process by reducing agency costs and constraining opportunistic actions of management in communication. This role of the board of directors in overseeing the accountability process has been emphasised by major stock exchanges (Anderson, Mansi and Reeb 2004). However, with

apparent financial reporting scandals, questions have been raised on whether the composition of the board has been a contributing factor to the ineffectiveness of boards in the accountability function[13].

There are reasons to expect that the board of directors influence the complexity and tone of the annual report narratives. Either this can be from a direct influence given that the board of directors are actively involved in the writing process or an indirect influence i.e. the presence of the board as a governance body of the firm, affects the behaviour and actions of the writers. The figure below shows the parties involved in the process of the preparation of the annual reports and highlights the role of the directors in the process. From the diagram, the directors are mainly responsible for the preparation of the annual reports, however to achieve the complete document, the directors work with other parties such as the auditors who check financial statements and the graphic designers who design the reports.

In addition, aiding the directors are the public relations consultants, company accountants, and other managers who are responsible for writing and providing information for specific sections of the annual report. However, the directors have the responsibility for preparing, signing off, and issuing the annual reports to shareholders as stated in the company act 2006. The process of writing the annual reports differs with firms, thus, this study models the relationship between narrative communication and directors based on the direct influence of directors through the an active participation in writing the report and monitoring the writing process, or an indirect monitoring influence, which influences the behaviour of the report writers.

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[13] For example the presence of two foreign independent directors (FIDs) in the audit committee of Enron during the period of 1997–2001 of its high accounting fraud raised the questions of the effectiveness of FIDs in the monitoring role MASULIS, R. W., C. WANG and F. XIE. 2012. Globalizing the boardroom—The effects of foreign directors on corporate governance and firm performance. *Journal of Accounting and Economics,* **53**(3), pp.527-554..

Figure 6-1: *Diagram showing the process for the preparation and issuing of Annual reports*
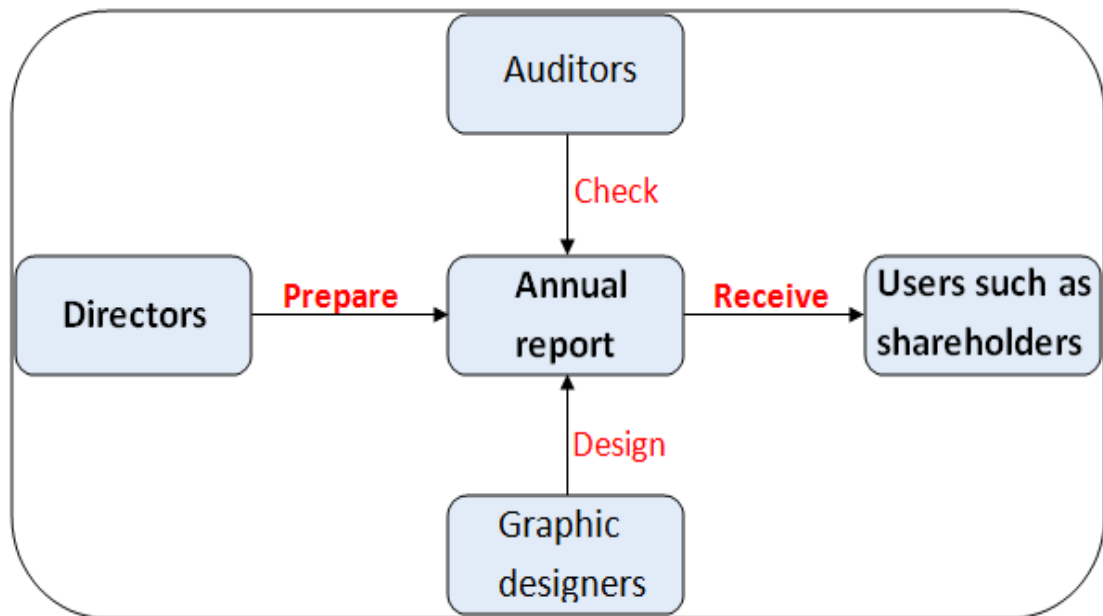
This diagram is modified from Jones (2013), it shows the parties involved in the process of preparing the annual reports and highlights the role of the directors in the preparation of the annual reports.

This chapter assesses how the composition of the board affects communication in narrative reporting. Most studies investigating what determines narrative communication factors of reading difficulty and tone have focused on firm characteristics as potential determinants (Li 2008; Li 2010). Therefore, this study specifically adds to the readability and tone literature by investigating the role of the board of directors in the level of the reading difficulty and tone of annual report narratives. The following sub-section develops testable hypotheses on the relation between narrative reporting and factors affecting the composition of the board.

6.2.2 Director Age and Annual Report Narrative Communication

The Accounting literature studying the average age of the members of a board uses the age of the directors as a proxy for the level of business experience of board members (Anderson, Mansi and Reeb 2004). It is expected that older directors are

more experienced in business and thus would be better informed on more efficient communication styles in narrative reporting. Given experience in business, boards with a higher average age for the board of directors are better informed on what communication framework best increases company value. Conversely, business experience does not infer that they would adopt the most unbiased communication style. This is because the position taken will depend on the specific patterns that have previously worked for them, and other age specific factors that will motivate the directors towards certain communication styles.

Two age specific factors are identified in the literature associated with older directors. First, board members with ties to the CEO (Chief Executive Officer) are usually older (Fracassi and Tate 2012). The second is that due to proximity of the age of older directors to the retirement age, it is more likely that older directors will take up more outside directorships to increase retirement savings (Ferris, Jagannathan and Pritchard 2003). These two factors tend towards reducing the ability of older directors to be efficient in the monitoring role of the board of directors. The busyness hypothesis proposes that multiple directorships tends to overcommit the individual, who becomes too busy to adequately monitor management and perform directors duties, increasing agency costs (Ferris, Jagannathan and Pritchard 2003). On the other hand, ties to the CEO means that older directors are more likely to be too familiar with the CEO to perform their monitoring role without bias.

Merkl-Davies and Brennan (2007) show that management increase manipulation in narrative reporting by making narrative disclosures more difficult to read. This supports the obfuscation hypothesis that annual reports are more difficult to read when performance is poor. Following the obfuscation hypothesis, it is more likely that managers of firms with older directors can exhibit opportunistic actions of obfuscation because of the reduced capacity of the older directors to monitor the financial reporting process. If older directors are less effective monitors of management, then opportunistic managers can obfuscate narrative communication to shareholders.

H1a: Greater Board member experience (age) is associated with annual report narratives that are more difficult to read.

Although older members of the board are more likely to shirk their director duties, providing leeway for impression management in annual report, the evidence on the relationship between director age and firm performance is mixed (Cochran, Wartick and Wood 1984; Waelchli and Zeller 2013). Hence, it is not clear whether older directors are associated with poorly performing firms. However, Child (1974) provides evidence that shows that youthful leadership tends to lead to higher growth but the growth trend appears to be more volatile. Thus, indicating that there is higher risk taking when the leadership of the firm is younger. If younger managers are more likely to have higher growth potential and are more likely risk takers (usually having positive future expectations in discussions), it is expected that annual reports discussions of firms with younger directors will have more positive discussions. Thus, narrative communication in the annual reports of firms with older board members will have a lower positive slant.

H1b: Greater Board member experience (age) is associated with a lower positive slant in annual report narratives.

6.2.3 Board Gender Diversity and Annual Report Narrative Communication

The Financial Reporting Council article on Guidance on Board Effectiveness states that diversity of gender in the board, is important to help reduce the likelihood of a board with only like-minded individuals (FRC. March, 2011). Furthermore, the UK Corporate Governance code highlights the need for gender diversity to be incorporated as an important factor in the search for board candidates (FRC September, 2012). One of the motivations for these specific provisions on gender diversity on the board, stems from the advantage of improved quality of board discussions in a gender diverse board and increased ability of effective oversight over financial reporting (Gul, Srinidhi and Ng 2011).

Empirical work on female directors supports the improved board effectiveness hypotheses. Clatworthy and Peel (Forthcoming) show that the increase of female directors in the board improves the accuracy of financial reporting, while Gul, Srinidhi and Ng (2011) provide evidence that stock price informativeness increases with gender diversity (increase in female directors). Gul, Srinidhi and Ng (2011) showed that informativeness of stock prices improves due to the increase of voluntary public disclosures in large firms and the increased incentives for private information collection in small firms. Female directors are more likely to provide disclosures to the owners that will increase the incremental information content of the annual report narratives and are more likely to provide an equal opportunities information environment.

Supporting an informative position as opposed to an opportunistic position, female directors will exhibit lower tolerance to opportunism in the reporting process. Including female directors in the board will improve reporting discipline and increase investor confidence in management communication. This is because females are seen to be of higher moral maturity than men and less tolerant of opportunism (Srinidhi, Gul and Tsui 2011). According to the Merkl-Davies and Brennan (2007) framework, emphasis on good news is an opportunistic impression management strategy supporting agency theoretic assumptions of management self-interest. Likewise, obfuscation hypothesis advocates that complexity or reading difficulty of annual report is an opportunistic measure used by management to conceal management communication to shareholders (Li 2008).

The findings in the accounting literature and as supported by Adams and Ferreira (2009) show that females in the board are more effective in the monitoring of managers and will demand greater accountability for management performance. If female directors provide better accountability and the complexity of management communication is obfuscation of information, then it is expected that firms with more female directors in the board will have reports that are less difficult to read because they constrain opportunism. Likewise, if the emphasis of good news is an opportunistic action to manage shareholder impression, because management is held

accountable for its reports, the expectation is that firms with more female directors will have annual report narratives with a lower positive slant.

H2a: Greater board female participation is associated with annual report narratives that are less difficult to read

H2b: Greater board female participation is associated with a lower positive slant in annual report narratives

6.2.4 Expertise of the Board (Board Tenure) and Narrative Communication

Corporate governance code with specific provisions on the tenure of board members relates this with succession planning. It provides that there should be satisfactory plans in place for orderly succession of existing members so as to maintain balance of skills and experience and ensure progressive board refreshing (FRC September, 2012). The corporate governance code goes further to state that it is important that knowledge of the company on the board be maintained. This is done by ensuring there is a balance of knowledge in the boardroom such that there are members with adequate knowledge and experience of the board as well as members that are refreshing and are a fresh pair of eyes that can see differently from the status quo.

The expertise of the board is a measure of the average number of years that directors serve on the board. It is a proxy for the presence of directors that can be easily influenced by management due to familiarity because, with a longer director tenure managers will potentially capture decision making (Anderson, Mansi and Reeb 2004). This is supported by the evidence provided by Anderson, Mansi and Reeb (2004), which show that an increase in the tenure of board members increases the cost of debt for the firm. Cost of debt increases because the debt holders cannot rely on the financial reports as per increased tenure reduces the integrity of the financial reporting process, which creditors rely on for debt assessment.

There are benefits of increased board tenure; board members will elicit better communication, function better as group while also providing an opportunity for good succession planning for incoming members. Better communication can mean that they have either identified ways of providing informative reports to the shareholders or from an opportunistic perspective have adopted opportunistic measures of management communication. The latter option of an opportunistic capture will support the evidence in Anderson, Mansi and Reeb (2004) of reduced integrity in financial reports.

Following agency theoretic assumptions, if longer board tenure increases opportunities for collusion and aligns goals of self-interest amongst the directors, then it is more likely that boards with longer tenures will manage impressions by writing narrative communications that have a higher positive slant. However, reading difficulty in report communication can be reduced because of the directors' familiarity with the narrative reporting process or it can as well be reduced to ensure positive communication to shareholders is clearly received. Thus, it is expected that firms with longer tenure of board of directors will have reports that are less difficult to read.

H3a: Greater board expertise (longer tenure) is associated with less difficult to read annual report narratives

H3b: Greater board expertise (longer tenure) is associated with higher positive slant in annual reports

6.2.5 Board Size and Annual Report Narrative Communication

Several firm specific factors determine what board size is suitable as a good governance structure for the firm. The UK corporate governance code specifically states that the board size should be sufficient to meet the requirements of the business and be able to manage changes in board composition and committees without undue disruption, being not too large to become unwieldy (FRC September, 2012). While there is no specifically stated optimum size for the board it is clear that

the size of the board can materially affect the effectiveness of the board. This is because the number of directors in the board determines the number of independent directors monitoring management, the number of board members in the board committees and other monitoring roles, which makes the board more effective by constraining opportunistic actions of the firm (Srinidhi, Gul and Tsui 2011).

Board size is associated with board independence and the ability of the board of directors to be efficient in its monitoring role. In addition, Klein (2002b) finds that audit committee independence increases with board size. The audit committee is directly responsible for the financial reporting process, thus, its independence is more likely to increase the integrity of the financial reporting process. However, the size of the board can act as a deterrent to efficient and effective decision-making process. Smaller boards have been found to be more effective, and associated with higher firm values and CEO monitoring (Yermack 1996). The benefits of monitoring gained from bigger boards could be outweighed by the cost of slow decision-making and less candid discussions making easier for a dominant individual to control. For instance Jensen (1993) finds that when the boards go beyond seven or eight members it becomes less effective and easier for the CEO to control.

Despite the advantages of a smaller board for management such as increased firm values, the inherent monitoring effectiveness that is associated with larger boards means that larger boards are more likely to provide increased integrity in the financial reporting process. Anderson, Mansi and Reeb (2004) show that the cost of debt is inversely related to board size. An increase in the size of the board will increase both the monitoring capacity of the board and the expertise available in the board, thus, as noted earlier it will make board committees both more independent and more efficient. This is because there are more board members to allocate to committees without overload of workload for each member. If larger boards are more effective in monitoring the financial reporting process, then annual reporting communication should benefit from a more transparent and less complex communication. With respect to the readability of annual report, firms with larger boards will have annual reports that are less difficult to read because they will

constrain opportunistic actions of management. With respect to tone, firms with larger boards will seek to provide a balanced view of the firm as recommended by the financial reporting council (FRC 2009), thus this study does not expect tone to increase or decrease with board size.

H4a: Larger Board of directors are associated with Annual report textual communications that are less difficult to read

H4b: There is no relationship between board size and the tone of annual reports

6.2.6 Board Nationality Diversity and Annual Report Narrative Communication

Recent regulations of corporate governance on diversity in the board encourage the presence of board members with differing backgrounds to satisfy the shareholders that the directors are not likeminded (FRC. March, 2011). Increasing diversity in nationalities ensures differing background and informs shareholders that leadership is more likely to increase international opportunities for the firm. Srinidhi, Gul and Tsui (2011) observes that international directors bring value to the firm through diverse cultural practices because they broaden the scope of attention bringing more perspectives to the board's attention. This means that the board is better positioned to evaluate critical decisions and make better-informed decisions. However, it is not clear how foreign directors will affect communication to shareholders.

One argument could be that foreigners will increase the complexity in the communicated information because they have to deal with communicating mainly in the local standards of which they may be less familiar. The first effect of this will be difficulty in evaluating management performance (as based on the local standards) and second effect is the difficulty in monitoring and constraining opportunistic actions of management, which may be more difficult to identify. Masulis, Wang and Xie (2012) observes that these effects will increase agency problems between management and shareholders.

Masulis, Wang and Xie (2012) studies the impact of foreign independent directors and observes that the monitoring role is weak and there is a higher tendency of financial misreporting and high CEO compensation with an increase in foreign independent directors. However, Masulis, Wang and Xie (2012) observe the advisory role of the foreign independent directors can be quite effective because of the first-hand knowledge of foreign markets and extended network.

Contrary to the definition of foreign directors in Masulis, Wang and Xie (2012) as directors not based in the firm's country, this study defines nationality diversity as number of directors with other nationalities. Consequently, because other nationalities in the case of this study are not necessarily directors not based in the UK, these directors may be familiar with country rules etc. However, what remains common is that there is a cultural difference with respect to the background of these directors. These cultural differences will be more prevalent in their approach to narrative reporting. This is because narrative communication is usually not standardised and is therefore subjective to the writer's background. It will highlight that they are unfamiliar with the culture of the country. If firms with diverse nationalities in the board struggle with synchronization due to cultural differences, it is more likely that these will decrease performance as management performance is poorly evaluated. Poor firm performance is associated with a lower positive slant in annual report. However, because management opportunistic actions are not constrained, it is more likely that management will tend to obfuscate negative communication to shareholders by making narratives more difficult to read.

H5a: Greater board globalisation is associated with more annual report narratives that are more difficult to read.

H5b: Greater Board globalisation is associated with a lower positive slant in annual reports.

6.3 Data and Methodology

6.3.1 The Sample

This study uses the sample of companies listed in the FTSE All Share (FTALSH) index. To obtain the list of companies in the FTALSH, the study uses the list obtainable from the Thomson One Banker database. This is the FTALSH list in the Thomson One Banker database as at 2011. The FTALSH companies are large premium listed companies with strict disclosure rules. These disclosure rules are aimed at enhancing investor communication. This is important as underpinning the research design of this study is in what manner firms communicate to investors. Explicitly included in the disclosure obligations for the FTALSH index companies under listing rules is 'Premium listing principle 4'. Premium listing 4 in the FSA handbook requires a listed company to communicate information on the business to its owners and potential owners in a way that it avoids "the creation or continuation of a false market" in its listed shares (FSA Instrument 2010). This further emphasises the importance of the investor communication obligation of the firms in the FTALSH index.

The FTALSH index is a representative sample for studies assessing the impact of disclosures on investors. This is because the index represents 98% of the United Kingdom's market capitalisation (FTSE 2012). Therefore, empirical analysis using this sample provides robust results for the determinants and consequences of disclosure communication. In addition, the FTSE factsheet highlights that the index is designed so as to be suitable for use as a performance benchmark (FTSE 2012). Annual reports for each firm in the FTALSH index are downloadable from Thomson One Banker database or the Company websites. This study uses reports from 2000

to 2011 retrieved mainly from Thomson One Banker database. Where the report is unavailable from the database, the annual reports are retrieved from the company websites. Using the period 2000 to 2011 provides a time series that will inform on the changes to the complexity of annual reports over time providing robust results independent of time specific effects in the research design. This process produces a sample of 4,347 annual reports downloaded from these sources.

Most studies investigating the narratives in the UK regulatory regime use small sample sizes, for a full review see Jones and Shoemaker (1994). This study uses a large sample of firms that are constituents of the FTALSH Index. To implement the complexity models described in chapter 5, the study uses the textual content of the annual reports. Sampling methods and sample size have an impact on the results of textual analysis studies. The common sampling methodology used in most UK studies has been the use of 100-word sections from parts of the report. These sections are used as the representative text for all the text in the report or the specific part of the report analysed. This is because the textual scores are calculated manually. However, using 100-word sampling is likely to bias the results towards the sections chosen. Advances in information technology have offered accounting researchers the opportunity to investigate the linguistic features using an adequate representation of text. This study performs the test of reading difficulty and tone of the annual report using all the textual contents in the annual report, as opposed representative 100-word sections for each report.

The data collection process excludes reports, which are interim reports but presented as annual reports. For firm year observations with annual reports that are less than 2000 words, the study eliminates these reports from the sample. After application of the Perl En Fathom and Perl program for tone analysis discussed in the next section, the study eliminates firm year observations that return missing or extreme values. This occurs because the Perl program is unable to read the text in the computer due to the format of the file, which does not allow the text to be computer readable. Furthermore, the study eliminates firm years with no matching financial statement data.

This produces a final sample of 1,916 firm years from the 4,347 firm years initially downloaded over the period between 2000 and 2011. Table 6-1 shows the sampling process, which produces the final sample.

Table 6-1: Sample Selection Process

Sampling Process	
Event	**Firm Years after Event**
Initial annual report collections/downloads	4,347
Eliminate interim reports presented as annual reports	4,268
Eliminate observations with less than 2000 words	4,231
Eliminate report with missing/extreme values from Perl En Fathom	4,226
Eliminate observations with no corresponding financial statement data	<u>1,916</u>
Final Narrative firm year observations =	**<u>1,916</u>**

6.3.2   Measuring the Readability and Tone of Narrative Disclosures

Earlier accounting research on readability, measures the fog index of annual reports by using 100-word samples of text from different sections of the paragraph (Courtis 1986; Schroeder and Gibson 1992). However, with developments in technology, researchers are able to obtain a complete representation of the text using computer-assisted programs. For example Li (2008) uses Perl programming language to compute readability scores of annual reports including all the text in the report for computing the scores. Tone on the other hand, has incorporated the developments in accounting research in its research process for a few years. This is particularly because tone research became popular with the involvement of technology

development in linguistic research e.g. the use of the Diction software. This study uses as its sample unit the narrative disclosures in annual report. It assesses the readability and tone of the complete text of a company's annual report narrative per firm year. Its recording unit are the words in each sentence and the syllables in each word.

To measure the text for readability and tone, first download the PDF files for the FTSE ALL SHARE companies. Extract all text from the PDFs by converting the PDF files to text format. This process is important as it enables the Perl program to read the text in the files. The process of text extraction extracts all text from the document, presenting only the text for the analysis. To parse the text for input into the readability Perl module, the researcher writes a Perl code that cleans up the text by removing text encodings and full stops between two numbers. It is important to remove the text encodings to avoid misrepresentation of the text file. In addition, it is important to remove the full stop between numbers as the Perl module identifies the full stop as the end of a sentence.

The next step after the file conversion and parsing process is to input each file into the Lingua EN Fathom Perl module, which reads the text files and returns the readability result. The Lingua En Fathom Perl module, used in various studies (for instance Li 2008; Miller 2010; Lehavy, Feng and Merkley 2011) is a Perl code written to calculate the readability of English text. It takes as input a text file and calculates various text based statistics of the input file. Its criteria for identifying words are that a word must consist of letters and at least a vowel sound. To ensure robustness in the word identification process, it does not count symbols such as '&' as words, and does not identify abbreviations as words. It defines a sentence as a group of words and non-words terminated with a full stop, question mark, or exclamation. This study compares the result of the Perl program to manually calculated results and results from other studies to assess the validity of the Program.

Loughran and McDonald (2011), measure the tone of a 10-K report using proportional weights, defined as negative word counts in the annual report relative

to total number of words in the annual report. To apply this formula, this study uses a bag of words approach similar to the approach used in the Loughran and McDonald (2011), which requires parsing the document into vector of words and word counts. To obtain a word list count, the study needs to split the text in the report to words. To split the text to words this study uses the Perl Module, Lingua EN Splitter. This module splits a document into words by identifying words as a group of letters separated by a space or punctuation from another group of letters.

The researcher writes a Perl program that takes as input the split words (results files of the EN splitter analysis) including words with hyphens as one word following Loughran and McDonald (2011). This loops through the Negative word list (Fin-Neg) developed by Loughran and McDonald (2011) for application in a business context. The program loops through the Fin-Neg list to identify words in the Fin-Neg list appearing in the annual report file (split words). The code produces the total count and list of the words in the Fin-Neg list appearing in the annual report file. The count produced relative to the total number of words appearing in the document is the tone score measure for the annual report. To validate the output of the program the researcher manually counts the word appearances and this produces the same results as that produced by the program. The next step is to transform the tone measure to a measure of positive slant by multiplying the score by -100 following Gurun and Butler (2012), this provides a range of score of between -100 and 0. This enables the use of a negative word list to measure the positive slant of disclosure, as the literature on tone shows that negative words have a higher impact than other word lists (Tetlock, Saar-Tsechansky and Macskassy 2008; Davis and Tama-Sweet 2012).

6.3.3 Variable Definitions

Table 6-2 provides the definitions of the variables used in this study; it includes the fog index, word complexity, sentence complexity, positive slant, and the determinant variables.

Table 6-2: Variable Definitions

Variable	Definitions
Fog_Ind	*The fog index measures the reading difficulty of annual reports. The higher the fog index the more difficult it is to read the annual reports*
Word_C	*Word complexity Index measures the word difficulty level in annual reports. As word complexity score increases, the annual report has a higher number of complex words.*
Sent_C	*Sentence Complexity Index measures the sentence difficulty level of annual reports. As sentence complexity score increases, the annual report has a higher number of complex sentences.*
Pos_S	*Positive Slant measures the slant of annual report narratives towards positive discussions. As the positive slant measure increases, the annual report has a higher positive slant.*
Age_mean	*Age is the average age of board members As the Age score increases, the directors in the board are older.*
Per_F	*Per_F is the percentage of female in board. As the female score increases, there are more females in the board of directors.*
Board_size	*Board_size is the number of board members. The higher the figure for board size the larger the size of the board of directors.*
Serv_exp	*Service Experience is the average years of board members on the board. The higher the Experience score, the longer the average board tenure of the members of the board.*
Nation	*Nation is the number of nations that board members come from. The higher the Nation score, the more nationalities there are in the board.*

6.4 Results

6.4.1 Descriptive Statistics

Table 6-3: Descriptive Statistics of Board Characteristics

This table presents the descriptive statistics of the board characteristics of the sample of study. It provides descriptive statistics of the mean, standard deviation (Std), maximum (Max), 95th percentile (p95), median, 5th percentile (P5) and minimum (Min) for the sample of study.

	N	Mean	Std	Max	P95	Median	P5	Min
Age_mean	1776	54.71	3.08	65.25	59.42	54.9	49.4	35.75
Per_F	1776	0.08	0.09	0.75	0.25	0.08	0	0
Board_Size	1776	11.15	3.28	25	17	11	7	4
Serv_exp	1776	5.06	1.93	15.5	8.5	4.86	2.29	0
Nation	1776	2.17	1.32	9	5	2	1	1

Variable Definitions

Age_mean is the average age of board members.

Per_F is the percentage of female in board.

Board_size is the number of board members.

Serv_exp is the average years of board members on the board.

Nation is the number of nations that board members come from.

Table 6-3 provides descriptive information for the board composition characteristics of the sample. Table 6-4 presents a correlation matrix of the board composition variables. Table 6-3 shows means, medians, standard deviations, percentile and minimum and maximum scores. Table 6-4 provides correlation coefficients of the association between the variables and the significance of the coefficients.

The average size of the board of directors in the sample is a little above 11 members. This is similar to that reported in most studies, which is about an average of 12 members in a board (Klein 1998; Yermack 1996). The standard deviation of the

board size is about 3. There is a maximum and minimum value of 25 members and 4 members in a board respectively. The average age of the members of the board in the sample is about 55 years, with a standard deviation of 3 years. The board with the oldest members has an average age of about 65 and a quarter years and the board with the youngest members has an average age of about 36 years, between the board members.

The percentage of females in the board varies widely across the sample from a minimum of 0% of board members to a maximum of 75% of board members. This means that some firms have no females in the board of directors, while some firms have up to three-quarters of the members of the board as females. There is also substantial variability in the number of nationalities that can be found in the board of directors, from a maximum of nine nationalities in a board to a minimum of one nationality in the board of directors. Average tenure on the board as measured by the variable serv_exp is about 5 years, with members serving for as long as 15 years.

Table 6-4 provides correlation coefficients between the board composition variables. In general, larger board tend to have more female members, older members, and a higher number of nationalities between the board members. This means that the larger the board the more opportunities there are for diversity in the board with respect to female members and nationality of members. However, from the table, firms with larger boards have members with on average a shorter tenure, as there is a significant negative correlation between board size and board tenure (Serv_exp), which indicates that a decrease in board tenure is associated with an increase in board size.

Firms with older directors in the board have less female members in the board. However, older members appear to have longer tenures on average, and a higher number of nationalities between them. On average female board members, generally have shorter tenures. The female board members do appear to have more diversity with respect to the nationalities of the female members. This analysis indicates that firms with a higher number of female members in the board are more likely to have

a larger board of directors consisting of members from more nationalities and are younger. In table 6-4, all the correlation coefficients are significant at the 0.01 level. Thus, to control for the effect of the board composition variables, this study also uses a multivariate framework to explore the relationship between the board composition variables and the narrative variables measuring the communication in annual reports.

Table 6-4: Pearson Correlation Matrix

Pearson Correlation Coefficients of the Governance Variables

Table presents the correlation coefficients that estimate the correlation between the governance variables used in this chapter. Age_Mean is the average age of board members; Per_F is the percentage of female in board; Board_Size is the number of board members; Experience is the average years of board members on the board; Nation is the number of nations that board members come from. Sample size N = 1776.

	age_Mean	per_F	board_size	experience	nation
Age_Mean	1				
Per_F	**-0.18618***	1			
Board_Size	**0.17879***	**0.17955***	1		
Serv_exp	**0.25601***	**-0.17856***	**-0.24016***	1	
Nation	**0.2825***	**0.1226***	**0.54902***	**-0.17412***	1

***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

6.4.2 Univariate Analysis

To test the hypotheses of the determinants of annual report narrative disclosures stated earlier in the chapter, this study first performs a t-test univariate analysis. Table 6-5 presents the results of the univariate analysis of the determinants of annual report narrative communication. The unit of analysis of the scores is based on the column headings, which is the narrative variables. The variable q1 to q5 represents the quintiles groups of the board composition variables, q1 is the group in the lowest quintile and q5 is the group in the highest quintile.

Table 6-5 : Univariate Analysis

Univariate Analysis: Board Composition as Determinants of Annual Report Narratives

This table presents the univariate results testing board characteristics as determinants of the reading difficulty and slant of textual discussions in annual report narratives. Results reported are of the following univariate analysis: t-test of whether q1 = q5. Each year firms are sorted into quintiles based on the value of the board variables, with q1 = lowest quintile and q5 = highest quintile. The board variables are as defined in Table 6-2. The unit of analysis is the mean of the narrative variables for all firm years in specific quintiles. ***, **, and * represent statistical significance of the t-test at the 1%, 5%, and 10% levels, respectively.

Nar. Var	Mean FOG_Ind	Mean WORD_C	Mean SENT_C	Mean TONE
	(1)	(2)	(3)	(4)
Board Var				
age_mean_q				
q1	21.89	**26.41*****	28.33	**-0.97*****
q2	21.78	26.26	28.2	-0.97
q3	21.93	26.56	28.26	-1.03
q4	21.79	26.65	27.81	-1.04
q5	22.01	**26.81*****	28.21	**-1.06*****
Per_f_q				
q1	21.81	26.51	28.01	**-0.99****
q2	22.03	26.51	28.56	-1.05
q3	22.06	26.65	28.5	-1.01
q4	21.88	26.64	28.06	-1.06
q5	21.73	26.4	27.92	**-1.03****
board_size_q				
q1	**21.86*****	**26.48*****	**28.16****	**-0.98*****
q2	21.84	26.51	28.1	-1
q3	21.61	26.45	27.58	-0.99
q4	21.91	26.47	28.31	-1.03
q5	**22.17*****	**26.82*****	**28.61****	**-1.1*****
Serv_exp_q				
q1	**22.04*****	**26.63****	**28.47*****	**-1.09*****
q2	22.06	26.55	28.59	-1.06
q3	21.96	26.55	28.35	-1
q4	21.81	26.54	27.99	-0.98
q5	**21.52*****	**26.41****	**27.39*****	**-0.94*****
nation_q				
q1	**21.64*****	**26.23*****	**27.87*****	**-0.96*****
q2	21.98	26.73	28.22	-1.01
q3	21.88	26.57	28.12	-1.02
q4	22.25	26.94	28.69	-1.07
q5	**22.07*****	**26.77*****	**28.41*****	**-1.1*****

The table shows that the fog index of annual reports increases with board size, number of nationalities in the board, and decreases with board tenure. The upper quintile of firms with larger boards have annual reports that are more difficult to read, the reading difficulty is significantly different from the fog index of firms in the lower quintile of board size. Similarly, firms with a higher number of nationalities between the board members have annual reports that are more difficult to read. On the other hand, the univariate analysis shows that where the average board tenure is longer the annual report is easier to read.

Column 2 and column 3 of table 6-5 measure the word and sentence complexity of the annual report narratives. Larger board of directors with older members, with more nationalities between them, have annual report narratives with more complex words. While larger board of directors with a higher number of nationalities between them have annual reports with more complex sentences. Consistent with the complexity measure of the fog index in column one, it is observed that where the average tenure of board members is longer, the annual report narratives contain words and sentences that are less difficult to read. In table 6-4, it was observed that there is a positive association between larger boards and boards with more member nationalities, therefore testing the hypotheses in a multivariate will control for the effect of other board composition variables.

Column 4 of table 6-5 shows that boards with older members have annual reports with a lower positive slant. It is observed that boards with more female members have annual reports with a lower positive slant. Larger boards and boards with a higher number of nationalities between the members have annual reports with a lower positive slant. Boards with on average a longer tenure have annual reports with a higher positive slant, indicating that it is more likely that boards that have directors with longer tenures, have narrative reports that are more positive. The next section presents the results of testing the hypotheses in a multivariate setting, to assess if the associations will hold after controlling for other board characteristics.

6.5 Multivariate Analysis

6.5.1 Primary Specification

In the primary specification, the test is of the cross sectional relation between board composition variables and the narrative variables. The variable for abnormal earnings tested in the last chapter is included as a benchmark.

That is

$$NAR\_VAR_{it} = Intercept + \beta_1 Group\_Earn_{it} + \beta_2 Age\_Mean_{it} + \beta_3 Per\_F_{it} + \beta_4 Serv\_exp_{it} + \beta_5 Board\_Size_{it} + \beta_6 Nation_{it} + [\![\varepsilon]\!]\_it \quad ....Eq. 6-1$$

Where Nar_Var is the narrative measure of fog index, word complexity, sentence complexity and positive slant each in turn. $Group\_Earn$ is the variable for abnormal earnings, Age_Mean is the variable for average director age in the board of firm i at time t, Per_F is the percentage of female members in the board of firm i at time t, $Serv\_EXP$ is the average board tenure of all board members in the board of firm i at time t, $Board\_Size$ is the number of board members in the board of firm i at time t, $Nation$ is the number of nationalities in the board of firm i at time t.

To test the hypotheses, the primary interest of this study lies in the coefficients and the sign of the coefficients of the independent variables. Positive coefficient estimates in column 1 are consistent with a higher positive slant given an increase in the corresponding board composition variable. Positive coefficient estimates in columns 2, 3, and 4 are consistent with more difficult to read narrative communication given an increase in the corresponding board composition variable.

Column 2 of Table 6-6 provides the primary regression results: Positive slant of disclosure is the dependent variable for equation 6-1. The t-values are corrected for heteroskedasticity using White (1980) standard errors. Consistent with the results in the previous chapter, higher abnormal earnings significantly increases the positive slant of the annual report. This shows that controlling for the composition of the

board, higher abnormal earnings significantly increases the positive slant of the annual report discussions, consistent with emphasis on good news when performance is good. The test of board composition as determinants of narrative communication test what influence the characteristics of the board have on the tone and readability of narrative communication.

The results indicate that greater board member experience in age is associated with lower positive slant in annual report communication. This is consistent with the hypothesis that younger board members are associated with more positive performance and thus emphasis on good news. The coefficient estimate on AGE is -0.014 with a t-statistic of -6.95. This is also consistent with the concept that older directors are poorer monitors. With poor monitoring, managers are more likely to perform poorly, which means more discussions in the annual report that are negative (lower positive slant).

Consistent with the obfuscation hypothesis, managers will obfuscate information where discussions are more negative. This will occur where the monitoring board members are less effective in the monitoring role. The results in column 2 and 3 indicate that firms with on average older board members have annual reports that are more complex. The fog index is significantly higher and the percentage of complex words is significantly higher when the members are older. This follows the opportunistic perspective, which hypothesises that with poor monitoring, management will obfuscate negative communication to investors.

Table 6-6 : Multivariate Regression Analysis

Board Composition as Determinants of Annual Report Narrative Quality

This table reports the results of the following regression: Dependent Variable = α+ βindependent Variables + residual. The dependent variables are Tone slant, Fog index, Word complexity, and Sentence complexity as presented in columns (1) to (4) respectively. The independent variables are as listed under the column independent variables. The unit of analysis is the dependent variable as reported for each column. The independent variables are defined in Table 6-2. The model uses White (1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable:	Tone	Fog_Ind	Word_C	Sent_C
	(1)	(2)	(3)	(4)
Independent Variables:				
Intercept	-0.2702**	20.906***	23.621***	28.644***
	(-2.4)	(37.15)	(42.93)	(22.18)
Group_Earn	0.0164***	-0.004	-0.01	-0.001
	(4.11)	(-0.19)	(-0.47)	(-0.02)
Age_Mean	-0.014***	0.022**	0.0521***	0.0029
	(-6.95)	(2.05)	(4.97)	(0.12)
Per_F	-0.131**	-0.226	0.0133	-0.578
	(-2.01)	(-0.67)	(0.04)	(-0.78)
Board_Size	-0.004	-0.015	-0.022*	-0.015
	(-1.5)	(-1.25)	(-1.81)	(-0.58)
Serv_exp	0.0265***	-0.062***	-0.014	-0.141***
	(8.1)	(-3.54)	(-0.82)	(-3.58)
Nation	-0.019***	0.1243***	0.1756***	0.1351*
	(-3.39)	(3.94)	(5.65)	(1.95)
R-Square	0.1121	0.0235	0.0486	0.0109
Adj R-Sq	**0.109**	**0.0202**	**0.0454**	**0.0076**

The coefficient estimate on the percentage of female directors in column 1 is -0.131 with a t-statistic of -2.01, indicating that firms with more females as members of the board of directors have annual report narratives with a lower positive slant. An additional 1% of female members to the board, reduces the positive slant of the reports by 0.131. These results are economically significant such that the impression

management effect achieved through emphasis on good news when performance is poor (coefficient estimate of 0.0164 for group_earn variable) will be constrained by the increase of female directors in the board. This is consistent with the expected hypothesis that firms with more female board participation have annual reports with a lower positive slant. It follows the literature findings that show female directors in the board will improve reporting discipline by constraining opportunism in reporting. Thus, female directors will mitigate impression management.

Holding other board composition factors constant, in column 1, the size of the board has no significant effect on the positive slant of narrative communication. However, in column 3, larger boards have annual report communication with less complex words, indicating that larger boards significantly constrain management opportunistic actions of information obfuscation. This confirms the concept that larger boards are more effective in the monitoring role of boards due to the presence of more effective board committees and more directors that are independent. On average, longer board tenure is associated with narrative communication with a higher positive slant, supporting the hypothesis that longer board tenure tends to encourage collusion amongst board members, which creates allowance for opportunistic actions of management through impression management. The coefficient estimate on board tenure in column 1 is 0.0265 with a t-statistic of 8.1. Likewise, confirming the hypothesis, longer board tenure is associated with less complex reports. Lower complexity could be due to either experience with management communication to investors, which may inadvertently incorporate simpler words, or not constraining opportunistic action of management i.e. making positive discussions easier to read.

Observing from all four columns, the variable Nation is significant in all cases, indicating the importance of this board composition variable for narrative communication. In a multivariate setting, it confirms the results of the univariate analysis. Lower positive slant is associated with poor performance, thus the coefficient estimate of -0.019 t-statistic of -3.39, confirms the hypothesis that firms with more nationalities in the board may have discussions that are more negative.

The results in columns 2, 3, and 4 shows that board of directors with more nationalities on the board are associated with annual report communication that is more difficult to read. Column 2 indicates that an additional nationality on the board significantly increases the fog index by 0.1243, percentage of complex words by 0.1756 and words per sentence by 0.1351, all significant at the 0.01 level. This indicates that more nationalities on the board will not limit management opportunistic actions of obfuscating narrative communication. This may be due to lack of familiarity with cultural narrative systems, which will inhibit the monitoring process.

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6.5.2 Sensitivity Analysis

The analysis above assumes that the board composition factors influence narrative communication notwithstanding firm-specific characteristics. However, the previous chapter identified that firm-specific characteristics are determinants of narrative communication in a firm's annual report. As such, the study further examines the effect of the board composition factors holding the identified firm characteristics constant. The results are reported in Table 6-7. The results are reported in a similar format to the results in table 6-6 and include the coefficient estimates for the board composition variables and the control variables.

The Firm-specific control variables include firm age, price volatility, business complexity, geographical complexity, and firm size. The study expects firm age, firm size, volatility, and complexity of the business to be negatively related to the tone of disclosure. This means that older firms, larger firms, more volatile and more complex firms have a lower positive slant in their annual report. The results for the control variable are consistent with this expectation, which is consistent to the results in the previous chapter. In addition, consistent with previous results, the study finds that firm age and reading difficulty are negatively related, indicating narrative complexity increases for younger firms. This is also confirmed with the negative relation between firm age and sentence complexity. The remaining control

Table 6-7: Robust Regression Model

Governance Characteristics and firm Characteristics as Determinants of Annual Report Narrative Quality

This table reports the results of the following regression: Dependent Variable = α+ βindependent Variables + residual. The dependent variables are Tone slant, Fog index, Word complexity and Sentence complexity as presented in columns (1) to (4) respectively. The independent variables are as listed under the column independent variables. The unit of analysis is the dependent variable as reported for each column. The independent variables are defined in Table 6-2 and Chapter 5: Table 2. The model uses the (White 1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable:	Tone (1)	Fog_Index (2)	Word_C (3)	Sent_C (4)
Independent Variables:				
Intercept	-0.22* (-1.86)	20.427*** (30.35)	24.825*** (37.53)	26.242*** (17.01)
group_earn	0.0127*** (3.03)	-0.004 (-0.17)	-0.001 (-0.06)	-0.009 (-0.16)
age_Mean	-0.009*** (-3.87)	0.0199 (1.6)	0.0173 (1.41)	0.0325 (1.12)
per_F	-0.132* (-1.93)	-0.406 (-1.16)	-0.236 (-0.66)	-0.779 (-0.99)
board_size	0.0043* (1.68)	-0.039*** (-2.61)	-0.037** (-2.41)	-0.06* (-1.75)
Serv_exp	0.019*** (5.73)	-0.028 (-1.55)	0.0221 (1.23)	-0.091** (-2.26)
nation	-0.004 (-0.65)	0.0196 (0.59)	0.0711** (2.04)	-0.022 (-0.29)
F_AGE	-0.001*** (-5.53)	-0.007*** (-5.54)	-0.002 (-1.43)	-0.017*** (-5.56)
P_VOL	-0.004*** (-5.58)	0.0098*** (2.64)	0.0004 (0.12)	0.0241*** (2.77)
BUS_C	0.0005 (0.05)	0.0047 (0.08)	0.0661 (1.18)	-0.054 (-0.38)
GEO_C	-0.074*** (-6.94)	0.2413*** (3.64)	0.4106*** (6.9)	0.1927 (1.25)
F_SIZE	-0.029*** (-5.62)	0.1027*** (4.46)	0.0761*** (3.05)	0.1807*** (3.44)
R-Square	0.1946	0.0756	0.0836	0.049
Adj R-Sq	0.1885	0.0686	0.0766	0.0417

variables measuring the firm size, volatility and complexity of operations are positively related with narrative complexity. This indicates that complexity increases for bigger, more complex and more volatile firms.

Testing the sensitivity of the results in table 6-6 to firm specific characteristics show that holding these firm specific characteristics constant, the average age of board members has no significant effect on the complexity annual report communication. This implies that given firms with similar characteristics based on the control variables used, the age of board members does not significantly influence the reading difficulty of the annual report narratives. However, the coefficient for age in column 1 remains significant indicating that given similar firm characteristics, the average age of board members significantly influences the tone of the disclosure. The sign of the coefficient is consistent with the previous analysis in table 6-6; on average older board members are associated with narratives with a lower positive slant. Similarly, the table shows that holding these firm characteristics constant, the number of nationalities in the board does not significantly affect the tone of disclosure. However, consistent with previous results in table 6-6, the number of nationalities does significantly increase the complexity of words in narrative communication.

The results for female board members and board tenure are consistent with the analysis in table 6-6. This indicates that the percentage of females in the board is an important determinant of the tone of annual report narratives, and the length of service in the board is an important determinant of the tone and reading difficulty of narrative communication.

What is interesting is that the size of the board appears to be significantly associated with all the measures of narrative communication when holding other firm characteristics constant. Board size increases with the positive slant of annual report narrative, indicating firms with larger boards have annual reports that have a higher positive slant. Conversely, table 6-7, column 2 indicates that larger boards have

annual reports that are easier to read. The coefficient estimate on board size is -0.039 with t-statistic of 2.61. This is also confirmed by the negative coefficients for board size in column 3 and column 4. This indicates that given similar firms, board size is associated with a higher positive slant and easier to read reports. The result on board size can be interpreted as either increased monitoring, thus improved performance or reduced cohesion between board members (due to size) leading to dominance of CEO, thus more opportunistic actions. An opportunistic action because managers are emphasising on good news, thus, making these discussions easier to read.

Board size and the number of nationalities in the board appear to be important determinants of the complexity of words in the annual reports. From column 3, it is observed that larger boards reduce the complexity of words; however, firms with more nationalities in the board have annual reports with more complex words. This confirms the hypotheses that due to increased efficient (inefficient) monitoring, larger boards (more nationalities in the board) have annual reports with less (more) complex narratives.

From table 6-8, it is observed that the average age of directors in the board remains a strong determinant of the positive slant of annual reports. It confirms the result that firms with younger directors have annual report narratives that are more positive. The size of the board is as well significantly influencing the reading difficulty of annual report as the table shows that bigger board tend to reduce the reading difficulty of annual reports. Additionally, board tenure significantly influences the tone of narrative discussions in annual reports. However, from table 6-8 below, which provides additional robust regression model, this study cannot confirm that the percentage of female directors in the board and the size of the board, are strong determinants of annual report tone.

Table 6-8 : Robust Regression Model (2)

Governance Characteristics and firm Characteristics as Determinants of Annual Report Narrative Quality

This table reports the results of the following regression: Dependent Variable = α+ βindependent Variables + residual. The dependent variables are Tone slant, Fog index, Word complexity and Sentence complexity as presented in columns (1) to (4) respectively. The independent variables are as listed under the column independent variables. The unit of analysis is the dependent variable as reported for each column. The independent variables are defined in Table 6-2 and Chapter 5: Table 3. The model includes included industry and year dummies as control variables. The model uses the (White 1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. The standard errors are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable:	Tone (1)	Fog_Index (2)	Word_C (3)	Sent_C (4)
Intercept	-0.11064 (-0.87)	**20.48575*** (28.99)**	**26.00715*** (37.51)**	**25.20722*** (15.28)**
Group_earn	**0.01439*** (3.6)**	-0.00727 (-0.31)	-0.00381 (-0.18)	-0.01436 (-0.25)
Age_Mean	**-0.00684*** (-3.25)**	0.01938 (1.62)	0.00901 (0.76)	0.03945 (1.39)
Per_F	-0.09707 (-1.42)	-0.67965 (-1.99)	-0.04486 (-0.13)	**-1.65425** (-2.12)**
Board_size	0.000926 (0.36)	**-0.03307** (-2.3)**	**-0.0382*** (-2.65)**	-0.04448 (-1.28)
Serv_exp	**0.01705*** (5.15)**	**-0.06202*** (-3.39)**	-0.01038 (-0.58)	**-0.14466*** (-3.41)**
Nation	-0.00304 (-0.51)	0.03688 (1.17)	**0.06002* (1.85)**	0.03218 (0.44)
F_AGE	**-0.00117*** (-5.7)**	**-0.00618*** (-4.46)**	0.000525 (0.48)	**-0.01597*** (-4.96)**
P_VOL	**-0.0043*** (-5.64)**	**0.00754** (2)**	-0.00093 (-0.25)	**0.01979** (2.2)**
BUS_C	-0.00263 (-0.26)	-0.06303 (-0.99)	0.00352 (0.06)	-0.16109 (-1.06)
GEO_C	**-0.07551*** (-6.72)**	**0.25637*** (3.89)**	**0.3027*** (5.06)**	**0.33822** (2.2)**
F_SIZE	**-0.02999*** (-5.8)**	**0.04994** (2.13)**	**0.04908** (1.96)**	0.07578 (1.39)
Year and Industry Effects	Yes	Yes	Yes	Yes
R-Square	0.274	0.1368	0.1952	0.0896
Adj R-Sq	**0.2587**	**0.1187**	**0.1783**	**0.0705**

6.6 Conclusion

One of the most important responsibilities of the board of directors is the oversight of the financial reporting process (Anderson, Mansi and Reeb 2004). Consistent with this idea, this study investigates the effect of board composition factors on narrative communication in the corporate annual report. The study develops testable hypotheses on the effect of these factors on narrative communication to shareholders. Investigating using a univariate and multivariate setting, it finds that an increase in the average age of board members significantly lowers the positive slant of annual report.

On the other hand, increasing the tenure of board members significantly increases the positive slant of annual report narratives, while reducing the difficulty of the narrative discussions. The analysis also indicates that increasing the size of the board significantly decreases the reading difficulty of narrative communication, while increasing the number of nationalities in the board significantly increases the reading difficulty of narrative communication. In conclusion, the study provides evidence that board characteristics tested in this study are associated with the reading difficulty and tone of annual report narrative communication, suggesting that the board of directors are important elements in the annual report communication process.

7 Annual Report Tone and the Post Earnings Announcement Drift

7.1 Introduction

Post Earnings Announcement Drift documented in accounting literature exhibits the trend of which stock prices move in the direction of unexpected earnings as a result of investors' initial under reaction to the earnings event (Ball and Brown, 1968; Medenhall, 2004). Tone of annual reports as measured in this study is the slant of the narrative discussions in an annual report towards a positive outlook of firm. This chapter studies the effects of the tone of management's textual disclosures in annual reports on immediate and delayed stock returns around earnings event. It assesses the effect beyond the documented effect in the literature captured by the level of unexpected earnings (Ball and Brown 1968).

The objective of this study is to investigate if the tone of annual report textual disclosures provides investors with additional information for the relationship between abnormal earnings and the immediate and subsequent post earnings event returns. Post earnings event in this study refers to the period from the filing of the annual report, this study uses narrative disclosures, and textual disclosures interchangeably to mean the contents of the annual reports that are not in the financial statement numbers. The next section provides the motivation for this study, section 7.3 presents the hypotheses, section 7.4 describes the data, section 7.5 presents and discusses the results of the hypotheses tests, and section 7.6 concludes.

7.2 Motivation

The accounting literature has extensively contributed to research on the information content of financial disclosures for the Post Earnings Announcement Drift, however, the problem is, incorporating information from quantitative factors alone may be inadequate to explain the Post Earnings Announcement Drift (Feldman et al. 2010). Several studies have used these quantitative factors to provide an explanation for the Post Earnings Announcement Drift (Garfinkel and Sokobin 2006), while a smaller number of studies have shown the importance of incorporating non-financial factors to examine stock prices (Amir and Lev 1996).

Qualitative textual information accompanies quantitative information, consequently financial analysts and investors are expected to process the textual information in making judgements of the quantitative financial information. In the specific case of this study, the narratives are included in the annual report in presenting the financial statements. These narratives provide explanations to the figures in the financial statements. In addition, peculiar to the sample of this study the annual reports are filed contemporaneously with the release of preliminary earnings announcements. Therefore, the narratives in the report will provide contextual explanations for both the financial statement detailed accounting numbers and the earnings numbers disclosed in the earnings announcement event. This increases the significance of the narrative disclosures for explaining investor choices; hence investors' reaction to earnings announcement.

Tetlock et al (2008) highlights three sources of information for investors making decisions on their shares; analysts' forecasts, quantifiable publicly disclosed accounting variables, and linguistic descriptions of firms' profit-generating activities. Tetlock et al (2008) goes further to note that as investors have to rely on second hand information, if the first two sources are inaccurate or inconsistent they will tend to look to the third for incremental explanatory and supporting evidence. It is more likely that investors will turn to narrative disclosures in such instances as

Grossman and Stiglitz (1980) notes that an increase in noise reduces the informativeness of an information system.

Further, the motivation for this study is driven from these perspectives; if investors are likely to use management narrative disclosures to make informed decisions, the characteristics of the narratives will have an impact on investors' decision-making process. Specifically, the tone of management narrative disclosures providing explanations to accounting numbers, affects investors' perception of the accounting numbers, which is used in market trading. Further, the results in chapter 5 and 6 show that abnormal earnings levels determine the tone of narratives, thus, motivating this current study to investigate what role tone plays when investors react to abnormal earnings levels. Contributing to the motivation for research in the area of management qualitative disclosures is recent advances in research, which has improved and provided an objective measure for measuring qualitative information, which aims to contribute to measuring what affects the effectiveness of accounting information.

7.3 Hypotheses Development

7.3.1 Post Earnings Announcement Drift

The accounting literature documents a persistent positive relationship between high earnings groups and an immediate upward pressure on stock prices, documenting that this trend continues long after the initial earnings event (Bernard and Thomas 1989; Jones and Litzenberger 1970). This behaviour has been labelled as the Post Earnings Announcement Drift anomaly; it is the tendency for a firm's share price returns to drift in the direction of unexpected earnings (Mendenhall 2004), implying that the higher (lower) the unexpected earnings the higher (lower) the subsequent returns. The explanation for this drift is that investors' under react to earnings announcement initially with a gradual price adjustment overtime causing an increase

(decrease) in returns for firms with high (low) abnormal earnings. This effect has remained persistent from its initial documentation by Ball and Brown (1968) that when actual earnings differs from expected earnings stock prices will move in the direction of the difference.

However, what remains unexplained is the driving force or the cause of this price reaction and subsequent drift. An explanation of the drift is that it represents an under reaction by investors to the income numbers that is driven by risk; investors are more likely to under react to earnings news because acting otherwise increases their risk. The explanation highlights that market forces have not eliminated this observed phenomenon due to the inherent risk of such action, supporting this Mendenhall (2004) provides evidence that the Post Earnings Announcement Drift will be greater for shares that are riskier to arbitrage. Likewise, Bartov, Radhakrishnan and Krinsky (2000) indicates that investor sophistication reduces the magnitude of the Post Earnings Announcement Drift. If investor sophistication reduces risk due to higher accuracy in return predictability, it is expected that firms with a higher amount of sophisticated investors will have lower drift, thus it emphasises the ability of risk to explain the Post Earnings Announcement Drift anomaly. Bartov, Radhakrishnan and Krinsky (2000) use institutional holdings as a proxy for investor sophistication and provide evidence that the predictability of returns as observed in the drift is linked to unsophisticated investors, hence the study concludes that drift is explained by the trading behaviour of small investors.

Related to risk, another explanation for the drift anomaly is that the drift increases with opinion divergence of investors (Garfinkel and Sokobin 2006), implying that factors that will potentially influence the opinion of investors may be driving the observed drift effect. Garfinkel and Sokobin (2006) measures opinion divergence using unexpected volume and shows that the association of opinion divergence and drift is likely associated with investors treating opinion divergence as a risk proxy requiring future compensation. In other words, opinion-diversifying factors are higher for more risky firms and this increases the sensitivity of drift to unexpected volume. An underlying explanation that persists through most explanations for the

drift is the transaction cost factor this is because; most explanations for drift can be narrowed down to the economic factor of profit. If investors cannot make a return that covers their costs then they are more unlikely to exploit existing trends. An evidence of the persisting effect of transaction cost is Bhushan (1994) who uses several proxies for transaction costs and provides evidence of a positive relation between drift and these transaction costs proxies.

The focus of this study is to approach the Post Earnings Announcement Drift from a management disclosure perspective. However, it uses a different approach from the studies discussed above. It assesses if textual disclosures by management in annual reports explains the drift. While textual disclosures by management are more likely to increase transaction costs, opinion divergence and risk similar to the explanations of previous studies of increasing noise, thus uncertainties, this study contributes to this area of research by identifying a specific measure of management disclosures, which contributes to the identified factors and hence potentially drives the drift phenomenon. However, it does not directly use this measure as a proxy for transaction costs and risk. The study measures characteristics of management textual disclosure using the tone of the annual report. It controls for other identified explanations for the drift using specific variables, which proxy for transaction costs and risk identified in the study as firm size, firm age, and price volatility.

7.3.2 Tone and the Post Earnings Announcement Drift

Research Question: Given levels of abnormal earnings, does the identified Post Earnings Announcement Drift increase in tone?

Accounting research examines if the tone expressed in annual report narratives is associated with short-term and future stock returns over and beyond what is associated with unexpected earnings (Demers and Vega 2011; Feldman et al. 2010). Given that the Post earnings announcement drift is explained as caused by an under reaction to earnings information, this study questions what role the tone levels of annual report as reported by management play to increase or reduce this under

reaction and subsequent drift. Tone levels used in this study are from the tone of the annual report released by all firms at the end of their financial year. Therefore, the question is how does the tone of the information in the annual report narratives filed by management affect investors' response to earnings information. However, preliminary earnings announcements occur with the release of the annual report; therefore, new information around the filing date is in two forms. The first is in the form of earnings released and the second comes in form of the tone of the information disclosed in the annual report narratives as measured in this study.

Measuring new information in form of tone, Feldman et al. (2010) assesses if the change in tone of annual report filings provide incremental information beyond unexpected earnings information, and finds that given a 3-day buy and hold return period tone provides incremental information beyond earnings information and contributes to drift in return. Demers and Vega (2011) provides consistent evidence that the tone of management communication provides value relevant news, showing that this news is slowly incorporated into stock prices. These two studies differ in disclosure setting, while Feldman et al. (2010) use the management and discussion analysis section of the 10-K filings, Demers and Vega (2011) use earnings press releases. However, they both provide comparable conclusions of changes in tone of management disclosures being associated with drift. If management influences investors' reaction to unexpected earnings in the annual report through tone, this study expects the Post Earnings Announcement Drift to increase with the tone of narratives in the annual report.

Mendenhall (2004) explains that the Post Earnings Announcement Drift is an under reaction to unexpected earnings but arbitrageurs are not profiting from this apparent under reaction due to risk. On the other hand, Demers and Vega (2011) show that where information from the accounting numbers provide a noisier valuation measure, the market responds more to softer information as represented by tone, especially given soft information that is more credible, for instance firms that provide supporting numerical data and have higher levels of analyst following. Accounting numbers being a noisier valuation measure is an indication of risk; hence, this shows

that it is more likely that with higher firm specific risk, investors are more likely to respond to information in textual disclosures if management have a credible presentation. Therefore, if investors are informed by disclosure tone, the current study expects that observed investor response would be associated with tone.

This study proposes that the Post Earnings Announcement Drift is increased by the tone of management reporting, given that tone represents positive disclosure in annual report narratives. This is because report users study the narratives provided by management in the annual report and this impacts on their decision-making process post annual report filing. Jones and Litzenberger (1970), propose the argument that changes in the beliefs of market professionals contributes to the drift as it causes gradual price adjustments overtime. If the tone of annual reports affects and changes the beliefs of analysts, this study expects that when the annual reports are filed and market professionals read the reports, reports with positive tone will increase subsequent investors' reaction (subsequent returns) to high abnormal earnings.

However, as noted by Engelberg (2008), under reactions to earnings news may be as a result of frictions in information processing. If management communications are difficult to process and incur high transaction costs to decipher, the incremental information content of tone to earnings announcement may provide larger changes in future returns and will likely not provide immediate increase in returns given abnormal earnings levels. Further providing evidence to support this view, Engelberg (2008) using media articles written about firms around earnings announcements show that soft earnings news predicts larger changes in future returns.

Tetlock, Saar-Tsechansky and Macskassy (2008) models the ability of negative words to predict firm fundamentals of which specifically were earnings and returns. They show that negative words convey information incremental to that provided by other historical accounting data. In terms of implications for stock returns, they show that stock markets responds to information in negative words in linguistic

media with a small, one-day delay (Tetlock, Saar-Tsechansky and Macskassy 2008). Tetlock (2007), supports this view and provides additional evidence showing that high levels of media pessimism predicts downward pressure on market prices (Tetlock 2007). This study measures tone using a measure that converts the count of negative words in the report to a positive score. It uses the negative word list developed by Loughran and McDonald (2011). Dougal et al. (2012) uses this word list and supports the evidence in Tetlock, Saar-Tsechansky and Macskassy (2008) and Tetlock (2007), the study showed that in testing Journalist writing, writers using more pessimistic words are associated with more negative next-day returns, hence emphasising the tone and returns relationship.

Empirically, there is support for the expectations that tone is informative for stock returns. Specifically, there is support for using the negative word list developed by Loughran and McDonald (2011) in relation to stock returns. Other studies applying this word list for the analysis of tone and drift include Feldman et al. (2010) and Demers and Vega (2011). These studies support the view that tone is informative for stock returns. In addition to this evidence, in developing the word list, Loughran and McDonald (2011) sort firms in the sample into quintiles based on negative scores obtained applying the negative word list, and finds that firms with reports that are have negative words produce lower stock returns.

Finally, applying an explanation from prospect theory for the relationship between tone and drift, Henry (2008) explains that prospect theory supports the view that how management phrases it's communications will affect how investors will react to explanations of the earnings announcement in management communications. In assessing tone and returns, Henry (2008) show a positive relation between tone and abnormal returns, and a positive relationship between tone and unexpected earnings indicating that earnings press releases of firms that are more profitable have a positive tone and higher returns. However, they show that the effect of tone on market reaction is positive and concave indicating that increase in market reaction is only up to a point (Henry 2008).

Overall, the literature on tone around earnings event suggests that investors trading activity (which generates returns) is driven by several factors. Investors may be reacting to the tone of media stories around earnings announcements supporting the high response to Journalist fixed effects of Dougal et al. (2012). Returns may increase in the direction of the tone of information accompanying earnings press release (Demers and Vega, 2011). Third, investors may be reacting to the tone of the annual report filing contemporaneous to preliminary earnings announcement (Feldman et al. 2010). This study measures the tone of disclosure using the tone of narratives in annual report filings, hence the study assesses if tone of annual report drives the response to drift. While Feldman et al. (2010) assesses the information content of change in tone and uses management disclosure and analysis section of the 10-K filings, this study examines the direct implication of tone levels of the whole annual report for stock returns. It examines the implications of annual report tone for stock returns at given levels of abnormal earnings.

The null hypothesis is that Post Earnings Announcement Drift is independent of the tone of annual report narratives of a firm. The alternative hypothesis is that the drift increases as the tone of annual report increases.

7.4 Description of Data

The main types of data of relevance in answering the stated research questions are; the textual contents of annual reports; the income numbers; the dates of the annual report filing; and the movements of security prices around the report filing dates. Data on the dates of the annual report, the abnormal earnings numbers and the movement of security prices is provided by the University of Leeds Data support. Therefore, this section provides the definitions of these variables. The data collection process on the retrieval of the textual contents of annual reports and

subsequent PERL programming process to estimate the tone of the annual report is provided in detail below.

Table 7-1: <u>Summary of the Sampling Process</u>

<u>Event</u>	<u>Firm Years after Event</u>
Initial annual report collections/downloads	4,347
Eliminate interim reports presented as annual reports	4,268
Eliminate observations with less than 2000 words	4,231
Eliminate report with missing/extreme values from Perl En Fathom	4,226
Eliminate observations with no corresponding financial statement data	1,916
Exclude observations without contemporaneous filing date and earnings announcement dates	<u>1,716</u>
Final Narrative firm year observations =	**<u>1,716</u>**

7.4.1   Annual Report Textual Contents: Tone

This study uses a specific word list to test if market reacts to the relative frequency of negative words in annual report narratives. It uses the Loughran and McDonald (2011) FIN-NEG negative word list to measure tone. This word list unlike other word list/dictionaries is specific to the financial context. It is developed using report filings and therefore most suitable for the research design of this study. Feldman et al. (2010) uses other word list in combination with FIN-NEG word list and observes similar results across the two word lists. However, in comparing the FIN-NEG word list with other word lists in an empirical analysis Loughran and McDonald (2011) show that the FIN-NEG word list consistently outperforms the other word lists. Specifically, Loughran and McDonald (2011) note that due to reduced noise in the

classification of words it performs better than other word list. This noise is caused by business specific words such as depreciation, which may be classified as negative in other dictionaries, but it is a regular word in business context with no negative meaning as it is included in all accounts.

To obtain signals of the tone levels of the annual report, the study needs to obtain the word count of the negative words in the report relative to the total number of words. The process begins with obtaining a list of constituents of the FTSE ALL SHARE index from Thomson One Banker and downloading the annual reports from the filings section of the Thomson One Banker database per year for each company. The final number downloaded is 4,347 firm years because some companies' annual reports are not available for download. The next step is extracting the text from the annual report document, by converting the PDF formats of the annual report documents to text formats.

After the text extraction, the next step is to parse the text. The parsing process involves extracting numbers and text encodings out of the original texts in order to leave only the textual contents for the analysis. The parsing process reduces the probability of having numbers and text encodings included in the text, which is to be processed. However, as a robust measure, the split process employs a methodology for identifying words, which ensures that numbers are not identified as words. Next, a Perl Program for splitting a document into words is used to split all the text for each annual report into word tokens. Following this, the word counts of all the words in the document is performed using a PERL program. To test the results of the program the researcher manually performs all processes done by the program using sample text and the results are consistent.

To obtain the negative word count applying the Loughran and McDonald (2011) word list, the study needs to identify all instances of the words in the FIN-NEG word list appearing in the document. Similar to Loughran and McDonald (2011), this study includes all words with hyphens in the split process to ensure that word

are not incorrectly identified where they were compound words. Following this, the researcher writes a program that matches all occurrences of the words appearing in the Loughran and McDonald (2011) FIN-NEG word list in the annual report document. After all matches, it performs a count, which provides the total count of the negative words in the report. This study defines the tone level signal as the percentage of the total number of negative words in the annual report document of firm i at year t relative to total number of all words in the annual report document of firm i at year t . Table 7-1 shows the sampling process which arrives at a final sample of 4,226 firm years after the tone signals collection process. Annual reports with less than 2,000 words and reports with missing values after the Perl program process are eliminated. This is to ensure reports that are not readable by the Perl program are excluded from the analysis.

7.4.2   Definition of Abnormal earnings

The definition for abnormal earnings is as follows; Where Income in current year less income in the previous year represents the change in income, Abnormal earnings is the change in income divided by the standard deviation of the last three-year's change in income. Estimated as follows:

If: $Inc_{i,t} - Inc_{i,t-1} = \Delta Inc$ ……....…………………………..Equation 7-1

Then: Group_Earn $= \dfrac{\Delta Inc}{SD \langle \Delta Inc_t | \Delta Inc_{t-1} | \Delta Inc_{t-2} \rangle}$ …………………………Equation 7-2

Where $Inc_{i,t}$ is Net Income in the current year for firm i in year t and $Inc_{i,t-1}$ is net income in the prior year for firm i in year t-1 and ΔInc is the change in income between the years t and year t-1. $SD \langle \Delta Inc_t | \Delta Inc_{t-1} | \Delta Inc_{t-2} \rangle$ is the standard deviation of the change in income in last three years and Group_Earn represents the abnormal earnings levels.

To address outlier issues as in previous studies, this study transforms the abnormal earnings figures into coded earnings quintiles scores based on their ranks in each year. Bernard and Thomas (1990) code the earnings figure into deciles from 0.0 to

1.0, while Mendenhall (2004) adopts the same procedure, it modifies it by subtracting 0.5 from the coded scores. This coding allows for an interpretation of the slope coefficient as the difference in abnormal returns between most positive and most negative (Mendenhall 2004). This study codes abnormal earnings in quintiles from -2 to +2. This allows the median surprise to be zero with the most negative surprise group being -2 and the most positive surprise group as +2. Table 7-1 shows that the sample of 4,226 firm years reduces to 1,916 firm years, due to not obtaining corresponding financial statement data.

7.4.3 Annual Report Filing Dates Definition

Annual report filing dates are the date in each year which a company releases its annual report. A majority of the firms in this sample have annual report filing dates contemporaneous with the preliminary earnings announcement dates. From table 7-1, it is observed that after the match for firms with only contemporaneous annual report dates and preliminary earnings announcement dates, there is a final sample of 1,716 firm years.

7.4.4 Security Price Movements: Post Earnings announcement return Estimation – Definition

Feldman et al. (2010) calculates mean excess returns as the buy and hold return on a stock minus the average returns on a matched size book to market momentum portfolio. Mendenhall (2004) measures the post-earnings announcement returns as the compound abnormal returns from the day following the earnings announcement. This study measures return as the size adjusted return using the FTSE ALL Share index as the matched size. The periods are defined as from day 0 to day 1 (same day return), day 1 to day 5, day 1 to day 10, and day 1 up to days 20, 30, 40, 50, 60 respectively. The firms in the sample are constituents of the FTSE All Share index, thus, this index is used for the adjustment for size in this study. The index is used as the benchmark portfolio that is representative of the sample, to determine expected

return. Therefore, this study uses a standardized return representative of the sample and suitable for the research design.

7.5 Results

The results are presented as follows. The main findings are in section 7.5.1 (evidence of a drift in the sample) and 7.5.2 (Tone and the Drift). The robustness checks are discussed in section 7.5.3.

7.5.1 Post Earnings Announcement Drift Analysis

Table 7-2 shows the mean cumulative return for five subgroups of the sample firms in this study. The groups are formed using abnormal earnings quintiles. The mean cumulative return is calculated as the mean post earnings return for each quintile group over a certain period. Period '[_01]' represents a 0 to 1 day buy and hold period and '[_60]' represents a 1 to 60 day buy and hold period. Day 0 is identified as the annual report release date of which unique to this sample is simultaneous with the earnings release date. To form the abnormal earnings quintile groups, for each year firms are classified into five groups, firms with the highest abnormal earnings are in group 5 and firms with the lowest abnormal earnings are in group 1. Group_earn = 1 represents all firms in group 1 and group_earn = 5 represents all firms in group 5.

Consistent with the literature the group with the highest abnormal earnings persistently has the highest cumulative return. The table shows that given a simultaneous buy and hold period [_01], firms in group_earn=5 have a higher return of 1.63 when compared to firms in group_earn=1 return of 0.71. This effect persists in all other buy and hold periods as observed in the table, for instance, from the table, given a buy and hold period of 1 to 60 days, firms in the higher abnormal earnings

group have more than 50% higher return than that of firms in the lower abnormal earnings group. This effect confirms the existing literature for instance Ball and Brown (1968) that firms with higher unexpected earnings exhibit persistently higher returns than the return of firms with lower unexpected earnings.

Figure 7-1 confirms this effect as the chart shows that the line plot of group_earn= 5 remains persistently higher than the line plot of group_earn= 1 throughout the given buy and hold return periods.

In figure 7-1, the line shows an upward drift, which indicates that the higher return persists and continues to increase as the buy and hold period increases. This is consistent with the literature on Post Earnings Announcement Drift that subsequent returns tend to move in the direction of unexpected earnings long after the earnings event (Bernard and Thomas 1989; Jones and Litzenberger 1970). The return on earnings event are not fully revealed in a short event window, identifying that there is a Post Earnings Announcement Drift in the sample. There is a continuous persistent market reaction to earnings event up to 60 days after event. There is a Post Earnings Announcement Drift anomaly because market still reacts up to 60 days following the earnings event. If there is no Post Earnings Announcement Drift the expectation would be of prices to be fully revealed in 1 to 2 days after earnings event however, the figure shows that return continues to increase after the earnings event in all the given buy and hold periods after the initial buy and hold periods.

Table 7-2: Post Earnings Announcement Drift

This table summarizes the mean cumulative Buy and hold return for abnormal earnings group quintiles. BHR periods are the buy and hold return period starting from '0 to 1' day period [_01] up to '1 to 60' day period. [_60]. Group_Earn is the quintiles for abnormal earnings given the abnormal earnings of the sample of firms in the study; it is obtained by sorting firms into abnormal earnings quintiles for each year of study. Group_Earn = 1 represents the group with the lowest abnormal earnings and Group_Earn = 5 represents the group with the highest abnormal earnings.

BHR Periods	[_01]		[_05]		[_10]		[_20]		[_30]		[_40]		[_50]		[_60]	
Group_ Earn	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
1	397	0.71	397	0.34	397	0.64	397	1.54	397	2.15	397	3.29	397	3.33	397	2.77
2	388	0.82	388	0.6	388	0.94	388	1.2	388	2.59	388	3.6	388	3.66	388	3.19
3	384	1.56	384	0.69	384	1.29	384	2.27	384	3	384	4.15	384	4.38	384	4.63
4	366	1.21	366	0.86	366	1.14	366	1.27	366	2.61	366	2.73	366	3.23	366	2.67
5	381	1.63	381	1.36	381	1.87	381	2.22	381	3.24	381	4.9	381	4.68	381	4.68

Figure 7-1: The mean cumulative Buy and Hold Return for highest and lowest abnormal earnings quintiles, by Buy and Hold periods

The mean cumulative Buy and Hold Return for highest and lowest abnormal earnings quintiles, by Buy and Hold periods.
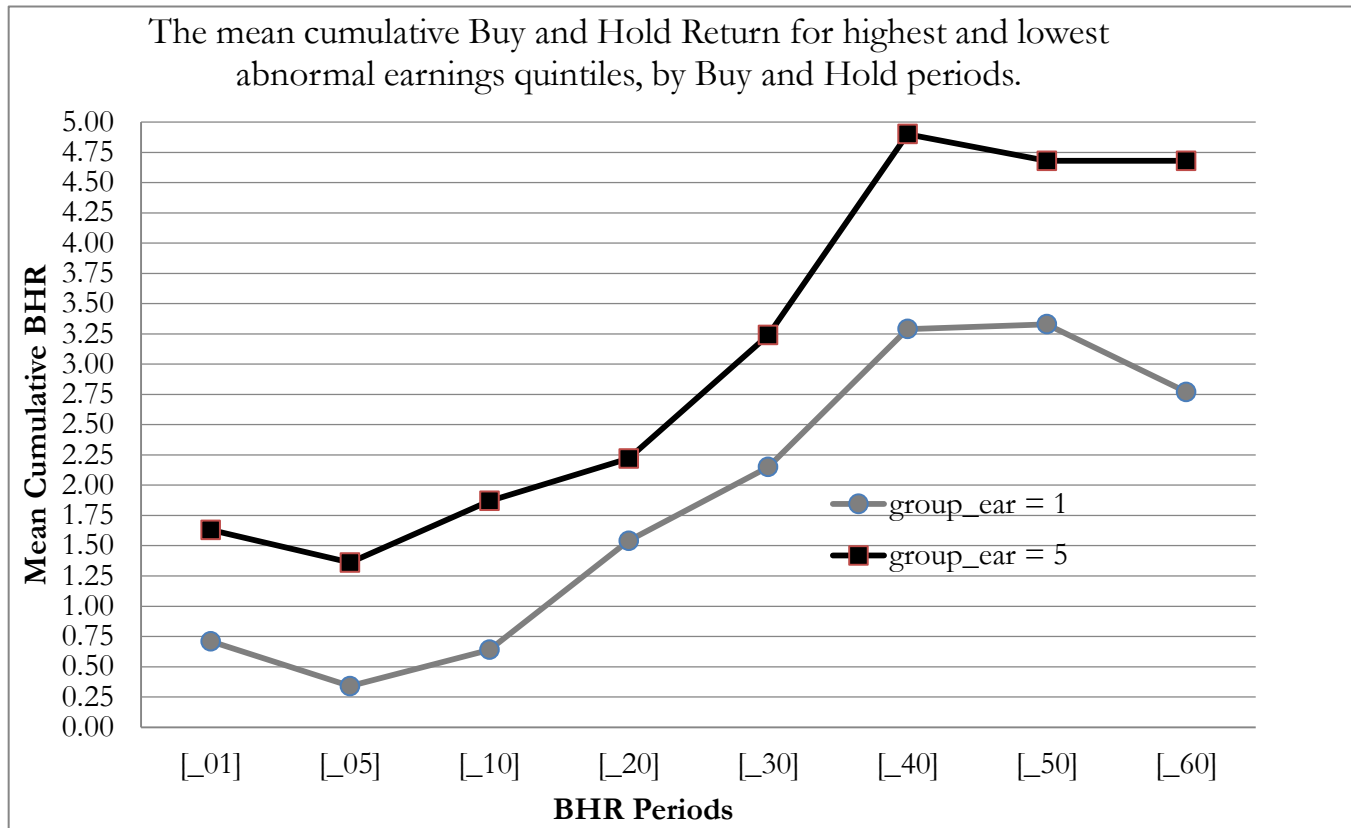
.

Table 7-3 presents results from the regression of post earnings announcement returns on abnormal earnings and the interaction of abnormal earnings and tone and other standard controls identified in the drift literature. The model also includes other controls identified as determinants of the tone of narrative disclosures in chapter 5 and in other studies (Li 2010). The dependent variable is the size-adjusted returns over the given period. The independent variable group_earn is the abnormal earnings variable, given earnings, the quintiles of abnormal earnings groups and firms are coded into groups from -2 to +2. The control variables are as defined in variable definitions in chapter 5. Panel A of table 7-3 presents the results for the regression on the short-term buy and hold periods, while panel B presents the results for the long-term buy and hold periods. Short-term is defined as the periods from day 0 to day 1 up to from day 1 to day 10. Long-term is defined as from a day 1 to day 20 buy and hold period up to a day 1 to day 60 buy and hold period.

Table 7-3 panel A, shows the regression of abnormal earnings on the post earnings event return for each buy and hold return period defined as short-term. It provides multivariate evidence that supports the observed Post Earnings Announcement Drift in figure 7-1. In the short-term abnormal earnings is significant when the buy and hold period is 1 to 10 days. This differs from some studies as they observe a drift from the immediate day post earnings announcement (Ball and Brown 1968). However, this could be due to the characteristics of the sample; the sample has a significant number of firms, which are small and not liquid with limited trading in the short-term, but fully active in the long term. The result for the 10 day buy and hold period confirms the hypothesis that return moves in the direction of abnormal earnings following earnings event as there is a significant coefficient for the group_earn variable when the 10 day period return is the dependent variable.

Table 7-3 panel B presents the results for long-term buy and hold periods. This table shows that consistent with prior work, in the long-term, post earnings announcement returns are increasing with abnormal earnings. There is a positive coefficient for the group_earn variable for all given buy and hold periods, the coefficient of the

variable group_earn is significantly different from zero with 99% confidence across all periods in the long-term. This confirms that there is a post-earnings drift anomaly existent in the sample as the market still reacts up to 60 days following the earnings event. Combining both panel A and panel B to explain the control variables included in the model, Table 7-3 show that post earnings announcement returns are decreasing with firm size up to a buy and hold period of 1 to 20 days, documenting evidence consistent with Garfinkel and Sokobin (2006) that drift is decreasing with firm size. In addition, Table 7-3 shows that post earnings announcement returns significantly increases with price volatility and business complexity in the long-term and significantly increases with geographical complexity in the short-term.

7.5.2 Does Post Earnings Announcement Drift increase with Positive Slant (Tone)?

With respect to the analysis of this study of the incremental effects of tone on post earnings event returns, Table 7-3 shows the regression of the post event returns on the interaction of tone with abnormal earnings, with buy and hold periods defining each model (shown in columns). This study uses interaction variables to test whether the abnormal earnings and drift relationship is different for annual reports with a more positive tone in their narrative disclosures. The abnormal earnings variable 'group_earn' is coded from -2 to +2 allowing for an interpretation of its coefficient as the average difference in returns between observations in the highest and lowest abnormal earnings quintiles. Therefore, it allows for the interpretation of the coefficient on the 'group_earn*tone' interaction variable as the additional influence of tone at given levels of abnormal earnings. This follows the methodology of prior studies testing the incremental impact of test variables in explaining the earnings-drift relationship (Garfinkel and Sokobin 2006).

The short-term results are presented in Table 7-3 Panel A, testing how the interaction of abnormal earnings with tone can affect immediate post earnings returns. The main result in this panel is that in the short-term there is a weak relationship between the interaction variable and returns. At given levels of

abnormal earnings, market does not react to tone in the short-term. This can be due to the time that investors require for reading information in annual reports. However, Feldman et al. (2010) observe positive reaction given a 3 day buy and hold period, this could be due to the disclosure setting used, which is the MD&A section of 10-K filings. Investors will likely react differently to specific sections given section preference for reading priorities and time required for reading. In addition, (Feldman et al. 2010) uses the change in tone which may be more salient to investors in the short term i.e. before actually reading the narratives.

Table 7-3 panel B presents the results for the long-term buy and hold periods; long-term defined as from a day 1 to 20 up to a day 1 to day 60 periods. The main result in this panel is that the drift is strongly increasing with an increase in the positive slant of the annual report. The coefficient on the interaction variable 'group_earn*tone' is significantly different from zero for all buy and hold periods in the long-term at a 99% confidence level. The results confirm the hypothesis that given levels of abnormal earnings, Post Earnings Announcement Drift increases with the tone of annual report narratives. It indicates that tone is informative for the Post Earnings Announcement Drift and plays a significant role when market reacts to abnormal earnings levels. This provides evidence that the tone of the narratives of annual reports further explains the relationship between abnormal earnings and post earnings event returns. Interpreting the results with respect to tone, it shows that an increase in the positive slant of annual reports (i.e. emphasis on good news) increases the Post Earnings Announcement Drift.

Table 7-3: Full Regression Model

This table presents regression analysis relating post earnings event buy and hold return to abnormal earnings, the interaction of abnormal earnings with tone of annual report, and other control variables. The dependent variable is the mean cumulative buy and hold return. Each column presents the regression model given the buy and hold return period. *GROUP_EARN* is the variable for abnormal earnings of firm i at time t. *GROUP_EARN*TONE* is the interaction variable of abnormal earnings with the tone of the annual report of firm i at time t. Control variables include the variables which are determinants of the annual report tone and are as defined in the table variable definition. Panel A presents the regression models for short-term buy and hold periods defined as '0 to 1' day up to '1 to 10' days buy and hold periods. Panel B presents the results for the long-term buy and hold periods defined as '1 to 20' days up to '1 to 60' days buy and hold periods. The unit of analysis is the dependent variable as reported for each column. The model uses White (1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7-3 Panel A: Short-Term Full Regression Model

Dependent Variable:	$BHR_{[\_01]}$	$BHR_{[\_05]}$	$BHR_{[\_10]}$
	(1)	**(2)**	**(3)**
Independent Variable			
Intercept	**2.337****	**1.76028***	1.29636
	(2.07)	**(1.88)**	(1)
GROUP_EARN	0.45625	0.8683	**1.49359****
	(0.68)	(1.48)	**(2)**
GROUP_EARN*TONE	0.27113	0.53982	1.00798
	(0.41)	(0.91)	(1.35)
F_AGE	0.00427	0.0026	0.01018
	(0.63)	(0.49)	(1.4)
P_VOL	0.00071	-0.01015	0.01512
	(0.03)	(0.61)	(0.6)
B_COMP	**0.67931****	0.07404	0.3103
	(2.09)	(0.29)	(0.86)
G_COMP	0.20144	**1.0271*****	**1.19173*****
	(0.6)	**(3.37)**	**(3.12)**
F_SIZE	**-0.31696*****	**-0.2937*****	**-0.38853*****
	(-2.82)	**(-2.86)**	**(-3.21)**
R_Square	0.0129	0.0269	0.0297
Adjusted_R-Sq	**0.007**	**0.0211**	**0.024**

Table 7-3 Panel B: Long-Term Full Regression Model

Dependent Variable:	$BHR_{[\_20]}$ (1)	$BHR_{[\_30]}$ (2)	$BHR_{[\_40]}$ (3)	$BHR_{[\_50]}$ (4)	$BHR_{[\_60]}$ (5)
Independent Variables					
Intercept	-0.38388	-1.86324	-3.08234	-3.76742	-3.53262
	(-0.21)	(-0.81)	(-1.1)	(-1.23)	(-1.07)
GROUP_EARN	**3.40663*****	**4.39364*****	**5.3338*****	**6.43832*****	**6.67785*****
	(3.01)	**(2.85)**	**(3.06)**	**(3.45)**	**(3.29)**
*GROUP_EARN*TONE*	**3.01426*****	**4.04362*****	**4.92372*****	**6.02285*****	**6.10359*****
	(2.74)	**(2.7)**	**(2.84)**	**(3.25)**	**(3.04)**
F_AGE	0.00429	0.00403	0.01685	0.02368	0.02442
	(0.44)	(0.33)	(1.06)	(1.3)	(1.22)
P_VOL	0.05045	0.06519	**0.13498****	**0.14909****	**0.16387****
	(1.35)	(1.28)	**(2.2)**	**(2.27)**	**(2.2)**
B_COMP	0.83655	**1.10554***	**1.70095****	**1.84416****	**1.90268***
	(1.64)	**(1.73)**	**(2.1)**	**(2.01)**	**(1.94)**
G_COMP	**1.51752*****	**2.32246****	**1.86871****	**1.61075***	**2.02324****
	(2.89)	**(3.19)**	**(2.19)**	**(1.69)**	**(1.95)**
F_SIZE	**-0.29843***	-0.12011	-0.2291	-0.16886	-0.39921
	(-1.85)	(-0.57)	(-0.88)	(-0.56)	(-1.23)
R_Square	0.0291	0.0311	0.0312	0.0304	0.0299
Adjusted_R-Sq	**0.0234**	**0.0254**	**0.0254**	**0.0247**	**0.0241**

7.5.3 Robustness Checks

The investigation in this chapter is related to the literature on Post Earnings Announcement Drift, which is subject to extensive debates and has provided certain standard models over the years. Therefore, in this section, the study examines whether the results in section 7.5.1 and section 7.5.2 persist in a setting where only the standard controls of post earnings returns are included as controls. From the identified determinants of annual report tone, this study finds that the age of the firm, price volatility and firm size have been modelled as determinants of post earnings event returns (Bhushan 1994).

Table 7-4 presents results from the regressions of post earnings event returns on abnormal earnings (group_earn), interactions of earnings with tone (group_earn*tone) and the standard control variables. This allows for a robust model to assess whether the post-earnings announcement drift exist in the sample, and whether tone provides incremental information for the abnormal earnings drift relationship.

Consistent with prior results, post earnings event returns are increasing with abnormal earnings. In panel A, the drift is observed in a 5-day buy and hold period and a 10-day buy and hold period. The coefficient for group_earn is significantly different from zero and positive. Moreover, the panel also shows that the interaction variable group_earn*tone becomes significantly positive given a 10-day buy and hold period. This indicates that in the short-term tone is informative for the earnings-drift relationship but only from a 10-day period. Overall, the table provides support for the evidence that return is increasing with abnormal earnings and tone is informative for this relationship given time to decipher information in tone.

Observed in Table 7-4 panel B, given a model consistent with the drift literature this study continues to find evidence that is consistent with the literature that post earnings returns increases with unexpected earnings and that this relationship

persists beyond the event period i.e. there is a drift in the sample. The coefficients on the interaction of abnormal earnings with tone are significantly different from zero at a 99% confidence level. Taken together, these results show that the relationship between earnings and drift exist in the sample and that tone provides additional information for this relationship, thus tone contributes in explaining the earnings-drift relationship.

Table 7-4: Robust Regression Model

This table presents regression analysis relating post earnings event buy and hold return to abnormal earnings, the interaction of abnormal earnings with tone of annual report, and other control variables. The dependent variable is the mean cumulative buy and hold return. Each column presents the regression model given the buy and hold return period. The dependent variable includes the variable for abnormal earnings, its interaction with tone, and other control variables. Control variables are variables tested as determinants of abnormal earnings. Panel A presents the regression models for short-term buy and hold periods defined as '0 to 1' day up to '1 to 10' days buy and hold periods. Panel B presents the results for the long-term buy and hold periods defined as '1 to 20' days up to '1 to 60' days buy and hold periods. The unit of analysis is the dependent variable as reported for each column. The model uses White (1980) procedure to correct for heteroskedasticity when estimating the coefficients' standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7-4 Panel A: Short-Term Robust Regression Model

Dependent Variable:	$BHR_{[\_01]}$	$BHR_{[\_05]}$	$BHR_{[\_10]}$
	(1)	(2)	(3)
Independent Variable			
Intercept	2.87636**	1.48851	0.57853
	(2.43)	(1.52)	(0.4)
GROUP_EARN	0.43402	0.94033*	1.63083**
	(0.68)	(1.74)	(2.34)
*GROUP_EARN*TONE*	0.26733	0.61663	1.16403*
	(0.4)	(1.11)	(1.66)
F_AGE	0.00456	0.00308	0.01103
	(0.68)	(0.59)	(1.53)
P_VOL	-0.00432	0.00645	0.04079
	(-0.17)	(0.34)	(1.3)
F_SIZE	-0.24543**	-0.16359*	-0.17722
	(-2.33)	(-1.82)	(-1.56)
R_Square	0.0072	0.0128	0.0167
Adjusted_R-Sq	0.0034	0.0091	0.013

Table 7-4 Panel B: Long-Term Robust Regression Model

Dependent Variable:	$BHR_{[\_20]}$ (1)	$BHR_{[\_30]}$ (2)	$BHR_{[\_40]}$ (3)	$BHR_{[\_50]}$ (4)	$BHR_{[\_60]}$ (5)
Independent Variables					
Intercept	-0.74841	-2.39851	-3.00188	-3.76411	-2.91086
	(-0.43)	(-1.06)	(-1.09)	(-1.26)	(-0.9)
GROUP_EARN	3.83261***	5.01654***	5.79167***	6.67745***	6.86161***
	(3.68)	(3.5)	(3.62)	(3.89)	(3.68)
*GROUP_EARN*TONE*	3.42564***	4.65594***	5.37106***	6.33273***	6.38037***
	(3.36)	(3.3)	(3.34)	(3.68)	(3.42)
F_AGE	0.003	0.0062	0.01672	0.02472	0.02386
	(0.31)	(0.52)	(1.08)	(1.38)	(1.2)
P_VOL	0.07066**	0.09016*	0.14597**	0.15151**	0.14145**
	(1.94)	(1.85)	(2.54)	(2.51)	(2.06)
F_SIZE	0.01954**	0.31548	0.21634	0.27388	0.14149
	(0.13)	(1.6)	(0.91)	(1.01)	(0.48)
R_Square	0.0202	0.0207	0.0221	0.022	0.0181
Adjusted_R-Sq	0.0165	0.017	0.0184	0.0183	0.0144

7.6 Conclusion

The main explanations for the investors under reaction to earnings information have emanated from the literature that explores the causes of the drift applying quantitative factors as explanatory variables. However, work by Feldman (2010) advocates using qualitative factors as an explanatory variable that is informative towards the post-earnings announcement drift.

This study applies the tone of the narrative disclosures in annual report in providing an explanation to the drift phenomenon using a sample of United Kingdom firms from the FTSE ALL SHARE index. Contributing to the literature on post-earnings

announcement drift, it documents that there is a drift in the sample of firms used in the study. The results are consistent with the Post Earnings Announcement Drift anomaly. The main evidence applying the impact of qualitative factors shows that at given levels of abnormal earnings, post-earnings announcement returns are increasing in the positive slant of annual report. In other words, the movement of post-earnings announcement returns in the direction of abnormal earnings increases when management provide narrative disclosures that discuss a more positive outlook.

The results are sensitive to controlling for the determinants of the tone of disclosure and the standard control variables in Post Earnings Announcement Drift literature. In total, these results present evidence that the tone of annual report of firms contributes to the highlighted under reaction to earnings information by increasing the reaction in the subsequent long-term periods. It is consistent with the expectation that information changing the beliefs of investors will significantly contribute to the Post Earnings Announcement Drift.

8 Conclusion

8.1 Background of Thesis

In recent years, the size and complexity of annual reports has continually increased, as evident in UK company annual reports, which has recorded more than 50% increase in size between 2000 and 2010. The UK financial reporting council records that there are growing concerns on the increasing complexity and decreasing relevance of corporate reports, highlighting a concern on the obscurity and imbalance of information in annual reports (FRC 2009). This study identifies the fog index and positive slant as measures of syntactical complexity. An increase in the fog index increases the obscurity of information in the narratives by making narratives more difficult to read, while an increase in the positive slant of the report increases the imbalance of information in annual report narratives.

An increasing body of literature examines narrative disclosures in annual reports. The focus on narrative reporting is justified by the increasing importance of narrative reporting in providing meaning for the numbers communicated to investors. The importance is increasing in the current age due to advances in technology that has made narrative information easily accessible. Further, Barthes, (1977) highlights the importance of narratives in this quote '*Narrative is international, transhistorical, transcultural: it is simply there, like life itself*' (cited in Beattie 2013). The difference between narratives and the disclosed numbers is in its ability to communicate with a contextual background and potentially manage the impression of information disclosed.

However, the increasing body of literature providing large sample evidence on the readability and tone of narrative disclosures is mostly US based evidence. Conversely, given the difference in the regulatory regimes in the UK and the US, and FRC reports on the increasing complexity of reports, there are reasons to expect that the determinants and the consequences of narrative complexity may be different. The UK's principle based system relies on disclosures in annual report as a mechanism to ensure compliance to best practice regulations, this may provide motivations for complexity in annual reports. Furthermore, FRC reports on the increasing complexity of annual reports indicate that it is in ineffective communication that complexity is increased.

In addition, differentiating this study from previous studies is the empirical analysis on the determinants and consequences of narrative complexity. The first empirical analysis contributes to the literature on the readability and tone of disclosures by identifying firm characteristics that are determinants of readability and tone, using a measure of tone not previously used to assess the determinants of tone and identifying that large positive abnormal earnings increases the positive slant of annual reports. The second empirical chapter contributes to the readability and tone literature by identifying board composition factors that are determinants of readability and tone. The third empirical chapter contributes to the literature by identifying that tone of the narratives in corporate annual reports has consequences for investor communication; Post Earnings Announcement Drift. Prior studies testing consequences of tone for the Post Earnings Announcement Drift do so using sections of the annual report such as the MD&A (Feldman et al. 2010) or other management disclosures such as earnings press releases (Engelberg 2008).

By examining the determinants and consequences of the syntactical complexity of narratives in annual reports, the current study answers the following questions: What firm specific characteristics determine the syntactical complexity of annual report? What board composition factors determine the syntactical complexity of annual reports? Does the Post Earnings Announcement Drift increase with an increase in the syntactical complexity of annual report narratives? By answering these questions,

the thesis has contributed largely to the debate on the increasing complexity and decreasing relevance of annual report.

8.2 Summary of Findings

8.2.1 Role of Firm Characteristics in Annual Report Syntactical Complexity

The first empirical chapter examines if firm characteristics are important determinants of the syntactical complexity of annual report. The main findings of this chapter are that the size of the firm, age of the firm, volatility, and complexity of firms operations are important determinants of the syntactical complexity of annual report narratives. In addition, the chapter identifies that firms with large positive abnormal earnings have annual report narratives with a higher positive slant. It contributes to the accounting literature by showing that these firm-specific characteristics affect narrative communication in annual reports.

8.2.2 Role of Board Composition factors in Annual Report Syntactical Complexity

The second empirical examines if the composition of the board determines the level of the syntactical complexity in annual report narratives. The main findings in this chapter are that the size of the board, age of board members, percentage of females in the board, board tenure and the number of nationalities in the board are important determinants of the syntactical complexity of annual report narratives. It contributes to the literature by showing that the composition of the board significantly affects narrative communication in annual reports.

8.2.3 The Interaction of Tone and the Post Earnings Announcement Drift

The third empirical chapter examines if the Post Earnings Announcement Drift increases with an increase in the positive slant of annual reports. Motivated by the Post Earnings Announcement Drift anomaly in the literature and the evidence provided in chapter 5 that positive slant increases with large positive abnormal earnings, it sets out to investigate if the Post Earnings Announcement Drift (PEAD) is increasing with positive slant. The chapter shows that an increase in the positive slant of annual report narrative discussions significantly increases the PEAD. It contributes significantly to the literature on PEAD by identifying that narrative communications in annual report influences investors' reaction to abnormal earnings levels.

8.3 Policy Implications

Due to the important role of narrative reporting as a contextual background creating meaning for the information reported in the financial statements, clear communication in annual report narratives is of considerable interest to policy makers. This is because at the market level, the special role of narratives is illustrated in its ability to increase capital misallocations, thereby increasing the inefficiency of capital markets. Furthermore, because company regulations stipulate that companies include specific disclosures in annual report narratives, policy makers have to ensure that these disclosures are effectively communicated to investors.

Therefore, while regulators require specific disclosures in annual report, what is more important is if the disclosures are effectively communicated to investors. The FRC discussion paper 'louder than words' provides guidance as to effective communication and points out that complexity in regulatory requirements contributes to the increased complexity in annual reports. This study further adds to

this discussion by observing that other firm specific factors increase complexity in annual reports. Chapter 5 shows that complexity in annual report narratives changes with a change in the firm's size, age, and operations. It is therefore important at this stage to look into the characteristics of the firm and how policies and regulations can be enacted such that they do not increase complexity occurring due to firm specific characteristics. Policy could ensure that regulations on firms more likely to have narratives that are more complex do not contribute to increasing complexity in the narratives. In addition, policy makers should control the complexity in annual reports by establishing set formats and standard words that will make the reports more accessible to the users that struggle to read the reports. This would as well constrain complexity in narratives of firms that are more likely to increase the reading difficulty of the annual report narratives they disclose.

Furthermore, regulations on appropriate corporate governance mechanisms can be informed by the results in this study indicating that specific board composition factors determine the level of annual report narrative complexity. The FRC is interested in effective communication in annual reports. Thus, reducing board composition factors that increase complexity in annual reports and increasing factors that reduce complexity in annual report can increase effective communication in annual reports. Further, the evident on the effect of tone on investor communication, shows that it is important that policy makers are aware of board characteristics that increase the positive slant of annual report. This is because the FRC's request for a balance of communication of information can be adhered to if these board composition factors are controlled.

The results of chapter 7 document a positive relationship between the interaction of abnormal earnings and positive slant and the Post Earnings Announcement Drift. It demonstrates that positive slant plays an important role when the market reacts to abnormal earnings levels. It is important that in policy decisions, there is a focus on the primary purpose of annual report. As the FRC document points out that, the primary purpose of annual report is in its role in communicating information that is useful for making resource allocation decisions (FRC 2009). If narratives in annual reports increase the delay of investors' response to earnings information, then it is

important that regulations ensure that narrative communication achieves its primary purpose of improving information flow to investors rather than mitigating the information communication process.

The Financial Reporting Council is seeking ways to improve the relevance of annual report communication by reducing the complexity in these reports. This study has identified factors that increase complexity in annual report and the consequence of these complexities. The result in this study can assist in policies aimed at improving communication in annual report. In addition, specific response to specific factors identified as determinants of complexity can help improve the usefulness of the reports for the 'comply or explain' corporate governance regulatory regime and other mandatory disclosure requirements. This will help achieve the primary purpose of annual reports, which is in providing investors with information that is useful for resource allocation decisions.

8.4   Constraints of the Thesis

This section focuses on the central theme of the thesis; Narrative disclosures in corporate annual reports.

The narrative measures used in this study are a construct of syntactical complexity; they have been identified in the literature as one of the best measures for complexity of text (Martiniello 2008). However, in measuring syntactical complexity and its effect on the users of annual report, this study recognises that there are other qualitative factors, which affect the complexity of the text. This will include other subjective factors such as the experience of the user e.tc. Therefore, it is important that the results in this study be carefully interpreted as the syntactical complexity of the text, of which, its effect could change depending on the user of the report. Nevertheless, the significant results observed in this study on the impact of narrative communication on the Post Earnings Announcement Drift, show that syntactical complexity is associated with investor communication.

On the other hand, because using measures of complexity, which define user attributes, is mostly subjective, it makes it difficult to assess scientifically if such measures will measure the construct of which they are to measure based on the research design. In addition, such a model may be difficult to replicate. Therefore, the current study focuses on using measurable quantitative factors to measure syntactical complexity. This provides an opportunity to research using measures that are consistent with the measures used in the literature on accounting narratives. In addition, the measures used have the advantage of being objective measures without the researcher's bias in its interpretation. Furthermore, it means that the research can be replicated and the results can be interpreted as the determinants and consequence of the syntactical complexity of corporate annual reports without the restriction to specific set of users of annual reports. Using quantifiable measures provide an opportunity for the contribution in this study to be applicable in accounting practice.

The data process requires text extraction from PDF files. This is because corporate reports are mostly available in PDF formats, while on the other hand, the PERL program analysing the narratives to estimate the scores accesses text only files. The limitation with respect to the text retrieval process is in the presentation of the text for processing by the Perl program. The model in the analysis assumes that the text used is representative of the annual report investors receive when a company releases its report to investors. However, the structure and presentation of the text changes when converting the PDF files to text files before processing in the PERL program. Nonetheless, because the research design is at a word level, it is suitable for the interpretation of the research results. Word level means that the research design is assessing the impact of the words that investors have to read in order to retrieve the information in the annual reports narrative discussions.

8.5 Directions for Further Research

The limitations identified above provide opportunities for further research. The limitations show that accounting research can benefit from further knowledge on the interaction between narrative complexity and user specific disclosure attributes that measure complexity in narratives. In addition, it shows that subject to availability of an accessible report format, assessing the determinants and the consequence of the reports using a document level approach can provide additional contribution to the interaction between narrative complexity, its determinants and consequence.

Identifying qualitative factors of textual complexity can provide more information on how the complexity in narratives affects investor communication. This could be specific user attributes obtained via interviews, which can inform on the effect of narrative complexity on investor communication. Obtaining narrative measures through interviews can add to accounting knowledge on how specific users of accounting information assess complexity in accounting narratives. In addition, these measures can show how these users react to complexity in investors' communication. This relates to the empirical chapter on the role of tone at various levels of abnormal earnings. Estimating user specific measures could show that for some sets of investors there is a higher increase in the Post Earnings Announcement Drift, while for some sets of investors there is no significant relationship between tone and the Post Earnings Announcement Drift. Taking the research further in this direction, would for instance show if there is any difference between the tone and PEAD relationship when institutional investors and ordinary investors are compared.

Further research on narrative complexity could use annual report texts in the form presented to investors. This will be a narrative analysis at a document level rather than a word level. The aim of further research at a document level is to assess the role of the presentation form of the narratives in narrative communication between the managers and the investors. This will provide further knowledge on if complexity affects investors independent of presentation form or if presentation of the narratives adds to the effect of complexity in the narrative communication

process. This sort of document level analysis may become more accessible as more data of company reports become available in an electronic form that is accessible by computer text processing programs.

While the research results on firm characteristics as determinants of syntactical complexity does not differentiate between an opportunistic and an informative motive of management, used as a framework for developing the hypotheses in chapter 5. Future research can identify if complexity is as a result of an opportunistic or informative motive of management. However, it is important to note that the research design has to be suitable for such conclusions. The results in chapter 5 indicate that bigger firms have annual reports that are more complex, however, whether this complexity is due to the regulatory burden as identified by the FRC complexity project or due to opportunistic motives of management to obfuscate information was not identified as it was beyond the scope of this study.

Further, enhancing the argument of obfuscation is the result on tone indicating that bigger firms have annual reports that are more negative. This is because negative disclosures that are difficult to read could be seen as obfuscating negative disclosures. Research can enhance the knowledge in this respect by assessing if the regulatory requirements for big firms cause an increase in narrative complexity as opposed to the effect of regulatory requirements on the narrative complexity of small firms. Further, as mentioned earlier on the research design for an opportunistic or informative motive, it is important to note that bigger firms may as well be providing more narrative disclosures to reduce agency costs, which is more apparent in bigger firms. Increase in the size of disclosures potentially increases complexity because increased disclosures is associated with increased complexity of disclosures (Li 2008).

The current study identifies specific board characteristics as determinants of syntactical complexity of annual report narrative disclosures. It does not distinguish empirically between board composition factors that increase monitoring activities and will therefore ensure accountability to shareholders. Further research that will

add to the contribution of this study is identifying board composition factors that increase accountability to shareholders and specifically testing if these factors increase or will decrease the complexity of narrative communication to investors. Furthermore, identifying board composition factors that improve the monitoring role of the board of directors is useful to assess if complexity increases or decreases with an increase in the board monitoring factors. This will also inform on the opportunistic and informative motive because an increase in board monitoring factors that is associated with an increase in complexity can lead to such interpretation as management being informative because it is expected that the monitoring of opportunism is efficient given the presence of these factors.

This thesis makes valuable contributions on the determinants and consequence of narrative reporting. It does this by showing that firm characteristics and specific board composition factors determine the syntactical complexity of annual reports and identifies that a consequence of complexity is that the interaction of tone and abnormal earnings increases with Post earnings returns. What would as well be important to investigate following from the contributions of the empirical analysis in the thesis is if the observations in the thesis is more significant for specific parts of the annual report. For example, does the complexity of the Chairman's statement significantly increase with the size of the firm? Further, studies can add to knowledge by investigating if the tone of the Chairman's statement significantly increases the Post Earnings Announcement Drift. Answers to these questions can provide knowledge concerning what specific sections of the report is increasing the syntactical complexity of narratives, and which sections significantly influence investors' reaction to earnings information.

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