THE AUDITOR CHANGE DECISION IN UK: FACTORS AND MARKET REACTION

A Thesis

presented to

the Faculty of Business Administration and Economics

at Notre Dame University-Louaize

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

---

by

MELISSA CHALLITA CHAANINE

DECEMBER 2018

© COPYRIGHT

By

Melissa Challita Chaanine

2018

All Rights Reserved

Notre Dame University - Louaize

Faculty of Business Administration and Economics

Department of Management and Marketing

We hereby approve the thesis of

Melissa Challita Chaanine

Candidate for the degree of Master of Science in Business Strategy

Grade: A+

Dr. Dorine Mattar Haddad — Supervisor

Dr. Rim EL Khoury — Reader

Dr. Viviane Naimy — Committee Member

Dr. Atef Harb — Committee Member

NDU LOUAIZE GRADUATE DIVISION FACULTY OF BUSINESS ADMINISTRATION & ECONOMICS

ACKNOWLEDGMENTS

First I would like to express my gratitude to my supervisor Dr. Dorine Mattar Haddad for her academic support, motivation and continuous guidance. She has been always ready to share her knowledge and offer help whenever is needed. She kept on encouraging me and never let me give up.

Beside my supervisor, I am greatly indebted to Dr. Rim El-Khoury for her valuable comments and nonstop assistance throughout the process of achieving this work. She never accepted less than excellence and her advices have been priceless.

This thesis could have been impossible to accomplish without Dr. Mattar and Dr. El-Khoury.

Furthermore, my sincere thanks goes to my family and friends who have supported me by their love and prayers, I am so blessed for being surrounded by all these loving and caring people.

Last but not the least, I have to thank God for giving me good health, hope and strength to reach this goal.

LIST OF TABLES

Table 1: Variables with their Symbols and Expectations 68
Table 2: Univariate Analysis: Auditor Changing vs non-Changing Auditor Companies 93
Table 3: Frequency Distribution of Binomial Variables 97
Table 4: Multicollinearity 97
Table 5: Firm Characteristics and Auditor Change 105
Table 6: Goodness-of-Fit Tests 105
Table 7: The Classification Test 106
Table 8: ROC 106
Table 9: Firm Characteristics, Corporate Governance, and Auditor Change Decision 109
Table 10: Goodness-of-Fit Tests 110
Table 11: Model 2 Classification Test 110
Table 12: ROC 111
Table 13: Comparing Model 2 and Model 1 111
Table 14: ROC Comparison 112
Table 15: Univariate analysis: Companies Changing Auditor to Big N vs Changing Auditor to non-big N 115
Table 16: Frequency Distribution of LOSS 116
Table 17: Univariate analysis: Four Auditor Change Types 117
Table 18: Goodness-of-Fit Tests 120
Table 19: The Classification Test 121
Table 20: ROC 121
Table 21: Attempt 4' and Attempt 4'' Models' Comparisons 123
Table 22: Firm's Characteristics and the Successor Auditor Type 123
Table 23: Summary of the Findings 130
Table 24: The 10 Industry Codes 137
Table 25: Distribution of Observations: by Auditor Change Type and Year 138
Table 26: Distribution of Observations: by Auditor Change Type and Industry 138
Table 27: The CAR (mean-adjusted) Regardless of the Successor Auditor Type 139
Table 28: The CAR (market) Regardless of the Successor Auditor Type 139
Table 29: CAR (mean-adjusted) for Switch from non-big 4 to Big 4 auditor 141
Table 30: CAR (market) for Switch from non-big 4 to Big 4 Auditor 141
Table 31: T-test of Companies Switching from non-Big 4 to Big 4 based on Market Capitalization (window 0,+1) 143

LIST OF FIGURES

Figure 1: Event Study Windows 86

ABSTRACT

Purpose: This study examines the firm's characteristics and the corporate governance factors that influence the auditor change decisions, and observes the market reaction following the announcement of such decisions.

Design/methodology/approach: The relation between the firm's characteristics and the corporate governance factors with the auditor change decision is addressed using a logistic regression. The market reaction to the auditor change announcement is tested using the event study methodology.

Findings: The results show that the company's size is positively related to the auditor change decision and especially to the choice of a big 4. The executive board members gender diversity, the board independence and the board members compensations are found to be negatively related to the auditor choice decision. Furthermore, a positive market reaction to the switch to a big 4 has been detected, one day after the auditor change announcement.

Research limitations: The relation between the ownership structure and the auditor change decision is not addressed in this thesis due to data unavailability. Furthermore, the majority of the companies in the sample are those changing to big 4 auditors, and consequently the analysis excluded the non-big 4 successor cases.

Practical implications: By revealing the hidden intentions behind the auditor changes, the tax authorities, the creditors and the shareholders will be able to take more accurate decisions concerning their stake in the companies engaging in such changes. Furthermore, the regulatory bodies will be aware of the audit industry problems that need to be resolved.

Originality/value: First, The UK market is a new context for this type of research. Second, in the presence of outdated studies tackling the market reaction following the auditor change announcements, a contemporary study is needed. Third, this thesis has examined three board factors that no previous studies have tackled.

Keywords: Auditor change decision, auditor change announcement, big 4, non-big 4, firm's characteristics, corporate governance factors, market reaction.

CONTENTS

ACKNOWLEDGMENTS IV
LIST OF TABLES V
LIST OF FIGURES VI
ABSTRACT VII

Chapter 1 ..... **1**
INTRODUCTION 1
1.1. Introduction 1
1.2. Context of the Study: The Audit Industry in UK 4
1.3. The Need for the Study 5
1.4. The Objectives of the Study 6
1.5. Research Methodology 7
1.6. The Structure of the Thesis 8

Chapter 2 ..... **9**
REVIEW OF LITERATURE 9
2.1. The Big N Industry Historical Evolution 9
2.2. The Importance of an Auditor Choice and its Tenure 11
2.3. Theories behind Auditor Change Decisions 12
2.3.1. Agency Theory 12
2.3.2. Signaling Theory 14
2.3.3. Opinion Shopping 14
2.3.4. Assurance Theory 15
2.4. Reasons behind Switches to Big N Auditors 16
2.5. Reasons behind Switches to non-Big N Auditors 18
2.6. Market Reaction to Auditor Changes 20
2.7. Factors That Affect Auditor Change Decisions 23
2.7.1. Client Firm's Characteristics 23
2.7.1.1. Change of Management 24
2.7.1.2. Client's Size 24
2.7.1.3. Complexity 26
2.7.1.4. Growth 27
2.7.1.5. Leverage 28
2.7.1.6. Profitability 28
2.7.1.7. Performance 29
2.7.2. Corporate Governance 30
2.7.2.1. Board Characteristics 30
2.7.2.1.1. Board Diligence 31
2.7.2.1.2. Board Size 31
2.7.2.1.3. Board Gender Diversity 32
2.7.2.1.4. Board Independence 33
2.7.2.1.5. CEO-Chair Duality 35

2.7.2.1.6. Audit Committee 36
2.7.2.1.7. Board Members Compensation 37
2.7.2.1.8. Board Members' Skills 38
2.7.2.1.9. Board Structure Type 39
2.7.2.2. Ownership Structure 40
2.8. Conclusion 41

Chapter 3 43
RESEARCH METHODOLOGY 43
3.1. Research Philosophy 43
3.1.1. The Positivism Approach 43
3.1.2. The Phenomenological Approach 44
3.1.3. The Philosophical Approach Adopted 45
3.2. The Reasoning Approach 45
3.2.1. The Deductive Reasoning 46
3.2.2. The Inductive Reasoning 46
3.2.3. The Reasoning Approach Adopted 46
3.3. Data Sources and Types 47
3.3.1. Primary Data 47
3.3.2. Secondary Data 47
3.3.3. Qualitative Data 47
3.3.4. Quantitative Data 48
3.4. Research Questions and Hypotheses 48
3.4.1. Factors Affecting Auditor Change Decision 48
3.4.2. Auditor Change Announcement and Market Performance 50
3.5. Sample and Variables 52
3.5.1. Sample 52
3.5.2. The Selection of Market Index 54
3.5.3. Variables 54
3.5.3.1. The Logistic Regression Variables 54
3.5.3.1.1. The Dependent Variable [CHNG] and [CHNGBIG] 54
3.5.3.1.2. The Independent Variables 55
3.5.3.2. The Event Study Variables 67
3.6. Methodology 67
3.6.1. Logistic Regression 67
3.6.1.1. Model 67
3.6.1.2. Model Diagnostics 71
3.6.2. The Event Study Methodology 79

Chapter 4 90
DATA PRESENTATION AND ANALYSIS 90
4.1. Firm Characteristics, Corporate Governance Factors and Auditor Change Decision 91
4.1.1. Hypotheses 91
4.1.2. Descriptive Statistics: A Univariate Analysis 93
4.1.3. Multicollinearity 97

4.1.4. Multivariate Analysis: Firm Characteristics and Auditor Change Decision 98
4.1.4.1. Model 1 Fitting Process 99
4.1.4.2. Model 1 Fitting Attempts 100
4.1.4.3. Presentation of Findings 103
4.1.4.4. Goodness-of-Fit Tests 105
4.1.4.5. Classification Tests and ROC 106
4.1.5. Multivariate Analysis: Corporate Governance and Auditor Change Decision 107
4.1.5.1. Model 2 Fitting 107
4.1.5.2. Presentation of Findings 108
4.1.5.3. Goodness-of-Fit Tests 110
4.1.5.4. Classification Tests and ROC 110
4.1.6. Model 1 vs. Model 2 111
4.2. Firm's Characteristics and the Choice of the Successor Auditor' Type 112
4.2.1. Hypotheses 112
4.2.2. Descriptive Statistics: A Univariate Analysis 113
4.2.2.1. Univariate Analysis: Change to Big 4 vs. Change to non-Big 4 114
4.2.2.2. Univariate Analysis based on Four Auditor Change Types 116
4.2.3. Multivariate Analysis 118
4.2.3.1. Model Fitting Attempts 119
4.2.3.2. Goodness-of -Fit Tests 120
4.2.3.3. Classification Tests and ROC 121
4.2.3.4. Controlling for Predecessor Auditor's Type-Model Fitting 122
4.2.3.5. Presentation of Findings 123
4.3. Summary and Analysis of the Findings 124
4.3.1. Corporate Governance Variables (Hypothesis H1") 124
4.3.2. Firm's Characteristic Variables (Hypotheses H1' and H2) 127
4.4. Market Reaction to an Auditor Change Announcement 131
4.4.1. Hypotheses 131
4.4.2. Steps 1-5 in the Event Study Methodology 133
4.4.3. Steps 6 and 7: The empirical results 136
4.4.3.1. Descriptive Statistics 136
4.4.3.2. The Inferential Statistics- Presentation of Findings 138
4.4.3.2.1. Market Reaction to an Auditor Change Announcement: All Types of Changes 138
4.4.3.2.2. Market Reaction to an Auditor Change Announcement: From a non-big 4 to a Big 4 140
4.4.4. Analysis of the Findings 143

Chapter 5 146
CONCLUSION AND RECOMMENDATIONS 146
5.1. Introduction 146
5.2. Recommendation 147
5.3. Limitations 148

5.4. Research Implication 149
5.4.1. Theoretical Implication 149
5.4.2. Practical Implication 150
REFERENCES 151
APPENDIX A 164
APPENDIX B 192

Chapter 1

INTRODUCTION

1.1. Introduction

Every business is a social entity that comprises members called the stakeholders who have financial and non-financial interest in this entity. The business operations are translated into financial figures that appear in statements issued on a periodic basis. All public corporations are required by law to issue, among others, balance sheets, income statements, statements of changes in equity and financial position, corporate governance reports and notes from management. These documents are intended to inform the stakeholders and keep them aware of the business transactions. The more the information communicated is reliable, transparent, credible and trustworthy, the more the stakeholders are accurate in their decision making process. Consequently, they will have a clear picture of the company's current financial position and the future business prospects (Sankar & Narayan, 2017).

There are independent individuals who are in charge of making sure that the information transmitted to the stakeholders is highly reliable. These individuals are the auditors who are expected to give shareholders assurance that the management is communicating the true value of the company. Their duty is to assess the strategic vision of the company and understand its future plans to generate money (Santenac & Ball, 2015). Any manipulation attempts have to be detected by the auditors who have to make sure that the shareholders interest in the company is well protected (Sankar & Narayan, 2017). Auditors are not only expected to approve the reliability of the financial figures, but mostly to highlight all the strategic information that cannot be translated in the financial statements (Santenac & Ball, 2015). The

importance of the auditor in influencing the decision of several social members has raised the concern of how to make the audit profession as efficient as possible. Countries all over the world have enacted laws and regulations related to the ethical compliance and the internal control programs that help detecting and overcoming the manipulation (Sankar & Narayan, 2017).

Previously, eight big audit firms dominated the audit market. However, due to some mergers and collapses in the last 30 years, only four remained operational (PricewaterhouseCoopers, Ernst & Young, KPMG, and Deloitte) (Harris, 2017). The big auditors have failed many times in spotting financial wrongdoings in big corporations which resulted in a decline in the public confidence (Sankar & Narayan, 2017). Until the problems have been detected, the company issuing falsified financial documents has deceived the shareholders, the supplier, the creditors and the tax authorities by optimistic figures (Sankar & Narayan, 2017).The year 2002 was the peak of the scandals during which the former Big 5 audit firm, Arthur Andersen has left the industry. It had collapsed after the revelation of Enron's fraud which created a big scandal and left 1,300 clients in search of a new auditor (Harris, 2017).

Despite the big failures, the big 4 are still dominating the world. Ninety-seven percent of the publicly owned corporations in US and 70% of the European public entities are audited by one of these firms. Similarly in UK, during 2015, the big 4 auditors dominated all the FTSE250 and the FTSE 100 companies with no exception (Harris, 2017). Many researchers have discussed the possibility of the big 4 to become big 3 at any time; however, both the regulators and the clients expressed their desire to preserve the four industry pillars operational. This public support created a security fence for these firms and gave them excuse to engage in risky actions (take risky clients, eliminate some necessary procedures to reduce costs and

act upon the management desires) under the umbrella of their big brands. The public support, the low competition and the high market concentration have raised concern about the audit firms' quality services and their willingness to protect their clients (Harris, 2017).

A big wave of auditor changes appeared after the demise of the former big 5, Arthur Andersen. Between 2002 and 2006, more than 6,543 auditor change cases were reported, out of which 2,304 cases were reported in 2002, and 5,325 cases occurred between 2003 and 2006. This movement hit all the industries. The biotechnology, the software and programming and the banking sectors have witnessed the highest number of auditor changes. More than half of these change cases were initiated by the company and not by the auditor himself. Companies change their auditors in search for a better service, more specialization in a certain industry or lower audit fees. Sometimes the change is triggered by a disagreement with the incumbent auditor, change in their management perceptive or even as result of a certain policy that dictates a consistent change to bring in a new blood. Auditors might initiate the change and resign due to many reasons. First, they might notice that auditing the company is getting riskier as the management is getting involved into manipulation or the company is losing the effective internal control. Second, they might feel that they are getting paid less than the efforts put into the auditing process. While some companies disclose the true driver behind the change, many other companies choose to keep it secret. During 2005 and 2006, more than 2,000 companies that changed their auditors refrained from disclosing the reason of change (Grothe & Weirich, 2007).

1.2. Context of the Study: The Audit Industry in UK

In 2007, the UK market raised concerns about two alarming problems in the audit industry, the concentration of the big N accounting firms and the absence of competition (McMeeking, 2009). The merger of Price Waterhouse with Coopers & Lybrand (1998) and the breakdown of Arthur Andersen (2002) have exacerbated the problem. A huge gap existed between the biggest mid-tier auditor and the smallest big N auditor in terms of size and market share. Furthermore, in 2006, the big N firms were auditing 99 companies of the FTSE 100 and 242 companies of the FTSE 250 which explained their high market share and dominance in the audit market. During that year, one-third of the FTSE 350 companies (Oxera, 2006), and the big N firms themselves (McMeeking, 2009) have expressed their need for more auditors' choices as the available options were very limited especially in specialized industries like the banking sector (Oxera, 2006).

Consequently, a series of recommendations were issued by UK regulatory bodies. The following are some of them. Non-big firms are encouraged to set a marketing strategy to show their potential and regain clients' confidence, the government is called to eliminate all barriers that stop new small audit firms from entering the industry, and the audit committees are encouraged to choose other than big N firms (McMeeking, 2009).

Big N auditors were convinced by most of the recommendations issued, however, non-big N firms believed that no significant changes in the market structure nor in the auditor choices will happen (McMeeking, 2009). The problem of concentration continued in 2010. The big four firms earned 99% of audit fees paid by the FTSE 350 firms, and by the end of 2011, they had 534 partners compared to 209 partners for the largest non-big 4 firm (Competition Commission, 2012).

The absence of competition resulted in lower audit quality and less efficiency in the reporting processes due to the lack of innovation in the audit analysis and financial strategy. The high barriers to entry in the audit market increased the big N market shares and allowed them to set high prices. Furthermore, providing low audit quality, provided by big N, had affected the overall capital market. The auditors lost their significant role in reflecting a trustworthy image of the company's position to shareholders, investors and creditors (Competition Commission, 2012).

Some believed that the capital market is so susceptible, the big 4 might become big 3 in any moment and a scenario similar to Arthur Andersen's will happen again any time. This fear pushed the regulators to protect these firms and helped them acquire more power and made them able to lobby the regulators to enact rules that benefit them (Competition Commission, 2012).

1.3. The Need for the Study

Audit-related studies are encouraged for many reasons. First, unlike many other industries where the continuous scientific research is highly required for legal and operational purposes (i.e. medicine, law, and others), the auditing field lacks this urgent need. Second, auditors are always expected to succeed in detecting signs of fraud, however the reality might fell short of this utopian expectation. Firms might choose to keep this imperfection unrevealed, thus some in depth research can uncover what is intended to be hidden. Furthermore, authorities and regulators do not encourage new auditing research to avoid detecting gaps and weaknesses in the adopted systems; which indicates their irresponsibility in accomplishing their duties. Finally, scholars in the auditing field are undertaking projects that could only ensure

accurate statistical measures on the expense of the importance and the need for the study (Francis, 2011).

The research in the audit field reached its peak after the big accounting scandals and the enactment of the Sarbane Oxley Act (SOX) which made a reform in the predominant standards. Now after more than 15 years of this big shake in the audit industry, a study is warranted to know how the market today perceives the audit switch decisions and the possible reaction to such announcements. The companies also need to know how healthy is to change auditors and what factors make it subject to such choices.

In addition, studies that tackled the market reaction to auditor changes are very few and outdated. These studies and others that focused on the factors affecting these change decisions were conducted in countries like Malaysia, China, Kuwait, Nigeria, Taiwan, Saudi Arabia or regions like East Asia and the MENA region. Even after the revelation of the UK audit market characteristics that had been prevailing for more than 30 years (Competition Commission, 2012), no studies have focused on the UK audit industry, which urges a recent and up-to-date research to be conducted in this context.

1.4. The Objectives of the Study

This study aims to check the impact of both the firms' characteristics and the corporate governance factors on the auditor change decisions, regardless of the successor auditor's type as well as their relation with the choice of a big 4 auditor. Furthermore, it attempts to examine the market reaction following the auditor change announcement in general and more precisely following a switch to a big 4 auditor

over two periods (short-term and long-term). This objective is achieved by answering the following research questions: What are the factors that affect companies' decisions to change their auditors? What are the factors that affect companies' decision to change to big 4 auditors? Does the announcement of an auditor change, regardless of the successor auditor's type, affect the companies' short-term return? Does the announcement of a shift to a big 4 auditor affect companies' short-term return? Does an auditor change announcement, in general, affect companies' long-term return? Does the announcement of a shift to a big 4 auditor affect companies' long-term return?

1.5. Research Methodology

This study focuses on all the UK companies listed on the London Stock exchange that have changed their auditors between March 2013 and February 2018. The list of the companies' names is collected from the Financial Times news website. The firm's characteristics, the corporate governance factors and the companies' daily stock prices as well as the market index daily value are all collected from the Eikon DataStream. Furthermore a sample which includes UK companies, listed on the London stock exchange, and that did not change their auditors is formed to better compare the characteristics of the companies that are changing and those that are not changing their auditor. The study uses the logistic regression and the event study methodology to answer the research questions presented above. The data compilation and analysis is completed using the Microsoft office excel and the STATA software.

1.6. The Structure of the Thesis

The remainder of this thesis is organized as follows. Chapter two gives a quick historical overview of the audit industry evolution, the theories and reasons behind the auditor change, the market reactions following the announcement of an auditor change and the previous literature's findings concerning all these issues. Chapter three describes the different philosophical and reasoning approaches, the different sources of data and its types, and presents the philosophies and the data collection methods adopted in this study. Furthermore, it explains the methodologies and the techniques used to analyze the data collected and it represents the research questions along with the hypotheses formulated and the variables selected. Chapter four revisits the methodologies described in chapter three with numerical applications, generates findings that result in accepting or rejecting the hypotheses formulated, and links the findings back to the literature discussed in chapter two for deeper analysis. Finally, chapter five recalls all the analysis conducted briefly by presenting the major findings along with their theoretical and practical implications, discusses the limitations confronted in the study, and gives recommendations as well as implications for further research.

Chapter 2

REVIEW OF LITERATURE

2.1. The Big N Industry Historical Evolution

In 1989, eight big audit firms were dominating the market until three couples decided to merge and the big eight auditors became big five. For instance, Deloitte and Touche came out as the merge result between Deloitte, Haskins & Sells and Touche Ross. Ernest and Young was the result of the merger of Arthur Young and Ernst & Whinney and, Price Waterhouse and Coopers and Lybrand became the PricewaterhouseCoopers company (Sullivan, 2002).

Few years later, the world started witnessing a massive wave of corporate accounting scandals. It started with Sunbeam in 1996 and reached its peak in 2001 with Enron. After the revelation of Enron's accounting manipulation, Arthur Andersen, the largest among the five auditing firms went out of business and the audit industry was left with only four big auditing firms: Deloitte and Touche, PricewaterhouseCoopers, Ernest and Young, and KPMG (Rockness & Rockness, 2005). Thereafter, we will refer to all these big auditing firms as the "big N".

Following the demise of Arthur Andersen, a new trend of changing auditors appeared. Subsequent to Enron's scandal, and until 2006, 7,629 cases of auditor changes among US firms were reported, representing approximately half of the registered US companies at that time (Grothe & Weirich, 2007). The public confidence in the big audit firms has been shaken, following the sea change in this industry. The medium-sized audit firms, referred to as second-tier (BDO Seidman, Grant Thornton, McGladrey & Pullen and Crowe Chizek) lived a golden age, during

which great opportunities were grabbed and huge revenues were generated (Grothe & Weirich, 2007).

Most of the clients chose smaller firms to audit their financial statements. Owens-Jackson et al. (2008) reported that in 2004 there was an unusual movement of switch from big N to other firms (that were either the next largest firms or small local auditors). The most shocking decisions were the Fannie Mae's dismissal of KPMG and the American Express' dismissal of Ernest and Young which was auditing its work since 1975 (Turner et al., 2005). The number of non-big N clients increased by 854 companies during this switch wave. The industries where most of the switches occurred between the years 2004 and 2006 include: software and programming, biotechnology and drug, as well as banking (Grothe & Weirich, 2007).

Hogan & Martin (2009) argued that second-tier firms confronted a very high risk during that period. They had to leave their small clients, who were urged to search for smaller auditors, and consequently be able to accommodate new large clients with high-risk portfolios. Before Enron's scandal there was no need to search for a smaller auditor, risky firms were able to move easily from a big N to another big N auditor because the latter was risk tolerant. However this 'lateral' movement has decreased obviously after the passage of the Sarbanes Oxley Act (Landsman et al., 2009) and a trend of shifting from big N to non-big N appeared unexpectedly. The Sarbanes Oxley Act (SOX), established in US, is a set of legislations enacted to supervise auditors' performance by enhancing the internal control processes. It reassures the credibility, the transparency and the cleanliness of the financial reports to protect investors from fraudulent attempts (Coates, 2007). It is a comprehensive guide to ethical behavior, expected performance, certifications and sanctions for violations. More than 20 sections are devoted to the accounting and corporate ethical

provisions (Rockness & Rockness, 2005). For instance, this act has required the managers to personally affirm their approval on the quality of the internal control. This core element has eliminated the usual excuse provided by the managers, who always claim of not being aware of the wrongdoing in their organizations (Coates, 2007).

2.2. The Importance of an Auditor Choice and its Tenure

The auditor choice is a critical decision that might affect every stakeholder in the company. The auditors act as intermediaries between the management and the shareholders, and ensure to the investors and to all the users of the financial statements that the financial information released is credible and trustworthy. Their ability to take role in corporate governance makes the auditor's choice decision so critical (Houghton & Jubb, 2003). An auditor is responsible to make sure that the financial statements are of high quality in order to ensure that the company's creditors are as informed as the managers, and consequently guarantee a low cost of capital (Francis & Wilson, 1988). Furthermore, an auditor improves the efficiency of the firm's internal processes and mitigates the management illegal deviations (Wallace, 1981).

Due to this important role, many worldwide regulatory bodies have stressed on the need to closely monitor the auditor's performance, and provide guidance on the maximum appropriate auditor tenure to maintain a high level of independency. In the EU, a law was initiated, requiring a mandatory rotation for all companies' auditors (KPMG, 2014). In Canada, the same law has been enacted but then amended to focus on a proper evaluation of auditor's performance (KPMG, 2014) and the Sarbanes

Oxley Act (SOX) has imposed a maximum of a 5-year tenure (Tepalagul & Lin, 2015).

2.3. Theories behind Auditor Change Decisions

The decision to change the auditor is attributed to four different theories: the agency theory, the signaling theory, the opinion shopping theory, and the assurance theory. However, some literature has agreed that the change of auditor is a multi-factor issue that cannot be limited to one theory (Schwartz & Menon, 1985; Grayson, 1999).

2.3.1. Agency Theory

The agency theory is one of the oldest concepts in business and management (Wasserman, 2006). Adam Smith (1937) is probably the first economist who detected the presence of a problem of agency, since then many studies started focusing on discovering the source of this problem and its consequences. Three types of agency problems exist. The first type is the principle-principle problem, which is the misalignment of interest between the majority shareholders and the minority shareholders and it happens when the majority shareholders take decisions that benefit them on the expense of their counterparts (Fama & Jensen, 1983). The second type is the principle-creditors problem. It occurs when the owners take risky project to increase their return without the approval of the creditors who might eventually bear a share of their losses (Damodaran, 1997). Finally, the most common type is the principle-agent problem which is a conflict of interest between the owners, who invest their wealth in the company, and the managers, who are supposed to work for the best interest of the owners. The owners nominate an agent to perform the daily work on their behalves. The agent, or the manager, can closely monitor the

operations and be aware of all financial information. His role is to communicate with the shareholders who are uninformed, and this communication should be performed with an extreme level of transparency. In the absence of communication between the two parties, the "information asymmetry" problem occurs (Houghton & Jubb, 2003).

The agency theory arises when the ownership and the management are separated. While the owners expect the managers to work for their best interest and maximize their wealth, managers take the role of "satisfiers" rather than "maximizers". They play it safe in taking growth opportunities because preserving their positions in the company is more important than satisfying the owners' needs (Herbert, 1959).

The agency theory, also known as the contracting theory has two different dimensions. First, the behavioral dimension which states that the auditor change and choice cannot be explained by any philosophy (Schwartz & Menon, 1985; Knapp & Elaikai, 1988). This assumption arises from the inability to explain the theoretical aspects of auditor change through the actual behavior of individuals (Nazri et al., 2012). Second, the economic dimension of the agency theory can partially explain the decisions of auditor change (Beattie & Fearnley, 1998) since it fails to include a clear understanding of the firms' characteristics and its relation with the auditor change behavior.

Farooq & Tabine (2015) found that the presence of high agency problems is positively related to the choice of a big N auditor. They measured the agency problem by the dividend payout ratio, ownership concentration and transactions complexity. A low dividend payout ratio, a high ownership concentration and a high complexity intensify the principle-agent conflict and thus alarm the need for a high quality auditor to mitigate the problem. Similarly, Farooq & Kacemi (2011) have

used the ownership structure as a proxy of agency problem and found a positive relation between this variable and the choice of big N auditors.

Although the agency problem backed up most of the auditor change decisions, many other expected cases did not take place however; where you can still find agency problems taking place without triggering an auditor change (Schwartz & Menon, 1985; Grayson, 1999).

2.3.2. Signaling Theory

The signaling theory is used when the management starts seeing an upcoming agency problem. It anticipates the potential future distress by searching for a high audit quality provider. Switching to a brand name auditor is an action that signals an optimistic future vision for the shareholders. Such strategy gives intention that the owners' interests are being protected and prioritized (Teh et al., 2016). Some literature has linked the audit switch decisions to audit quality. It was widely believed that when local auditors are replaced by big 4 auditors, better audit quality is attained. By hiring one of the brand names that have been always considered audit specialists; the clients guarantee a high-perceived competence (Chan et al., 2011). Choosing high quality auditors, mainly big audit firms, shows that the managers are working for the best interest of the shareholders and they are mitigating all signs of the agency problem (Houghton & Jubb, 2003).

2.3.3. Opinion Shopping

Many researchers have tackled the concept of "opinion shopping". It happens when the auditor's interest does not coincide with the interest of the management, the latter

exerts a power over the incumbent firm to publish a favorable audit report which may lead to a disagreement and consequently, the auditor is replaced in most of the cases (Fried & Schiff, 1981).

Opinion shopping is the most common explanation of auditor change, especially when initiated by the client. When the company is struggling financially, it searches for a new auditor to avoid receiving unfavorable audit reports from its current auditor. By hiring a new auditor, the company tries to stop the bad information from reaching the public and tries to cover its bad financial situation (Chow & Rice, 1982; Eichenseher & Shields, 1983). Thirty five percent of the companies changing their auditors were receiving going-concern reports, an unpleasant report that alarms an upcoming bankruptcy, and were searching for a better opinion provider (Turner et al., 2005). This situation creates a doubt concerning the credibility of the future financial report that might be distorted to hide unpleasant financial figures (Fried & Schiff, 1981; Davidson et al., 2006). Turner et al. (2005) found that most of the companies that change their auditors for disagreement have big N firms as predecessors and non-big N as successors. One reason behind this finding is that big N are reluctant to take risky clients (Turner et al., 2005), and unwilling to manipulate the financial reports (Guedhami et al., 2014). Hogan & Martin (2009) stated that no matter what the reason of change is, the public tends to attribute the change to audit shopping.

2.3.4. Assurance Theory

As discussed earlier, companies choose big N firms as a result of their reputation and high audit quality services. Creditors and shareholders have always considered the big N firms the best audit quality providers. Some scholars have even reported that

big N auditors earn a premium over non-big N for their significant reputation (Craswell et al., 1995). Grothe & Weirich (2007) reported that during 2006 big N auditors were earning eight times more revenues than the non-big N due to their perceived quality.

From here the emergence of the assurance theory that assumes that companies, that have previously issued unreliable financial reports, change their auditors in order to strengthen back their position. They choose to switch to a new high quality auditor who is able to issue more professional financial reports and offers good understanding of the available information which ultimately improves the companies' performance (Teh et al., 2016).

However, many have argued that auditor quality is not assessed exclusively by the audit firm's rank or size. The audit quality is related to multiple factors and cannot be limited to the firm's brand name (Knechel et al., 2007). Moreover, Francis (2011) explains that multiple elements should be assessed in the process of measuring audit quality. He argued that quality is a matter of a two-stage assessment: the input level which refers to the efforts and skills employed in the audit process conducted, and the output level which refers to the financial results, their accuracy and the market reactions.

2.4. Reasons behind Switches to Big N Auditors

Big N auditors have big international clients who are a source of huge revenues and earnings for them. Any attempt of professional misconduct threatens their reputation and makes them loose this economic benefit. Thus, these firms have much to lose if they tend to offer low quality auditing services (Houghton & Jubb, 2003).

Big N auditors are distinguished by their ability to deal with the agency problem with high professionalism. When big N auditors detect agency problems among their clients, they dedicate more working hours and devote more efforts to this misalignment before issuing their reports (Houghton & Jubb, 2003). For this reason, struggling companies tend to prefer big N firms over local auditors (Fan & Wong, 2005).

Furthermore, big audit firms can easily raise equity capital, provide good audit quality, reflect a transparent image of the company's financials, and they are less likely to overstate earning figures to get better market valuation (Guedhami et al., 2014). It has been suggested that companies with strong political connections are more likely to choose big N auditors to prove that quality is a priority and that the company's members are not using their power to waste the firm's resources (Guedhami et al., 2014).

Beisland et al. (2015) posit that hiring a big N auditor is highly associated with audit quality signs, and Alfraih (2017a) argued that the auditor's type is a measure of audit quality. Besides quality, big auditing firms are known for their international exposure and their affiliation with foreign audit firms which is highly required with large clients who have overseas presence (Grothe & Weirich, 2007).

Hiring a big auditor is driven most of the times by the perception that small audit firms are risky. First, small auditors do not show a good proficiency in dealing with actual agency problems nor preventing their potential occurrence. Their low quality control widens the misalignment between the managers and the owners and possibly conveys doubtful messages about shareholders' future wealth (Chan et al., 2011). Only when controlling owners want to protect their personal interests, choosing a low quality small auditor is preferred (Fan & Wong, 2005).

Second, the frequency of financial restatements increases when small audit firms are hired. Accounting restatement is the act of going back to correct previous accounting figures that deem to be inaccurate (Coates, 2007). Engaging frequently in such act creates a doubt concerning the professionalism of the auditors. Grothe & Weirich (2007) found that small audit firms do accounting restatements at a rate of 13% while the big audit firms do it at a rate of 6% only. Furthermore, the managers might restate the company's earnings downward to pay less dividends to shareholders, or even hide real financial situations in order to control the share prices (Fan & Wong, 2005).

2.5. Reasons behind Switches to non-Big N Auditors

After the dismissal of the giant auditing firm Arthur Anderson and the widespread accounting failures, the public perception of the professionalism and the credibility of the big firms have changed (Agrawal & Chadha, 2005). When it comes to quality, some scholars documented similar audit services between the big N and the non-big N audit firms, and others even argued that non-big N provide better audit services. Small auditors are able to create a better relationship with their clients, they get to know their needs and respond in a very fast way, something not easily done in big N firms in the presence of a hierarchical management system with rigid managerial levels of authority (Chang et al., 2010).

Gaeremynck & Willekens (2003) stated that, even though Big N firms are considered to be sometimes stricter in their reports, struggling Belgian clients were getting similar audit reports from both Big N and non-Big N. Chang et al. (2010) stated that big N auditors can offer lower quality services than a small audit firm.

They also argue that a switch from big N to a smaller auditor creates a positive market reaction, especially when the latter is an industry specialist.

Furthermore, the PCAOB (Public Company Accounting Oversight Board) stated in its inspection report that big N firm's performance is unsatisfactory. The PCAOB issues audit and professional standards for the public companies to follow in the preparation of their reports ("PCAOB standards," n.d.). In one of its reports, it is revealed that more than 30% of the big N auditors restated the financial statements. Following the PCAOB strict standards, the non-big N auditors improved their performance to offer better quality and eliminate the opinion shopping doubts among the public. They have reached a new level of excellence complemented with lower audit fees which made them look attractive to clients (Chang et al., 2010). Chan et al. (2012) argued that small audit firms are more compliant and help companies maintain their listing status and raise new capital necessary for future growth.

Finally, the choice of a non-big N is highly related to the audit fees huge discrepancies. The compliance with the SOX act was the cause of an unusual increase in the audit fees especially the section 404 (the internal control reporting) which was the most debatable part concerning the implementation fee. This section forces the auditors to issue an "internal control report" that defines the responsibilities of the management concerning the control system and assesses their performance throughout the year (Raghunandan & Rama, 2006). The audit fees charged by big N auditors have extremely risen after the passage of the SOX regulations since more audit efforts were dedicated. The compliance with these new regulations obliged many companies to replace their current auditors by new ones, who are usually from non-big four auditing firms and definitely less costly (Ebrahim, 2010; Chan et al., 2011; Ettredge et al., 2007).

In 2004, the average audit fees have increased by 86% compared to the previous year (Raghunandan & Rama, 2006). In 2005, PricewaterhouseCoopers explained that due to the increased need for scrutiny and the high risk involved, more audit efforts are required and audit fees jump is inevitable. These new stringent requirements were imposed on the clients and they ended up paying high fees for efforts they did not demand. Turner et al. (2005) reported that in 2004, 60% of the companies that changed their auditors for audit fee were audited by big N firms and 45% chose successors which are smaller firms.

2.6. Market Reaction to Auditor Changes

Some scholars found that regardless of the circumstances, the auditor's type, or the companies' size; auditor change decisions are perceived by the public as a negative signal. Consequently, the companies' stock return slumps following any change announcement (Dunn et al., 1999; Fried & Schiff, 1981). This immediate rejection from the public is believed to be the result of the "opinion shopping" associated with each auditor change announcement. Furthermore, Eichenseher et al. (1989), Albrecht (1990), Teh et al. (2016) have all supported the same argument and reported a negative market reaction following the auditor change decision in general. They explained that the auditor change signals a doubt concerning the credibility of the financial statements which causes the share price to decline and the cost of capital to increase following the announcement. Whisenant et al. (2003) reported a significant negative market reaction over a three-day window and a seven day-window for all audit switches that are caused by a lack of internal control and unreliable financial reports during the predecessor auditor's tenure. However, Chan el al. (2011) found that companies' financial performance improves after the change regardless of the

audit firm chosen, due to the fact that companies usually take such decision to benefit from lower audit fees.

Even though the perceived audit quality of the big N might be indefinite, the market still reacts more favorably to the big N auditor (Chan et al., 2011). Eichenseher et al. (1989) and Dunn et al. (1999) found that a negative market reaction follows the switch from a Big N to a non-Big N, using a one-week event window. Knechel et al. (2007) revealed that the switch from a big N to a non-big N auditor during the period extended from 2000 to 2003 created a negative market response, while an opposite switch created a positive one. Similarly, Huson et al. (2000) have reported a positive reaction following the choice of a big N and a negative market response to non-big N. In the same context, Hogan & Martin (2009) found that companies that left big auditors and joined second tiers have generated lower returns than the latter's present clients and even lower than those that shifted from second tiers to smaller audit firms. This decline in the non-big N clients' stock return is caused by the dependence of the small auditors on the management team in any decision making process. This belief gives intention that the small auditors issue information just to appeal their management (Houghton & Jubb, 2003).

Another opposing perception justifies a positive market reaction following a migration toward non-big 4 audit firms. After Enron's big scandal that has shaken the public confidence in the brand names, a public migration to small auditors appeared. Many regulators like Christopher Cox, Chairman of the U.S. Securities and Exchange Commission, and William McDonough, Chairman of the Public Company Accounting Oversight Board, have encouraged the clients to trust those auditors who were perceived inferior to big N firms in the past years. Consequently, an unusual positive market reaction to these kinds of switches followed (Chang et al., 2010).

Chang et al. (2010) found that the market reacted positively to the change from big N to non-big N auditor within an 8-day window due to the highly perceived audit quality services. Grant Thornton, which is a non-big 4 auditor but one of the big auditors in the audit industry, has reported that the market does not react negatively to the switch from a big N to a non-big N firm (Whisenant, 2006).

Contrary to all the previous findings, some studies revealed that the public does not show any significant reaction to such announcements and the opinion shopping is becoming a minor factor for auditor change especially after the SEC efforts concerning this issue (Klock, 1994; Davidson et al., 2006). The SEC has set some guidance for companies to better assess their internal control and comply with SOX regulations. Following the SOX rules, the financial reporting process has been subject to strict oversights, managers were responsible for any inaccuracy (section 302) and they faced penalties in case of violation (section 906) (Carver et al., 2011). Furthermore, several scholars have failed to report any reaction following the auditor change announcement (Lefanowicz et al., 1989; Johnson & Lys, 1990; Fried & Schiff, 1981; Nichols & Smith, 1983; Klock, 1994).

Other literature has linked the market response to the level of the predecessor auditor's specialty and companies' abnormal earnings. Knechel et al. (2007) have extended the previous studies by distinguishing between big 4 auditors who are specialists in their clients' industry, and big 4 auditors who are not. They argued that the level of industry specialization has a great impact on the auditors' performance and their ability to anticipate risk. They stated that the negative response is robust only when the switch from a big N to a non-big N audit firm involves an industry specialist predecessor. Whereas, the switch from a non-big 4 auditor to a big 4 auditor, creates a positive reaction only when the successor is a non-specialist.

Furthermore, they conducted an analysis of a switch among big 4 firms. The findings revealed that, when the predecessor is a specialist and the successor is not, the market reacts negatively to the event whereas a reverse situation has a strong positive effect on firm's market value.

Furthermore, Lin et al. (2009) have linked the market reaction to the companies' abnormal earnings before the auditor change announcement. Companies switching to top 10 auditors experience a positive market reaction only if they enjoyed positive pre-announcement abnormal earnings. However, companies that have negative pre-announcement abnormal earnings are hurt by such switch. When audited by big N, companies that received positive earnings in the previous year, ensure an investor favorable perception of the share's value, whereas, companies which received negative earnings tend to see an unfavorable judgment (Lin et al., 2009).

2.7. Factors That Affect Auditor Change Decisions

After the massive wave of auditor changes discussed earlier in this chapter, scholars started searching for the factors that induce the auditor change decision. The factors were grouped into two board categories: the firm characteristics and the corporate governance factors. The corporate governance factors are divided into two sub-categories: the board characteristics and the ownership structure.

2.7.1. Client Firm's Characteristics

Many researchers tackled the relation between the client firm characteristics and the auditor change decision. These firm characteristics include: the change in the management, the client's size, complexity, growth, leverage, profitability and performance.

2.7.1.1. Change of Management

The management is the body held responsible, among others, for the two extreme financial situations: success and failure. Shareholders usually expect the management to show effective performance that generates favorable results. Consequently if management fell short of expectations, it is automatically replaced. An auditor change follows the appointment of a new management in case there is doubt concerning the professionalism of the old auditor or in case the latter does not accept the new managers' reporting methods (Nazri et al., 2012). The relationship between the new management appointment and the change of auditor is viewed as a violation of the agency contract especially when the new management chooses an auditor with whom it is familiar (Williams, 1988).

2.7.1.2. Client's Size

The most important factor affecting the auditor change is the client's size (Abidin et al., 2016; Huson et al., 2000; Hudaib & Cooke, 2005). Knechel et al. (2008) stated that the choice of one of the big N auditors is highly related to the size of the company, its need for equity issuance and loan acquisitions as well as the size of its labor force.

Big companies are always under the spotlight of the media coverage and the financial analysts' assessment. This creates an endless public debate following an auditor change decision, which discourages big companies to take such action (Carcello et al., 2002). Many findings have revealed that large companies do not

change their auditors as frequently as small ones (Francis & Wilson, 1988; Haskins & Williams, 1990; Krishnan, 1994), which supports the previous argument.

However, as companies grow in size, their structure becomes more complex. The management is required to fulfill more duties, which necessitates higher shareholders' empowerment. Monitoring the agents becomes difficult in a complex structure and the probability of having agency problems increases. In small companies the owners control the operations easily, whereas in big ones, as the level of complexity increases, the need for high audit quality increases too. Consequently, shareholders tend to search for a higher quality auditor to mitigate the possible "loss of control" problem (Nazri et al., 2012).

Many findings have supported the previous argument. Knechel et al. (2008) found that big companies search for a certified auditor to reestablish the control system. Sankaraguruswamy & Whisenant (2004), Palmrose (1986) and Woo & Koh (2001) also found that the bigger the size of the company is, the more severe the agency problem becomes and, the higher is the need for a more independent auditor. Johnson & Lys (1990) and Haskins & Williams (1990) have reported a positive relationship between the change of an auditor and the company's size. Furthermore, many studies reported that bigger companies experience a higher risk of manager-shareholder misalignment, and therefore they need a highly independent auditor to attenuate the agency problem (Watts & Zimmerman, 1986). In Malaysia, it is found that the bigger the companies are, the more auditor change will occur, regardless of the auditor type (Nazri et al., 2012; Huson et al., 2000; Hudaib & Cooke, 2005; Abdul Nasser et al., 2006). Similarly, Davidson et al. (2006) and Hogan & Martin (2009) found that the company's size is highly related to auditor choice decisions; the bigger the company is, the higher is the probability to choose a big audit firm.

Big clients search for a smaller auditor only when they receive an unfavorable audit opinion or have an intention to decrease their audit fees (Hogan & Martin, 2009). Knechel et al. (2007) reported that companies switching from big N to another big N auditor tend to be bigger than those engaging in other auditor change types, and Lin & Liu (2010) found that the bigger the companies are, the lower is the probability to switch to a small auditor. On the other hand, Chang et al. (2010) found that small companies tend to switch to a small audit firm.

Unlike all the previous findings, Jaafar & Alias (2002) and Takiah & Ghazali, (1993) have conducted a similar study in Malaysia and reported an insignificant relationship between the client's size and the auditor change decision.

2.7.1.3. Complexity

Complexity is another factor that has been associated with the auditor change decision. Complexity has been related to the client's size and the size of the work force, which are evaluated by the total assets and the number of personnel respectively (knechel, 2008). Several findings revealed that the larger the firm is, the higher the level of complexity. Woo & Koh (2001) measured the complexity by the number of subsidiaries and reported that the number of subsidiaries and the auditor change are positively related. (Sankaraguruswamy & Whisenant, 2004; Palmrose, 1986; Woo & Koh, 2001). While Chang et al. (2010) found that small companies with low complexity tend to choose a small auditor.

2.7.1.4. Growth

Growth can be looked at from different angles: new management, new staff members or new subsidiaries, which entails decentralization of financial decision. Researchers have associated the change of auditor to the companies' growth process (Haskins & Williams, 1990; Abidin et al., 2016). According to Williams (1988), growth is a sign of change in the principal-agent contract. Growing companies suffer from difficult control mechanism and thus require the expertise of a highly qualified auditor (Huson et al., 2000).

Several studies argued that as companies grow, they tend to change from non-big N to big N audit firms (Johnson & Lys, 1990; DeAngelo, 1981; Danos & Eichenseher, 1986). Similarly, Woo & Koh (2001) found that growing companies are more likely to switch to a brand name auditor and Chang et al. (2010) reported that low-growth companies tend to switch to small auditors. Growth has been measured by the market to book value (Chung & Kallapur, 2003; Wang & Xin, 2011) and Carver et al. (2011) found that companies switching from big N to non-big N have reported a low market to book value ratio in their financial reports. However, Lin & Liu (2010) and Chang et al. (2010) have reported that companies having high growth levels tend to switch to big auditors in order to benefit from the positive quality and the good reputation echoes resulting from hiring brand names.

Contrary to all the previous findings, Williams (1988) did not find any significant relation between the auditor change and the company's growth. Similarly Wang & Xin (2011) have tested the same variables among Chinese listed companies that cross list in Hong Kong stock exchange and was not able to report any significant association.

2.7.1.5. Leverage

Leveraged companies are the ones that rely on an external source to finance their operations. The choice of auditor is highly dependent on the need for financing and the level of leverage (knechel, 2008; Lin & Liu, 2010). Companies planning to get external financing know that lenders grant high priority to the auditor's competence, as clean, transparent and credible financial reports are needed. Therefore, to meet the creditor's requirements, moving up in the auditors' quality scale is needed (Knechel, 2008).

It has been evidenced that companies' leverage is associated with auditor change, however inconsistent relations between this factor and auditor change decisions were reported. Chang et al. (2010) found that the lower the companies' need for financing is, the higher is their tendency to choose a small auditor. Furthermore, Knechel et al. (2008) found that the higher the debt ratio is, the more is the tendency to hire a high quality auditor. However, Wang & Xin (2011) results have contradicted the previous studies as they found that big companies with low leverage ratio tend to choose big N auditors. And here again, the Chinese context of their study is to be highlighted.

2.7.1.6. Profitability

Referring back to the opinion shopping theory and the assurance theory discussed earlier in this chapter, companies' profitability is found to be a driver for auditor change decisions. The opinion shopping is supported by several research findings. Knechel et al. (2008) suggested that firms have incentive to hire a low quality auditor to hide their true profitability. DeFond et al. (2000) stated that companies that were unprofitable in the past have incentive to choose a small auditor, while highly profitable firms change to a big auditor to expose there good financial position to the

public. Furthermore, the authors argued that profitable companies might tend to choose large auditors just because they can afford the high audit fees. Chen (2016) found that unprofitable companies tend to manipulate their earnings, by choosing non-big N auditors to hide their losses. Within the same context, Chang et al. (2010) found that low profitable firms are more likely to switch to a small auditor. Furthermore, Dedman & Lennox (2007) and Berger & Hann (2007) reported that unprofitable companies usually avoid declaring their true financial figures, especially to shareholders and creditors, and therefore search for a low quality auditor to help them in the concealing process. However, Wang & Xin (2011) did not find any significant association between auditor change and the companies' profitability across Chinese cross-listed firms.

Landsman et al. (2006) and Schwartz & Menon (1985) found that companies with poor financial performance are more likely to change their auditor. Francis & Wilson (1988) stated that companies having financial burdens tend to choose high quality auditors to re-establish their shareholder's trust, which is backed by the assurance theory.

2.7.1.7. Performance

Studies that have tackled the association between companies' performance and the auditor change decisions have supported both the assurance theory and the opinion shopping theory. Companies with financial problems tend to choose an independent, high quality auditor to help them re-establish their position (assurance theory) (Francis & Wilson, 1988). However, some scholars argued that struggling companies tend to change their auditors to cover their actual bad situation (opinion shopping theory) (Fried & Schiff, 1981; Chow & Rice, 1982; Eichenseher & Shields, 1983).

Wang & Xin (2011) have used the operating cash flow (OCF) as a measure of the firm performance, and stated that companies having low OCF are more likely to change their auditors. Furthermore, Hogan & Martin (2009) found that companies that have financial problems are more likely to switch from big N to non-big N auditors.

2.7.2. Corporate Governance

Corporate Governance is the set of institutional processes that enables the outside investors to assess the performance of the internal members and guarantee return on their wealth (Xu & Wang, 1999). Corporate governance was thought to be an important driver for auditor's choice. Asthana et al. (2010) have discussed the major role of corporate governance in the decision of auditor selection and Abbott & Parker (2000) posit that the presence of strong corporate governance mechanism is positively associated with the choice of high quality auditors. The board of directors' composition and the ownership structure are the most common corporate governance facets discussed in the context of auditor change (Hudaib & Haniffa, 2006).

2.7.2.1. Board Characteristics

The board of directors plays an important role in the auditor's change decision. Each of the following board characteristics is discussed separately in the upcoming sections: board diligence, board size, board gender diversity, board independence, CEO-Chair duality, audit committee, board members compensation, board members skills and board structure type.

2.7.2.1.1. Board Diligence

Board diligence refers to the frequency of the board meetings and the board members' behavior. Board members who meet frequently tend to be more responsible and committed. They show an effective control process and a high need for transparency and compliance with the best reporting standards (Kuang, 2011). Many research findings have supported this argument and found that the higher the board meeting frequency, the more the auditor change will occur (Conger et al., 1998; Vafeas, 1999; Kuang, 2011). Abbott & Parker (2000) found that boards with more than one annual meeting tend to choose a high quality specialist auditor. Furthermore, Quick et al. (2018) found that the higher the number of board meetings, the lower is the tendency to choose a big N auditor.

2.7.2.1.2. Board Size

The Board size is found to be an important corporate governance factor for auditor change decision. Boards that include many members contain varied leadership styles that enrich the company's vision and encourage diversified participation in the decision-making process. This healthy contribution mitigates the possible domination of the chairman (Van den Berghe & Levrau, 2004). Furthermore, the bigger the board size, the better is the companies' financial performance (Hudaib & Haniffa, 2006) since large boards are very demanding when it comes to financial accounting and the transparency in the financial reports (Anderson et al., 2004). In addition, the board size is highly associated with the auditors' selection. Many studies revealed that the larger the board is, the higher is the tendency to choose a high quality auditor (Ianniello et al., 2015; Anderson et al., 2004; Quick et al., 2018; Ianniello et al., 2015; Alfraih, 2017a). Chen & Zhou (2007) found that the number of members on

board, irrespective if they are outsiders or insiders, is by itself a determinant of auditor change decisions. However, Beisland et al. (2015) and Lin & Liu (2010) failed to find any relation between the board size and the auditor choice in the profit and non-profit micro finance institution.

2.7.2.1.3. Board Gender Diversity

Gender Diversity has been lately under the spotlight all over the world. A new movement that encourages the involvement of women in the corporate governance system has emerged to highlight their role in improving the effectiveness of the board. A female quota has been introduced and the gender diversity has become an important indicator of the board efficacy. Board diversity is a healthy indicator. Gender, age, ethnicity and experience help in providing different viewpoints during the problem solving process, yet gender diversity is an issue that is being lately highlighted (Lai et al., 2017). Different countries have set quotas for gender diversity such as Netherland, Iceland and France (Pande & Ford, 2012). Furthermore, listed companies in Norway are obliged to have 40% of their boards represented by females (Ahern & Dittmar, 2012). The law in Germany and Spain requires a minimum of 30% and 25% female board representation respectively (Burke & Vinnicombe, 2008). As for the US, during the last two decades, the women participation has been rising without any mandatory rules (Catalyst Group, 2004).

It is found that females are more independent than males when it comes to controlling managers and they show lower absenteeism rate during meetings. Their participation on board adds objectivity and reliability in the decision-making process (Adams & Ferreira, 2009). Women are known for their strict ethical conduct and

good monitoring skills. The international efforts to engage them in corporate governance guarantee their effectiveness in the monitoring process (Lai et al., 2017). There is a significant relation between the female presence on board and the auditor choice (Alfraih, 2017a). Women are demanding when it comes to the auditing system. Their presence increases the likelihood to hire a specialist auditor by 6 to 7% (Lai et al., 2017). Many scholars have reported that the gender diverse board encourages the selection of a big N auditor (Lai et al. 2017; Gul et al., 2012; Adams & Ferreira, 2009; Alfraih, 2017a). Similarly, Lai et al. (2017) reported that companies having a gender diverse board tend to choose a high quality auditor, since women are more demanding, ethical and professional than men. Gul et al. (2012) also reported that companies having females on their boards search for a high quality auditor. However, Quick et al. (2018) failed to report any significant relationship between the female presence on board and the auditor's choice decision.

2.7.2.1.4. Board Independence

The shareholders delegate a board to closely monitor the managers and make sure they are accomplishing their duties toward the company. The board can be composed of either independent outside directors or insider managers. It is generally believed that outsiders can serve this position more efficiently as they protect the shareholders' rights and detect any managerial misconduct. The more independent members are serving on board; the better is the monitoring system over the management team (Fama & Jensen, 1983). Literature has linked the board characteristics to the effectiveness of the audit system. The accounting fraud has been found to be less in companies where the board includes more outsiders and where the members are less engaged in other firm's directorship (Beasley, 1996).

Studies have shown that the more the board is independent, the higher is the need for an effective auditing system that mitigates the 'information asymmetry' between the owners from one side and the management from the other side (Beasley & Petroni, 2001). The presence of outsiders on board increases the auditor's independence as auditors become able to discuss all the issues with the board members without any managerial influence (Abidin et al., 2016). However, Abidin et al. (2016) found that the more the board includes independent members, the more the company is likely to change its auditor.

The independence of board members increases the effectiveness of the control system and the mitigation of the principle-agent conflict (Beasley, 1996). In Australia, the corporate regulators can stop or delay an auditor change decision if any doubt exists concerning the independence of the new auditor. Some results reveal that the higher the number of common stocks held by outside directors is, the lower is the occurrence of financial misconducts (Beasley, 1996). Independent directors search for high quality audit providers to safeguard their image and to support shareholders' wealth-maximization goal (Carcello et al., 2002). Companies, in general, are choosing independent members on board for their ability to mitigate the misalignment between the managers and the owners (McCabe & Nowak, 2008).

Carcello et al. (2002) stated that independent directors search for a high quality auditor to avoid litigation problems and protect shareholders' wealth. They are able to effectively monitor the managers' performance and reduce the agency problem. One way to do it is to choose a high quality auditor (Beasley & Petroni, 2001). Furthermore, Australian companies hire independent outsiders, who act as board members in other firms. This strategy aims to benefit from those members'

experience with different audit firms, which results in a better auditor choice decision (Houghton & Jubb, 2003).

Leung & Cheng (2014) found that the number of independent members on board is positively associated with the choice of an auditor. Independent board members exert more efforts in the governance mechanism and the monitoring process and consequently tend to choose big N auditors. Beasley & Petroni (2001) found that the higher the board independence is, the higher is the tendency to search for brand names in the audit industry. In a study conducted in Kuwait, it is found that companies that have independent board tend to choose big N auditors (Alfraih, 2017a). However, in the insurance industry, it is found that companies having outsiders on their board tend to prefer a specialist big N auditor over both the non-big N and the non-specialist big N firms (Beasley & Petroni, 2001).

Opposing to all the above findings, Aljabr (2010) and Bradbury et al. (2006) failed to report any significant relation between the board independence and the selection of the auditor.

2.7.2.1.5. CEO-Chair Duality

The effect of the CEO-Chair duality (the CEO being the chairman at the same time) is dependent on the type of the potential agency problem within the firm. If the potential problem exists between the management and the controlling shareholders, then the duality will attenuate the problem. If the potential disagreement lies between the controlling shareholders and the minority shareholders, the duality will make the problem more severe and the CEO/Chairman will take the role of the advocate of the controlling shareholders. In that case, the controlling shareholders might tend to choose a low quality auditor who supports their personal interests (Karim et al.,

2013). Similarly, Jubb (2000) explains that for a more independent board, the separation in the roles of the chairman of the board and the Chief executive officer of the company is deemed necessary. When the same person acts as chairman and CEO at the same time, the CEO gains power over the board members and the board loses its independence. Whereas when two different persons are serving these positions, the chairman gets power over the CEO, monitors his/her actions and protects the shareholders' interests. As the duality hinders the independence of the board (Tonello, 2011), the duality is expected to be negatively associated with the auditor change.

However, Ianniello et al. (2015) suggest that the CEO duality is associated with the choice of a low quality auditor. Many researchers have found that the presence of CEO-Chair duality is positively associated with the switch to a small auditor (Ianniello et al., 2015; Lin & Liu, 2010; Beisland et al., 2015; Alfraih, 2017a). Nevertheless, O'Sullivan (2000) and Abidin et al. (2016) did not find any significant relationship between the CEO-Chair duality and the auditor change.

2.7.2.1.6. Audit Committee

The audit committee is the body responsible for appointing external auditors and deciding on their compensations (Lamm et al., 2018). Furthermore, this committee is responsible for the financial reporting control, the ethical compliance checks and the communication with outside stakeholders (Lamm et al., 2018). Therefore this body is closely engaged in the auditor change decision. Brandt & Li (2003) argued that when all audit committee members are independent, the possibility of engaging in earnings management decreases. Independent members are very cautious about their image and the financial burden associated with litigations and regulatory sanctions, which

pushes them to search for high quality auditors (Abbott & Parker, 2000). Furthermore, the frequency of audit committee meetings results in high quality of financial reporting that translates in a low debt cost (Anderson et al., 2004). Bradbury et al. (2006) argued that the quality of financial statement improves only when the committee members are all independent.

2.7.2.1.7. Board Members Compensation

In the absence of direct evidence concerning the association between the board members' compensations and the auditor change decision, a logical reasoning follows to reach a possible relation. In the light of the continuous debate on the appropriateness of the high compensations levels, two viewpoints have been offered to find a possible relation between the compensation and the auditor change. First, board members who receive high compensation believe that they have to repay to shareholders with more efforts, greater transparency and better control. Therefore, high compensations can be positively linked to more effective internal monitoring system (Dah & Frye, 2017). In the light of this argument, companies with highly compensated members might choose a high quality auditor to keep shareholders assured and protected and hence, keep receiving their benefits in return. Second, it is found that high compensations make the agency problem more severe (Dah & Frye, 2017). Core et al. (1999) found that companies with principle-agent problem report high compensation levels. Again based on this finding, companies might tend to search for brand name auditors when their directors are highly compensated to solve the principle-agent problem (according to the agency theory discussed earlier in this chapter).

Furthermore, a negative relation is reported between the compensation levels and the company's future performance (Core et al., 1999; Brick et al., 2006). Based on the assurance theory of auditor change, managers tend to change their auditors and search for a brand name in order to improve their future performance.

Nevertheless, Cheng & Warfield (2005) found that high board members compensation is associated with earnings manipulations. Earning are overstated especially in companies where compensations are performance-based, in order to push compensation high. While not all auditors accept such practices, and most of the board members desire to get highly compensated, a disagreement between the two parties can occur in case of low compensation. The clash between the two can lead to the change of the incumbent auditor. According to the opinion shopping theory, a disagreement between the two parties can occur when there is misalignment between the interest of the board members and the company's auditor, therefore the auditor change occurs (Fried & Schiff, 1981).

2.7.2.1.8. Board Members' Skills

In the absence of direct evidence on the association between the members' skills and the auditor change decision, a logical reasoning is adopted here as well in order to find a possible relation between the two variables. The most important competence that every board member should have is the industry knowledge. Knowing the industry rules, being aware of the regulatory system, and having a clear vision of all risks and opportunities in the market help in anticipating many problems and consequently many possible solutions. In 2011, a survey in S&P 500 conducted by Spencer Stuart (the American global executive search) revealed that 42% of the respondents believe that the financial background is the most important competence

for a board member, followed by 40% for industry expertise (Small, 2012). Furthermore, Small (2012) stated that the presence of these skills is positively associated with the innovation levels, patent acquisitions and R&D projects. In the light of these findings, and mostly because innovation needs a more effective monitoring system due to the high risk levels that are involved, the presence of these board skills can be associated with auditor change, and more specifically with a switch to high audit quality providers.

2.7.2.1.9. Board Structure Type

A board can have two different types of structure: the single tier structure or so called unitary, and the two-tier structure or dual. A single-tier structure comprises managers, CEO and outsiders in one board whereas a two-tier structure is divided in two boards: the supervisory board and the management board. The supervisory board acts as the monitoring unit that controls the activity of all the managers, whereas the management board is in charge of the normal daily operations within the organization (Belot et al., 2014). A unitary structure allows a smooth communication which mitigates the information asymmetry (Jungmann, 2006). No previous literature has reported a clear relation between the board structure type and the auditor change decision. However, some findings have led to a potential association between the two variables. According to Spencer Stuart (2013), in the dual structure, the two boards meet rarely which enlarges the information asymmetry and creates distance between the members. Nevertheless, unifying the two boards' role in one single unit might annul the supervisory role of the board, which risks its independence (Jungmann, 2006). Based on the latter argument and based on the literature that supports the positive association between the board independence and

the auditor change (discussed earlier in this chapter), a dual structure is assumed to have the same relation.

2.7.2.2. Ownership Structure

When it comes to the relation between the ownership structure and the auditor change, it is revealed that government-owned companies tend to choose a small auditor (Alfraih, 2017b; Guedhami et al., 2009; Wang et al., 2008; Chan et al., 2012). Their choice of small auditors has been attributed to two main reasons. First, these companies know that they are backed up by the government in any financial crisis they might face, and they get special treatment from both the central bank and the stock market regulators. Therefore, they do not need a reputable auditor to legitimize their reputation or to help them detect in advance any possible problem (Brandt & Li, 2003). Second, local auditors are able to understand government operations better than foreign ones (Wang et al., 2008).

Furthermore, it is argued that companies having more institutional shareholders are more likely to search for high audit quality providers and therefore end up employing big 4 auditors (Alfraih, 2017b). Similarly, Kane & Velury (2004) found that institutional shareholders prefer big audit companies due to their competence and reputation. Guedhami et al., (2009) conducted a study on the relationship between the ownership structure and the auditor choice decisions. The results reveal that there is only 30% chance that a state-owned company will choose a big 4 auditor and 64% chance that a newly privatized company goes for the same decision. The study also posits that the government tends to misrepresent the firm information while the foreign shareholders search for transparency and credibility. Moreover, companies switching from state ownership to private ownership shifts from small

auditors to top 10 auditors (Wang et al., 2008). However, Piot (2001) and Adeyemi & Fagbemi (2010) failed to find evidence of a link between the presence of institutional shareholders and the audit quality (Alfraih, 2017b).

2.8. Conclusion

To sum up, the auditor choice decision is one of the most important strategic decisions that impact all company's stakeholders. The literature offers four different theories to explain the auditor change decisions. First the agency problem that attributes the auditor change decision to the presence of conflict of interest between the managers and the owners. The assurance theory links auditor changes to the managers' intention to promise shareholders with a better future performance. The signaling theory looks at the change decision as a prevention of future agency problems. Finally, the opinion shopping theory assumes that any change is intended to obscure the company's bad financial situation, and it is the most commonly used theory to justify an auditor change.

There was no consistency in the findings related to the market reaction following the auditor change decisions. In some studies, the public seems to be convinced by the opinion shopping assumption, as it is translated in a negative market reaction, regardless of the successor auditor's type. In some other researches, the public shows a favorable reaction to big N auditors which is reflected in both positive reaction to the switch to a big N, and a negative reaction to the switch to a non-big N, which means that the big N auditors are still perceived to be high audit quality providers despite being associated with big financial scandals.

In this chapter, many factors affecting auditor change decisions were highlighted and categorized under either the characteristics of the firm or of the

board structure. Literature revealed that size is positively related to an auditor change in general and to the choice of a big N in particular. A positive relation between the board diligence and the auditor change in general is reported too. Moreover, a positive relation between the choice of a big N and the following variables is reported: the company's growth, board size, gender board diversity and the board independence. The CEO-Chair duality is found to be negatively related to the choice of a big 4, however, the company's performance and profitability were negatively related to the choice of big N auditors.

To conclude, some studies reported different reasons for auditor switching decisions such as the company's rules concerning the auditor's tenure and the need for special expertise in a certain industry and some others have revealed that an auditor change can be initiated by the auditor himself. Between the years 2001 and 2004, the auditors were leaving large firms due to the increased risk of litigation issues and the high need for compliance with strict rules set by the SOX (Owens-Jackson et al., 2008).

Even though every auditor change decision is triggered by a strong driver, many companies refrain from disclosing the real reason behind the change (Grothe & Weirich, 2007). In 2003, 69% of the companies that changed their auditor did not declare the reason behind this change (Turner et al., 2005). Companies tend to hide the real reason behind the auditor change because they fear that this news will be considered a signal of bad financial situations (Nazri et al., 2012).

Chapter 3

RESEARCH METHODOLOGY

This chapter distinguishes between the different philosophical (positivism and phenomenological) and reasoning (inductive and deductive) approaches while presenting the researcher's position regarding each. Then it presents the four research questions that need to be answered along with their related hypotheses. Two methodologies are discussed: the logistic regression and the Event Study methodology, and their related models and variables are defined. Furthermore, this chapter presents the types and sources of data, and describes the samples used for answering each research question.

3.1. Research Philosophy

A research philosophy is a belief about how data should be gathered, analyzed, and used. Two major research philosophies have been identified, namely positivism (sometimes called scientific) and phenomenological approaches (sometimes called non-positivism or interpretive paradigm).

3.1.1. The Positivism Approach

The positivism approach is a philosophical approach deeply rooted in the study of physical and life sciences, and is the reason behind many achievements in history, medical field, engineering, Physics, and many others (Remenyi et al., 1998). It focuses on measurements like 'how many' and 'how much'. It is based on the view that everything that exists can be verified through experiments, observations, and mathematical proofs. Positivists stress on the importance of using quantitative

methods such as surveys, questionnaires, and statistics because of their reliability and representativeness (Remenyi et al., 1998).

However, there has been much debate whether or not this approach is entirely suitable for social sciences. When it comes to studying human behavior and people's life patterns, this approach misses the mark, isolates itself from the reality, and fails to take into consideration changes taking place in people's mind. For example, some business researches have tackled the employees' characteristics and performance within their organizations and found that a non- positivism approach served them much better (Remenyi et al., 1998).

3.1.2. The Phenomenological Approach

The phenomenological (non-positivism) approach is frequently used to answer behavioral management questions like: why are some employees motivated more than others? Why do some employees ask for more autonomy? Why are clients dissatisfied? (Remenyi et al., 1998). It generates results based on a closer look into the event using experience and observation. It considers that an event which is objectively studied from an outward appearance is not eligible to research (Cohen & Manion, 1980). It assumes that the researcher should be engaged in the study to understand all the aspects of the phenomena and find answer to 'what', 'why' and 'how' questions. In this context, the results from what has been observed and experienced is much reliable than what is interpreted and analyzed because in every situation, there is a unique setting that people create to reflect their own reality (Easterby-Smith et al., 1994).

In summary, under the phenomenological umbrella, the one in charge for investigation has to know that people are different in different places and when

disconnected from their own environment, they lose social ties and consequently, their normal unconscious behavior will disappear (Clarkson, 1989). Phenomenologists treat the individuals in the study as human and not as objects. Even though some business researches are directed toward the human conduct, they still use the phenomenological approach (Remenyi et al., 1998). The phenomenological approach is frequently confused with the qualitative research techniques, however not all qualitative research necessarily falls under the non-positivism (Remenyi et al., 1998).

3.1.3. The Philosophical Approach Adopted

This study clearly falls under positivism. Secondary data is extracted from the Financial Time news website and from Eikon DataStream so that no direct human contact is present in the data collection process, and thus, ensuring objectivity. The study uses pure scientific methodologies, regression and models that have been tested for years and used in many previous studies. Mathematical measures that remain valid in all times and contexts are employed to generate causal relationships between different variables. No subjective interpretation or personal experiences are involved.

3.2. The Reasoning Approach

There are two broad methods of reasoning, known as the deductive reasoning and the inductive one.

3.2.1. The Deductive Reasoning

The deductive reasoning starts with the general aspect of the topic and then moves to the specific part. It takes the theory of a specific topic and translates it into a narrower form called the hypothesis. The hypothesis can be tested by observation to confirm the initial theory or reject it. This reasoning is also called the 'top-down' approach (Trochim, 2000).

3.2.2. The Inductive Reasoning

The inductive reasoning, also called the 'bottom-up' approach, is more open-ended at the beginning. It starts with an observation and an investigation in a specific field and detects any pattern or consistency that can lead to a general conclusion to formulate the theory. Therefore, this approach starts with the specific side of a research and then moves to its general side (Trochim, 2000).

3.2.3. The Reasoning Approach Adopted

Given the aims and nature of this study, a deductive reasoning approach is followed. The topic by itself is widely discussed among researchers. The theories and hypotheses presented have been already tested in other contexts and using other techniques. This thesis reformulates theories and hypotheses of previous literature to either confirm the results, regenerate new conclusions or add new findings.

3.3. Data Sources and Types

3.3.1. Primary Data

The primary data is an original set of data collected by the researcher him/herself to be tailored especially for his/her research topic. The researcher conducts interviews, goes for direct observations, records videos, takes photos or collects diaries to structure his/her own information baggage and analyzes it later on (O'Gorman & MacIntosh, 2015).

3.3.2. Secondary Data

The secondary data is the already available data that is accessible by everyone. It is collected by the researcher and compiled into files to be analyzed and manipulated in a way to serve his/her own research questions. This type of data can be found in archives, interviews already conducted by other researchers and saved in documents, public speeches, journal articles, books, data streams, news, company's reports and others. Secondary data might have been primary at the first place. In some cases, the secondary data complements the primary one in order to give the researcher better insights into the topic under investigation. It is used either to support findings generated from primary data or to redefine it to come up with robust findings (O'Gorman & MacIntosh, 2015).

3.3.3. Qualitative Data

The qualitative data comes in the form of texts, videos, keywords, voice recordings and others. It can be obtained from in-depth interviews, analysis of written documents, direct observations and other tools. Initially, it is not numerical, but the

researcher transcribes it and codes it at a later stage. The conversion of qualitative data into a quantitative one makes the data analysis process easier and more effective (Trochim, 2000).

3.3.4. Quantitative Data

The quantitative data is collected in the form of numbers, ratios and other numerical values. As mentioned above, qualitative data is coded and consequently benefits from some advantages of the numerical aspects; similarly, quantitative data is enriched when a qualitative judgment is highlighted. Thus, the distinction between the two types of data becomes insignificant (Trochim, 2000).

3.4. Research Questions and Hypotheses

This study tackles two main topics under which one or more research questions can be posed and translated into null hypotheses and alternative ones. While the null hypothesis, denoted by H_0, is what the researcher is trying to find evidence against, the alternative hypothesis, denoted by H_1 is the opposite of H_0 and reflects what needs to be proven.

Thus, the research questions that this thesis investigates along with their corresponding hypotheses are as follows:

3.4.1. Factors Affecting Auditor Change Decision

The first objective of this research is to investigate whether firms' internal characteristics and corporate governance factors affect auditor change decision in general, and the change to a big 4 in particular, which is formulated as:

Research Question 1: What are the factors that affect the companies' decisions to change their auditors?

Research Question 2: What are the factors that affect the companies' decision to change their auditors to big 4?

In order to answer these two questions, three main hypotheses are developed. The first one tackles the firms' internal characteristics (size, growth, leverage, profitability, and performance) and their relation with an auditor change in general. The second one focuses on the corporate governance variables (board diligence, board size, board gender diversity, CEO-Chair duality, board independence, audit committee independence, board members compensation, board members specific skills, and board structure type) and their relation with the auditor change decision in general. The last one emphasis on the firm's characteristics and their relation with the choice of a big 4 successor auditor. Thus research question 1 and research question 2 are formulated and translated into three sets of hypotheses as follows:

The first set of hypotheses that focuses on the firms' characteristics and the auditor change regardless of the successor auditor's type are:

H1'.0: Firm Characteristics do not affect the company's decision to change the auditor

H1'.a: Firm Characteristics affect the company's decision to change the auditor

These hypotheses are divided into six sub-hypotheses, explained later on throughout this chapter.

The second set of hypotheses which tackles the relation between the corporate governance characteristics and the auditor change regardless of the successor auditor type are:

H1''.0: Corporate governance variables do not affect the company's decision to change the auditor

H1''.a: Corporate governance variables affect the company's decision to change the auditor

This hypothesis is tested only on the decision of an auditor change, irrespective of the type of auditor change, due to data unavailability. In turn, this hypothesis is divided into 10 sub-hypotheses, explained later on in this chapter.

The third set of hypotheses that emphasize the relation between the firm's characteristics and the choice of a big 4 auditor are:

H2.0: Firm Characteristics do not affect the company's decision to change the auditor to big 4

H2.a: Firm Characteristics affect the company's decision to change the auditor to big 4

3.4.2. Auditor Change Announcement and Market Performance

The second objective of this research focuses on testing the impact of the auditor change announcement on the market value of the stock. A positive impact is translated into a positive and significant cumulative abnormal return. This objective is divided into two research questions. The first question tackles the immediate market reaction (over a 7-day event window) following the release of the auditor change news. The second question examines the market reaction several days following the auditor change announcement, measured over a 17-day period after the event window period.

Research Question 3: Does the announcement of an auditor change affect companies' short-term return?

H3'.0: There is no significant positive cumulative abnormal stock return around the announcement of an auditor change, irrespective of the successor auditor's type (measured over a 7-day event window)

H3'.a: There is a significant positive cumulative abnormal stock return around the announcement of an auditor change, irrespective of the successor auditor's type (measured over a 7-day event window)

The type of the successor auditor is included again to test more precisely the market reaction following the shift to a big 4 auditor (measured over a 7-day event window). Therefore, the following set of hypotheses is also tested:

H3''.0: The positive cumulative abnormal stock return is the same regardless of the auditor's type

H3''.a: The positive cumulative abnormal stock return is more evident when the successor auditor is a big 4

Research Question 4: Does an auditor change announcement affect companies' long-term return?

H4'.0: There is no significant positive cumulative abnormal stock return several days following the auditor change announcement, irrespective of the successor auditor's type (measured using a 17-day post-event period)

H4'.a: There is a significant positive cumulative abnormal stock return several days following the auditor change announcement, irrespective of the successor auditor's type (measured using a 17-day post-event period)

Again the type of the successor auditor and more precisely the case of the shift to a big 4 auditor is included in the testing process (over 17-day post-event period), and the following hypotheses are tested again:

H4''.0: The positive cumulative abnormal stock return is the same regardless of the auditor's type

H4''.a: The positive cumulative abnormal stock return is more evident for companies switching to a big 4 auditor

While research questions one and two are tested using a logistic regression, research questions three and four are tested using the Event Study methodology, which are elaborated in the upcoming sections.

3.5. Sample and Variables

3.5.1. Sample

The study is limited to the UK market, and more precisely to the London stock exchange. All the UK companies that changed their auditors from March 2013 till February 2018 and that are listed on this stock exchange are collected from the financial times website. A list of 157 companies that announced a change of an auditor is collected. Out of the 157 companies, 11 are reappointment cases and eight are closed end funds, resulting in 138 companies. However, eight companies have missing data since they had been delisted, merged or acquired. Therefore, the final sample of companies changing their auditors includes a total of 130 companies.

In order to find the drivers behind the decision to change the auditor, the 130 companies are used as a treatment group along with a control group of companies that did not change their auditors. Therefore, a comparison between the variables of the treatment group companies and those of the control group is deemed necessary. The control sample comprises a group of 95 UK companies that did not change their auditors and that are part of the FTSE 250, and thus listed on the London Stock exchange. To answer research question one, all the firm's characteristics and the corporate governance factors (explained in

upcoming sections) of the 225 companies are collected. All independent variables are collected one year prior to the auditor change announcement.

The second research question tackles the firm's characteristics that affect the switch to a big 4 auditor, therefore, the 130 UK companies that have engaged in auditor change are categorized into two sub-samples according to the type of their successor auditor (those who changed to a big 4 auditor and those who changed to a non-big 4 auditor). The two sub-samples' firm characteristics are compared in order to detect the drivers behind the choice of a big 4 auditor.

To answer research questions three and four, the daily stock prices of each company and of market index are obtained 103 days prior the announcement date and 20 days following the event date from the Eikon DataStream. A fake date column is created where the announcement date is denoted as t=0 and all the trading days leading to that date are denoted as t-1, t-2 … until t-103, which is the last date needed for the estimation period. As for the days following the event, they are denoted as t+1, t+2… until t+20, which is the last day of the post-event period over which the cumulative abnormal return is observed. Some companies had missing data because they have been merged, acquired or delisted, which limited the sample again to 120 companies in the Event Study analysis.

The data is secondary and quantitative in nature. It is collected from the Eikon DataStream, mainly from the financial statements of the companies and from the environmental, social and governance (ESG) statements (see appendix A). It is compiled and organized in excel sheets before being exported to the STATA software where a logistic regression and an Event Study methodology is run to either accept or reject each of the above hypotheses.

3.5.2. The Selection of Market Index

In the process of analyzing research questions three and four, a market index is selected in order to find the abnormal return as explained in the next sections. The study focuses on the UK market, and therefore, an index in this market is selected. Megaw (2017) states that the FTSE 100 mostly includes multinational companies whereas FTSE 250 is dominated by domestic oriented companies. Therefore, the FTSE 100 is sensitive and prone to international fluctuations, contrary to FTSE 250 which is a better reflection of the UK economic market. Wright (2016) argues that looking at FTSE 100 will create an optimistic image of the UK economy, while FTSE 250 is better in gauging the risks in the economic situation as it contains more domestic firms. Therefore, the daily prices of the FTSE 250 are collected over the period of study to be used as the market benchmark.

3.5.3. Variables

3.5.3.1. The Logistic Regression Variables

3.5.3.1.1. The Dependent Variable [CHNG] and [CHNGBIG]

In the first research question that tackles the factors that affect an auditor change in general, the dependent variable 'CHNG' is a binary variable that takes the value of 1 if the company announces a change of an auditor between the years 2013 and 2018, and 0 otherwise.

In the second research question that tackles the factors that affect the choice of a big N successor auditor, the dependent variable 'CHNGBIG' is a binary variable that takes the value of 1 if the successor auditor is a big N and 0 otherwise.

3.5.3.1.2. The Independent Variables

Firm characteristics and corporate governance variables that previous studies have employed to explain the reasons behind the decision to change auditors are investigated. Following previous studies, each variable is defined and measured. Based on previous empirical evidence and related theories, the sign of the relationship between each variable and the auditor change decision is formulated and summarized in Table 1 at the end of this section.

A. Firm's Characteristics (Hypothesis 1')

A.1. Company's Size [SIZE]:

As previously stated in the literature section, the client size is one of the most important factors for auditor change decision (Abidin et al., 2016; Huson et al., 2000; Hudaib & Cooke, 2005) with no consensus on the sign of the relationship. On one side, some argued that big companies are less likely to change their auditors. Being largely scrutinized by the media channels and the financial regulators, big companies are discouraged to change their auditors as they fear the public criticism (Carcello et al., 2002). On the other side, as companies grow in size, they will have more complex structures and the number of agency relationships will increase; managers will be granted loads of responsibilities making the shareholders' control task more difficult. Given the resulting increase in agency costs, the company might need to search for a better audit quality provider (Nazri et al., 2012). In light of the latter argument, the relationship between companies' size and the auditor change decision is expected as follows:

H1'.a: The larger the size of the company, the more likely an auditor change will occur.

H2.a: The larger the size of the company, the more likely to choose a big N auditor.

Empirically, many scholars have reported a positive association between the company's size and the auditor change decision (Johnson & Lys, 1990; Haskins & Williams, 1990; Nazri et al., 2012). Furthermore, size is found to play a role in the choice of an auditor. For example, some authors have found that the bigger the company is, the more it tends to choose an independent auditor (Sankaraguruswamy & Whisenant, 2004; Palmrose, 1986; Woo & Koh, 2001; Watts & Zimmerman, 1986), whereas Davidson et al. (2006) and Hogan & Martin (2009) found that the company's size is positively related to the choice of a big N auditor.

The company's size can be measured either as the logarithm (log) of total assets or the market capitalization. Some have computed the log of the change in total assets two years before the auditor change (Nazri et al., 2012), others have used the total assets at the end of the previous year (Lin & Liu, 2010), whereas some have used the market capitalization in the year where the change occurred (Chang et al., 2010).

In this study, size will have two proxies: log total assets and log market capitalization. These proxies are found in the Eikon DataStream, in the year prior to the change announcement.

A.2. Company's Growth [GRWTH]**:**

Abidin et al. (2016) found that the company's growth is associated with the auditor change decision. Growth is manifested by a new labor force, new subsidiaries, new managers, decentralization of decisions and more complex processes (Huson et al., 2000). The monitoring process becomes difficult in growing companies which requires a better audit service (Huson et al., 2000). More specifically, as companies

grow, they are more likely to switch to a big N auditor, who presumably has more expertise to provide specialized services. Based on this argument, a positive relation between the company's growth and the auditor change decision is expected as follows:

H1'.b: The higher the growth of the company is, the more likely an auditor change will occur.

H2.b: The higher the growth of the company is, the more likely a firm will choose a big N auditor.

Empirically, many scholars found that growing companies tend to change to a big N auditor (Johnson & Lys, 1990; DeAngelo, 1981b; Danos & Eichenseher, 1986; Woo & Koh, 2001).

The company's growth can be measured by the market to book value (Chung & Kallapur, 2003; Wang & Xin, 2011; Lin & Liu, 2010) or by the change in sales (Chang et al., 2010). In this research, growth is measured as the market to book value (due to data availability reasons) one year preceding the change. This measure is found in the Eikon DataStream in the financial statements issued by each company.

A.3. Company's Leverage [LEV]:

High leverage companies are those companies that rely on external creditors to finance their operations. Given that the willingness of creditors to give financing to firms is highly dependent on the reliability and trustworthiness of the financial statements (knechel, 2008), high leverage companies are expected to change their auditors to constantly improve their financial reports.

Furthermore, according to Jensen & Meckling (1976), managers and owners have the opportunities to transfer wealth from debtholders to themselves. As the amount

of debt increases, the potential amount of wealth increases, which will increase the incentive for managers to transfer wealth. Thus, firms with a high financial leverage have more incentive to change their auditors to increase the reliability of accounting information used to verify covenant compliance.

H1'.c: The higher the financial leverage is, the more likely an auditor change will occur.

H2.c: The higher the financial leverage is, the more likely a firm will choose a big N auditor.

Knechel (2008) and Chang et al. (2010) have reported a positive relation between the company's leverage and the choice of a big N auditor. The company's leverage can be measured by the total debt ratio (total debt over total assets) (Knechel et al., 2008) or by the change in financing calculated as the difference between the sum of equity and debt issues in two different years (Chang et al., 2010).

In this research, leverage is measured by the debt to equity ratio knowing that the debt equity ratio is as efficient as the debt ratio in explaining the company's debt levels. The debt to equity ratio is measured one year prior to the change and is obtained from the Eikon DataStream, in the financial statements reported by each company.

A.4. Company's Profitability [ROA and LOSS]:

Some scholars found that unprofitable firms tend to cover their bad situation by changing their auditors (Dedman & Lennox, 2007; Chen, 2016; Berger & Hann, 2007) and most of the time they change to a non-big N auditor (Chen, 2016). Chang et al. (2010) and Wang & Xin (2011) found that low profitable firms are more likely to switch to a smaller auditor. Furthermore, Francis &Wilson (1988)

argued that companies having financial distress are more likely to change their auditors to regain shareholders' trust. Based on these findings, the relationship between the company's profitability and the auditor change is expected as follows:

H1'.d: The lower the profitability is, the more likely an auditor change will occur.

H2.d: The lower the profitability is, the less likely a firm will choose a big 4 auditor.

H1'.e: Firms incurring losses are more likely to change their auditor.

H2.e: Firms incurring losses are less likely to choose a big 4 auditor.

Profitability can be measured by return on assets (ROA) (Knechel et al., 2008; Chang et al., 2010), or Loss either in the same year or in the year prior to the change date (Wang & Xin, 2011; Chang et al., 2010; Lin & Liu, 2010). In this research, two proxies are used to test companies' profitability. ROA is included as the measure of profitability, and a dummy variable is included, which is equal to 1 if net income is less than zero, 0 otherwise. Both Net Income and ROA are collected from the Eikon DataStream, one year prior the change.

A.5. Performance [OCF]:

As discussed in the literature, the opinion shopping, one of the theories behind the decision to change the auditor, argues that struggling companies tend to change their auditors to cover the actual bad situation (Fried & Schiff, 1981; Chow & Rice, 1982; Eichenseher & Shields, 1983). Based on the assurance theory, companies that are struggling financially and have economic problems tend to choose an independent, high quality auditor to regain shareholders' confidence and minimize litigation risk (Francis & Wilson, 1988). Furthermore, companies that switched

from big N to non-big N auditors were found to be struggling before the shift (Hogan & Martin, 2009). In the light of these arguments, the expected association between company's performance and auditor change is as follows:

H1'.f: The lower the performance is, the more likely the auditor change will occur.

H2.f: The lower the performance is, the less likely a firm will choose a big 4 auditor.

Wang & Xin (2011) used the operating cash flow (OCF) as a measure of the firm's performance, and found a negative relation between the OCF and the auditor choice. In this research, the operating cash flow in the year prior to the change announcement is used to test this hypothesis. The OCF is the cash generated from internal operations that results from day-to-day operations related to the company's core business transactions (Robinson, 2009), and it can be found in the ESG statements in the Eikon DataStream.

B. Corporate Governance Variables (Hypothesis 1")

B.1. Board Diligence [BODIL]:

Board diligence is usually observed through board meetings and the way members behave during the meeting. Members who show a high commitment level by their frequent meetings are seeking an effective control and an enhanced financial reporting practices (Kuang, 2011). Based on these arguments, a positive relation is associated between the board diligence and the auditor change.

H1".g: The more diligent boards in the company are, the more likely an auditor change will occur.

Many previous findings supported the same relationship between the audit quality and the board meeting frequency (Conger et al., 1998; Vafeas, 1999; Kuang, 2011). This variable is generally measured by the number of board meetings (Kuang, 2011). The number of board meetings, one year prior to the change, is found in the ESG statements in the Eikon DataStream.

B.2. Board Size [BOSIZ]:

It has been argued that large boards comprise varied skills, visions and leadership styles (Van den Berghe & Levrau, 2004) and they require high levels of transparency and accuracy in the financial reporting process. Thus, board size is positively associated with company's performance (Hudaib & Haniffa, 2006; Anderson et al., 2004). Since large boards are demanding high professionalism and show good performance, it is expected that they always search for better audit services and therefore a positive relation between the board size and auditor change decision is expected.

H1''.h: The larger the board size is, the more likely an auditor change will occur.

Furthermore, many studies have shown that companies with larger boards tend to choose a big N auditor (Quick et al., 2018; Ianniello et al., 2015; Anderson et al., 2004; Quick et al., 2018; Ianniello et al., 2015).

The board size is measured by the number of members on the board (Chen & Zhou, 2007). The number of board members at the end of the fiscal year prior to the change announcement is found in the ESG statement of each company in the Eikon DataStream.

B.3. Board Gender Diversity [BOGDIV and EXEDIV]:

According to Adams & Ferreira (2009), women are more independent and committed than men. They are objective and demanding when it comes to the financial reporting transparency (Lai et al., 2017). The female presence is often associated with high ethical conduct and strict managerial supervision (Lai et al., 2017). Based on these findings, a strong female presence might cause a continuous search for the best audit services and therefore a positive relation between the board gender-diversity and the auditor change is expected.

H1''.i: The higher the board gender diversity is, the more likely an auditor change will occur.

H1''.j: The higher the executive board members gender diversity is, the more likely an auditor change will occur.

Empirically, many studies have reported a positive relation between female presence on board and the switch to a big N auditor (Alfraih, 2017a; Lai et al., 2017; Gul et al., 2012; Adams & Ferreira, 2009). In this research, board diversity is measured by the percentage of females on board (in the testing of H1.h.) and more precisely among executive board members (in the testing of H1.i), which are found in the ESG statements of the companies in the Eikon DataStream one year prior the change.

B.4. Board Independence [BOIND]:

Board members can be either insider managers or independent outsiders. The higher is the number of outsiders on board, the more the board is independent. Companies having highly independent boards tend to search for high quality auditors to mitigate any possible information asymmetry (Beasley & Petroni,

2001). Thus, a positive relation between the board independence and the decision to change the auditor is expected

H1''.k: The more independent the board is, the more likely an auditor change will occur.

Empirically, Abidin et al. (2016) found that the more the board is independent, the more likely is the change of the auditor. Furthermore, several research findings revealed that companies with independent boards search for big N auditors (Carcello et al., 2002; Beasley & Petroni, 2001).

This variable is measured by the percentage of the independent members on board, one year prior to the change announcement and is obtained from the ESG statements reported by each company in the Eikon DataStream.

B.5. CEO-Chair Duality [CEOCHAIRDUAL]:

The separation of the chairman and the CEO positions is necessary to safeguard the independence of the board (Jubb, 2000). In case of separation in the two roles, the chairman maintains his/her ability to monitor the CEO performance to protect shareholders' rights. Based on the argument that the separation of the two roles boosts the independence of the board, and referring to the explanation in the previous variable [BOIND], it is expected that the CEO-Chair duality is negatively associated with the auditor change decision.

H1''.l: The CEO-Chair duality is negatively associated with an auditor change.

In this research, this variable is dichotomous and takes the value of 1 when the CEO simultaneously chair the board and the value of 0 otherwise. It is found in the Eikon DataStream, in the ESG statement reported by each company, whereby it is coded as 'True' if there is a role duality.

B.6. Audit Committee Independence [AUDCOMIND]:

Since the audit committee is part of the board, its independence is needed for the board to be independent. Independent committees search for high quality auditors to protect themselves from litigation issues and financial problems (Abbott & Parker, 2000). Furthermore, Bradbury et al. (2006) found that the financial statements' quality improves only when the audit committee members are independent, which also supports the previous idea that companies with independent committees tend to search for high quality auditors. Consequently, a positive relation between the audit committee independence and the auditor change is expected.

H1''.m: The more independent the audit committee is, the more likely an auditor change will occur.

This variable is measured by the percentage of the independent audit committee members one year prior to the auditor change announcement. It is reported in the Eikon DataStream in the ESG statement of each company.

B.7. Board Member Compensation [BOMEMCOMP]**:**

High board member compensation is found to worsen the agency problem (Dah & Frye, 2017). Thus, companies with highly compensated directors might tend to search for high audit quality providers to attenuate the severity of the agency problem. Supporting this expectation, Core et al. (1999) found that companies suffering from agency problems show high compensation levels and high compensation levels are negatively associated with companies' future performance (Core et al., 1999; Brick et al., 2006). Based on these findings, it is expected that

companies with high compensation levels are more motivated to change their auditors as a solution for their potential corporate governance problems. Thus, the board compensation and an auditor change are positively related.

H1''.n: The higher the compensation of the board members is, the more likely an auditor change will occur.

This variable is measured as the log total compensation of the board members (in US dollars) and is obtained from Eikon DataStream in the ESG statement of each company, one year prior to the auditor change announcement.

B.8. Board Members' Industry Specific Skills and Financial Background [BOMEMSKL]:

One of the most important skills that a board member should have is the industry knowledge. Being an expert in the industry in which the company operates can provide the board with a clear understanding of the business environment, its opportunities and risks. This skill gives insight into the prevailing regulatory system and its players (Small, 2012). According to Stuart (2011), the most important competence for board members is having strong financial background, followed by the industry knowledge skills. Small (2012) found that board members' industry expertise is positively associated with the firm value, its innovation levels, R&D investments and acquired patents. Moving upward in the innovation scales requires an upward shift in the audit services provided (Small, 2012). Thus, a positive relation between the board members' skills (industry and financial skills) and the auditor change is expected.

H1''.o: The higher the presence of industry and financial background skills in the board members is, the more likely an auditor change will occur.

This variable is measured as the percentage of the board members having industry or financial background skills one year prior the auditor change announcement and is found in the Eikon DataStream in the ESG statement.

B.9. Board Structure Type [BOSTR]:

The board structure can be a single-tier or a two-tier. The single-tier or so called unitary board structure is where there is only one board that comprises the CEO, managers and independent outsiders who defend shareholders' rights (Belot et al. 2014). The two-tier or the dual board structure is where there are two boards: the management board that copes with daily operations and the supervisory board that controls all the activities and is in charge of the managers' appointments (Belot et al., 2014). The single-tier board structure allows an easier flow of information which helps mitigate the information asymmetry and the delay caused by bureaucratic processes (Hooghiemstra & Van Manen, 2004; Jungmann, 2006). Based on Stuart (2013) findings, the two-tier board meets less frequently than the one-tier board which minimizes the trust between the board members and worsens the information asymmetry. Thus, the two-tier structure is a fertile soil for agency problems and therefore, a positive relation might exist between the two-tier board structure and the auditor change decision.

H1''.p: The existence of a two-tier structure is positively associated with an auditor change.

In this research, this variable is a binary variable that takes the value of 1 when there is a two-tier structured board, and 0 otherwise, one year prior the auditor change announcement. It is obtained from the Eikon DataStream, which is indicated as 'unitary' and 'two-tier'.

All these variables are defined in Table 1 along with the expected sign.

3.5.3.2. The Event Study Variables

In the Event Study, the main parameter is the return, which is referred to as the actual return, and calculated from the stock prices using the following formula:

$$R_t = Ln\ (P_t/P_{t-1}) \quad (1)$$

Where R_t is the actual return at time t, P_t is the current price at time t and P_{t-1} is the price of the previous trading day.

Besides the actual return, the normal return, the abnormal return and the cumulative abnormal return are all defined and calculated in section 3.6.2 in the 3rd step of the Campbell 7-step process of the event study.

3.6. Methodology

3.6.1. Logistic Regression

3.6.1.1. Model

To answer research question one and two, a logistic regression is used. The latter is a regression where the dependent variable is binary or dichotomous (Scott & Marshall, n.d.); it shows the relationship between the outcome variable (dependent variable) and the predictors or the explanatory variables (the independent variables also called covariate) (Cramer, 2003). The logistic regression was originally used in biology for experimental interpretations, and then quickly moved to other fields of study including marketing and economics (Cramer, 2003).

Table 1: Variables with their Symbols and Expectations

Independent Variable	Symbol	Measure	Sign		Hypothesis	
			Auditor change	Choice of big 4	Auditor change	Choice of big 4
Company's Size	SIZE CAP	-Ln (Assets) -Ln(market capitalization)	Positive Positive	Positive Positive	H1'.a	H2. a
Company's Growth	GRWTH	Market Value/ Book Value	Positive	Positive	H1'.b	H2. b
Company's Leverage	LEV	Debt/ Equity	Positive	Positive	H1'.c	H2. c
Company's Profitability	ROA LOSS	- Net Income/ Assets -1 if Net Income<0, 0 otherwise	Negative Positive	Positive Negative	H1'.d H1'.e	H2.d H2. e
Company's Performance	OCF	Operating Cash Flow	Negative	Positive	H1'.f	H2. f
Board Diligence	BODIL	Number of board meetings	Positive		H1''.g	
Board Size	BOSIZ	Number of board members	Positive		H1''.h	
Board Gender Diversity	BOGDIV EXEDIV	-Percentage of females on board -Percentage of executive females on board	Positive Positive		H1''.i H1''.j	
Board Independence	BOIND	-Percentage of independent board members	Positive		H1''.k	
CEO-Chair Duality	CEOCHAIRDUAL	-1 If the CE0 simultaneously chair the board,0 otherwise	Negative		H1''.l	
Audit Committee Independence	AUDCOMIND	Percentage of independent audit committee members	Positive		H1''.m	
Board Member Compensation	BOMEMCOMP	Ln(board members compensation)	Positive		H1''.n	
Board Members' Industry Specific Skills and Financial Background	BOMEMSKL	Percentage of board members' specific skills	Positive		H1''.o	
Board structure type	BOSTR	1 if second-tier board structure, 0 if unitary board structure	Positive		H1''.p	

The dependent variable is the "log odds" of an event, which is the log probability of 'event' over probability of 'no-event', and the independent variables are the causes of the change in the alternatives, therefore a cause-effect relationship is addressed in a logistic regression (Cramer, 2003). The coefficient beta is included in the model to measure the rate of change in the 'log odds' of the dependent variable, as the

independent variable changes by 1 unit, holding all other independent variables constant. The standard error is included to measure the accuracy of the cause-effect relationship tested (Scott & Marshall, n.d.).

In this research, the dependent variable takes a value of 1 in case of an auditor change and 0 otherwise.

The general form of a logistic regression is as follows (Princeton university library, n.d.):

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots b_n X_{n+} \varepsilon$$

Where:

- Y is the dependent variable that takes the value of 1 in case of 'event', 0 in case of 'no event'
- $X_1, X_2, \dots X_n$ are the independent variables that are causing the effect on the dependent variable
- b_1, b_2, b_n: The coefficients measure the rate of change in the 'log odds' of the dependent variable, as the independent variable changes by 1 unit
- b_0: is the model intercept, the "log odds" of the dependent variable when all the independent variables are zero

Research question one aims to detect the factors that affect the auditor change decision regardless of the successor auditor's type. To achieve this purpose, two models are tested. Model 1 includes the firms' characteristics variables (test hypotheses H1.a- H1.f) and Model 2 includes both the firms' characteristics and as well as the board ones. Each model is tested separately in chapter four; some variables might be dropped out and some proxies might be eliminated (in case there

are two proxies for a certain variable). This process is called 'model fitting' where each model is arranged to best reflect the cause-effect relationship. The result of this fitting process is two fitted models (one for the firms' characteristics and one for both firm's characteristics and the corporate governance variables). These two models are compared in order to measure the extent to which adding the corporate governance variables can improve the model. Below are the two models that need to be fitted in the following chapter:

Model 1: Firms' Characteristics

$$CHNG = b_0 + b_1\ SIZE_{t-1} + b_2\ GRWTH_{t-1} + b_3\ LEV_{t-1} + b_4\ ROA_{t-1} + b_5\ LOSS_{t-1} + b_6\ OCF_{t-1} + \text{Industry Dummies} + \varepsilon$$

Model 2: Firms' Characteristics and Corporate Governance Factors

$$CHNG = b_0 + b_1\ SIZE_{t-1} + b_2\ GRWTH_{t-1} + b_3\ LEV_{t-1} + b_4\ ROA_{t-1} + b_5\ LOSS_{t-1} + b_6\ OCF_{t-1} + b_7 BODIL_{t-1} + b_8\ BOSIZ_{t-1} + b_9\ BOGDIV_{t-1} + b_{10}\ EXEDIV_{t-1} + b_{11}\ BOIND_{t-1} + b_{12}\ CEOCHAIRDUAL_{t-1} + b_{13} AUDCOMIND_{t-1} + b_{14} BOMEMCOMP_{t-1} + b_{15} BOMEMSKL_{t-1} + b_{16} BOSTR_{t-1} + \text{Industry Dummies} + \varepsilon$$

Where: CHNG is the dichotomous independent variable that takes the value of 1 when there is an auditor change, 0 otherwise.

Independent variables are previously defined in Table 1.

ε: The error term of the regression that results from a misrepresentation of the relationship between the outcome variable and the explanatory variable.

b_0: The intercept, which refers to the "log odds" of the dependent variable when all the independent variables are zero.

$b_1, b_2 \ldots b_{16}$: The coefficients of the independent variables, measure the rate of change in the 'log odds' of the dependent variable, as the independent variable changes by 1 unit, holding all other independent variables constant.

The industry dummies included are 10 categories based on the SIC classification code.

Research question 2 aims to detect the factors that affect the choice of big 4 auditors. Due to data unavailability, only the firm's characteristics' effect on big 4 auditor choices is tested, whereas the corporate governance factors will not be examined. Therefore, another model (model 1'), presented below, will include the firm's characteristics, and it will be subject to a similar fitting process where proxies, variables and dummies are dropped and added subsequently, until the best fitted model is obtained.

$$CHNGBIG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1} + \text{Industry Dummies} + \varepsilon$$

The independent variables are all defined the same way as the previous model expect for the dependent variable 'CHNGBIG' which is a dichotomous variable that takes the value of 1 when the successor auditor is a big N and 0 otherwise.

3.6.1.2. Model Diagnostics

When running the regression, it is necessary to know if the coefficients are truly different than zero (which means that the independent values have a true effect on the dependent value). The null hypothesis in this case is that the independent variable has no effect over the dependent variable which means that the coefficient is always zero. The P-value is observed to either accept or reject the null hypothesis. A significance level is set, where a p-value lower than this significance level indicates a significant association between the dependent and the independent variable, thus rejecting the null hypothesis. A p-value higher than the significance level indicates the opposite, thus accepting the null hypothesis (Princeton university library, n.d.).

However, in order to reach a reliable model, the p-value alone is not enough to decide on the significance of the model. Thus, several tests should be conducted in order to avoid any errors or biased results, which are described below.

a. Multicollinearity Tests

As a first step and before running the logistic regression, it is important to test the presence of multicollinearity or interdependence between variables. Multicollinearity occurs when two or more independent variables are the result of a linear combination of other independent variables. The presence of multicollinearity hinders the exact estimation of the coefficients. A moderate collinearity can be acceptable whereas a high collinearity levels might result in high standard errors and unreliable coefficients in the regression model (Berry & Feldman, 1985).

To test the presence of multicollinearity, the tolerance and the variance inflation factor (VIF) is used. The tolerance is the level of collinearity between the variables that the model is able to tolerate, which is calculated as 1 minus R^2 that results from the regression of other variables on the variable X. The VIF is the inverse of the tolerance (1/tolerance). If the collinearity is completely absent, R^2 is zero, which means the tolerance and the VIF are both equal to 1. The more the variables are correlated, the more the tolerance approaches to zero and the more the VIF is high. Generally, a tolerance of 0.1 or higher, in other words a VIF of 10 and higher, indicates an inappropriate interrelation between the variables of the model (Berry & Feldman, 1985).

Once the absence of multicollinearity is verified in the previous step, the logistic regression will be fitted to a given set of data, followed by some post-estimation tests. Before analyzing the significance and meaning of the regression coefficients, it is important to determine the suitability of the model. The adequacy of the model is mainly examined by the specification error test, the overall goodness of fit tests, the classification test, and the area under the receiver operating characteristic curve (ROC).

b. Specification Error Test

First, the model specification is tested, which is based on the idea that if a regression is properly specified, there should be no other independent significant variables that could be included, unless by chance. Furthermore, it assumes that the relationship between the logit of the outcome variable and the predictors is linear in nature. If one of these assumptions fails, the model is considered to be misspecified.

Given that $y = f(X_\beta)$ is the model and $\bar{\beta}$ are the parameter estimates, then prediction (hat) is calculated as $\bar{X}\beta$ and a prediction square (Hatsquare) is defined as hat^2. The model is then refit with these two variables by regressing the dependent variable on the prediction and the prediction squared. If the model is specified correctly, then, the prediction should be significant, while the prediction squared should have no explanatory power. The 'linktest' in the STATA software is used in chapter four to measure the level of specification error using the predicted value (_hat) and the predicted value square (_hatsq) as suggested by Pregibon (1979). A significant variable (_hat) signals a good specification since it measures the

predicted value of the model, whereas a significant value (_hatsq) is a bad indicator. The presence of specification errors indicates that some predictors that should have been included in the model were omitted, or the link function between the outcome variable and the predictors is not correctly presented (Berry & Feldman, 1985).

c. The Goodness-of-Fit Tests

Second, the 'goodness-of-fit' measures the extent to which the fitted models are similar to the real data (Hosmer et al., 2013). In other words, it checks the extent to which the model fitted values match the actual values. A model fits well if the differences between the observed and fitted values are small. The log likelihood chi-square, the pseudo-R^2, the variance, the Hosmer and Lemeshow's goodness-of-fit, the Pearson chi-square, the AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) are such goodness-of-fit measures.

The log likelihood chi-square measures the overall significance of the model. It is 2 times the difference between the log likelihood of the model adopted and the model including the intercept only. The pseudo- R^2 is very similar to the chi-square as it measures the proportion of change in the likelihood (Pregibon, 1981). The variance measures the gap between the fitted values and the real observations (Algeri & Bellocco, 2013). The Hosmer and Lemeshow's goodness-of-fit measures the similarity between the observed data (real values) and the predicted data (Pregibon, 1981). The Pearson chi-square test measures the squared difference between the fitted value and the actual value divided by its standard error (Archer & Lemeshow, 2006). For a model to have a good fit, it has to score high on the log likelihood chi-square (LR chi^2) and high on the pseudo- R^2. However a high variance signals an

unsatisfactory model fit as it indicates a big gap between the estimated values and the actual ones. As for the Pearson chi-square and Hosmer and Lemeshow' goodness-of-fit tests, the idea is that the predicted frequency and the observed frequency should match closely. A good fit will thus yield a large p-value.

However, some of the above tests have been criticized. First, Pearson chi-square test is argued to be an inexact fit assessment. In a logistic regression with n observations, k is assumed to be the number of unique covariate patterns and m_k is the number of observations with the same covariate patterns. When some continuous variables are added to the model, the number of unique covariate patterns becomes approximately equal to the number of observations which diminishes the credibility of the Pearson chi-square test. To avoid this problem, Hosmer & Lemeshow (1980) and Lemeshow & Sturdivant (2013) suggested regrouping the observations in 10 equal groups (deciles) to calculate the chi-square test. In this thesis and to avoid the problems associated with having the number of covariate patterns close to the number of observations, the data is grouped into 10 nearly equal sized groups to calculate the Hosmer Lemeshow chi^2 (using estat GOF group (10)' in the STATA software) for better accuracy and reliability of fitness tests (Archer & Lemeshow, 2006). Similar to any test of association between two variables, a large p-value suggests a good fit.

Second, relying on the chi square tests as a measure of the model fit has been subject to criticisms. Large samples necessitate a more complex model that includes a big number of variables. However, adding too many variables improves the model fit automatically and therefore, the chi-square might fail to give a real fit measurement, thus, the likelihood ratio test, the pseudo R^2, the Hosmer and Lemeshow's goodness-of-fit, and the Pearson chi-square might become misleading.

For this reason, the use of the Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) became so popular (Williams, 2018). The BIC and the AIC are useful for any type of model analysis, not only for logistic regression. They are usually useful in comparing the credibility of two models, rather than merely measuring the difference between the fitted values and the actual values of one single model. Whether nested models (the variables of one model are included in the other model) or non-nested models are compared, these measures give powerful results and the researcher can identify which model is better to generate the observed data. The smaller the value of these measures, the better is the model fit (Williams, 2018).

The difference between two models' BIC (BIC_x and BIC_y) is calculated and interpreted as follows (Williams, 2018):

BIC_x-BIC_y >0	Model y is better fitted
BIC_x-BIC_y< 0	Model x is better fitted

To explain the extent to which a model is more preferred than the other, the absolute value of the difference is interpreted as follows (Williams, 2018):

Absolute Difference	Evidence
0-2	Weak
2-6	Positive
6-10	Strong
>10	Very Strong

The 'fitstat' function in STATA is used to give a summary of the measures necessary to evaluate the overall model fit. These measures include several types of R^2 measures, AIC, BIC, log likelihood, deviance and p-value. The Mcfadden R^2 is the most commonly used pseudo R^2 measure which is referred to as pseudo R^2 in the 'fitstat' results (Williams, 2018).

d. The Classification Test

Third, the classification test is somehow similar to the fit measures as it shows the percentage of the predicted data that was correctly classified. It checks the classification power of the model adopted by looking to its specificity and sensitivity percentages. Sensitivity is the proportion of the observations that has been classified as 'an event' or positive (auditor change in this case) and which has been in reality 'an event'. Specificity is the proportion of observations that has been classified as 'non-event' or negative (no auditor change) and which is actually 'non-event'. A cutoff should be specified, on which the analysis is based (Van Stralen et al., 2009). An observation is classified as positive if its predicted probability (p) is higher or equal to the cutoff and otherwise is classified as negative. The default is 0.5, where any predictive probability (p) higher than this threshold is classified as 'event' and takes the value of 1. Thus, the classification is correct if p is positive and the actual outcome is 1 (y=1) or if p is negative and the actual outcome is 0 (y=0). Thus, sensitivity is the fraction of all y=1 that is correctly classified, while specificity is the percentage of all y=0 that is correctly classified (Reichenheim, 2002).

e. Receiver Operating Characteristic (ROC)

Finally, the Receiver Operating Characteristic (ROC) analysis is used to evaluate each model and to compare the fitted models that result from Model 1 and Model 2 in chapter four. Back to the classification test described above, if instead of selecting a cutoff of 0.5, we select a cutoff of 0.3, then we would obtain different sensitivity and specificity values. If instead, we use each predicted probability value obtained from the model as possible cut-off points, we would obtain an associated sensitivity and specificity values for each probability value. ROC curve is plotting the obtained

sensitivity and specificity values. Two commands in STATA are available: 'lroc' and 'roccomp'. Since the 'lroc' cannot be used for model comparison, 'roccomp' is adopted in this research. This command is able to measure the difference between multiple ROC curve models for one single sample, as well as for different samples. The area beneath every ROC curve illustrates the predictive power of the model, where the higher this area, the better is the model significance. However, this conclusion has to be re-approved by the chi-square test. A high ROC with an insignificant chi-square test has no powerful significance. Thus, 'roccomp' tests the equality of two or more ROC areas obtained from applying two or more test modalities to the same sample or to independent samples. For this test to be performed correctly, the number of observations must be the same for the two compared models. This might not be always the case, since some missing data might be dropped from one model while the other model still has a complete data set. For this reason, STATA software equalizes the two samples before running the 'roccomp' test (Cleves, 2002).

Finally after doing all the tests discussed earlier, one fitted model is obtained, based on which the regression is run. After analyzing the regression results, all variables having a significant p-value are concluded to be the factors affecting the auditor change decision. Looking at the coefficient of these variables allows detecting the type of the relation (positive/negative) that exists between the outcome variable and these variables. Chapter four will describe the application of the process described earlier, starting with the first stage of the model fitting until running the regression of the final fitted model.

3.6.2. The Event Study Methodology

To answer research questions three and four, the Event Study methodology is used. The Event Study methodology is based on the assumption that the market is efficient and the stock prices reflect the reaction of the public following the release of important news. It is a widely used technique that tests the impact of an event on the value of the firm. It aims to observe the direct impact of an important announcement on the value of the companies' asset prices which can be either debt securities or most commonly equity securities (Campbell et al., 1997).

The Event Study methodology goes back to the year 1933 when Dolley conducted for the first time a study on the market reaction to the stock split announcement. Since that date, many modifications have been introduced to the initial method, and most of the attempts aimed precisely to isolate the companies under study from outside events. These outside parasites were referred to as the 'confounding events' that might affect the study, mask the real stock reaction to the announcement, and mislead the researcher (Campbell et al., 1997).

This methodology has been originally used in accounting and finance, but then quickly became a technique adopted in management, marketing, economics, law, history and many other fields (Corrado, 2011). It aims to study several types of announcements like the enactment of new environmental laws, CEO resignation, patent filings, bankruptcy filings (Dutta, 2014), and many scholars have used the Event Study methodology to test the market reaction to auditor change announcements (Klock, 1994; Davidson et al., 2006; Lin et al, 2009; Knechel et al., 2007).

According to Campbell et al. (1997), the Event Study follows seven steps: (1) the event definition, (2) the criteria selection, (3) the calculation of normal and abnormal

return, (4) the estimation procedure, (5) the testing procedure, (6) the empirical results, and (7) the interpretation and conclusion. Each of these steps is elaborated below.

1- Step 1: The Event Definition

In the first step, it is required to select the event that is expected to impact the company's value, and choose the period over which the returns of the stock will be observed, which is called the 'event window'.

A 7-day event window is frequently used by many scholars (Lv et al., 2015; Chong & Liu, 2016; Kanas,2005) and some suggested to include an extended period following the event to examine the post-announcement return behavior (Campbell et al., 1997). Cox & Peterson (1994) chose a $\pm$4 event window and added a (+4, +20) post-event window to better capture the market reaction after the event date.

Oler et al. (2008) stated that even though shorter windows are less likely to be affected by confounding events, they cannot capture the true reaction of some complex events. Some short period analysis generated incorrect conclusions; many market reactions were thought to be positive over the short-run, but then proved the opposite when longer periods are observed. Chong & Liu (2016) analyzed the impact of the event over two different windows: one in the short-run including $\pm$3 days around the event date and one in the long-run including $\pm$20 days around the event date.

In this study, the auditor change announcement has been chosen to be the event of study, and a 7-day window is adopted, including a [-3, +3] days around the event date and the event date at time t=0. The event window is divided into smaller time periods to detect the particular time where the cumulative abnormal return shows the highest significance level. Furthermore, a post-event window (+3, +20] is extended

to observe the return behavior over a total of 20 days following the date of the announcement t=0.

2- Step 2: The Criteria Selection

It is necessary to set some criteria to limit the study to a specific sample. The criteria usually include a specific industry, a stock exchange, time limits or even some limitations related to data availability (Campbell et al., 1997). In this study, the objects of this research are UK companies that changed their auditors between March 2013 and February 2018 and that are listed on London Stock Exchange. Other uncontrollable limitations related to data retrieval are dictating the sample size.

3- Step 3: The Calculation of Normal and Abnormal Return

The return of the security i at time t relative to the event is referred to as R_{it} (Equation 1), assumed to be the component of two return behavior: the normal (or the expected return) and the abnormal (or the unexpected return), as follows:

$$R_{it} = K_{it} + e_{it} \quad (2)$$

Where K_{it} is the normal return (calculated using one of the statistical or economic model elaborated thereafter) and e_{it} is the part of the return that is abnormal. Therefore the abnormal return is the difference between the actual return of security i and the normal that could be generated assuming that the event did not take place, calculated as follows (Campbell et al., 1997):

$$AR = e_{it} = R_{it} - K_{it} \quad (3)$$

In this study, the cumulative abnormal returns on the securities are also calculated by adding up the abnormal returns over the event window:

$$CAR_{(i,-t+t)} = \sum_{-t}^{+t} AR_{it} \quad (4)$$

The normal return can be calculated using many models falling under two big categories: the statistical and the economic models. The statistical model, on one side, relies on pure statistical assumptions in observing the change pattern in the stock prices and includes the mean adjusted return, the market adjusted model, and the market model. The economic model, on the other side, takes into consideration the investors' behavior when observing the stock prices and includes the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT) (Campbell et al., 1997).

a. The Statistical Models

a.1. The Constant-Mean Return Model or the Mean Adjusted Returns

First, according to the constant mean return or the mean adjusted return, the normal return of security i is equal to the mean return of that security in the estimation period, knowing that the mean return is a constant value, written as:

$$K_{it} = \bar{R}_{i,t} \quad (5)$$

Thus, the abnormal return (Equation 3) is simply the difference between the actual return of stock i at time t and the mean return of that stock in the estimation period, which will defined in Step 4.

$$AR_{it} = E_{it} = R_{it} - \bar{R}_{i,,t} \quad (6)$$

Although this is the simplest model, it can be adopted when dealing with daily data and Brown & Warner (1980) stated that it generates results similar to those generated by other models. The variance of the abnormal return is not found to be reduced by using more complex models (Campbell et al., 1997).

a.2. The Market Adjusted Model

Second, the market adjusted model assumes that the normal return of the security i is equal to the return of the market at the same period (Campbell et al., 1997). The market return is the return of any market index.

$$K_{it} = R_{m,t} \tag{7}$$

The abnormal return (Equation 3) in this case is

$$AR_{it}=E_{it} = R_{it-} R_{m,t} \tag{8}$$

a.3. The Market Model

Third, according to the market model, there is a linear relation between the return of the security i and the market return (which is a return of an index in the industry of focus). It has been argued that this model can better capture the impact of the event by minimizing the level of variation (Campbell et al., 1997). The normal return at time t is found by applying the following formula:

$$K_{it}=\alpha+\beta R_{m,t}$$

(9)

Where K_{it} is the normal return of security i and R_{mt} is the market return in the period t. The parameters of the model α and β are found by running a regression in the estimation period between the return of the security i and the market return (Campbell et al., 1997).

This model is a one-factor model that includes solely the market return. Other multi-factor models could be applied to incorporate portfolios of companies of different sizes measured by their market value of equity. However, the multi-factor models do

not generate any further benefit concerning the level of variation compared to the one-factor model. Only when the companies studied in the sample have very similar characteristics (market capitalization category, industry, and others), the multi-factor model would be worth considering (Campbell et al., 1997).

The effectiveness of this model is greatly affected by the R^2 of the model regression. The higher is the R^2, the lower is the variation of the abnormal return (Campbell et al., 1997).

In the case of missing data, the market adjusted model is used. When the stock return or the market index return in the estimation period is not accessible, α is fixed to 0 and β is fixed to 1. When both α and β are preset, the estimation period is not necessary anymore to calculate the model parameters (Campbell et al., 1997).

b. The Economic Models

There are two economic models, mainly the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT). Sharpe (1964) and Lintner (1965) in Campbell et al. (1997, p.158) stated that the CAPM is an "equilibrium theory where the expected return of a given asset is a linear function of its covariance with the return of the market portfolio". Ross (1976) in Campbell et al. (1997, p.158) states that the APT is an "asset pricing theory where in the absence of asymptotic arbitrage the expected return of a given asset is determined by its covariances with multiple factors".

The CAPM was frequently used in the 1970's but many scholars started shifting away from both CAPM and APT due to their unnecessary complexity toward the market model which provides very similar results (Campbell et al., 1997).

c. The Model Adopted in this Study

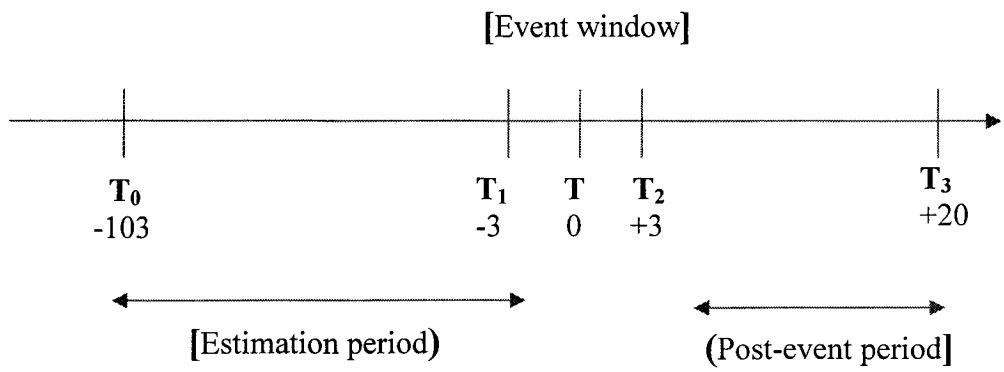
The literature presents two opposing views concerning the constant mean return model. Corrado (2011) stated that comparing the security return in the event window to the security return in the estimation period is considered a naïve technique that disregards the market information affecting the market price. However, Brown & Warner (1980) stated that even though the constant mean model is the simplest model, it generates similar results compared to other models. In our study we are using the constant mean return to calculate the abnormal return and then redo the same work by applying the market model in order to better capture the return patterns and eliminate any doubt concerning the inefficiency caused by the simplicity of the mean adjusted return model. Chan et al. (2011) and Fried & Schiff (1981) have used the four-factor model of Fama French (1993) and the CAPM model respectively. Whereas Dunn et al. (1999) adopted the market model to test the impact of the auditor change decision on the abnormal return and stated that the latter is the most commonly used model.

4- Step 4: The Estimation Procedure

Once the normal return model is selected, an estimation period over which the model will be applied has to be specified. The estimation window, the event window, and the post-event window should be defined. The announcement day is assumed to be

T=0. The estimation period is the time period prior to the event and defined as the interval between T_0 and T_1; the event window is the period around the actual event defined as the interval between T_1 and T_2 while the post-event window is the time period following the event window between T_2 and T_3. A 100-day estimation period ranging from T_0= - 103 till T_1= -3 is selected in this study as illustrated in Figure 1. Al-Shattarat and Al-Shattarat (2017) as well as Cox & Peterson (1994) have used a 100-day estimation window, and Peterson (1989) suggested that for studies using daily datasets, the estimation period should range from 100 to 300 days. The estimation period excludes the event period to avoid any influence on the normal return estimation (Campbell et al., 1997).

Figure 1: Event Study Windows



Source: Campbell et al., 1997

The figure above is constructed according to the following notations: T is the time of the event (the day of the auditor change announcement); $[T_1,T_2]$ represents the event window of length T_2-T_1 (7-day event period) with both T_2 and T_1 inclusive; $[T_0 ,T_1)$ constitutes the estimation window of length T_0-T_1 (100-day estimation period) excluding T_1; $(T_2,T_3]$ is the post-event period of length T_3-T_2 (17-day period) excluding T_2.

5- Step 5: Testing Procedure

The next step is to design the testing framework. The abnormal return can be calculated once the normal return is found. However, the observation of one single return can be noisy and the impact of the announcement cannot be limited to one single day. Therefore, the abnormal return is aggregated over small periods to test the overall inferences of the event (Mackinlay, 1997). The sum of abnormal returns is called the cumulative abnormal return (CAR) (Equation 4) which is derived by adding up all the abnormal returns over the specified periods. The event window and the post-event period are divided into small sub-periods as mentioned above, over which the CAR is examined.

Next, the null hypothesis and the testing procedure of the firms' cumulative abnormal return have to be clearly set (Campbell et al., 1997). The main objective of the Event Study is to assure that the cumulative abnormal return is significantly different from zero due to the event and not due to chance. Therefore a hypothesis testing is conducted where the null hypothesis assumes that the cumulative abnormal return is zero and the alternative hypothesis assumes that the cumulative abnormal return is different from zero in the event period. The null hypothesis usually tested in such Event Studies follows:

H_0: The cumulative abnormal stock return for companies changing their auditors is equal to zero around the announcement date.

H_a: The cumulative abnormal stock return for companies changing their auditors is significantly different from zero around the announcement date.

Testing the significance of the results can be done using the parametric and the non-parametric tests. First, the parametric test assumes that the abnormal returns of the companies are normally distributed, and the sample chosen is representative of the

population (Trochim, 2000). Second, the non-parametric test does not impose any assumption related to the statistical nature of the abnormal returns. Non-parametric tests usually come as complementary to parametric test to support the validity of the results (Trochim, 2000).

In this study, the parametric t-test is used. A remarkable number of literature on Event Studies adopted the parametric tests (Dutta, 2014) and the t-test is considered as one of the leading tests used in the Event Study methodologies (Ahern, 2009). This test aims to check whether the means of two different groups are identical or different, relative to the dispersion of the variables (Trochim, 2000). In the Event Study case, it serves in testing whether the mean of the cumulative abnormal returns is different from zero.

6- Step 6: Empirical Results

In this step, it is required to make diagnosis based on the calculations performed in previous steps and generate some empirical results. In case of a small number of observations, it is important to know that the results can be distorted by one outlier company (Campbell et al., 1997). This step and the following one are highlighted in the next chapter.

7- Step 7: Interpretation and Conclusion

Finally, the results are interpreted in order to reach a conclusion concerning the impact of the event on the security prices. As explained above, the significance of the cumulative abnormal return during the event window should be tested using the t-test. The test requires setting an error margin or a risk level (referred to 'alpha' or 'significance level'), which is the percentage probability of getting a significant

difference in the means due to chance (Trochim, 2000). An alpha of 0.05 is usually used in social sciences (Trochim, 2000), and many scholars have used this risk level in their Event Study research papers (Kothari & Warner, 2006; Dyckman et al., 1984; Prakash, 2013; Corrado, 2011).

Any p-value larger than the critical alpha provides evidence that the auditor change announcement has no statistically significant effect on the company's stock prices, and any value that is lower than alpha proves that the auditor change announcement has a statistically significant effect (Campbell et al., 1997).

In conclusion, this chapter has presented an overview of the data needed and has set an outline for the methodologies adopted. In Chapter four, the models, variables, and formulas presented above are revisited with direct application with numerical evidence. After running the appropriate analysis, the results are presented in the next chapter, analyzed and linked to the literature discussed in chapter two.

Chapter 4

DATA PRESENTATION AND ANALYSIS

Chapter three formulated the hypotheses tested, described the variables used along with their proxies and presented the methodologies used in the analysis. The first methodology is the logistic regression and the model fitting process which are explained with their two stages testing, and two hypothetical models. The second methodology is based on the Event Study methodology process. Chapter four follows the steps of chapter three but with numerical application in order to generate results to either reject or accept all the hypotheses. Thus, this chapter presents and analyzes the empirical results of this study. The research questions established in Chapter three are investigated to see if the hypotheses are accepted or rejected. To achieve this purpose, this chapter starts by providing a univariate descriptive statistics for the variables. Second, results are presented in a multivariate setting and analyzed in order to answer the posed research questions and link them back to the theories and previous empirical findings. The same process is repeated for every research question.

This chapter tests four research questions. The first two research questions examine the relationship between the auditor change decision and the firm's internal characteristics on one side and the corporate governance factors on the other side. First, this research attempts to detect the firms' internal characteristics such as size, growth, leverage, profitability and performance that affect companies' decision to change their auditor. Second, this research extends the analysis by including ten variables that make up the companies' board characteristics, mainly board diligence, board size, board diversity, board independence, CEO-Chair duality, audit committee independence, board member compensation, board members specific skills and board

structure type. The purpose is not only to investigate the factors that can explain this decision, but also to measure the extent to which corporate governance variables can improve the predictive ability of the model including only firms' internal characteristics. To achieve this propose, a logistic regression is run to either accept or reject **H1'** which is related to the firms' characteristics and **H1''** which is related to the corporate governance variables. A supplementary analysis is conducted to test the relation between the firms' characteristics and the successor auditor's type, which will be tested in **H2**. This supplementary analysis will not be extended to include the corporate governance variables due to data availability.

Research questions three and four tackle the market reaction following the auditor change announcement over two periods. First, a short-time period is presented by a 7-day window where the market reaction is tested following the auditor change in general (tested by **H3'**) and the auditor change to a big 4 in particular (tested by **H3''**). The same testing is repeated over a long-time period presented by a 17-day post event window (tested by **H4'** and **H4''** respectively).

4.1. Firm Characteristics, Corporate Governance Factors and Auditor Change Decision

4.1.1. Hypotheses

The first set of the hypotheses tackles the effect of the firms' characteristics (size, growth, leverage, profitability and performance) on the auditor change decision regardless of the successor auditor's type.

H1'.0: Firm Characteristics do not affect the company's decision to change the auditor.

H1'.a: Firm Characteristics affect the company's decision to change the auditor.

As mentioned in the previous chapter, each of the above set of hypotheses will be divided into six sub-hypotheses which address each firm's characteristic (size, growth, leverage, profitability including ROA and loss, and finally performance) separately.

The second set of hypothesis tackles the corporate governance factors (board diligence, board size, board diversity, board independence, CEO-Chair duality, audit committee independence, board member compensation, board members specific skills and board structure type) effect on the auditor change decision regardless of the successor auditor's type.

H1''.0: Corporate governance variables do not affect the company's decision to change auditor.

H1''.a: Corporate governance variables affect the company's decision to change auditor.

If the fitted model adopted in explaining the company's decision to change its auditor does not include any of the firms' characteristics enumerated above, the null hypothesis **H1'.0** is automatically accepted. If the characteristics are included in the model but none of them display any significant statistical power, **H1'.0** is also accepted. However, if at least one of the characteristics shows a significant statistical power, **H1'.0** is rejected and the sub-hypothesis that addresses this particular characteristic is then to be considered.

Similarly, if the fitted model adopted does not include any of the 10 board characteristics enumerated above, the null hypothesis **H1''.0** is automatically accepted. If the characteristics are included in the fitted model but all of them turn to be insignificant, **H1''.0** is again accepted. However, if at least one of the board

characteristics is significant, **H1''.0** is rejected and the sub-hypothesis of this particular characteristic has to be considered.

4.1.2. Descriptive Statistics: A Univariate Analysis

As mentioned before, descriptive statistics is a simple screening of the data on hand that cannot be used to generate any conclusion, nor to accept or reject the hypotheses. Table 2 displays the mean of each variable, by type of companies: changing their auditor and not changing their auditor. The final column reports the t-test which is conducted to compare the mean between the two groups for each variable separately, to see whether the average difference is statistically significant.

Table 2: Univariate Analysis: Auditor Changing vs non-Changing Auditor Companies

Variables	Proxies	No auditor change		Auditor change		T-test
		Obs	Mean	Obs	Mean	
$SIZE_{t-1}$	Log $Assets_{t-1}$	95	21.44033	129	19.67256	5.9023***
	CAP_{t-1}	95	21.19953	124	19.6844	5.7296***
LEV_{t-1}	D/E_{t-1}	95	1.025659	113	.6532743	1.8826*
$PROF_{t-1}$	ROA_{t-1}	95	.054456	126	-.0775571	2.1552
$GRWTH_{t-1}$	M/B_{t-1}	95	2.893798	115	3.419043	-1.1130
$BODIL_{t-1}$	$BODIL_{t-1}$	95	8.073684	57	8.315789	-0.5310
$BOSIZ_{t-1}$	$BOSIZ_{t-1}$	95	8.842105	58	9.137931	-0.8260
$BOGDIV_{t-1}$	$BOGDIV_{t-1}$	95	21.10658	58	22.07362	-0.5582
$BOGDIV_{t-1}$	$EXEDIV_{t-1}$	95	14.79722	57	13.71123	0.4741
$BOIND_{t-1}$	$BOIND_{t-1}$	95	57.79761	57	54.53491	0.9772
$AUDCOMIND_{t-1}$	$AUDCOMIND_{t-1}$	95	86.44866	57	93.68404	-2.4351**
$BOMEMCOMP_{t-1}$	LOG $BOMEMCOMP_{t-1}$	95	13.55006	58	13.26118	1.8145*
$BOMEMSKL_{t-1}$	$BOMEMSKL_{t-1}$	95	63.52724	57	60.66877	1.0147

***, **, * denote significance at 1%, 5%, and 10% respectively.

Starting with the firms' characteristics, companies that changed their auditors are of smaller size (lower log assets and smaller log market capitalization) as compared to companies that did not change their auditors. More specifically, the mean of log assets for auditor changing companies is lower (19.67256) than non-changing companies (21.44033), similar to the log market capitalization which is 19.6844 for

auditor changing companies as compared to 21.19953 for non-changing companies. Furthermore, companies that changed their auditors reported lower leverage (low debt to equity ratio), lower profitability (negative ROA) and higher growth (high market to book ratio) as compared to their counterparts. Although there is a difference in the mean between the two groups, only two differences are significant. The difference in size is statistically significant at 1%, which might suggest that big companies are less likely to change their auditors as compared to small companies. This finding might be explained by the idea discussed by Carcello et al. (2002), who stated that big companies are under the media spotlight, they are always scrutinized by the financial analysts and face public judgments after any strategic decisions. This public exposure discourages them from changing their auditors. Furthermore, the difference in the debt equity ratio is significant at 10% which means that low leveraged firms are more likely to change their auditors compared to high leveraged ones. This relationship can be explained by the findings of Abid et al. (2018) and Ha et al. (2016) who noticed that the company's leverage is negatively associated with the issuance of an unqualified audit opinion (a report issued by the auditor that indicates that the company has been violating the generally accepted accounting standards). Thus, low leverage companies tend to receive unqualified opinions more frequently, which might push them to change their auditors, as supported by the opinion shopping theory. Accordingly, companies change their auditors in search of a cleaner audit opinion. Nevertheless, Turner et al. (2005) reported that when companies are shopping for a better opinion, they tend to choose a non-big N who is more willing to issue reports that appeal to management. These findings are confirmed in Table 15 where low leverage firms were found to choose a non-big 4 (with a 5% significance level).

As for the corporate governance variables, companies that change their auditors have lower executive board members gender diversity (lower percentage of executive females on boards), lower board independence (lower percentage of independent members), lower board member compensation, and lower board specific skills means as compared to their counterparts, whereas non-changing companies appear to have smaller boards (low number of board members), less diverse board members (lower percentage of female board members), less-independent audit committees (less independent audit committee members) and less diligent boards (less numbers of meetings) as compared to their counterparts. Concerning the significance, only two differences are statistically significant. First, the difference in the audit committee independence is significant at 5%, which might indicate that companies with more independent audit committee members tend to change their auditors more than their counterparts. This finding is supported by the idea that independent audit committee members are very careful about their image and keep on searching for the best audit providers to eliminate any financial risks (Abbott & Parker, 2000). Second, the board member compensation is significant at 10%, which means that companies which grant low compensations to their board members, tend to change their auditors more frequently than companies that grant high compensations. This finding might suggest that in case the management is not satisfied with the low compensations granted, a conflict occurs resulting in a change of auditor in attempt to receive a higher pay (Fried & Schiff, 1981).

With respect to the binomial variables, they are generally described by looking at the frequency tables rather than the means. Thus, Table 3 reports the frequency for the CEO-Chair duality, the profitability (LOSS) and the board structure type. The majority of the companies that are changing their auditor (90/128

or 70.31%) and those who are not changing their auditors (85/95 or 89.47%) both are companies with positive net income. As for the CEO-Chair duality, the majority of the companies changing their auditors and not changing their auditors (52/57 or 91.22% and 87/95 or 91.57% respectively) both have separated the CEO and the chairman roles. Finally, for board structure type, the majority of companies that changed their auditors and those that did not change their auditor (56/57 or 98.24%, 94/95 or 98.94% respectively), both have unitary structure. A proportion test (pr-test) is conducted to check the significance of the proportion between companies that are changing and those that are not changing their auditors. The CEO-Chair duality and the board structure type showed an insignificant p-value (0.9403 and 0.7132 respectively). However, LOSS was found to be significantly different (at 1% significance level) between companies that are changing their auditors and those that are not changing their auditors. 10.53% of the companies that are not changing their auditors, are found to be non-profitable (LOSS=1), while 29.69% of the companies that are changing their auditors are found to be non-profitable companies (LOSS=1), which might indicate that non-profitable firms are more likely to change their auditors. This reasoning can be explained by the opinion shopping theory which states that unprofitable firms tend to change their auditors to hide their true financial situation (Fried & Schiff, 1981). When companies do not suffer from any income-related problems, there is no need to change the auditor in the intention to cover the negative figures. Furthermore, the incumbent auditor's disclosure of the company's positive figure might be considered more credible for the public. A new comer who needs time to acquaint with the company's operations (General Accounting Office [GAO], 2003) might be inaccurate in his disclosure.

Table 3: Frequency Distribution of Binomial Variables

Auditor change	LOSS (%)		Total	Pr-test
	0	1		
0	85 (89.47)	10 (10.53)	95 (100)	0.0006***
1	90 (70.31)	38 (29.69)	128 (100)	

*** denotes significance at 1%

Auditor change	CEOCHAIRDUAL (%)		Total	Pr-test
	0	1		
0	87 (91.57)	8(8.43)	95 (100)	0.9403
1	52 (91.22)	5(8.78)	57 (100)	

Auditor change	BOSTR (%)		Total	Pr-test
	0	1		
0	94 (98.94)	1 (1.06)	95 (100)	0.7132
1	56 (98.24)	1 (1.76)	57 (100)	

4.1.3. Multicollinearity

Before running the regression, it is crucial to test for collinearity, in order to eliminate any possible interdependence among the candidate variables. As explained in chapter three, a VIF higher than 10 is considered an alarming sign of a collinearity problem (Berry & Feldman, 1985). As shown in Table 4, the mean collinearity of all the variables (firm's characteristics and board characteristics) is found to be 1.90, suggesting the absence of any interdependence between the variables.

Table 4: Multicollinearity

Variable	VIF	SQRT VIF	Tolerance	R-squared
D/E_{t-1}	1.66	1.29	0.6011	0.3989
ROA_{t-1}	1.58	1.26	0.6337	0.3663
M/B_{t-1}	2.60	1.61	0.3849	0.6151
CAP_{t-1}	4.63	2.15	0.2161	0.7839
OCF_{t-1}	1.89	1.37	0.5298	0.4702
$SIZE_{t-1}$	4.80	2.19	0.2085	0.7915
$LOSS_{t-1}$	1.32	1.15	0.7562	0.2438
$BOSIZ_{t-1}$	1.69	1.30	0.5919	0.4081
$BODIL_{t-1}$	1.08	1.04	0.9302	0.0698
$BOGDIV_{t-1}$	1.26	1.12	0.7930	0.2070
$EXEDIV_{t-1}$	1.32	1.15	0.7567	0.2433
$AUDCOMIND_{t-1}$	1.07	1.03	0.9342	0.0658
$BOSTR_{t-1}$	1.38	1.18	0.7231	0.2769
$BOMEMSKL_{t-1}$	1.19	1.09	0.8395	0.1605
$CEOCHAIRDUAL_{t-}$	1.11	1.05	0.8990	0.1010
$BOIND_{t-1}$	1.24	1.11	0.8073	0.1927
LOG $BOMEMCOMP_{t-1}$	2.57	1.60	0.3895	0.6105
Mean VIF	1.9			

4.1.4. Multivariate Analysis: Firm Characteristics and Auditor Change Decision

Given that the univariate analysis cannot be used to draw any conclusion, this part will move to the inferential statistics which enable the researcher to either reject or accept the formulated hypotheses. Since the dependent variable is a dichotomous one, this research uses the logistic regression method to address the potential cause-effect relationship between the auditor change decision and the firm characteristics (Model 1) and between the auditor change decision and both the firm characteristics and the corporate governance characteristics (Model 2 in section 4.1.5). At the end of the two models, a conclusion should be drawn on whether the firm's characteristics and the board characteristics influence the auditor change decisions (section 4.1.6). Both models use the same dependent variable (CHNG), which is equal to 1 if the company changes its auditor, and 0 otherwise.

In order to run the regression, a 'model fitting process' is adopted to come up with the best model by adding and dropping variables from one preliminary model. In fact, not all independent variables enumerated above are to be included in the regression model. A full model might misrepresent the independent variables' effect on the dichotomous outcome variable, resulting in erroneous coefficients. Thus, creating a model that has a strong statistical power is a result of many trials and tests. Model 1 addresses the firm's characteristics while model 2 addresses both the firm's characteristics and the board characteristics. The two models presented in this chapter are compared later on in order to choose the one that best represents the cause-effect relationship.

4.1.4.1. Model 1 Fitting Process

The purpose of this process is to find out the firm's characteristics that need to be included in a logistic regression model to uncover the direction of their influence and their significance. As mentioned in the previous chapter, one variable can be measured by more than one proxy, thus the model fitting process is more complicated. Seven attempts of adding and dropping variables and proxies are performed before choosing the best model.

Stage 1 Testing:

The LR chi^2, the pseudo R^2, and the specification test are presented at this stage. Based on these measures, the model is either nominated for further tests (goodness-of-fit and classification) or dropped out. As explained previously, the LR chi^2 measures the overall significance of the model and the pseudo R^2 is very similar to the LR chi^2 as it measures the proportion of change in the likelihood. Furthermore, the specification test measures the extent to which the model is able to include all the variables that might affect the outcome. The specification test that results in a significant 'hatsq' is considered misspecified, suggesting that there are missing variables that could have been included in the model.

Therefore, a model that shows a low LR chi^2, low pseudo R^2, and fails the specification test (significant 'hatsq') is automatically dropped out. The model that shows a high LR chi^2, a high pseudo R^2, and passes the specification test (insignificant 'hatsq') is subject to further post-estimation tests, mainly a classification test (lstat), a goodness-of-fit (Hosmer and Lemeshow's chi square, AIC,BIC) and ROC area at Stage 2 before using the results to make any statistical inference.

Stage 2 Testing:

Once a model is well specified and has a relatively acceptable LR chi^2 and pseudo R^2, some fit tests are conducted to measure the ability of the model to generate estimate values close to the actual ones, which are the Hosmer and Lemeshow's chi-square, BIC, AIC, the ROC and the classification test. The Hosmer and Lemeshow's chi-square is a better equivalent of the Pearson chi-square test as explained in chapter three. Additionally, the AIC and the BIC measure the model fit. The ROC area is another indicator of the model fit, particularly useful when comparing two models. As for the classification test, it measures the classification power of the model, which is the percentage of the observations that are correctly classified. For a model to sufficiently fit well, it should have high p-value for Hosmer and Lemeshow's chi-square test, low BIC and AIC and a high classification percentage and a high ROC. Then, this model is presented and the regression results are interpreted to reject or accept the hypotheses previously formulated.

4.1.4.2. Model 1 Fitting Attempts

First, the firm's size (proxied by log total assets), growth (proxied by market to book value), leverage (proxied by debt equity ratio), and profitability (proxied by ROA and LOSS) are included in the model. The resulting LR chi ^{2} is 35.89 and the pseudo R^2 is 0.1279, however the model indicates the presence of a specification error by having a highly significant value 'hatsq' (p-value=0.000). Therefore this model (attempt 1 model) will not be nominated for any further testing.

Attempt 1 model: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1}$

The first thing to do to remedy this situation is to see if we have included all of the relevant variables. Thus, Attempt 1 Model will be extended by including Industry Dummies. Although both LR chi^2 and pseudo R^2 increase (being 47.92 and 0.17 respectively), the model still fails the specification test (the 'hatsq' is significant at 10% with a p-value of 0.074). Thus, we concluded that although Industry Dummies are important, this model (attempt 2 model) will be dropped.

Attempt 2 model: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1}$ + Industry Dummies

Again, the significance of 'hatsq' indicates the presence of a specification error because the independent variables are specified incorrectly. Thus and since many studies have used market capitalization as a proxy for size (Chang et al., 2010), Attempt 2 model will be run again but by replacing log of assets by log of the market capitalization. The resulting LR chi^2 is 48.75 and the pseudo R^2 is 0.1774, both higher than the previous two attempts, however the model is still misspecified (p-value of 'hatsq' is 0.03, significant at 5%). Thus, this model (attempt 3 model) will be dropped out.

Attempt 3 model: $CHNG = b_0 + b_1 CAP_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1}$ + Industry Dummies

Going back to the suggestion that some relevant variables might be added, Attempt 2 model will be run again by adding operating cash flow, following Wang & Xin (2011) who used this variable as a proxy of firm performance and reported that firms with low OCF are more likely to change their auditor. The resulting LR chi^2 and the

pseudo R^2 improve significantly (78.85 and 0.2870 respectively). Furthermore, the model passes the link test, since the 'hatsq' is insignificant with a p-value of 0.163. Thus, Attempt 4 Model is the best one among all previous attempts that can be qualified for further testing to check its classification power and fit capacity.

Attempt 4 model: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$ + Industry Dummies

In order to make sure that Attempt 4 Model is the best one, we rerun this model by dropping the Industry Dummies. This model has a LR chi ^{2} of 69.48 and a pseudo R^2 of 0.248, both lower than those obtained in Attempt 4 Model. Furthermore, this model (attempt 5 model) fails the link test by having a significant 'hatsq' with a p-value of 0.008 (significant at 1%). The result supports our previous findings that Industry Dummies are an essential part of the model.

Attempt 5 Model: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$

Although the link test in Attempt 4 Model reveals no problems with the specification, we decided to run again Attempt 4 Model but by including the log of market capitalization instead of log of assets, as a proxy of size. Although the resulting LR chi ^{2} and the pseudo R^2 are higher than those in Attempt 4 Model (80.05 and 0.2914 respectively), the model did not pass the link test. The 'hatsq' is significant at 10% with a p-value of 0.085. Therefore, this model (attempt 6 model) is again dropped out.

Attempt 6 model: $CHNG = b_0 + b_1 CAP_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$ + Industry Dummies

Finally, we have rerun attempt 4 model by including both proxies of size: log asset and log market capitalization. The resulting LR chi ^{2} is 81.56 and the pseudo R^2 is 0.2969 which are the best results of all attempts. However, the link test results in a significant 'hatsq' at 10% with a p-value of 0.081. Thus, this model (attempt 7 model) again fails in the specification test.

Attempt 7 model: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 CAP_{t-1} + b_3 GRWTH_{t-1} + b_4 LEV_{t-1} + b_5 ROA_{t-1} + b_6 LOSS_{t-1} + b_7 OCF_{t-1} +$ Industry Dummies

To conclude, after all the above attempts, the model in attempt 4 is found to be the best model that addresses the relationship between the firm's internal characteristics and the auditor change decision.

4.1.4.3. Presentation of Findings

Attempt 4 model is run and results are presented in Table 5.

$CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$ + Industry Dummies + ε

Where CHNG is the "log odd" of an event, which is the log probability of 'event' over probability of 'no-event'. It is a dichotomous dependent variable that takes the value of 1 when there is an auditor change, 0 otherwise.

Independent variables are SIZE defined by log of total assets; GRWTH defined by market to book ratio; LEV defined by debt divided by equity; ROA defined by net income divided by total assets; LOSS defined as a dummy variable that takes the value of 1 if net income is negative and 0 otherwise; OCF is defined as the difference in the cash inflow and cash outflow related to operating activities. Adjusting the net income to only reflect cash related revenues and expenses is one way to calculate the OCF. Some non-cash items (such as depreciation expenses, loss on sales, the increase in current liability, the decrease in current assets…) are added to net income,

and some others (such as amortization on bond premium, gain on sales, the decrease in current liability, the increase in current assets....) are subtracted (Robinson, 2009). All variables are one year preceding the date of the change.

In addition, ε is the error term; b_0 is the intercept, which is the "log odd" of the dependent variable when all independent variables are zero; and b_1, b2, etc. are the coefficients of the independent variables, that measure the rate of change in the "log odds" of the dependent variable, as the independent variable changes by 1 unit, holding all other independent variables constant.

Industry Dummies include the 10 categories based on the SIC classification.

Results in Table 5 show that only three variables are significant mainly SIZE, LOSS and OCF The significance of these variables lead to a rejection of the null hypothesis **H1'.0**. The size is negatively associated with the auditor change (with a coefficient of -0.964), which indicates that the odd of changing the auditor decreases by 62% (1- odd ratio) when there is a 1 unit increase in the log of assets (holding all other variables constant). LOSS is positively associated with the auditor change (with a coefficient of 1.366), which indicates that the odd of changing the auditor and being a losing company over the odd of changing the auditor and being a non-losing company is 3.92. In other words, the odd of changing auditors for companies reporting a loss is 292% (1-odd ratio) higher than for companies reporting a gain. Finally, even though the OCF looks to be positively significant, however we cannot say that companies having more cash on hand are more likely to change their auditors. The coefficient is very negligible; the odd of changing auditor and having a 1 unit increase in OCF is 1.

After passing the LR chi ^{2}, the pseudo R^2 and the specification tests successfully, the Goodness-of-fit of this model, the classification table, and ROC will be estimated.

Table 5: Firm Characteristics and Auditor Change

Logistic regression in terms of log Odd

Number of obs = **199**
LR chi2(**13**) = **=78.85**
Prob > chi2 = **0.0000**
Log likelihood = **-97.943026** Pseudo R2 = **0.2870**

Change	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
SIZEt-1	-.9645337	.1840167	-5.24***	0.000	-1.3252	-.6038677
GRWTH t-1	-.0648755	.0608947	-1.07	0.287	-.1842269	.0544758
LEV t-1	-.0415912	.1292933	-0.32	0.748	-.2950015	.2118191
ROA t-1	2.127827	1.341809	1.59	0.113	-.5020694	4.757724
LOSS t-1	1.366923	.6834512	2.00**	0.045	.0273836	2.706463
OCF_{t-1}	3.08e-09	9.52e-10	3.24**	0.001	1.22e-09	4.95e-09
_cons	18.54712	3.877301	4.78	0.000	10.94775	26.14649
Industry Dummies	Included					

Logistic regression in terms of odd ratio

Number of obs = **199**
LR chi2(**13**) = **78.85**
Prob > chi2 = **0.0000**
Log likelihood = **-97.943026** Pseudo R2 = **0.2870**

Change	odd	Std. Err.	z	P>|z|	[95% Conf. Interval]	
$SIZE_{t-1}$	.3811609	.07014	-5.24***	0.000	.2657499	.5466931
$GRWTH_{t-1}$	.9371841	.0570695	-1.07	0.287	.8317471	1.055987
LEV_{t-1}	.9592618	.1240262	-0.32	0.748	.7445305	1.235924
ROA_{t-1}	8.396603	11.26663	1.59	0.113	.6052768	116.4805
$LOSS_{t-1}$	3.923262	2.681358	2.00**	0.045	1.027762	14.97621
OCF_{t-1}	1	9.52e-10	3.24***	0.001	1	1
_cons	1.13e+08	4.40e+08	4.78	0.000	56826.14	2.27e+11
Industry Dummies	Included					

***, **, * denote significance at 1%, 5%, and 10% respectively.
Industry Dummies have been included in this regression.

4.1.4.4. Goodness-of-Fit Tests

The Hosmer and Lemeshow's chi square results in a p-value of 10.50 while the BIC and the AIC scores are 235.009 and 223.886 respectively (Table 6). The significance of p-value indicates a good model fit.

Table 6: Goodness-of-Fit Tests

Number of observations	199
Number of groups	10
Hosmer-Lemeshow chi2(8)	10.50
Prob > chi2	0.2318
AIC AIC divided by N BIC (df=4)	223.886 1.092 269.992

4.1.4.5. Classification Tests and ROC

Table 7 reports the classification test of the chosen model. The latter shows that the model is able to correctly classify 72.36% of the overall observations. More specifically, 71.96% of companies that changed their auditors are correctly classified (sensitivity), while 72.83% of companies that did not change their auditors are correctly classified (specificity).

As explained in chapter three, the ROC offers a solution for the change in the cutoff point set in the classification test. As the cutoff point changes, sensitivity and specificity change too. The ROC plots all the values of sensitivity and specificity for each possible cut off point. Consequently, the area under the curve determines the classification power of the model (0.8296 in Table 8). However, ROC is more important when it is compared to another model' ROC in order to come up with a significant conclusion. This comparison is done at the end of this section.

Table 7: The Classification Test

Sensitivity	Pr(+| D)	71.96%
Specificity	Pr(-|~D)	72.83%
Positive predictive value	Pr(D| +)	75.49%
Negative predictive value	Pr(~D| -)	69.07%
False + rate for true ~D	Pr(+|~D)	27.17%
False - rate for true D	Pr(-| D)	28.04%
False + rate for classified +	Pr(~D| +)	24.51%
False - rate for classified -	Pr(D| -)	30.93%
Correctly classified		72.36%

Table 8: ROC

Number of observations	199
Area under ROC curve	0.8296

4.1.5. Multivariate Analysis: Corporate Governance and Auditor Change Decision

4.1.5.1. Model 2 Fitting

Model 2 is run by adding the corporate governance variables to the fitted model found in the section before. This model passes the link test since the 'hatsq' is insignificant with a p-value of 0.668.

The purpose of running Model 2 is two-folded. The first is to answer hypothesis H1" by checking which corporate governance variables, if any, are significant. The second is to determine whether adding the corporate governance factors to the fitted model can improve the model fit. To be able to achieve this purpose, Model 2 is run as follows:

Model 2: $CHNG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1} + b_7 BODIL_{t-1} + b_8 BOSIZ_{t-1} + b_9 BOGDIV_{t-1} + b_{10} EXEDIV_{t-1} + b_{11} BOIND_{t-1} + b_{12} CEODCHAIRDUAL_{t-1} + b_{13} AUDCOMIND_{t-1} + b_{14} BOMEMCOMP_{t-1} + b_{15} BOMEMSKL_{t-1} + b_{16} BOSTR_{t-1}$ + Industry Dummies

Where CHNG is the dichotomous dependent variable that takes the value of 1 when there is an auditor change, 0 otherwise. SIZE, GRWTH, LEV, ROA. LOSS, and OCF are defined as before. The corporate governance variables included are BODIL defined as the number of board meetings; BOSIZ measured by the number of members on board; BOGDIV defined as the percentage of female on board; EXEDIV defined as the percentage of female executive on board; BOIND is measured by the percentage of independent board members; CEODCHAIRDUAL is measured by the duality in the CEO and the chairman roles, and it is represented by a dummy variable that takes the value of 1 if the CEO simultaneously chair the board and 0 otherwise. AUDCOMIND is measured by the percentage of independent audit committee members; BOMEMCOMP is measured by the log of board members compensation in USD; BOMEMSKL is measured by the percentage of board

members that has industry-related skills and financial background; and BOSTR is a dichotomous variable that takes a value of 1 if the board has a two-tier structure, and 0 otherwise.

All variables are one year preceding the date of the change.

In addition, ε is the error term; b_0 is the intercept, and b_1, b2, etc. are the coefficients of the independent variables that measure the rate of change in the "log odds" of the dependent variable, as the independent variable changes by 1 unit, holding all other independent variables constant.

Industry Dummies include the 10 categories based on the SIC classification.

4.1.5.2. Presentation of Findings

Table 9 presents the results from running Model 2. The results show that two variables measuring firm characteristics and three corporate governance variables are significant. Therefore, both null hypotheses **H1'.0** and **H1''.0** are rejected.

First, size is still significant but with a positive impact (coefficient of 0.583), whereas LOSS and OCF lost their significance. However, ROA becomes significant with a positive impact (with a coefficient of 6.710). The results show that the odd of changing the auditor increases by 79% for every 1 unit increase in the log of assets. As for the ROA, the odd of changing the auditor increases by 820% for every 1 unit increase in ROA.

Moving to the corporate governance variables, executive board member diversity, board independence, and the log of the board members' compensation are significant with a negative coefficient. The board diversity is negatively associated with the auditor change decision (with a coefficient of -0.043), which means that the odd of changing the auditor decreases by 4.3% for every 1 unit increase in the executive board members diversity. Similarly, board independence is negatively

associated with the auditor change decision (with a coefficient of -0.046), which indicates that the odd of changing the auditor decreases by 4.5% for every 1 unit increase in the board members independence. Finally, there is a negative relation between the log compensation and the decision to change the auditor with a coefficient of -0.69. This means that the odd of changing auditor decreases by 50.4% for every 1 unit increase in the log board members' compensation.

Table 9: Firm Characteristics, Corporate Governance, and Auditor Change Decision

Logistic regression based on log odd — Number of obs = **139**; LR chi2(**21**) = **58.99**; Prob > chi2 = **0.0000**; Log likelihood = **-62.398848**; Pseudo R2 = **0.3210**

Change	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
$SIZE_{t-1}$	.5833666	.3211646	1.82*	0.069	-.0461045	1.212838
M/B_{t-1}	.0850254	.0880244	0.97	0.334	-.0874992	.25755
D/E_{t-1}	-.1330099	.1858596	-0.72	0.474	-.497288	.2312683
ROA_{t-1}	6.710925	4.023757	1.67*	0.095	-1.175493	14.59734
$LOSS_{t-1}$	1.12172	.9852405	1.14	0.255	-.8093157	3.052756
OCF_{t-1}	9.04e-10	7.23e-10	1.25	0.211	-5.13e-10	2.32e-09
$BODIL_{t-1}$	-.0867046	.0982911	-0.88	0.378	-.2793516	.1059424
$BOSIZ_{t-1}$	.0827896	.1384759	0.60	0.550	-.1886183	.3541974
$BOGDIV_{t-1}$	.00301	.0246142	0.12	0.903	-.0452329	.0512529
$EXEDIV_{t-1}$	-.043046	.0201876	-2.13**	0.033	-.082613	-.003479
$BOIND_{t-1}$	-.046138	.0151949	-3.04***	0.002	-.0759195	-.0163564
$CEOCHAIRDUAL_{t-}$	-1.064786	.8971107	-1.19	0.235	-2.82309	.6935189
$AUDCOMIND_{t-1}$	.0119039	.0142342	0.84	0.403	-.0159946	.0398024
$BOMEMCOMP_{t-1}$	-.6995351	.3307499	-2.11**	0.034	-1.347793	-.0512772
$BOMEMSKL_{t-1}$	-.0181825	.014785	-1.23	0.219	-.0471605	.0107955
$BOSTR_{t-1}$	-.6779266	1.958401	-0.35	0.729	-4.516323	3.16047
_cons	-.5379105	6.559269	-0.08	0.935	-13.39384	12.31802

Logistic regression based on odd ratio — Number of obs = **139**; LR chi2(**21**) = **58.99**; Prob > chi2 = **0.0000**; Log likelihood = **-62.398848**; Pseudo R2 = **0.3210**

Change	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
$SIZE_{t-1}$	1.792061	.5755468	1.82*	0.069	.9549422	3.363014
M/B_{t-1}	1.088745	.0958361	0.97	0.334	.9162196	1.293757
D/E_{t-1}	.8754564	.162712	-0.72	0.474	.6081778	1.260197
ROA_{t-1}	821.3304	3304.834	1.67*	0.095	.3086667	2185476
$LOSS_{t-1}$	3.070131	3.024817	1.14	0.255	.4451626	21.17362
OCF_{t-1}	1	7.23e-10	1.25	0.211	1	1
$BODIL_{t-1}$	.9169479	.0901278	-0.88	0.378	.756274	1.111758
$BOSIZ_{t-1}$	1.086313	.1504282	0.60	0.550	.8281026	1.425037
$BOGDIV_{t-1}$	1.003015	.0246884	0.12	0.903	.9557748	1.052589
$EXEDIV_{t-1}$	.9578674	.0193371	-2.13**	0.033	.9207074	.9965271
$BOIND_{t-1}$	.9549102	.0145098	-3.04***	0.002	.9268908	.9837766
$CEOCHAIRDUAL_{t-}$	.3448017	.3093253	-1.19	0.235	.059422	2.000744
$AUDCOMIND_{t-1}$	1.011975	.0144046	0.84	0.403	.9841327	1.040605
$BOMEMCOMP_{t-1}$	.4968162	.1643219	-2.11**	0.034	.259813	.9500153
$BOMEMSKL_{t-1}$	.9819818	.0145186	-1.23	0.219	.9539343	1.010854
$BOSTR_{t-1}$	.5076685	.9942187	-0.35	0.729	.0109291	23.58167
_cons	.5839672	3.830398	-0.08	0.935	1.52e-06	223690.9

***, **, * denote significance at 1%, 5%, and 10% respectively. (Industry Dummies have been included in this regression).

4.1.5.3. Goodness-of-Fit Tests

The Hosmer and Lemeshow's chi-square resulted in a p-value of 0.1088, while the BIC and the AIC scored 233.356 and 168.798 respectively (Table 10). Again, the significance of p-value indicates a good model fit.

Table 10: Goodness-of-Fit Tests

Number of observations	139
Number of groups	10
Hosmer-Lemeshow chi2(8)	13.09
Prob > chi2	0.1088
AIC	168.798
AIC divided by N	1.214
BIC	233.356

4.1.5.4. Classification Tests and ROC

Furthermore, Table 11 reports the classification power of Model 2. Model 2 can correctly classify 77.70% of the observations in general. More specifically, 65.38% (sensitivity) are correctly identified as companies that changed their auditors and 85.06% (specificity) are correctly identified as companies that did not change their auditors. The overall classification of Model 2 is 77.70%, higher than the overall classification percentage of Model 1 (72.36% as reported in Table 7 above).

Table 11: Model 2 Classification Test

Classified + if predicted Pr(D) True D >= .5

Sensitivity	Pr(+| D)	65.38%
Specificity	Pr(-|~D)	85.06%
Positive predictive value	Pr(D| +)	72.34%
Negative predictive value	Pr(~D| -)	80.43%
False + rate for true ~D	Pr(+|~D)	14.94%
False - rate for true D	Pr(-| D)	34.62%
False + rate for classified +	Pr(~D| +)	27.66%
False - rate for classified -	Pr(D| -)	19.57%
Correctly classified		77.70%

As discussed earlier in this chapter, the ROC is employed to complement the traditional classification test displayed in the previous table. The ROC plots all correctly predicted positive values and all correctly predicted negative values for each possible cutoff point. Consequently, the area under the curve determines the model classification power. The area under ROC curve is 0.8850 (Table 12), higher than the one reported in Table 8 (0.8296).

Table 12: ROC

Number of observations	139
Area under ROC curve	0.8550

4.1.6. Model 1 vs. Model 2

To determine whether adding the corporate governance factors to the fitted model can improve the model fit, the fitted model 1 and model 2 are compared as shown in Table 13.

Results in Table 13 show that Model 2 is better than Model 1 since it has a lower deviance, higher pseudo R^2, higher Hosmer and Lemeshow's chi-square, and lower BIC and AIC. The absolute value of the difference between the BIC's of the two model $|BIC_2\text{-}BIC_1|$ is 36.634 which gives strong evidence to prefer model 2 over model 1(Williams, 2018).

Table 13: Comparing Model 2 and Model 1

Measure	Model 2	Model 1 (Attempt 4)
Deviance	124.798	195.8
LR chi ^{2}	58.989	78.85
Pseudo R^2	0.321	0.2870
BIC	233.356	269.992
AIC	168.798	223.886
Hosmer-Lemeshow chi2	13.09	10.50
Hat	0.00	0.00
Hatsq	0.668	0.163

Additionally, the overall classification of Model 2 in Table 11 is 77.70%, higher than the overall classification percentage of Model 1 reported in Table 7 (72.36%).

Finally, the area under ROC for Model 2 is 0.8550 (Table 12) as compared to 0.8296 for model 1 (Table 8). However, as explained in chapter three, the ROC area measure cannot be used to compare two samples with different number of observations. Therefore, for a better accuracy, the "roccomp" command equalizes the number of observations in the two samples before giving the ROC area measures. As shown in Table 14, the two samples are converted into two groups of 139 observations to be able to compute the ROC. The ROC area of model 2 is 0.8550, higher than ROC area of model 1, which is 0.6936. The chi-square test shows a significance probability of 0.0001 which indicates that Model 2 has a higher ROC than Model 1, a difference which is statistically significant at 1%.

Consequently, all the measures indicate that model 2 is better than model 1, and therefore, the corporate governance factors contribute to the company's decision to change its auditors.

Table 14: ROC Comparison

	Obs	Area	Std. Err.	Asymptotic Normal [95% Conf. Interval]	
Model 1	139	0.6936	0.0455	0.60447	0.78280
Model 2	139	0.8550	0.0332	0.78993	0.92006

Ho: area(Model1) = area(Model2)
chi2(1) =14.67 Prob>chi2 = 0.0001***
*** denote significance at 1%.

4.2. Firm's Characteristics and the Choice of the Successor Auditor' Type

4.2.1. Hypotheses

After testing the factors (firm's characteristics and corporate governance factors) that affect the decision to change the auditor, a complimentary analysis is done to uncover how the same firm's characteristics affect the choice of the auditor (big 4

versus non-big 4). Thus, the following set of hypotheses tackles the effect of the firm characteristics previously tested in the first hypothesis on the choice of the successor auditor' type.

H2.0: Firm Characteristics do not affect the company's decision to change the auditor to a big 4.

H2.a: Firm Characteristics affect the company's decision to change the auditor to a big 4.

In turn, this hypothesis is divided into 6 sub-hypotheses which address each firm's characteristic separately. If all firms' characteristics do not show any significant statistical power, hypothesis **H2.0** is accepted. However, if at least one of the characteristics is significant, then **H2.0** is rejected.

However, the impact on the corporate governance variables on the choice of the auditor type will not be tested due to data unavailability.

4.2.2. Descriptive Statistics: A Univariate Analysis

The sample used in this part comprises 130 UK companies listed on London Stock exchange that changed their auditors from March 2013 till February 2018.

The descriptive statistics is divided into two parts. In the first part, the sample is divided in two broad categories based on the successor auditor's type. The first category comprises all the firms that have changed to a big 4 auditor (coded as 1), while the second category comprises all the firms that have changed to a non-big 4 auditor (coded as 0). In the second part, the same sample is divided into 4 categories based on both the predecessor auditor's type and the successor auditor's type (big to big, non-big to non-big, big to non-big, non-big to big) as shown in Table 17,

Panel A.

While the difference in the mean is tested using T-test in the first part (Comparing two groups), it is tested using F-test in the second part (comparing four groups). The F-test or so called the ANOVA (analysis of variances test) is very similar to t-test. While T-test compares the mean of continuous variable for two groups only, F-test compares the mean of a continuous variable in more than two independent groups as follows:

- H_0: All means are equal $\mu_1 = \mu_2 = \mu_3 \ldots = \mu_k$
- H_1: Means are not all equal

A significance level alpha is selected. As previously mentioned, the significance level is the probability of having different means due to chance without any statistical meaning. H_0 is accepted if the significance level is higher than the agreed one. However, H_0 is rejected if the significance level is below the preset level, concluding that not all the means are equal. Therefore, the higher the F-value and the lower the alpha, the higher is the probability to reject H_0 (Sullivan, n.d.).

4.2.2.1. Univariate Analysis: Change to Big 4 vs. Change to non-Big 4

The means of each variable for companies changing auditors to big 4 and those changing auditors to non-big 4 are displayed in Table 15. Companies changing to big 4 auditors have a higher financial leverage, are more profitable, have more operating cash flow, and have higher growth than those changing to non-big 4. The same applies for size and market capitalization; companies changing to big 4 are larger in terms of assets and market capitalization than those changing to non-big 4. The last

column reports the t-test for each variable to test the equality of the means between the two groups. The results show that four variables are significant, out of which three are significant at 1% (the ROA, the size as measured by log total assets, and the market capitalization), and one significant at 5% (Leverage). These findings are confirmed by previous studies. First, Nazri et al. (2012) explained that large companies tend to switch to big N auditors. Large companies are characterized by a complex structure where more empowerment and delegation of authority are required. Continuous supervision becomes difficult and directors lose control, consequently companies search for big N auditors to re-establish their control system. Second, Knechel (2008) argued that companies having a high need for leverage tend to choose a big N auditor. Getting external financing is subject to strict financial requirements which are easier to meet by hiring a big N auditing firm. Finally, Francis & Wilson (1988) explained that low performance is positively related to the choice of non-big N, which is the one of the significant results obtained in Table 15. Poorly performing firms hire a non-big N, considered a low-quality auditor, to hide their financial failure. This argument is grounded in the opinion shopping theory (Chow & Rice, 1982).

Table 15: Univariate analysis: Companies Changing Auditor to Big N vs Changing Auditor to non-big N

VARIABLE	MEAN		T-test
	Change to big 4	Change to non-big 4	
LEV_{t-1}	.7625	.2688	2.1932**
ROA_{t-1}	.001675	-.3311	2.7518***
$GRWTH_{t-1}$	3.554945	2.90375	0.7256
OCF_{t-1}	4.23e+08	-9442886	1.6554
$SIZE_{t-1}$	20.46965	17.15272	6.7901***
CAP_{t-1}	20.48245	17.07012	7.7292***

***, **, * denote significance at 1%, 5%, and 10% respectively.

As for the LOSS, it is a binomial variable as explained previously in this chapter, so the T-test for mean equality is not accurate. Therefore the frequency distribution of

LOSS between the companies that changed to big 4 and those that changed to non-big 4 is tabulated in Table 16. 80.41% (78/97) of companies that are changing to big 4 have a positive net income (LOSS= 0) while only 19.59% of companies have a negative net income (LOSS=1).The pr-test is conducted in order to test the significance in the difference of the proportion of frequencies. Its significance indicates that loosing companies are more likely to choose a non-big N while profitable companies choose a big N auditor. This finding is significant at 1% with a p-value of 0.0000. The results confirm DeFond et al. (2000) reasoning that profitable firms choose a big N auditor to better expose their profitability to the public, and the opinion shopping theory which argues that financially struggling firms switch to a low quality auditor to help them opaque their true situation (Chow & Rice, 1982).

Table 16: Frequency Distribution of LOSS

Change to Big 4	LOSS (%)		total	Pr-test
	0	1		
0	12 (38.7)	19 (61.3)	31 (100)	0.0000***
1	78 (80.41)	19 (19.59)	97 (100)	

*** denote significance at 1%.

4.2.2.2. Univariate Analysis based on Four Auditor Change Types

The sample is divided into four categories based on both the predecessor auditor's type and the successor auditor's type (see Table 17, Panel A). The data shows that the majority (60.7%) of the auditor's change is of type 1 auditor change (big 4 to big 4). The lowest frequency is for the type 3 auditor change (big 4 to no-big 4) with a 7% only, while type 2 and type 4 have a frequency of 17.7% and 14.6 % respectively.

Furthermore, the means of each variable for all the four types of auditor change are tabulated in Table 17, Panel B. The data shows that the means of all variables are the

highest for Type 1 auditor change. Since a difference in the means' variables among the four types clearly exists, the last column reports the F-test to see if the average difference is statistically significant. The F-test results show that the differences are significant for all the variables except for Growth and OCF. Companies switching from big 4 to big 4 seem to be the most leveraged (highest mean debt to equity) and the most profitable (highest mean ROA) companies among all other types of auditor changes. When it comes to size, companies changing from big 4 to big 4 auditors appear to be big in terms of both assets and market capitalization.

Table 17: Univariate analysis: Four Auditor Change Types

Panel A: Frequency

Definition	**Type of auditor change**	**Frequency (%)**	
Switch from a big 4 to a big 4 auditor	Type 1	79	(60.7%)
Switch from a non-big 4 to a non-big 4	Type 2	23	(17.7%)
Switch from a big 4 to a non-big 4	Type 3	9	(7%)
Switch from a non-big 4 to a big 4	Type 4	19	(14.6%)
Total		130	(100%)

Panel B: Variables and F-Test

	Type 1	**Type 2**	**Type 3**	**Type 4**	**F-test**
LEV $_{t-1}$	0.91	0.272941	0.26	0.188889	4.34***
ROA $_{t-1}$	0.085	-0.39832	-0.14625	-0.31496	5.74***
GRWTH $_{t-1}$	3.780811	3.547059	1.341429	2.571765	1.15
OCF $_{t-1}$	5.30E+08	-1700035	-3.17E+07	1.04E+07	1.82
SIZE $_{t-1}$	21.18851	16.94331	17.75479	17.66612	37.46***
CAP $_{t-1}$	21.03592	16.91679	17.55201	18.26856	36.83***

*** denote significance at 1%.

Panel C: Frequency Distribution of LOSS

	AUDIT TYPE				
LOSS	1	2	3	4	Total
0	65	9	3	13	90
1	12	14	5	7	38
Total	77	23	8	20	128

Pearson chi2 (3) = 22.4471 Pr = 0.000***

As for the LOSS, which is a binary variable, the T-test cannot examine the significance of its mean equality. Therefore the frequency distribution of LOSS for all the four auditor change types is tabulated in Table 17, Panel C. The Pearson chi ^{2}

test is conducted in order to test the significance in the difference of the frequencies. The results show that the majority of type 1 and type 4 auditor changes (65/77 or 84.41% and 13/20 or 65% respectively) are companies with positive net income, while the majority of type 2 and type 3 auditor changes (14/23 or 60.86 % and 5/8 or 62.5% respectively) are losing companies. Furthermore, 72.22% (65/90) of companies reporting a positive net income (LOSS=0) are of type 1 auditor change. These differences in the frequencies are significant with a Pearson chi ^{2} p-value of 0.000. Knowing that big 4 auditors are associated with high audit fees, any company hiring a big 4 needs to be certainly profitable to be able to afford these audit firm's high costs. DeFond et al. (2000) found that highly profitable firms tend to choose brand name auditors because they can easily meet the high expenses. The same argument is presented by Chan el al. (2011) who stated that low profitable firms choose non-big 4 auditors just to benefit from low audit costs. Whereas, other scholars explained the latter choices by the opinion shopping theory explained previously.

4.2.3. Multivariate Analysis

In this stage of analysis, some powerful statistical tests are conducted in order to find the best fitted model and reach a conclusion concerning the hypotheses tested. The same sequence of tests presented in the previous part will be repeated but by changing the dependent variable. Here the dependent variable (CHNGBIG) is a dummy variable equals to 1 if the company changes its auditor to a big 4, and 0 if the company changes its auditor to a non-big 4. First, some attempts to find the fitted regression model are done, and the specification test is used to reject or accept each attempt. Second, after finding the best regression model, the following post-

estimation tests are conducted: the goodness-of-fit tests (Hosmer and Lemeshow's chi square, AIC, BIC) and the classification tests (lstat, ROC).

4.2.3.1. Model Fitting Attempts

Four attempts are made before reaching the final fitted model. The process entails adding and subtracting variables, proxies or dummies subsequently until getting an acceptable model with a good specification test (insignificant 'hatsq').

The starting point is running the resulting fitted model 1 tested in part 1 of this research question, which included the size (proxied by log total asset), Growth, leverage, ROA, LOSS, OCF, and the Industry Dummies, but by changing the dependent variable. The resulting LR chi ^{2} is 49.29 and the pseudo R^2 is 0.4752, however the model indicates the presence of a specification error by having a significant 'hatsq' (p-value=0.08). Therefore this model needs to be adjusted.

Attempt 1' model: $CHNGBIG = b_0 + b_1\ SIZE_{t-1} + b_2\ GRWTH_{t-1} + b_3\ LEV_{t-1} + b_4\ ROA_{t-1} + b_5\ LOSS_{t-1} + b_6\ OCF_{t-1}$ + Industry Dummies

In a second attempt, the same model is run but by dropping OCF to check if any improvements in the specification error occurs. The resulting LR chi ^{2} is 41.48 and the pseudo R^2 is 0.399, and the model still indicates the presence of a specification error by having a significant 'hatsq' (p-value=0.056). Again, this attempt failed to give an acceptable model, and further adjustments need to be done.

Attempt 2' model: $CHNGBIG = b_0 + b_1\ SIZE_{t-1} + b_2\ GRWTH_{t-1} + b_3\ LEV_{t-1} + b_4\ ROA_{t-1} + b_5\ LOSS_{t-1}$ + Industry Dummies

To see if we have included all the relevant variables, in a third attempt, the model is run by adding the market capitalization to Attempt 2. The model results in a LR chi ^{2} of 50.95 and a pseudo R^2 of 0.4912, both higher than those obtained in the first attempt. However, the model still fails in the specification test, with a significant 'hatsq' (p-value= 0.038).

Attempt 3' model: $CHNGBIG = b_0 + b_1 SIZE_{t-1} + b_2 CAP_{t-1} + b_3 GRWTH_{t-1} + b_4 LEV_{t-1} + b_5 ROA_{t-1} + b_6 LOSS_{t-1}$ + Industry Dummies

In a final attempt, Industry Dummies are dropped from Attempt 1 and the same model is run. The resulting LR chi ^{2} is 47.21 and the pseudo R^2 is 0.4324, and no specification error has been reported. The 'hatsq' p-value is 0.118, which is insignificant. This model is then nominated for the post-estimation tests to check its classification power and goodness-of-fit.

Attempt 4' model: $CHNGBIG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$

4.2.3.2. Goodness-of -Fit Tests

As shown in Table 18, the Hosmer and Lemeshow's chi square results in a p-value of 4.76, while the AIC and the BIC scores 75.98 and 94.75 respectively. The insignificance of p-value and the low value of both AIC and BIC indicate a good model fit.

Table 18: Goodness-of-Fit Tests

Number of observations	108
Number of groups	10
Hosmer-Lemeshow chi2(8)	4.76
Prob > chi2	0.7830
AIC	75.980
AIC divided by N	0.704
BIC(df=7)	94.754

4.2.3.3. Classification Tests and ROC

Table 19 reports the classification power of the chosen model. More specifically, 93.02% of companies that changed to big 4 auditors are correctly classified (sensitivity), while only 50% of companies that changed to non-big N auditors are correctly classified (specificity). Looking to the overall classification power of the model, the model is able to correctly classify 84.26% of the overall observations. It is important to note that this model is by far better in classifying companies changing to big 4 rather than those changing to non-big 4.

As explained before, the ROC is a complementary tool to the classification test as it shows the results of the values of sensitivity and specificity for each possible cut off point. The closer the ROC is to 1, the better the model is in classifying the observations correctly. The ROC of this model is 0.9186 which is a very high value (Table 20).

Table 19: The Classification Test

Sensitivity		Pr(+| D)	**93.02%**
Specificity		Pr(-|~D)	**50.00%**
Positive predictive value		Pr(D| +)	**87.91%**
Negative predictive value		Pr(~D| -)	**64.71%**
False + rate for true ~D		Pr(+|~D)	**50.00%**
False - rate for true D		Pr(-| D)	**6.98%**
False + rate for classified	+	Pr(~D| +)	**12.09%**
False - rate for classified	-	Pr(D| -)	**35.29%**
Correctly classified			**84.26%**

Table 20: ROC

Number of observations	108
Area under ROC curve	0.9186

4.2.3.4. Controlling for Predecessor Auditor's Type-Model Fitting

The above analysis is conducted to detect the factors that influence the company's decision to choose a big N or a non-big 4, regardless of the predecessor auditor's type. Thus, to control for the predecessor auditor's type, a dummy variable (PREAUD) is added to the model. This variable takes the value of 1 if the predecessor auditor was a non-big 4 and 0 if it was a big 4.

The same fitted model found in attempt 4 in the previous section is tested after adding the dummy variable of the predecessor auditor's type. The resulting LR chi ^{2} is 48.52, the pseudo R^2 is 0.4444 and no specification error has been reported. The 'hatsq' is insignificant with a p-value of 0.102, which makes this model acceptable.

Attempt 4'' model: $CHNGBIG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1} + b_7 PREAUD_{t-1}$

Table 21 compares Attempt 4' and Attempt 4''. The majority of the reported statistical measures of this model are very similar to **Attempt 4'.** However, Hosmer and Lemeshow's chi square in this model is lower than the one obtained in **Attempt 4'** (2.52 versus 4.076). Furthermore, the BIC and the AIC in Attempt 4''are higher than those obtained in Attempt 4'. In fact, Table 21 provides more support for the previous model, especially that PREAUD is found to be insignificant.

In conclusion, the final fitted model is as follows:

$CHNGBIG = b_0 + b_1 SIZE_{t-1} + b_2 GRWTH_{t-1} + b_3 LEV_{t-1} + b_4 ROA_{t-1} + b_5 LOSS_{t-1} + b_6 OCF_{t-1}$

The independent variables are previously defined in the first part of this research question.

Table 21: Attempt 4' and Attempt 4'' Models' Comparisons

Measure	Attempt 4'	Attempt 4''
Deviance	61.98	60.665
LR chi ^{2}	47.207	48.522
Pseudo R^2	0.4324	0.444
BIC	94.754	98.122
AIC	75.98	76.665
Hosmer-Lemeshow chi2	4.076	2.52
Hat	0.002	0.003
Hatsq	0.118	0.102
Overall Classification Power	84.26	85.19
Sensitivity	93.02	93.02
Specificity	50	54.55

4.2.3.5. Presentation of Findings

The regression of the final fitted model is run and presented in Table 22. Results show that only two variables are significant, mainly SIZE (significant at 1%) and OCF (significant at 10%). The significance of these two variables reject the null hypothesis **H2.0**. The size is positively associated with the change to big 4 auditors, which indicates that, holding all other variables constant, the odd of having a big 4 successor is 2.19 for every increase in one unit of size. This indicates that the odd of having a big 4 auditor while the size increases by one unit is 119 % .The OCF is also positively associated with the change to big 4 auditors, however the effect of OCF is negligible.

Table 22: Firm's Characteristics and the Successor Auditor Type

Logistic regression based on log odd — Number of obs = 108; LR chi2(6) = 47.21; Prob > chi2 = 0.0000; Log likelihood = -30.989776; Pseudo R2 = 0.4324

tobigfour	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SIZE $_{t-1}$	.7880093	.248635	3.17***	0.002	.3006937	1.275325
GRWTH $_{t-1}$	.0792117	.097037	0.82	0.414	-.1109774	.2694008
LEV $_{t-1}$	.324303	.4348827	0.75	0.456	-.5280515	1.176657
ROA $_{t-1}$	-1.300021	1.143595	-1.14	0.256	-3.541427	.9413842
OCF $_{t-1}$	2.22e-08	1.18e-08	1.88*	0.059	-8.83e-10	4.52e-08
LOSS $_{t-1}$	-.5505141	.7794223	-0.71	0.480	-2.078154	.9771256
_cons	-13.70654	4.586042	-2.99	0.003	-22.69502	-4.718061

Logistic regression based on odd ratio — Number of obs = 108; LR chi2(6) = 47.21; Prob > chi2 = 0.0000; Log likelihood = -30.989776; Pseudo R2 = 0.4324

tobigfour	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SIZE $_{t-1}$	2.199015	.5467519	3.17***	0.002	1.350796	3.579864
GRWTH $_{t-1}$	1.082433	.1050361	0.82	0.414	.894959	1.30918
LEV $_{t-1}$	1.383066	.6014716	0.75	0.456	.589753	3.243514
ROA $_{t-1}$	.272526	.3116594	-1.14	0.256	.028972	2.563527
OCF $_{t-1}$	1	1.18e-08	1.88*	0.059	1	1
LOSS $_{t-1}$	.5766533	.4494565	-0.71	0.480	.1251611	2.656809
_cons	1.12e-06	5.11e-06	-2.99	0.003	1.39e-10	.0089325

***, **, * denote significance at 1%, 5%, and 10% respectively.

4.3. Summary and Analysis of the Findings

4.3.1. Corporate Governance Variables (Hypothesis H1")

The corporate governance variables are tested in Table 9, with only three significant variables. However, the sign of the three variables were against our expectation.

First, board diversity was measured by two proxies with an expected positive impact: the board members diversity (BOGDIV- H1''.i) and the executive board members diversity (EXEDIV- H1''.j). While the BOGDIV was found to be insignificant, the EXEDIV showed a significant result but with a negative sign. Quick et al. (2018) failed to report a significant relationship between the board diversity and the audit change decision which could have been conforming to our results if the BOGDIV alone was used as a proxy of board diversity. However, the executive board members play a crucial role in mirroring the situation to the uninformed non-executives before they take any strategic action, as the formers are always aware of the company's day-to-day operations (Deloitte, 2014). In addition, almost all the literature reviewed in this thesis reported that women are more efficient in their decision making, and tend to be cautious about the professionalism of the auditors, their accuracy in the financial reporting, and their ethical compliance (Adams & Ferreira, 2009). For this reason, gender diverse boards were found to be more likely to choose a big N auditor (Lai et al., 2017; Gul et al., 2012; Adams & Ferreira, 2009; Alfraih, 2017a). Based

on the importance of both gender diversity and executive board members in the decision making process, the executive board members diversity has been used to test its impact on the auditor change decision. A negative relation has resulted, indicating that boards that lack the female presence among their executive board members tend to change more frequently their auditors. In the light of the importance of the gender diversity on board, the absence of female on board might be subject to doubt when accompanied by auditor change decisions. When such decision is taken by non-diverse boards, it can be justified by the opinion shopping theory logic. Therefore, we can assume that non-diverse boards switch their auditors to cover their weaknesses and bad performance. This finding could have been more affirmed if we were able to detect a negative relation between this variable and the decision to choose a big 4 auditor. However, the corporate governance factors effect on the choice of the successor auditor was not tested in this thesis due to data unavailability.

As for the board independence (H1''.k), its significance contradicts Aljabr (2010) and Bradbury et al. (2006) who found no significant relation between the auditor choice and board independence. Furthermore, in contrast to Abidin et al. (2016) who reported a positive relationship between auditor change and board independence, our findings revealed that the auditor change decision and the board independence are negatively related. This negative relation obtained means that the less the board is independent, the more the auditor change will occur. Back to the literature, the presence of independent board members is highly associated with the absence of principal-agent and information asymmetry problems. Independent boards prioritize shareholders' interest and search for good audit services (Beasley & Petroni, 2001, Carcello et al., 2002; McCabe & Nowak, 2008). Due to the important role that independent boards play in the audit context, our results suggest that less

independent boards might be changing the auditor only for opinion shopping goals. As it was previously mentioned, the management team is responsible for the prevailing company's financial situations whether it is a failure or a success. The non-independent board members are influenced by the management desires, therefore, their decision to change the auditor has to attract the managers. This evidence might recall the opinion shopping theory that illustrates the auditor change as a mean to cover the management inappropriate actions by searching for an auditor who can help them with the concealing process.

Although no previous studies have tackled the relation between the board members compensation and the auditor change, our findings reveals that there is 50% odd that a company changes its auditor for a 1 unit decrease in the board member compensation (H1''.n), which confirms the univariate analysis significant result in Table 2. Again, although the sign obtained is against our expectation, the link could be attributed to the opinion shopping theory. According to Cheng & Warfield (2005), high compensations are associated with earnings manipulation practices. Earnings are overstated especially in companies that adopt performance compensation plans. While all board members desire to be highly paid, not all auditors accept to engage in such wrongdoing. Thus, a conflict occurs between board members and auditors, when low compensations are granted. The created disagreement might push the firm to change its auditor, as supported by the opinion shopping theory (Fried & Schiff, 1981). Furthermore, setting the level of board compensations is in the hand of the audit committee who works in collaboration with the external auditor (Lamm et al., 2018), consequently an undesirable pay leads to a change of auditor.

The results so far suggest that the sign of the three significant corporate governance variables are explained by the opinion shopping theory, supporting Chow & Rice

(1982) and Eichenseher & Shields (1983) statement that opinion shopping is the most used theory to explain auditor changes.

4.3.2. Firm's Characteristic Variables (Hypotheses H1' and H2)

Moving to the firm characteristic variables, they are tested in three models. Two models are used to explain the decision to change the auditor with (model 2) and without corporate governance variables (model 1) (Tables 5 and 9 respectively), out of which model 2 was concluded to be the best fitted model. The third model is used to explain the decision to change to a big 4 auditor without controlling corporate governance variables (Table 22).

Irrespective of the measure of the dependent variables (CHNG vs CHNGBIG) and irrespective of whether corporate governance variables are added to the model or not, SIZE (H1'.a, and H2.a) is found to be significant in all fitted models (Tables 5, 9 and 22), negative in model 1 in Table 9 and positive in the other two models in Tables 5 and 22. These findings contradict with Jaafar & Alias (2002) and Takiah & Ghazali (1993) who failed to report any significant relation between the auditor change decision and the size. The importance of size in explaining the company's decision to change its auditor in general, and to a big 4 auditor in particular, is well supported in previous empirical results (Abidin et al., 2016; Huson et al., 2000; Hudaib & Cooke, 2005). A negative relation between SIZE and CHNG resulted in the model 1 (Table 9) before controlling for the corporate governance factors indicates that the bigger the firm's size, the less probably an auditor change will occur. This result is consistent with several previous studies that have reported the same findings (Francis & Wilson, 1988; Haskins & Williams, 1990; Krishnan, 1994) and confirms the univariate analysis significant results displayed in Table 2. Carcello et al. (2002) have explained this relationship by the following reasoning.

Big companies are under the public scrutiny, media spots and the financial analyst's continuous evaluation. This public exposure makes these companies vulnerable to many judgments and consequently, they avoid taking such decisions.

After adding the corporate governance factors to the model (model 2, Table 9), SIZE turned to be significant and positive, which indicates that the bigger the company's size the higher is the probability to change the auditor. This finding is consistent with the agency theory. As companies get bigger, the agency problems might get more severe, pushing firms to change their auditor in an effort to mitigate these problems. Similarly, Nazri et al. (2012) stated that when companies grow big, it becomes difficult for the stakeholders to cope with the huge amount of duties. Therefore, management get empowered to smoothly run the operations on their behalf, which might result in shareholders losing their control and thus the agency problem risks to expand. Therefore, big firms try to search for a high quality auditor to remedy this problem. This finding is supported by many studies (Knechel et al., 2008; Whisenant, 2004; Woo & Koh, 2001), as well as confirmed in our results in the third model (Table 22) that controls for the successor auditor's type. In the latter model, again SIZE is found to be positive and significant, indicating that bigger companies tend to choose big 4 auditors, something explained earlier by the agency theory logic and confirmed in the univariate analysis significant results in Table 15.

As for ROA (H1'.d), after demonstrating an insignificant result in the first model (without the corporate governance factors, Table 5), it became a very significant factor with a positive impact (with a coefficient of 6.710) in the second model where the corporate governance factors are included (Table 9). The results indicate that highly profitable firms have a higher tendency to change their auditors, contradicting our expectations (H1'.d) and those of Wang & Xin (2011) findings that failed to

detect a significant relation between the profitability and the auditor change. The positive relationship obtained is confirmed by DeFond et al. (2000) who argued that profitable firms tend to change their auditors, searching for others being better in exposing their strong financial situation. Furthermore, they suggested that the successor auditor is usually one of the big 4 auditors who is able to better articulate this financial success publically. However, as the profitability variable did not show any significant results in the third model (which controls the choice of big 4 auditor), this argument could not be adopted, at least in this research.

As for the LOSS (H1'.f), this factor shows a significant result in model 1(Table 5) when only the firm characteristics are included. The results show a positive relation between LOSS and the auditor change, which confirm our expectations and indicate that loosing firms tend to change their auditors more frequently. Our findings are supported by Landsman et al. (2006) and Schwartz & Menon (1985) who found that unprofitable firms tend to engage in auditor change, irrespective of the successor auditor's type. This reasoning has contradicted Wang & Xin (2011) who failed to report any relation between the two variables. LOSS has been associated with auditor changes in almost all the studies reviewed, some have extended their research and found that the successor auditor is a non-big 4 (Chang et al., 2010; Dedman & Lennox, 2007; Berger & Hann, 2007) and some others found it to be a big 4 (Francis & Wilson, 1988). The relationship between the LOSS and the choice of a big 4 auditor is backed up by the assurance theory that states that unprofitable firms switch to a big 4 to regain shareholders' trust. However this reasoning is not applicable here, as LOSS has not been found significant in model 3 and therefore the association between the LOSS and CHNGBIG is not confirmed.

Therefore, losing companies in our case are changing to a non-big 4 and consequently engaging in opinion shopping as most of the literature reveals.

Finally, the operating cash flow OCF (H1'.f and H2.f) is found to be positively significant in two models (Tables 5 and 22) which confirms the hypothesis H2.f, but contradicts H1'.f. However, the coefficient is very small which reflects a very minimal effect of OCF. When corporate governance variables are added to the model, OCF lost its significance (Table 9).

The presence of two significant firm characteristics (SIZE and ROA) rejects the hypothesis **H1'.0** and the presence of three significant corporate governance factors (EXEDIV, BOIND, BOMEMCOMP) rejects the hypothesis **H1''.0**. Thus, both firm's characteristics and board characteristics affect the decision to change auditor. As for the sub-hypotheses presented in chapter three that address each characteristic separately, ***H1'.a*** is proved to be correct since a positive relation between the SIZE and auditor change is found. ***H2.a*** is also proved to be correct since a positive relation is found between the size and the change to a big 4. However, ***H1''.j, H1''.k*** , ***H1''.n,*** *and* ***H1'.d*** related to EXEDIV, BOIND, BOMEMCOMP, and ROA respectively, have been proven wrong since a negative relation was found between the first three variables and the auditor change decision, and a positive relation was found between ROA and the auditor change decision.

Table 23: Summary of the Findings

Dependent Variable	Variable	Direction (1 unit change)
CHNG	ASSET	Increase
CHNG	ROA	Increase
CHNG	EXEDIV	Decrease
CHNG	BOIND	Decrease
CHNG	BOMEMCOMP	Decrease
CHNGBIG	ASSET	Increase

4.4. Market Reaction to an Auditor Change Announcement

The first part of this chapter revealed the factors that affect the auditor change decision. The firm characteristics and the board structure characteristics are examined to detect the ones that might lead to such strategic action. Then, in the second part, only firm's characteristics are studied to investigate their impact on the type of the successor auditor chosen. This following part tackles the market reaction following an announcement of an auditor change.

4.4.1. Hypotheses

The second objective of this thesis is to test the market reaction to an auditor change announcement. The market reaction is observed through the stock returns behavior of companies announcing the change of their auditors. To do so, an Event Study methodology is applied and the cumulative abnormal return (CAR) over specific event windows is measured and tested as explained in the previous chapter in order to detect the effect of such news on the companies' stock returns.

The following hypotheses are formulated to test the market reaction following the auditor change announcement over two periods: a short period referred as the 'event window' [-3,+3] and a long period referred as 'the post-event window' (+3,+20].

First, the event Window [-3,+3] refers to a short period, or '7-day period': 3 days before and 3 days after the announcement date including the announcement date itself. Hypotheses tested are as follows:

H3'.0: There is no significant positive cumulative abnormal stock return around the announcement date of an auditor change, irrespective of the successor auditor's type.

H3'.a: There is a significant positive cumulative abnormal stock return around the announcement date of an auditor change, irrespective of the successor auditor's type.

Over the same period, another set of hypotheses is formulated to investigate whether the stock market reaction following the announcement is associated with the auditors' type. Based on the rich literature discussed in previous chapters, switching to a brand name auditor has been perceived as a positive stimulus in the market (Chan et al., 2011). Therefore, the hypotheses tested are as follows:

H3''.0: The positive cumulative abnormal stock return is the same regardless of the auditor's type.

H3''.a: The positive cumulative abnormal stock return is more evident for companies switching to a big 4 auditor.

Second, the 'Post-Event Window' (+3,+20] refers to a long period extended over 17 days following the short window starting on the 3rd day (exclusive) following the announcement day and ending at the 20th day (inclusive) following that day. The hypotheses formulated are as follows:

H4'.0: There is no significant positive cumulative abnormal stock return several days following the auditor change announcement, irrespective of the successor auditor's type.

H4'.a: There is a significant positive cumulative abnormal stock return several days following the auditor change announcement, irrespective of the successor auditor's type.

Similarly, the market reaction is tested based on the auditor's type; more precisely, the shift to a big 4 auditor is expected to create a more significant positive market reaction. Thus, the following hypotheses are formulated:

H4''.0: The positive cumulative abnormal stock return is the same regardless of the auditor's type.

H4''.a: The positive cumulative abnormal stock return is more evident for companies switching to a big 4 auditor.

Rejecting the first null hypothesis (H3'.0) suggests that a positive abnormal return is generated around the announcement date regardless of the successor auditor's type. Subsequently, rejecting (H3''.0) suggests that the market reaction is more obvious following a shift to a brand name auditor.

Rejecting the second null hypothesis (H4'.0) suggests that a positive abnormal return is generated few days following the announcement date regardless of the successor auditor's type. Subsequently, rejecting (H4''.0) means that the positive market reaction is more evident following a shift to a brand name auditor.

All these hypotheses are tested using the Event Study methodology which, according to Campbell et al. (1997), follows a 7-step process. Each of these steps is revisited in this chapter.

4.4.2. Steps 1-5 in the Event Study Methodology

Step 1: The event definition

The auditor change announcement is the event studied in this research. The main objective is to reach a conclusion concerning the market reaction following such announcements. The financial times website is used to collect the names of the companies that have announced a change in their auditors, in order to test the extent to which the market is efficient and how fast it is able to absorb the news content related to such managerial decision, over two time periods.

Step 2: The criteria selection

The sample of this study includes UK companies announcing a change in their auditors between March 2013 and February 2018 and listed on the London Stock

exchange. Following these criteria, a total of 157 companies are recorded. However the final sample includes only 120 companies after excluding: the companies that have reappointed the same auditor (11), the closed end funds (8), and companies that have been merged, acquired or delisted (18).

Step 3 and 4: The calculation of normal and abnormal return, and the estimation procedure

First and as explained previously in chapter three, the actual return is calculated for the final sample of 120 companies over the period [-3,+20] using the formula: $R_t = Ln (P_t/P_{t-1})$

Second, the normal return is estimated over an estimation period prior to the event to get the return that could be generated in normal conditions if the event did not take place. The estimation period is a 100-day period ranging from day -103 (inclusive) till day -3 (exclusive). As previously mentioned, excluding the event window from the estimation period is necessary to avoid any distortion in the normal return calculation.

The normal return is calculated over those 100 days using two methods:

- The mean-adjusted return, which is simply the average of the security's returns in the estimation period using the following formula:

  $$K_{it} = \bar{R}_{i,t} = \frac{1}{100} \sum_{i=-3}^{-103} Ri$$

- The market return which consists of running a regression between the actual return of the security i and the market return in the estimation period, estimating the intercept (α) and the slope (β) of the relationship, and then using the intercept and the slope again in the period t to find the normal return k_{it} as follows:

  $K_{it} = \alpha + \beta R_{m,t}$

Third, the abnormal return is calculated by subtracting the normal return (calculated in the second step) from the actual return (calculated in the first step) as follows:

$$AR_{it} = R_{it} - \bar{R}_{it}$$

The third step is repeated twice depending on the methods used to calculate the normal return, as follows:

- Abnormal return (mean-adjusted)= Actual return - Normal return (mean-adjusted)
- Abnormal return (market) = Actual return - Normal return (market)

The two measures of abnormal returns are then imported to the STATA software in order to compute the cumulative abnormal return over the following two periods:

- Short run periods: [-3,+3]: divided into smaller intervals [-3,0]; [-3,-2];[-1,0]; [0,+3], [0,+1]; [+2,+3].
- Long run periods: (+3,+20]: divided into smaller intervals (+3,+5], [+6,+10]; [+11,+20].

As explained in the previous chapter, both the event window (short period) and the post-event window (long period) are subdivided into smaller windows to detect the particular time where the CAR shows the highest significance levels.

For each of the eleven periods, two sets of CAR are calculated. The first one is calculated by adding the abnormal return using the mean-adjusted model and the second one is calculated by adding the abnormal return using the market model. The significance of all CARs obtained in this step is then tested by running the t-test in the 5th step of Campbell process.

Step 5: The testing procedure

The t-test is the most popular parametric test used in the Event Studies as clarified in chapter three. It is used to test the significance of the CAR over each of the eleven

windows mentioned above, by testing whether the mean of the CAR is statistically different than zero using an alpha of 0.05. An alpha of 0.05 allows a 5% margin of error or a 5% probability that the mean of the CAR is different than zero due to chance and not due to the announcement of the auditor change. A p-value greater than 0.05 indicates an insignificant CAR, whereas a p-value smaller than 0.05 indicates a statistically significant CAR.

4.4.3. Steps 6 and 7: The empirical results

Two types of analysis are conducted in this research: the descriptive statistics and the inferential statistics.

4.4.3.1. Descriptive Statistics

In this section, the characteristics of the sample are summarized. Since the raw data available is not meaningful and not subject to a practical analysis, a descriptive statistics at the beginning is deemed necessary. However, it cannot be used neither to reject/accept the hypotheses, nor to draw a conclusion concerning the research questions. This process only helps in describing the sample and visualizing all the variables in an easier way.

First, the whole sample is divided into 4 sub-groups according to the type of the old/new auditor, as illustrated in Table 17, Panel A. This categorization is used in the descriptive statistics part as well as in the inferential part elaborated in the next section, where the hypotheses are tested.

Furthermore, in order to know the industries where the auditor change announcements are concentrated, each company is assigned one of the 10 industry codes summarized in Table 24. This classification follows the Standard Industrial

Classification (SIC) code which is a system created in 1937 in US to help categorize companies within specific industries (Farlex Financial Dictionary, 2009).

Table 25 reports the distribution of observations by auditor change type and year, while Table 26 reports the distribution of observations by auditor change type and industry. First, Table 25 reveals that the majority of the auditor change (27.5%) took place in 2014, followed by year 2016 (25%). When it comes to the type of auditor change, the majority of the changes are of type 1 (from a big 4 to a big 4).

Table 24: The 10 Industry Codes

Industry Code	Industry Type
1	Agriculture, Forestry, Fishing
2	Mining
3	Construction
4	Manufacturing
5	Transportation & Public Utilities
6	Wholesale Trade
7	Retail Trade
8	Finance, Insurance, Real Estate
9	Services
10	Public Administration

Moreover, Table 26 shows that the majority of auditor changes, regardless of the type, are concentrated in the service industry (Classification 9), followed by finance, insurance and real estate (classification 8). However 'construction' (classification 3) is the only industry that has not witnessed any auditor change announcements during the period of study. Based on Oxera's report (2006), the insurance, finance, real estate and the service sectors pay the highest audit fees, while the construction sector pay the lowest. Based on these findings one could expect that type 1 and type 4 display the highest concentration in the first two industries, while the other two types display the lowest concentration. This expectation is based on the fact that switching to big 4 is associated with high audit fees (Oxera, 2006). However, this is not the case in Table 26, probably since type 2 and type 3 have very low observations compared to other types.

Table 25: Distribution of Observations: by Auditor Change Type and Year

	Full sample		Type 1		Type 2		Type 3		Type 4	
Year	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
2013	6	5.00	5	6.49					1	5.26
2014	33	27.50	20	25.97	3	17.65	3	42.86	7	36.84
2015	26	21.67	18	23.38	5	29.41	1	14.29	2	10.53
2016	30	25.00	19	24.68	3	17.65	2	28.57	6	31.58
2017	23	19.17	14	18.18	5	29.41	1	14.29	3	15.79
2018	2	1.67	1	1.30	1	5.88				
Total	120	100	77	64.16	17	14.17	7	5.83	19	15.84

Table 26: Distribution of Observations: by Auditor Change Type and Industry

	Full sample		Type 1		Type 2		Type 3		Type 4	
Industry	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1	3	2.50	3	3.90						
2	2	1.67	1	1.30					1	5.26
3										
4	13	10.83	9	11.69	1	5.88			3	15.79
5	7	5.83	5	6.49	1	5.88			1	5.26
6	3	2.50	2	2.60	1	5.88				
7	4	3.33	2	2.60			1	14.29	1	5.26
8	30	25.00	20	25.97	5	29.41	2	28.57	3	15.79
9	57	47.50	35	45.45	9	52.94	4	57.14	9	47.37
10	1	0.83							1	5.26

4.4.3.2. The Inferential Statistics- Presentation of Findings

4.4.3.2.1. Market Reaction to an Auditor Change Announcement: All Types of Changes

To test the first set of hypotheses, in both the short period analysis (H3'.0, H3'.a) and the long period one (H4'.0, H4'.a), the whole sample is subject to test. The CARs (both mean adjusted and market models) of all the 120 companies are recorded over the eleven sub-periods specified previously, and the t-test is conducted to observe the significance of this return under the two methods. The results are shown in Table 27 and 28 respectively. The cumulative abnormal return in the event window is divided into two sub-periods: short period and long period, and each period is divided into smaller intervals.

Referring to Tables 27 and 28, the event window [-3,+3] shows a negative mean cumulative abnormal returns in both models. Dividing this window into sub-periods

shows negative mean cumulative abnormal returns in the sub-periods of the before event period [-3,0], [-3,-2] except for [-1,0] and positive cumulative abnormal returns for all sub-periods in the post-event period in the short-run [0,+3], [0,+1], [+2,+3] . Looking at the significance levels, under both models, the means are insignificant in the event window and remain insignificant after dividing the window in the pre-event period and the post-event period in the short-run.

Table 27: The CAR (mean-adjusted) Regardless of the Successor Auditor Type

	Window	t-value	Mean	St.dev.	p-value	Significance
Short period						
Event window	[-3,+3]	-0.2833	-.0022334	.0863619	0.7774	insignificant
Before event	[-3,0]	-0.7659	-.0058092	.083083	0.4452	insignificant
	[-3,-2]	-1.3439	-.0085354	.0695761	0.1816	insignificant
	[-1,0]	0.8186	.0027261	.0364823	0.4147	insignificant
Post event	[0,+3]	1.3837	.0064379	.0509687	0.1690	insignificant
	[0+1]	1.1655	.0039943	.0375429	0.2462	insignificant
	[+2,+3]	0.7316	.0024436	.0365914	0.4659	insignificant
Long period						
	(+3,+20]	0.4080	.0048424	.130024	0.6840	insignificant
	(+3,+5]	1.5175	.0065643	.047386	0.1318	insignificant
	[+6,+10]	0.1737	.0009667	.0609818	0.8624	insignificant
	[+11+20]	-0.3199	-.0026887	.0920763	0.7496	insignificant

Table 28: The CAR (market) Regardless of the Successor Auditor Type

	Window	Mean	t-value	St.dev.	P-Value	Significance
Short period						
Event window	[-3,+3]	-.0022436	-0.2883	.0852551	0.7736	insignificant
Before event	[-3,0]	-.0059013	-0.7763	.0832794	0.4391	insignificant
	[-3,-2]	-.0084959	-1.3487	.069004	0.1800	insignificant
	[-1,0]	.0025946	0.8000	.0355289	0.4253	insignificant
Post event	[0,+3]	.0066729	1.5379	.047531	0.1267	insignificant
	[0+1]	.0043447	1.3201	.0360541	0.1893	insignificant
	[+2,+3]	.0023281	0.7111	.035865	0.4784	insignificant
Long period						
	(+3,+20]	.0077907	0.8885	.0960571	0.3761	insignificant
	(+3,+5]	.0058967	1.3829	.0467108	0.1693	insignificant
	[+6,+10]	.000463	0.0849	.0597441	0.9325	insignificant
	[+11+20]	-.0003989	-0.0490	.0891589	0.9610	insignificant

As for the long period, the mean cumulative abnormal return is positive in the window (+3,+20] in both models. After dividing this window into sub-periods, the periods (+3,+5] and [+6,+10] still show a positive mean cumulative abnormal return, however a negative sign appear in the sub-period [+11,+20] (Tables 27 and 28). Looking at the significance in this long period, all the cumulative abnormal return

means are insignificant for both models. Thus, both null hypotheses, (H3'.0) and (H4'.0), are accepted. There is no significant positive cumulative abnormal return around the announcement of auditor change, irrespective of the successor auditor's type; and there is no significant cumulative positive abnormal return 17 days following the announcement day, irrespective of the successor auditor's type.

4.4.3.2.2. Market Reaction to an Auditor Change Announcement: From a non-big 4 to a Big 4

In testing the second set of hypotheses (H3''.0; H3''.a) and (H4''.0; H4''.a), only Type 4 auditor change (from a non-big 4 to a big 4) is needed, and therefore a sample of 19 companies is used in this analysis. The CARs of these 19 firms are recorded under both models (mean-adjusted and market) and tested using the t-test to detect any significant cumulative abnormal return associated with the switch from non-big 4 to big 4 auditors over the specified windows. The results are summarized in Table 29 and Table 30 respectively.

In the short period (Tables 29 and 30), the event window [-3,+3] shows again negative mean cumulative abnormal returns in both models. Dividing this window into sub-periods shows negative mean cumulative abnormal returns in all sub-periods before event period [-3,0], [-3,-2], [-1,0], and positive mean cumulative abnormal returns for all sub-periods in the post-event of the short-run [0,+3], [0,+1] except in the window [+2,+3]. Looking at the significance levels, under both models, the mean CARs are insignificant in the event window and remain insignificant in the before event period. Similarly in the post-event period of the short-run, all the windows show insignificant cumulative abnormal returns except for the window [0,+1] which is positive and significant at 10 % level under the mean adjusted model (Table 29) and positive and significant at 5% level under the market model (Table 30).

Table 29: CAR (mean-adjusted) for Switch from non-big 4 to Big 4 auditor

	Window	t-value	Mean	St.dev.	P-Value	Significance
Short period						
Event window	[-3,+3]	-1.3615	-.0493229	.1579116	0.1902	insignificant
Before event	[-3,0]	-1.1926	-.0457027	.1670455	0.2485	insignificant
	[-3,-2]	-1.1057	-.0395936	.1560815	0.2834	insignificant
	[-1,0]	-0.8129	-.0061091	.0327581	0.4269	insignificant
Post event	[0,+3]	0.0126	.0001452	.0501339	0.9901	insignificant
	[0+1]	1.8906	.0100403	.0231482	0.0749*	Positive and significant at 10%
	[+2,+3]	-1.0409	-.009895	.0414372	0.3117	insignificant
Long period						
	(+3,+20]	-0.3433	-.01493	.1895434	0.7353	insignificant
	(+3,+5]	0.5206	.0058726	.0491713	0.6090	insignificant
	[+6,+10]	-0.9843	-.0189386	.0838712	0.3380	insignificant
	[+11+20]	-0.0548	-.001864	.1483646	0.9569	insignificant

As for the long period (+3,+20], the mean cumulative abnormal return under the mean-adjusted model is negative, while under the market model, it is positive. After dividing this window into sub-periods, the window (+3,+5] shows a positive cumulative abnormal return while [+6,+10] shows a negative cumulative abnormal return under both models. In the window [+11,+20] the mean cumulative abnormal return is again negative under the mean-adjusted model but positive under the market model. Looking at the significance in this long period, all the cumulative abnormal return means are insignificant in both models.

Table 30: CAR (market) for Switch from non-big 4 to Big 4 Auditor

	Window	t-value	Mean	St.dev.	P-Value	Significance
Short period						
Event window	[-3,+3]	-1.2952	-.047073	.1584153	0.2116	insignificant
Before event	[-3,0]	-1.1855	-.0453729	.1668226	0.2512	insignificant
	[-3,-2]	-1.1131	-.039694	.1554426	0.2803	insignificant
	[-1,0]	-0.7427	-.0056789	.033329	0.4672	insignificant
Post event	[0,+3]	0.1973	.0022884	.0505661	0.8458	insignificant
	[0+1]	2.3246	.0115521	.0216614	0.0320**	Positive and Significant at 5%
	[+2,+3]	-0.9757	-.0092638	.0413857	0.3421	insignificant
Long period						
	(+3,+20]	0.0173	.0005202	.1308172	0.9864	insignificant
	(+3,+5]	0.4713	.0050135	.0463658	0.6431	insignificant
	[+6,+10]	-0.8521	-.0162818	.083289	0.4054	insignificant
	[+11+20]	0.0466	.0015792	.1478331	0.9634	insignificant

**, * denote significance at 5%, and 10% respectively

Thus, under both models, H3''.0 is rejected. Under the mean adjusted model, companies changing from non-big 4 to big 4 auditors showed a positive cumulative abnormal return in the window [0,+1], significant at 10%, with a p-value of 0.0749. Similarly, those companies, under the market model over the same window show a positive CAR but significant at a 5% with a p-value of 0.032. H4''.0 is accepted under both models.

Because the CAR over the window [0,+1] is found to be positive and statistically significant for companies switching from non-big 4 to big 4 auditors using both models, a further analysis is conducted to detect which type of companies (big or small) are more likely to do that change and still generate this positive CAR.

We tried to divide the sample of companies shifting from non-big 4 to big 4 auditors (which includes 19 companies) into two sub-samples based on the market capitalization mean of the whole sample (4858.674). The purpose is to repeat the t-test for each of the two groups separately over the window [0,+1]. A sub-sample 1 includes companies having a market capitalization smaller than the whole sample's mean (4858.674) while a sub-sample 2 includes companies with a market capitalization greater than the whole sample's mean. The results in Table 31 show that all the 19 firms are found to be part of sub-sample 1, having a market capitalization lower than the whole sample's mean, and zero observations are found in sub-sample 2. Therefore, we tried to divide the same sample again but this time, instead of dividing it based on the whole sample mean, the mean market capitalization of this particular sample (19 companies) is used as a reference for categorizing the companies.

The results in Table 31 show that 15 companies are in sub-sample 1' having a market capitalization lower than the sample's mean (330.73111) while only four are in sub-

sample 2' with a market capitalization higher than the samples' mean (330.73111). The CAR obtained in the first and the second categorization cases is positive and statistically significant at a 5% and 10 % significance levels respectively, revealing that small companies switching from non-big 4 to big 4 auditors are more likely to generate a positive market reaction one day following the announcement day.

Table 31: T-test of Companies Switching from non-Big 4 to Big 4 based on Market Capitalization (window 0,+1)

Samples	Market CAP	Obs	Mean	St. dev.	p-value	T-test
Sub-sample 1	lower than 4858.674	19	.0115521	.0216614	0.0320	2.3246**
Sub-sample 2	Higher than 4858.674	0	0	0	0	0
Sub-sample 1'	lower than 330.7311	15	.0116096	.0210539	0.0509	2.1356*
Sub-sample 2'	Higher than 330.7311	4	.0113365	.0273245	0.4675	0.8298

**, * denote significance at 5%, and 10% respectively.

4.4.4. Analysis of the Findings

Results reveal that the market did not react neither in the short-term nor in the long-term to the announcement of auditor change in general. No significant p-value is obtained in any window in Tables 27 and 28. Consequently H3'.0 and H4'.0 are both accepted. Regardless of the successor auditor type, there is no significant positive cumulative abnormal stock return neither around the announcement date nor several days following the announcement. Our findings failed to confirm many studies that reported a negative market reaction following the auditor change. These studies use the opinion shopping theory to explain the negative response. They argue that no matter who is the successor auditor, the act of changing the auditor creates a bad signal concerning the accuracy of the financial reports, thus the share price declines while the cost of capital increases (Eichenseher et al., 1989; Albrecht, 1990; Teh et

al., 2016). However, the results obtained in this study support a big body of literature that found an insignificant market reaction following the auditor change (Lefanowicz et al., 1989; Johnson & Lys, 1990; Fried & Schiff, 1981; Nichols & Smith, 1983; Klock, 1994). Researchers argue that the opinion shopping cease to exist after the SEC (Klock, 1994; Davidson et al., 2006), the PCAOB and several other regulatory bodies' efforts concerning the internal control and the financial reporting strict guidance that helped in minimizing the manipulation attempts. For instance, the SEC has obliged all the auditing firms to issue an internal control report (section404). In this report, all management teams are assigned some tasks for which they are accountable (section 302) and subject to sanction in case of violation (section 906).

As for the market reaction following the switch from non-big 4 to big 4 auditors, different results are obtained. More specifically, a significant positive market reaction is found one day following the announcement (over [0,+1] window), under both the mean-adjusted model and market model. This finding is supported by the literature that reported a positive market reaction to the switch to a big N auditor (Knechel el al., 2007, Chan et al., 2011). Consequently, H3''.0 is rejected since the market reacted positively to the switch from a non-big N to a big N auditor. This positive market reaction is triggered by the believe that Big 4 auditors are less likely to engage in earning manipulation since they have an international reputation that they fear to lose (Houghton & Jubb, 2003). Furthermore, these auditors are perceived to be more professional in dealing with agency problems (Houghton & Jubb, 2003). The result can lead to two implications. First, big N firms are still perceived to be high quality auditors even after all the scandals that had occurred. Second, the PCAOB efforts to promote the public confidence in non-big N firms might have failed, as the public still demonstrates favorable reaction towards big auditor names.

This positive market reaction is only manifested in the short time period, but does not last in the long term one, as the cumulative abnormal return remains insignificant in all the windows in the long-term period. Therefore, H4''.0 is accepted, and the cumulative abnormal stock return is the same regardless of the auditor's type.

Furthermore, companies that have switched auditors (from non-big 4 to a big 4) and were able to generate a positive market reaction over the window [0,+1] were found to be small in terms of market capitalization. Two possible explanations can be provided in this context. First, as big 4 auditors are able to raise capital very easily (Guedhami et al., 2014), small firms might be opting to grow by hiring these auditors. Second, based on the assurance theory, small firms might change to big 4 auditors to spread positive signals among shareholders, and assure them that their wealth is being protected.

In conclusion, this chapter highlighted the factors that affect companies' decision in changing their auditors in general, the factors that affect the choice of a big 4 successor, the market reaction following the change regardless of the auditors' type, and the market reaction following the choice of a big 4 auditor. The findings are linked to the theoretical concepts and the empirical findings of previous researches. The importance of the findings lies in their ability to add a value and originality to the existing literature. The next chapter reformulates the findings, presents the implications of this research and discusses its limitations.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This research has investigated the factors affecting auditor change decisions. The firms' characteristics (size, growth, leverage, profitability and performance) and the corporate governance factors (board diligence, board size, board gender diversity, CEO-Chair duality, board independence, audit committee independence, board members compensation, board members specific skills, and board structure type) have been observed to detect their relation with an auditor change in general.

Furthermore, the relation between the firms' characteristics and the choice of a big 4 successor auditor, in particular, has been also tested. In addition, this research has revealed different scenarios of market reaction following auditor change announcements. The announcement of a switch to a big 4 auditor has been observed to test its impact on the stock return in both short-term and long-term periods. In addition, the market reaction to the change announcements regardless of the type of the successor auditor has been also examined in two time periods. The results have revealed that three board characteristics (the executive board members diversity, the board independence and the board members compensation) and two firm's characteristics (company's size, profitability) are associated with the auditor change decisions. Board independence, executive board members diversity and board members compensation are found to be negatively related to an auditor change. Whereas, ROA and size are found to be positively related to the auditor change. Furthermore, a positive relation between the company's size and the choice of a big 4 auditor has been revealed. While the effect of board structure characteristics is justified by the opinion shopping theory, the size effect is interpreted by the agency

theory. As for the market response to the change announcement, a positive market reaction one day following the switch to a big 4 auditor has been observed.

5.2. Recommendation

Even though we could not find any negative market reaction following the auditor change in general, most of the findings related to the factors affecting the auditor change were justified by the audit shopping theory. Therefore, we can conclude that the regulatory efforts to eliminate the opinion shopping intentions behind auditor changes might have failed. The auditing profession should be more under the government sight and the regulatory bodies should pay more attention to the auditors' performance. The regulatory bodies have to be stricter when it comes to reporting the reasons of auditor changes and investigate any possible hidden intention behind such decisions.

Furthermore, we noticed in this research that more than 75% of the auditor change cases are switches to a big 4 auditor, and a positive market reaction is observed after these switches. Therefore, the problem of the big 4 dominance that UK has been suffering from, between 2002 and 2011, seems to persist until today. More serious measures should be implemented to give smaller firms the opportunity to enter the audit market. When more competition exists, the audit quality will be automatically enhanced and the audit fees will go down. If the concentration problem is not remedied, the big 4 firms will end up dominating the market, imposing their own rules and the government will lose control. Government agencies might start hiring non-big 4 auditors to encourage the public to trust these firms. The government can stop big 4 firms from getting too big, by setting ceilings to limit the number of clients and the audit fees charged. They have to eliminate the barriers to

entry in this industry to allow new companies to enter and help them compete with the dominating firms.

5.3. Limitations

According to the literature discussed in chapter two, the ownership structure is a factor that can greatly impact the auditor change decision. Including them in the analysis could have enriched the research and generated more significant results. However due to some data constraints, the history of annual corporate governance measures was not available. The data kept changing on a monthly basis with no accessibility to older records, and therefore, it was impossible for us to check the impact of the ownership structure on the auditor change decision for the selected sample.

Furthermore, the number of observations that were initially 157 companies has shrunken due to some missing data. The firm's characteristics relation with the switch to a big 4 has been examined; however the same test was not possible for the corporate governance factors due to the small number of observation resulting from many missing data. Furthermore, it was planned to examine the market reaction following the choice of a non-big 4, however, less than 25 % of the cases in our sample were switch cases to non-big 4 auditors, and consequently, not being a substantial sample to test.

While reviewing the literature, one can find many studies that have included the audit firm characteristics among the factors influencing the auditor choice decision. These characteristics include the audit fees, the geographical proximity, the industry specific skills, etc. Moreover, other researchers have included the audit opinion report issued before the change decision (qualified, unqualified and disclaimer audit

opinions) to test for the opinion shopping intentions. However, due to time constraint, these variables have not been tested in our study.

5.4. Research Implication

5.4.1. Theoretical Implication

This study enriched the literature to a great extent. First, it was difficult to obtain previous findings related to the market reaction following an auditor change, as very few researches have tackled this subject. The few studies found were outdated and they addressed the market reaction around the auditor change announcement, without including the long period windows. Addressing the market reaction to an auditor change in a contemporary and new manner has given an original identity to this research. Second, three board characteristics were tested for the first time in this study: board compensation, board structure type, and board members skills; out of which one (board compensation) is found to be significantly affecting the auditor change decision. Furthermore, most of the reviewed literature on the auditor change topic highlighted the cases of Malaysia and China. Other studies focused on countries like Kuwait, Nigeria, Taiwan, Saudi Arabia or regions like East Asia or the MENA region. Consequently, the UK market has been a new context for such research. This work will pave the way for further studies to expand the research especially that very few scholars have tackled these questions in this market. In this study, the UK companies listed on the London stock exchange were the subjects of analysis, over a 5-year period. As the observations obtained were not so numerous, a new research can reexamine the same topic over a longer period of time, and/or by adopting a cross sectional analysis in two different stock exchange markets, two different countries or two different industries. Furthermore, a complimentary

research can investigate the impact of an auditor change decision on the company's earnings quality, as measured by discretionary accruals. Such study can uncover the company's intentions behind the change by detecting earning manipulations practices following the new auditor's appointment.

5.4.2. Practical Implication

The findings of this study will help several stakeholders including the government regulators, the creditors and the potential investors to better understand the auditor change context before taking any strategic decision. This research found that the audit industry problems that have always existed in the audit industry are still present. This conclusion urges the government to take serious actions regarding the big 4 powerful perceived quality, the big 4 dominance in the market, the opinion shopping attempts, the agency theory and the marginal position of non-big 4 firms. Furthermore, after highlighting the hidden intentions behind the auditor changes, the creditors will scrutinize the financial reports of the companies engaging in auditor changes, before extending any credit lines. The tax authorities will be surged to examine attentively the tax declaration reports issued by companies hiring a new auditor. Nevertheless, investors will be able to better manage their investment portfolios knowing that potential auditor change decisions will affect their stock returns. In addition, companies planning to change their auditors can anticipate the impact of this decision on the market reaction and the shareholders' future return. Finally, by discussing the agency problem and the opinion shopping theory, the stakeholders have been better informed about the auditor's hiring decisions taken solely to ensure clean audit opinions.

REFERENCES

Abbott, L., & Parker, S. (2000). Auditor selection and audit committee characteristics. *Auditing: A Journal of Practice & Theory, 19*(2), 47-66.

Abdul Nasser, A., Abdul Wahid, E., Nazri, S., & Hudaib, M. (2006). Auditor-client relationship: the case of audit tenure and auditor switching in Malaysia. *Managerial Auditing Journal, 21*(7), 724-37.

Abid, A., Shaique, M., & Anwar ul Haq, M. (2018). Do big four auditors always provide higher audit quality? Evidence from Pakistan. *International Journal of Financial Studies, 6(2), 1-22.*

Abidin, S., Ishaya, I., & M-Nor, M. (2016). The association between corporate governance and auditor switching decision. *International Journal of Economics and Financial Issues, 6(7S), 11-13.*

Adams, R., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics, 94*(2), 291-*309.*

Adeyemi, S., & Fagbemi, T. (2010). Audit quality, corporate governance and firm characteristics in Nigeria. *International Journal of Business and Management, 5(5), 169–179.*

Agrawal, A., & Chadha, S. (2005). Corporate governance and accounting scandals. *The University of Chicago Press Journals, 48*(2), 371–406.

Ahern, K. (2009). Sample selection and event study estimation. *Journal of Empirical Finance, 16*(3), 466–482.

Ahern, K., & Dittmar, A. (2012). The changing of the boards: the impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics, 127*(1), 137–197.

Albrecht, D. (1990). *The determinants of the market reaction to an announcement of a change in auditor* (unpublished Ph.D. dissertation). Virginia Polytechnic Institute and State University, Virginia, the United States.

Alfraih, M. (2017a). Choosing an external auditor: does the composition of boards of directors matter? *International Journal of Law and Management, 59*(3), 394–412.

Alfraih, M. (2017b). Does ownership structure affect the quality of auditor pair composition? *Journal of Financial Reporting and Accounting. 15*(2), 158-179.

Algeri, S., & Bellocco, R. (2013). Goodness-of-fit tests for categorical data. *The*

Stata Journal, 13(2), 356–365.

Aljabr, Y.A. (2010). The role of nonexecutive members of the board of directors in the auditor choice: evidence from Saudi Arabia. *Journal of King Saud University – Business Administration, 22*(1), 35-44.

Al-Shattarat, W., & Al-Shattarat, B. (2017). The Relationship between cumulative abnormal returns and earnings: evidence from emerging markets. *The Journal of Developing Areas; Nashville, 51*(2), 357–368.

Anderson, R., Mansi, S., & Reeb, D. (2004). Board characteristics, accounting report integrity, and the cost of debt. *Journal of Accounting and Economics, 37*(3), 315–342.

Archer, K., & Lemeshow, S. (2006). Goodness-of-fit test for a logistic regression model fitted using survey sample data. *The Stata Journal, 6*(1), 97–105.

Asthana, S., Balsam, S., & Krishnan, J. (2010). Corporate governance, audit firm reputation, auditor switches, and client stock price reactions: The Andersen experience. *International Journal of Auditing, 14*(3), 274–293.

Beasley, M., & Petroni, K. (2001). Board independence and audit-firm type. *Auditing: A Journal of Practice & Theory, 20*(1), 97–114.

Beattie, V., & Fearnley, S. (1998). Audit market competition: auditor changes and the impact of tendering. *The British Accounting Review, 30*(3), 261-289.

Beisland, L., Mersland, R., & Strøm, R. (2015). Audit quality and corporate governance: evidence from the microfinance industry. *International Journal of Auditing, 19*(3), 218-237.

Belot, F., Ginglinger, E., Slovin, M., & Sushka, M. (2014). Freedom of choice between unitary and two-tier boards: an empirical analysis. *Journal of Financial Economics, 112*(3), 364–385.

Berger, P., & Hann, R. (2007). Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review, 82*(4), 869–906.

Berry, W. D., & Feldman, S. (1985). *Multiple regression in practice*. Beverly Hills : Sage Publications.

Bradbury, M., Mak, Y., & Tan, S. (2006). Board characteristics, audit committee characteristics and abnormal accruals. *Pacific Accounting Review, 18*(2), 47-68.

Brandt, L., & Li, H. (2003). Bank discrimination in transition economies: ideology, information, or incentives? *Journal of Comparative Economics, 31*(3), 387–413.

Brick, I., Palmon, O., & Wald, J. (2006). CEO compensation, director compensation and firm performance: evidence of cronyism. *Journal of Corporate Finance, 12*(3), 403-423.

Brown, S., Warner, J. (1980). Measuring security price performance. *Journal of Financial Economics, 8*(3), 205-258.

Burke, R. J., & Vinnicombe, S., Huse M., & Bilimoria, D. (2008). *Women on corporate boards of directors: international issues and opportunities*. Cheltenham, UK: Edward Elgar.

Campbell, J. Y., Lo, A. W., & Mackinlay, A.C. (1997). *The Econometrics of financial markets*. Princeton, New Jersey: Princeton University Press.

Carcello, J., Hermanson, D., Neal, L., & Riley, J.A.R. (2002). Board characteristics and audit fees. *Contemporary Accounting Research, 19*(3), 365-84.

Carver, B., Hollingsworth, C., & Stanley, J. (2011). Recent auditor downgrade activity and changes in clients' discretionary accruals. *Auditing: A Journal of Practice & Theory, 30*(3), 33–58.

Catalyst Group (2004). *The bottom line: connecting corporate performance and gender diversity.* Research report sponsored by BMO financial group; Catalyst Publication Code D58.

Chan, H., Lin, K., & Wang, R. (2012). Government ownership, accounting-based regulations, and the pursuit of favorable audit opinions: evidence from China. *Auditing: A Journal of Practice & Theory, 31*(4), 47–64.

Chan, K., Farrell, B., Healy, P., & Lee, P. (2011). Firm performance following auditor changes for audit fee savings. *Journal of Business & Economics Research, 9*(10), 17–25.

Chang, H., Cheng, C., & Reichelt, K. (2010). Market reaction to auditor switching from big 4 to third-tier small accounting firms. *Auditing: A Journal of Practice & Theory, 29*(2), 83–114.

Chen, C. (2016). The effect of mandatory disclosure requirements and disclosure types of auditor fees on earnings management: evidence from Taiwan. *Asia Pacific Management Review, 21*(4), 181–195.

Chen, K., & Zhou, J. (2007). Audit committee, board characteristics, and auditor switch decisions by Andersen's clients. *Contemporary Accounting Research, 24*(4), 1085–1117.

Cheng, Q. & Warfield, T. (2005). Equity incentives and earnings management. *The Accounting Review, 80*(2), 441-476.

Chong, B., & Liu, Z. (2016). CAR associated with SEO share lockups: real or illusionary? *Review of Quantitative Finance and Accounting, 47*(3), 513–541.

Chow, C. & Rice, S. (1982). Qualified audit opinions and auditor switching. *The Accounting Review, 57*(2), 326-335.

Chung, H., & Kallapur, S. (2003). Client importance, non-audit services, and abnormal accruals. *The Accounting Review, 78*(4), 931–955.

Clarkson, P. (1989). *Gestalt counselling in action.* Fourth edition, Sage Publications, London.

Cleves, M. (2002). From the help desk: comparing areas under receiver operating characteristic curves from two or more probit or logit models. *The Stata Journal, 3*(2), 301–313.

Coates, J. (2007). The goals and promise of the Sarbanes-Oxley Act. *The Journal of Economic, 21*(1), 91–116.

Cohen, L. & Manion, L. (1980). *Research methods in education.* Second edition, Croom Helm, London.

Competition Commission. (2012). *Audit market investigation.* London.

Conger, J., Finegold, D., Lawler, E. (1998). Appraising boardroom performance. *Harvard Business Review, 76(1)*, 136-148.

Core, J., Holthausen, R., & Larcker, D. (1999). Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics, 51*, 371–406.

Corrado, C. (2011). Event studies: a methodology review. *Accounting & Finance,* 51(1), 207–234.

Cox, D. & Peterson, D. (1994). Stock returns following large one-day declines: evidence on short-term reversals and longer-term performance. *Journal of Finance 49*(1), 255-267.

Cramer, J. S. (2003). *Logit models from economics and other fields*. Cambridge, UK: Cambridge University Press.

Craswell, A., Francis, J., & Taylor, S. (1995). Auditor brand name reputations and industry specializations. *Journal of Accounting & Economics, 20*(3), 297.

Dah, M., & Frye, M. (2017). Is Board compensation excessive? *Journal of Corporate Finance, Forthcoming*. Retrieved from https://ssrn.com/abstract=2985031

Damodaran, A. (1997). *Corporate finance*. New York, NY: John Wiley.

Danos, P. and Eichenseher, J. (1986). Long-term trends toward seller concentration in the US audit market. *The Accounting Review, 61*(4), 633-50.

Davidson, W., Jiraporn, P., & DaDalt, P. (2006). Causes and consequences of audit shopping: an analysis of auditor opinions, earnings management, and auditor changes. *Quarterly Journal of Business and Economics, 45*(1/2), 69–87.

DeAngelo, L. (1981). Auditor size and audit quality. *Journal of Accounting and Economics, 3*(3) 183–199.

Dedman, E. & Lennox, C. (2007). *Managers' perceptions of product market competition, profitability and firms' voluntary disclosures of sales.* Working paper, Hong Kong University of Science and Technology.

DeFond, M., Wong, T., & Li, S. (2000). The impact of improved auditor independence on audit market concentration in China. *Journal of Accounting and Economics, 28*, 269–305

Deloitte. (2014). *The different types of directors*. Johannesburg. Retrieved from https://www2.deloitte.com

Dunn, J., Hillier, D., & Marshall, A. (1999). The market reaction to auditor resignations. *Accounting and Business Research, 29*(2), 95–108.

Dutta, A. (2014). Parametric and nonparametric event study tests: a review. *International Business Research, 7*(12), 136-142.

Dyckman, T., Philbrick, D., & Stephan, J. (1984). A comparison of event study methodologies using daily stock returns: a simulation approach. *Journal of Accounting Research, 22*, 1–30.

Easterby-Smith, M., Thorpe, R. and Lowe, A. (1994). *Management research: an introduction*. Sage Publications, London.

Ebrahim, A. (2010). Audit fee premium and auditor change: the effect of Sarbanes-Oxley act. *Managerial Auditing Journal, 25*(2), 102–121.

Eichenseher, J., Hagigi, M. & Shields, D. (1989). Market reaction to auditor changes by OTC companies. *Auditing: A Journal of Practice and Theory, 9,* 29-40.

Eichenseher, J.W. & Shields, D. (1983). The correlates of CPA - firm change of publicly-held corporations. *Auditing: A Journal of Practice and Theory, 2*(2), 23-37.

Ettredge, M., Li, C., & Scholz, S. (2007). Audit fees and auditor dismissals in the Sarbanes-Oxley era. *Accounting Horizons, 21*(4), 371–386.

Fama, E., Jensen, M. (1983). Agency problems and residual claims. *Journal of Law and Economics, 26*(2), 327-349.

Fan, J., & Wong, T. (2005). Do external auditors perform a corporate governance role in emerging markets? Evidence from East Asia. *Journal of Accounting Research, 43*(1), 35–72.

Farooq, O., & Tabine, S. (2015). Agency problems and the choice of auditors: evidence from the MENA region. *Review of Middle East Economics & Finance, 11*(1), 79–97.

Farooq, O., & Kacemi, Y. (2011). Ownership concentration, choice of auditors, and firm performance : evidence from the MENA region. *Review of Middle East Economics and Finance, 7*(2), 1-17.

Francis, J. & Wilson, E. (1988). Auditor changes: a joint test of theories relating to agency costs and auditor differentiation. *The Accounting Review, 63*(4), 663–82.

Francis, J. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice and Theory, 30*(2), 125–152.

Fried, D. & Schiff, A. (1981). CPA switches and associated market reactions. *The Accounting Review, 56*(2), 324-341.

Gaeremynck, A. & Willekens, M. (2003). The endogenous relationship between audit-report type and business termination: evidence on private firms in a non-litigious environment. *Accounting and Business Research, 33*(1), 65–79.

General Accounting Office (GAO). (2003). *Public accounting firms: required study on the potential effects of mandatory audit firm rotation.* Washington, DC: General Accounting Office.

Grayson, M. (1999). *An empirical test of auditor switching as a means to delay the revelation of bad news.* Working paper, School of Business, Jackson State University, Jackson, MS.

Grothe, M., & Weirich, T. (2007). Analyzing auditor changes. *The CPA Journal, 77*(12), 14–23.

Guedhami, O., Pittman, J. A., & Saffar, W. (2014). Auditor choice in politically connected firms: auditor choice in politically connected firms. *Journal of Accounting Research, 52*(1), 107–162.

Guedhami, O., Pittman, J., & Saffar, W. (2009). Auditor choice in privatized firms: empirical evidence on the role of state and foreign owners. *Journal of Accounting and Economics, 48*(2), 151–171.

Gul, F., Srinidhi, B. & Tsui, J. (2012). *Board gender diversity, auditor quality choice and audit fees*. Retrieved from https://ssrn.com/abstract=2041161

Ha, T., Nguyen, T., & Nguyen, T. (2016*). Factors influencing the auditor's going concern opinion decision.* In the 10th international days of statistics and economics. Prague.

Harris, S. (2017). *Audit industry concentration and potential implications*. The 2017 international institute on audit regulation, Washington: PCAOB. Retrieved

from https://pcaobus.org

Haskins, M. and Williams, D. (1990). A contingent model of intra-big-8 auditor changes. *Auditing: A Journal of Practice & Theory, 9*(3), 55-74.

Herbert S. (1959). Theories of decision making in economics and behavioral science. *American Economic Review, 49*(3), 253-283.

Hogan, C., & Martin, R. (2009). Risk shifts in the market for audits: an examination of changes in risk for "second tier" audit firms. *Auditing: A Journal of Practice & Theory 28*(2), 93–118.

Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression.* New York, United States: John Wiley & Sons, Incorporated.

Houghton, K., & Jubb, C. (2003). Auditor selection: what influences decisions by listed companies? *Australian Accounting Review, 13*(3), 67–72.

Hudaib, M. and Cooke, T.E. (2005). The impact of managing director changes and financial distress on audit qualification and auditor switching. *Journal of Business Finance & Accounting, 32*(9), 1703-1739.

Hudaib, M., & Haniffa, R. (2006). Corporate governance structure and performance of Malaysian listed companies. *Journal of Business Finance & Accounting, 33*(7), 1034–1062.

Huson, J., Shamsher, M., Mohd, A. and Annuar, M. (2000). Audit switch decisions of Malaysian listed firms: test of determinants of wealth effect. *Capital Market Review, 8*(1/2), 1-24.

Ianniello, G., Mainardi, M. and Rossi, F. (2015). Family control, corporate governance, and auditor choice: evidence from Italy. *International Journal of Accounting and Finance, 5*(2), 99-116.

Jaafar, N. & Alias, N. (2002). Audit firm rotations in Malaysia: prospects and problems. *Finance India, 16*(3), 33-48.

Jensen, M. & Meckling, W. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Johnson, W.B. & Lys, T. (1990). The market for audit services: evidence from voluntary auditor changes. *Journal of Accounting and Economics, 12*(1-3), 281-308.

Jubb, P. (2000). Auditors as whistleblowers. *International Journal of Auditing, 4*(2), 153-167

Jungmann, C. (2006). The Effectiveness of corporate governance in one-tier and two-tier board systems – evidence from the UK and Germany. *European*

Company and Financial Law Review, 3(4), 426–474

Kanas, A. (2005). Pure contagion effects in international banking: the case of BCCI's failure. *Journal of Applied Economics 8*(1), 101-123.

Kane, G., & Velury, U. (2004). The role of institutional ownership in the market for auditing services: an empirical investigation. *Journal of Business Research, 57*(9), 976–983.

Karim, A., Zijl, T., & Mollah, S. (2013). Impact of board ownership, CEO-Chair duality and foreign equity participation on auditor quality choice of IPO companies. *International Journal of Accounting & Information Management, 21*(2), 148-169.

Klock, M. (1994). The stock market reaction to a change in certifying accountant. *Journal of Accounting, Auditing & Finance, 9*(2), 339–347.

Knapp, M. and Elaikai, F. (1988). Auditor changes: a note on the policy implications of recent analytical and empirical research. *Journal of Accounting, Auditing, and Finance, 3*(1), 78-86.

Knechel, W. R., Niemi, L., & Sundgren, S. (2008). Determinants of auditor choice: evidence from a small client market. *International Journal of Auditing, 12*(1), 65–88.

Knechel, W., Naiker, V., & Pacheco, G. (2007). Does auditor industry specialization matter? Evidence from market reaction to auditor switches. *Auditing: A Journal of Practice & Theory, 26*(1), 19–45.

Kothari, S. P., & Warner, J. B. (2006). *Econometrics of event studies*. In handbook of corporate finance: empirical corporate finance. North-Holland: Elsevier.

KPMG. (2014). *Guide to audit quality and the external auditor* (pp. 1–13). Retrieved from www.kpmg.com/nz

Krishnan, J. (1994). Auditor switching and conservatism. *The Accounting Review, 69*(1), 200-215.

Kuang, X. (2011). *Board characteristics and higher audit quality—evidence from Chinese listed companies*. In MSIE 2011 (pp. 348–352). Retrieved from https://doi.org/10.1109/MSIE.2011.5707733

Lai, K. , Srinidhi, B. ,Gul,F. and Tsui, J.(2017). Board gender diversity, auditor fees, and auditor choice. *Contemporary Accounting Research, 34*(3), 1681-1714.

Lamm, B., MCcormack, D., Phillips, H., Dehaas, D., Parsons, k., Hitchcock, C., & Bujno, M. (2018). *The Role of Audit Committee* (pp. 1–31). Deloitte. Retrieved from https://www2.deloitte.com/lb/en.html

Landsman, W., Nelson K., and Rountree B. (2006). *An empirical analysis of big N auditor switches: evidence from the pre- and post-Enron eras.* Working paper, The University of North Carolina at Chapel Hill, NC.

Landsman, W., Nelson, K., & Rountree, B. (2009). Auditor switches in the pre- and post-Enron eras: risk or realignment? *The Accounting Review, 84(*2), 531–558.

Lefanowicz, C., Chris O., and Mark Z. (1989). *Assessments of the information content of corporate disclosures: A comparison of the SEC to the stock market.* Unpublished manuscript.

Leung, N., & Cheng, M. (2014). Corporate governance mechanisms and auditor choice: evidence from China. *International Journal of Business and Management, 9*(9), 41-56.

Lin, Z., Liu, M., & Wang, Z. (2009). Market implications of the audit quality and auditor switches: evidence from China. *Journal of International Financial Management & Accounting, 20*(1), 35–78.

Lin, Z., & Liu, M. (2010). The determinants of auditor switching from the perspective of corporate governance in China. *Advances in Accounting, 26*(1), 117–127.

Lintner, J. (1965). The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets. *Review of Economics and Statistics, 47*(1), 13-37.

Lv, X., Dong, W., & Fang, F. (2015). The asymmetric effects of official interest rate changes on China's stock market during different market regimes. *Emerging Markets Finance and Trade, 51*(4), 826–841.

Mackinlay, G. (1997). Event studies in economics and finance. *Journal of Economic Literature, 35(*1), 13–39.

McCabe, M., & Nowak, M. (2008). The independent director on the board of company directors. *Managerial Auditing Journal, 23*(6), 545–566.

McMeeking, K. (2009). *Competition, choice and governance in the UK audit market: interview evidence.* Edinburgh: The institute of chartered accountants of Scotland.

Megaw, N. (2017). *FTSE 250 hits record high.* Financial Times. Retrieved from https://www.ft.com/content/dcb2218d-69f9-3711-8fa2-a59dd43bdf17

Nazri, M., S., Ismail, Z., & Smith, M. (2012). Factors influencing auditor change: evidence from Malaysia. *Asian Review of Accounting, 20*(3), 222–240.

Nichols, D. & Smith, D. (1983). Auditor credibility and auditor changes. *Journal of Accounting Research, 21*(2), 534-544.

O'sullivan, N. (2000). The impact of board composition and ownership on audit quality: evidence from large UK companies. *The British Accounting Review, 32*(4), 397-414.

O'Gorman, K. & MacIntosh, R. (2015). *Chapter 4: Mapping research methods.* Oxford: Goodfellow Publishers.

Oler, D., Harrison, J., & Allen, M. (2008). The danger of misinterpreting short-window event study findings in strategic management research: an empirical illustration using horizontal acquisitions. *Strategic Organization, 6*(2), 151–184.

Owens-Jackson, L. A., Robinson, D. R., & Shelton, S. W. (2008). Auditor resignations and dismissals. *The CPA Journal; New York, 78*(1), 28–31.

Oxera Consulting Ltd. (2006). *Competition and choice in the UK audit market* (pp. 1–152). Oxford United Kingdom. Retrieved from https://www.oxera.com

Palmrose, Z. (1986). The effect of non-audit services on the pricing of audit services: further evidence. *Journal of Accounting Research, 24*(2), 405-11.

Pande, R. and Ford, D. (2012). *Gender quotas and female leadership.* Washington, DC: World Bank. Retrieved from https://openknowledge.worldbank.org/handle/10986/9120 License: CC BY 3.0 IGO.

PCAOB standards. (n.d.). The PCAOB official website. Retrieved from https://pcaobus.org:443/About/History/Pages/default.aspx

Peterson, P. (1989). Event studies: a review of issues and methodology. *Quarterly Journal of Business and Economics, 28*(3), 36-66.

Piot, C. (2001). Agency costs and audit quality: evidence from France. *European Accounting Review, 10*(3), 461–499.

Prakash, S. (2013). Event study test of incorporating earning announcement on share price. *Journal of Economics and Finance, 2*(1), 09–18.

Pregibon, D. (1979). *Data analytic methods for generalized linear models.* Unpublished Ph.D. thesis: University of Toronto.

Pregibon, D. (1981). Logistic regression diagnostics. *The Annals of Statistics, 9*(4), 705–724.

Princeton university library (n.d.). *Interpreting regression output.* Retrieved from https://dss.princeton.edu/online_help/analysis/interpreting_regression.htm

Quick, R., Schenk, N., Schmidt, F., & Towara, T. (2018). The impact of corporate governance on auditor choice: evidence from Germany. *Journal of Management and Governance, 22*(2), 251–283.

Raghunandan, K., & Rama, D. V. (2006). SOX section 404 material weakness disclosures and audit fees. *Auditing: A Journal of Practice & Theory, 25*(1), 99–114.

Reichenheim, M. (2002). Two-graph receiver operating characteristic. *The Stata Journal, 2*(4), 351–357.

Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management: an introduction to process and method.* London: Sage Publications Ltd.

Robinson, T. R. (2009). *International financial statement analysis*. Hoboken, N.J.: Wiley.

Rockness, H., & Rockness, J. (2005). Legislated ethics: from Enron to Sarbanes-Oxley, the impact on corporate America. *Journal of Business Ethics, 57*(1), 31–54.

Ross, S. (1976). The Arbitrage theory of capital asset pricing. *Journal of Economic Theory, 13*, 341-360.

Sankar, S. S., & Narayan, R. M. (2017). *Quality control procedure for statutory financial audit : an empirical study*. First edition. UK: Emerald Publishing Limited.

Sankaraguruswamy, S. and Whisenant, J. (2004). An empirical analysis of voluntarily supplied client-auditor realignment reasons. Auditing: *A Journal of Practice & Theory, 23*(1), 107-21.

Santenac, I., & Ball, H. (2015). *The future of assurance the role of audit in society.* UK: Ernst & Young. Retrieved from https://www.ey.com

Schwartz, K. & Menon, K. (1985). Auditor switches by failing firms. *The Accounting Review, 60*(2), 248-61.

Scott, J., & Marshall, G. (n.d.). *Logistic (or logit) regression.* In a supplementary dictionary of social research methods. Oxford University Press. Retrieved from http://www.oxfordreference.com/view/10.1093/acref/9780191796494.001.0001/acref-9780191796494-e-22

Sharpe, W. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. *Journal of Finance, 19*(3), 425-442.

SIC codes (2009). *Farlex financial dictionary*. Retrieved from https://financial-dictionary.thefreedictionary.com/SIC+codes

Small, C. (2012). *Industry expertise on corporate boards*. Harvard law school forum on corporate governance and financial regulation. Retrieved from

https://corpgov.law.harvard.edu/2012/10/11/industry-expertise-on-corporate-boards/

Smith, A. (1937). *The wealth of nations*. Edited by Edwin Cannan, 1904. New York, NY: modern library.

Sullivan, L. (n.d.). *Hypothesis testing - analysis of variance (ANOVA)*. Boston University School of Public Health. Retrieved from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/Menu/

Sullivan, M. (2002). The effect of the big eight accounting firm mergers on the market for audit services. *The Journal of Law & Economics, 45*(2), 375–399.

Takiah, I. & Ghazali, S. (1993). Incidence of qualified opinions and the effects on auditor switching: an empirical study in Malaysia. *Journal Pengurusan, (12),* pp. 53-63.

Teh, B., Ong, T., Samuel, A., & Huei Ng, S. (2016). An empirical study of auditors switching, corporate governance and financial performances of Malaysian public listed companies (PLCs). *Journal Pengurusan, 47*(1), 43–53.

Tepalagul, N., & Lin, L. (2015). Auditor independence and audit quality: a literature review. *Journal of Accounting, Auditing & Finance, 30*(1), 101–121.

Tonello, M. (2011). *Separation of chair and CEO roles*. Harvard law school forum on corporate governance and financial regulation. Retrieved from https://corpgov.law.harvard.edu/

Trochim, W. M. (2000). *Research methods knowledge base*. 2nd Edition. Cincinnati, OH: Atomic Dog Publishing.

Turner, L., Williams, J., & Weirich, T. (2005). An inside look at auditor changes. *The CPA Journal, 75*(11), pS12+.

Vafeas N. (1999). Board meeting frequency and firm performance. *Journal of Financial Economics, 53*(1), pp. 113-142.

Van den Berghe, L., & Levrau, A. (2004). Evaluating boards of directors: what constitutes a good corporate board. *Corporate governance: An International Review, 12*(4), 461–478.

Van Stralen, K., Stel, V., Reitsma, J., Dekker, F., Zoccali, C., & Jager, K. (2009). Diagnostic methods I: sensitivity, specificity, and other measures of accuracy. *Kidney International, 75*(12), 1257–1263.

Wallace, W. (1981). *The economic role of the audit in free and regulated markets*. Open educational resources, 2. Retrieved from https://scholarworks.wm.edu/oer/2

Wang, B., & Xin, Q. (2011). Auditor choice and accruals patterns of cross-listed

firms. *China Journal of Accounting Research, 4*(4), 233–251.

Wang, Q., Wong, T. & Xia, L. (2008). State ownership the institutional environment and auditor choice: evidence from China. *Journal of Accounting and Economics, 46*(1), 112-134.

Wasserman, N. (2006). Stewards, agents, and the founder discount: executive compensation in new ventures. *Academy of Management Journal, 49*(5), 960-976.

Watts, R. L. & Zimmerman. J. L. (1986). *Positive accounting theory*. Prentice-Hall, Inc., Englewood Cliffs, NJ.

Whisenant, J. (2006). *An analysis of the information content of auditor change announcements: Grant Thornton LLP engagements*. The Grant Thornton commentary series—investor perceptions of audit firm parity 1 (1).

Whisenant, J. S., Sankaraguruswamy, S., & Raghunandan K. (2003). Market reactions to disclosure of reportable events. *Auditing: A Journal of Practice & Theory 22*(1): 181–194.

Williams, D. (1988). The potential determinants of auditor change. *Journal of Business Finance & Accounting, 15*(2), 243-61.

Williams, R. (2018). *Scalar measures of fit: pseudo R2 and information measures (AIC & BIC).* University of Notre Dame.

Woo, E. & Koh, H. (2001). Factors associated with auditor changes: a Singapore study. *Accounting and Business Research, 31*(2), 133-44.

Wright, B. (2016). *Why we should be looking at the FTSE 250 and not the FTSE 100 to gauge the impact of Brexit*. The telegraph. Retrieved from https://www.telegraph.co.uk/business/2016/06/27/why-we-should-be-looking-at-the-ftse-250-and-not-the-ftse-100-to/

Xu, X., & Wang, Y. (1999). Ownership structure and corporate governance in Chinese stock companies. *China Economic Review, 10*(1), 75–98.

APPENDIX A

Table A: Firm's characteristics of companies that changed their auditors

Company Name	LOSS	SIZE	LEV	ROA	GRWTH	CAP	OCF
Aberdeen Asset Management PLC	285500000	5378900000	0.000	0.0623	2.5900	5,263,790,000	455,200,000
Acal PLC	7200000	236700000	0.570	0.0740	1.5300	156,200,000	8,200,000
Accesso Technology Group PLC	5367000	96839000	0.230	0.0562	4.2600	270,540,000	13,618,000
AFC Energy Plc	-5437000	10693000	0.000	-0.5269	2.7600	26,430,000	(5,948,800)
Aggreko PLC	215000000	125000000	0.490	0.1069	3.4300	3,696,310,000	401,000,000
Altus Strategies PLC	-649100	1250500	0.000	-0.4191	-		(1,523,500)
AO World plc	-2517000	107400000	0.120	-0.0179	13.1600	771,370,000	1,299,000
Arrow Global Group PLC	15111000	338536000	2.070	0.0533	4.4200	464,440,000	(6,717,000)
Ashley (Laura) Hldgs PLC	15900000	137400000	0.520	-	3.6500	160,110,000	(4,000,000)
Ashley (Laura) Hldgs PLC	15700000	140600000	0.000	0.1099	3.9300	191,040,000	(6,800,000)
AssetCo PLC	2253000	17343000	0.000	0.1451	2.4900	36,630,000	(766,000)
Atkins (WS) PLC	85700000	1201400000	0.540	0.0751	6.2400	1,278,410,000	116,200,000
Avanti Capital PLC	-212000	6136000	0.000	-0.0343	0.6100	2,610,000	(394,000)
BAE SYSTEMS PLC	913000000	22976000000	1.290	0.0436	5.4600	18,783,380,000	1,229,000,000
Balfour Beatty PLC	-206000000	4601000000	1.170	-0.0418	2.2600	1,864,380,000	(111,000,000)
Bankers Investment Trust PLC	55823000	789276000	0.100	0.0751	0.9800	699,410,000	(8,542,000)
Benchmark Holdings PLC	-11988000	134069000	0.000	-0.1288	2.3200	211,670,000	(8,959,000)
Berkeley Group Holdings (The) PLC	158500000	2153433000	0.060	0.0745	1.5300	1,681,690,000	(162,558,000)
BG GROUP plc/BAGIR	-5471000	44253000	-	-0.1200	-		1,091,000
Boxhill Technologies PLC	-1000	3313000	1.670	-	-		145,000
BP PLC	-6482000000	261832000000	0.550	-0.0234	0.9800	95,749,060,000	19,133,000,000
British American Tobacco PLC	3115000000	26167000000	2.220	0.1279	11.8400	65,241,660,000	3,716,000,000

British Land Co PLC	284000000	8269000000	0.390	0.0346	0.9400	5,361,220,000	190,000,000
British Smaller Companies VCT PLC	1123000	42400000	0.000	0.0274	0.7900	33,370,000	(1,098,000)
Brown (N.) Group PLC	75900000	875500000	0.530	0.0882	3.4500	1,672,230,000	40,700,000
Bunzl PLC	206800000	3175700000	0.980	0.0675	5.1500	4,835,970,000	340,000,000
Castings PLC	13875000	144055000	0.000	0.0981	1.4400	171,260,000	16,051,000
Catalyst Media Group PLC	-44000	25035000	0.000	-0.0018	0.7500	18,680,000	(16,200)
Chamberlin PLC	747000	21380000	0.120	0.0340	0.9800	8,120,000	2,260,000
Christie Group PLC	1423000	26580000	-	0.0499	-	22,020,000	(1,262,000)
Close Brothers Group PLC	186500000	8748200000		0.0223	1.7200	1,881,600,000	(18,800,000)
Computacenter PLC	33160000	1135288000	0.050	0.0295	2.4300	886,600,000	62,907,000
Consort Medical PLC	12968000	143727000	0.000	0.0954	2.1800	258,210,000	13,771,000
Cranswick PLC	45395000	510058000	0.000	0.0977	2.8900	1,063,190,000	83,834,000
Creightons PLC	471000	8371000	0.130	0.0593	0.5700	2,480,000	689,000
Croda International PLC	196700000	1499800000	0.710	0.1400	17.1000	4,194,680,000	263,800,000
Daniel Stewart Securities PLC	-3138000	6485000	0.000	-0.4120	1.1100	4,330,000	(74,400)
Derwent London PLC	456600000	3436500000	0.420	0.1461	1.0600	2,452,330,000	57,500,000
Devro PLC	4400000	338900000	0.600	0.0138	3.8200	509,110,000	36,700,000
Diageo PLC	2452000000	24991000000	1.450	0.1077	6.7100	47,194,700,000	2,033,000,000
Diamondcorp Plc	-2382600	21869000	1.300	-0.1303	2.3000	13,500,000	(3,368,200)
Dignity PLC	40400000	623400000	11.540	0.0744	16.7300	705,860,000	55,100,000
Dunelm Group plc	81454000	313193000	0.000	0.2581	8.4900	1,678,670,000	100,399,000
Electrocomponents PLC	59400000	859700000	0.470	0.0694	2.9000	1,099,690,000	76,700,000
Essentra plc	67900000	1416900000	2.320	0.0470	3.5600	2,172,490,000	110,600,000
Euromoney Institutional Investor PLC	72623000	626553000	1.920	0.1210	4.5100	1,466,900,000	86,956,000
Everyman Media Group PLC	-556000	42642000	0.000	-0.0177	1.8100	57,730,000	2,959,000
Formation Group PLC	1814000	21452000	1.310	0.1227	-		(6,906,000)

GAME Digital PLC	21400000	227900000	0.000	0.0921	3.5300	441,150,000	43,300,000
Go-Ahead Group PLC	70300000	1184200000	6.370	1.7063	20.0800	1,017,900,000	171,900,000
Grainger PLC	53600000	1711300000	2.250	0.0282	1.5600	725,460,000	84,300,000
Greencoat UK Wind	-4200000	215300000	-	-0.0173	-	-	1,800,000
Hammerson PLC	726800000	8959300000	0.550	0.0879	0.8500	4,706,590,000	4,706,590
Hargreaves Lansdown PLC	112960000	312802000	0.000	0.3598	15.4500	2,426,050,000	122,549,000
Hays PLC	105600000	950500000	0.370	0.1147	8.4200	2,271,020,000	132,100,000
Henderson Global Trust PLC	16350000	152143000	0.010	0.1177	0.9600	143,450,000	5,866,000
Henderson Opportunities Trust PLC	255000	91885000	0.150	0.0027	0.8300	65,850,000	737,000
HSBC Holdings PLC	13688000000	2634139000000	-	0.0055	0.9600	182,142,130,000	(21,372,000,000)
Huntsworth PLC	-39439000	245821000	0.250	-0.1478	0.8300	129,090,000	12,106,000
hVIVO plc	-17909000	84740000	0.000	-0.2322	2.8300	180,300,000	(9,846,000)
Ibstock PLC	93967000	669869000	0.350	0.1765	2.9200	900,620,000	41,964,000
Image Scan Holdings PLC	-550200	1424000	0.000	-0.3706	3.3100	2,040,000	(479,000)
Inland Homes PLC	29680000	190076000	0.780	0.1755	1.6000	142,470,000	36,807,000
Interserve PLC	50200000	1154500000	0.330	0.0487	2.2300	804,000,000	(64,600,000)
IQE plc	14385000	336395000	0.000	0.0699	3.6000	1,035,790,000	21,748,000
JPMorgan Japan Smaller Co Tst PLC	17171000	90323000	0.080	0.2125	0.8600	70,610,000	43,000
JPMorgan Smaller Cos IT PLC	70778000	538872000	0.080	0.1385	0.8900	442,010,000	3,408,000
Martin Currie Asia Unenst Trust PLC	-11025000	125508000	0.040	-0.0838	0.8600	102,600,000	1,629,000
Micro Focus International plc	162894000	4635693000	1.120	0.0363	2.9700	4,731,000,000	284,641,000
Motif Bio PLC	-8516700	34958000	0.130	-0.4841	2.3000	68,420,000	(7,997,680)
National Grid PLC	2476000000	52384000000	2.180	0.0460	2.3700	28,209,220,000	4,019,000,000
NCC Group PLC	7615000	123307000	0.470	0.0624	4.3500	262,700,000	18,453,000
Octopus Apollo VCT plc	2831000	132208000		0.0221	0.5300	67,840,000	(2,119,000)
Outsourcery PLC	-7612000	9143000	-	-0.7715	-	12,760,000	(3,240,000)

Palace Capital PLC	-158000	2090000	14.980	-0.0733	4.2200	510,000	(106,800)
PayPoint plc	-2111000	234582000	0.000	-0.0078	5.4500	479,400,000	59,014,000
Pennon Group PLC	20600000	4770300000	2.490	0.0046	2.1200	2,271,820,000	246,800,000
Porta Communications PLC	-4356000	31656000	0.820	-0.0908	1.9900	19,410,000	1,342,600
Porvair PLC	7736000	121198000	0.000	0.0706	2.6500	189,390,000	11,104,000
Premier Foods plc	0	0				-	-
Premier Oil PLC	-1103800000	5305900000	3.560	-0.1879	0.5000	365,120,000	809,500,000
Premier Veterinary Group PLC	1824000	3419000	0.550	-0.8266	12.2900	20,130,000	(2,165,000)
Premier Veterinary Group PLC	-734000	501000	0.000	-0.9892	-		(377,000)
Proton Power Systems PLC	-19498000	4957000	-	-5.2231	-	24,930,000	(6,906,000)
Proton Power Systems PLC	-4172000	1203000	-	-3.2129	-	11,190,000	(3,567,000)
Provexis PLC	-3873200	13415000	0.000	-0.3107	1.1400	13,180,000	(2,165,300)
PZ CUSSONS PLC	67700000	1169400000	0.640	0.0616	2.9800	1,501,390,000	82,400,000
QinetiQ Group plc	106100000	771600000				-	-
Quarto Group Inc	3656000	201467000	2.260	0.0195	1.2700	53,320,000	45,827,000
Regal Petroleum PLC	-128028000	153399000	0.000	-0.5651	0.4600	69,010,000	20,874,000
Rose Petroleum PLC	-3309000	6166000	0.190	-0.4496	0.7100	5,250,000	(393,000)
Rosslyn Data Technologies PLC	-2963200	9927200	0.030	-0.5594	3.2800	25,640,000	(2,565,070)
Rotork PLC	99509000	484776000	0.010	0.2211	7.5100	2,493,200,000	110,360,000
Royal Mail PLC	1277000000	5642000000	0.370	0.2492	2.2300	5,640,000,000	807,000,000
RWS Holdings PLC	15918000	89393000	0.000	0.1923	4.4700	320,540,000	16,204,000
Safestore Holdings plc	108500000	830400000	1.150	0.1337	0.8100	279,220,000	29,000,000
SAGA PLC	140900000	2752100000	0.520	0.0533	2.0100	2,192,410,000	150,400,000
Sage Group PLC	46400000	2197900000	0.640	0.0203	4.2400	3,618,070,000	286,200,000
Sainsbury(J) PLC	716000000	16540000000	0.460	0.0490	1.0000	5,981,010,000	939,000,000
Schroders PLC	467400000	18099900000	1.080	0.0244	3.0100	8,407,870,000	47,900,000

Scottish Oriental Smlr Co Tst PLC	43393000	277724000	0.080	0.1725	0.9200	232,190,000	2,979,000
Secure Trust Bank PLC	137500000	1510000000	-	0.0753	1.7500	397,400,000	(175,800,000)
SEGRO PLC	682000000	4813600000	0.590	0.1505	0.9500	2,748,950,000	123,000,000
Senior PLC	45400000	976300000	0.430	0.0494	1.6300	814,930,000	100,300,000
Serco Group PLC	-152600000	1839500000	6.560	1.5200	-0.0428	3,700,000	(2,200,000)
Share PLC	690000	30721000	0.000	0.0856	2.2400	46,330,000	199,000
Smith & Nephew Plc	556000000	5819000000	0.100	0.0970	3.1400	12,724,420,000	867,000,000
Spectris PLC	113800000	1459100000	0.160	0.0794	2.2200	2,146,200,000	153,400,000
Spirax-Sarco Engineering PLC	87438000	679739000	0.110	0.1324	3.7900	1,649,600,000	107,537,000
St. Modwen Properties PLC	216400000	1612600000	0.550	0.0353	1.0500	956,630,000	(38,700,000)
Stagecoach Group PLC	139300000	2212100000	8.350	0.0697	22.1800	2,086,840,000	315,500,000
Sutton Harbour Holdings PLC	1323000	64144000	0.530	0.0213	0.6500	25,030,000	361,000
Telecom Plus PLC	27463000	468187000	0.510	0.0862	7.3500	1,431,450,000	(17,183,000)
Telit Communications PLC	3914000	162070000	0.520	0.0274	1.4100	93,170,000	5,395,000
Tertiary Minerals PLC	-451200	4294900	0.000	-0.1215	2.2000	8,690,000	(394,000)
The Weir Group PLC	-178700000	161700000	0.850	-0.0472	1.8000	2,140,000,000	310,100,000
Trans-Siberian Gold PLC	7067000	104864000	0.210	0.0677	0.6900	54,980,000	18,871,000
Tribal Group PLC	-45516000	89841000		-0.3874	3.7000	22,760,000	(6,216,000)
Triple Point Income VCT PLC	1671000	43803000	0.000	0.0388	0.5300	24,580,000	(1,153,000)
Triple Point VCT 2011 PLC	178000	19684000	0.000	0.0094	-		1,335,000
Unite Group PLC	102600000	1459800000	0.580	0.0766	1.1100	937,170,000	44,200,000
Upland Resources Limited	-763660	2424400	0.000	0.4407	2.4200	5,650,000	(906,110)
Vedanta Resources PLC	-1798600000	36988900000	-	-0.0920	-	2,042,090,000	2,505,800,000
Versarien PLC	-414700	347000	0.000	-1.4055	-		(384,290)
Virgin Money Holdings (UK) PLC	8700000	26536800000	-	0.0003	1.0200	1,272,770,000	(623,800,000)
Vodafone Group Plc	413000000	138324000000	0.360	-0.0293	0.7100	60,517,420,000	8,824,000,000

Warner Estate Holdings PLC	-4200000	215300000	-	-0.0173	-		1,800,000
WH Smith PLC	81000000	463000000	0.000	0.1712	10.2200	1,042,430,000	119,000,000
Whitbread PLC	327900000	3347500000	0.240	0.0992	4.5000	7,976,160,000	429,600,000
Zegona Communications PLC	-14892000	736745000	0.760	-	0.9600	360,500,000	(937,000)

Table B: Firm's characteristics of companies that did not change their auditors

Company Name	LEV	ROA	OCF	LOSS	GRWTH	CAP	SIZE
A.G.Barr PLC	0.3%	13.1%	48,800,000	35,600,000	3.2211032	585595421.67	275,600,000.00
Ascential PLC	79.1%	1.3%	92,400,000	11,600,000	2.9912446	1081064207.50	934,300,000.00
Assura PLC	63.9%	7.5%	39,000,000	95,300,000	1.153146	941644825.62	1,379,600,000.00
AVEVA Group PLC	1.1%	9.7%	100,521,000	38,404,000	3.53146	1202106578.51	498,493,000.00
B&M European Value Retail SA	71.1%	8.6%	179,114,000	142,926,000	3.4747828	2780000000.00	1,773,516,000.00
Babcock International Group PLC	58.1%	5.3%	390,900,000	311,800,000	1.8047568	4818335569.41	6,130,900,000.00
Beazley PLC	24.3%	3.6%	157,183,096	203,470,640	1.6276249	2027994192.50	5,681,370,440.00
Bellway PLC	1.7%	16.1%	162,693,000	402,902,000	1.6269779	3037786449.00	2,720,842,000.00
Big Yellow Group PLC	36.5%	8.1%	55,974,000	99,511,000	1.2155742	1082012640.78	1,255,529,000.00
Bodycote PLC	1.7%	7.7%	125,900,000	67,000,000	1.9112968	1232977747.68	924,400,000.00
Bovis Homes Group PLC	0.0%	7.7%	61,805,000	120,848,000	1.0437404	1103083188.00	1,630,326,000.00
Brewin Dolphin Holdings PLC	0.0%	7.8%	52,033,000	38,967,000	3.5563585	863928274.93	484,791,000.00
Britvic PLC	278.3%	7.8%	132,800,000	114,500,000	5.3040225	1491029529.57	1,634,400,000.00
BTG PLC	0.0%	2.7%	74,200,000	33,600,000	2.3481652	2272025082.30	1,311,100,000.00
Cairn Energy PLC	0.0%	-4.0%	-16,699,184	-77,010,800	0.756615	1361699207.38	1,992,553,120.00
Capital & Counties Properties PLC	30.2%	-5.6%	-29,500,000	-127,000,000	0.8961941	2513827591.50	4,118,600,000.00
Card Factory PLC	55.4%	14.6%	81,800,000	65,700,000	3.2889239	862337505.92	445,800,000.00
Clarkson PLC	5.8%	6.6%	45,600,000	35,700,000	1.6263838	656966979.67	601,400,000.00
CLS Holdings PLC	97.0%	5.4%	40,100,000	97,800,000	0.7107578	622908117.04	1,923,300,000.00
Cobham PLC	258.7%	-26.0%	134,700,000	-795,200,000	5.9744518	2795773124.09	2,794,600,000.00
Crest Nicholson Holdings PLC	28.5%	11.8%	153,800,000	156,800,000	1.6229695	1152389100.90	1,413,400,000.00
CYBG PLC	178.4%	-0.4%	-359,000,000	-164,000,000	0.7703437	2475230518.65	39,929,000,000.00
Dairy Crest Group PLC	401.1%	5.4%	20,600,000	33,100,000	12.154924	873898808.68	557,100,000.00
Dechra Pharmaceuticals PLC	60.3%	4.4%	77,426,000	26,105,000	4.1626175	1251551955.50	638,069,000.00

Domino's Pizza Group PLC	53.8%	29.5%	63,038,000	65,154,000	16.789204	1866818094.24	256,371,000.00
Drax Group PLC	15.7%	5.6%	190,800,000	193,900,000	0.7514775	1536905623.80	3,668,900,000.00
Entertainment One Ltd	71.1%	1.3%	34,000,000	11,700,000	1.4750528	989189564.42	1,901,000,000.00
esure Group PLC	45.2%	4.1%	-3,800,000	59,500,000	3.050317	842102497.08	1,484,800,000.00
FirstGroup PLC	87.1%	2.1%	520,400,000	112,300,000	0.6088173	1248567048.76	5,786,500,000.00
Galliford Try PLC	197.9%	1.8%	106,300,000	48,700,000	1.8594	1069983252.90	3,044,000,000.00
Genus PLC	34.6%	4.5%	34,600,000	32,800,000	2.7509726	1097940705.76	797,600,000.00
Great Portland Estates PLC	20.9%	-3.9%	-58,300,000	-139,400,000	0.721557	2299146306.06	3,464,800,000.00
Greencore Group PLC	127.1%	4.1%	115,300,000	47,400,000	4.3623686	1730668330.99	1,255,900,000.00
Greene King PLC	129.5%	2.7%	299,200,000	151,700,000	1.1107928	2162682648.58	5,615,000,000.00
Halfords Group PLC	25.1%	7.6%	72,100,000	56,400,000	1.7386941	727771289.96	776,200,000.00
Hikma Pharmaceuticals PLC	35.9%	4.5%	237,517,520	125,649,200	2.3402909	4542339290.76	3,536,822,320.00
Hiscox Ltd	15.2%	5.7%	62,251,966	368,727,980	1.5986293	2904506072.28	6,641,776,867.42
Hochschild Mining PLC	46.6%	4.2%	256,221,417	36,924,652	1.8568012	1069283733.08	1,179,258,274.00
HomeServe PLC	83.3%	7.0%	113,200,000	74,400,000	5.2174498	1923476430.80	1,180,400,000.00
Howden Joinery Group PLC	0.0%	25.9%	207,200,000	185,600,000	6.0763422	2412317226.37	747,800,000.00
Hunting PLC	6.0%	-8.7%	36,316,672	-93,791,048	1.1010401	1027466529.65	1,054,723,704.00
IMI PLC	66.7%	8.4%	251,600,000	130,800,000	5.2071598	2828521529.60	1,649,000,000.00
Inchcape PLC	57.6%	4.9%	271,600,000	184,400,000	2.1991586	2955453759.18	4,381,100,000.00
Inmarsat PLC	205.8%	5.4%	624,922,376	196,823,392	3.3344857	3397252024.67	3,926,172,712.00
Intermediate Capital Group PLC	367.1%	4.2%	-86,000,000	217,800,000	1.7322145	2030675437.00	6,076,200,000.00
Investec PLC	107.6%	1.1%	761,428,000	442,466,000	1.1590442	5300240248.89	53,534,832,000.00
IWG Plc	27.1%	5.6%	432,900,000	138,800,000	3.0570399	2268310418.76	2,661,100,000.00
J D Wetherspoon PLC	289.0%	4.1%	177,345,000	56,581,000	4.2299411	986175814.80	1,440,910,000.00
James Fisher and Sons PLC	49.6%	7.2%	43,761,000	39,753,000	3.0603117	782691748.80	555,503,000.00
Jardine Lloyd Thompson Group PLC	209.6%	3.7%	248,152,000	81,466,000	6.5715697	2156427889.22	2,625,127,000.00
John Laing Group PLC	15.9%	17.0%	-37,100,000	190,300,000	0.9560751	993627689.81	1,267,800,000.00

Jupiter Fund Management PLC	0.0%	17.2%	147,300,000	136,300,000	3.132583	2030356827.38	801,000,000.00
Kaz Minerals PLC	708.6%	3.8%	-79,442,720	143,483,280	3.7575222	1595583741.84	4,099,406,480.00
Kier Group PLC	127.1%	0.6%	149,900,000	14,800,000	2.6315739	1323199820.89	2,776,600,000.00
Lancashire Holdings Ltd	26.6%	5.6%	39,640,296	124,676,432	1.4350762	1387492408.40	2,234,042,776.00
Londonmetric Property PLC	46.3%	4.1%	50,791,000	62,998,000	1.0623036	976664662.79	1,542,979,000.00
Man Group PLC	8.9%	-8.4%	73,768,240	-215,630,240	1.4542638	1987346417.60	2,388,145,440.00
Meggitt PLC	55.1%	3.5%	321,800,000	171,200,000	1.4482181	3557345671.55	5,313,500,000.00
Merlin Entertainments PLC	87.1%	7.0%	433,000,000	211,000,000	3.2000799	4556920367.28	3,298,000,000.00
Metro Bank PLC	81.2%	-0.2%	1,168,902,000	-16,753,000	2.9219612	2349851283.00	10,057,288,000.00
Mitchells & Butlers PLC	154.3%	1.8%	222,000,000	89,000,000	0.737126	1037899573.03	4,965,000,000.00
National Express Group PLC	111.1%	3.9%	260,800,000	112,100,000	1.6353649	1810019597.98	3,434,900,000.00
OneSavings Bank PLC	8.8%	1.9%	-323,800,000	120,900,000	1.9637006	821617467.58	6,580,900,000.00
Pagegroup PLC	0.0%	17.0%	88,820,000	72,096,000	4.7188517	1272865814.28	456,398,000.00
Paragon Banking Group PLC	1,276.6%	0.9%	865,200,000	116,000,000	1.2001308	1156168481.02	13,518,400,000.00
Petrofac Ltd	217.0%	0.2%	527,726,640	810,640	3.411588	3005981771.43	6,680,484,240.00
Phoenix Group Holdings	61.1%	-0.1%	-1,897,000,000	-101,000,000	0.6505404	2887446154.95	85,999,000,000.00
Polymetal International PLC	140.5%	16.4%	429,639,200	320,202,800	4.569065	3661642989.90	2,212,236,560.00
Polypipe Group PLC	66.4%	7.4%	76,400,000	43,400,000	2.2345636	642226270.50	592,100,000.00
Provident Financial PLC	234.8%	9.9%	11,700,000	262,900,000	5.3283908	4209958895.45	2,826,600,000.00
Redrow PLC	10.9%	11.7%	128,000,000	253,000,000	1.2216653	1586441734.02	2,201,000,000.00
Renishaw PLC	0.0%	16.7%	115,255,000	102,886,000	4.1405901	1840094367.04	630,110,000.00
RPC Group PLC	74.2%	3.5%	276,500,000	132,000,000	2.2626174	3532533155.10	4,767,800,000.00
Savills PLC	8.8%	6.3%	93,300,000	66,900,000	2.4146097	979366787.38	1,147,400,000.00
Shaftesbury PLC	31.9%	3.1%	42,000,000	99,100,000	1.0607473	2536165285.38	3,307,800,000.00
SIG PLC	76.4%	-7.9%	70,300,000	-122,100,000	1.1326967	610387030.63	1,489,600,000.00
Softcat PLC	0.0%	16.0%	29,925,000	33,158,000	6.4763445	582740515.71	207,243,000.00

Spire Healthcare Group PLC	48.3%	3.2%	177,400,000	53,600,000	1.3082555	1354451857.41	1,724,400,000.00
Spirent Communications plc	0.0%	-7.7%	34,614,328	-34,290,072	2.1045646	604095114.40	412,291,504.00
Superdry PLC	0.0%	12.9%	62,300,000	66,000,000	3.5106671	1340496993.76	552,800,000.00
Synthomer PLC	82.1%	13.3%	136,600,000	110,400,000	3.9864548	1300383822.19	1,095,600,000.00
Talktalk Telecom Group PLC	622.1%	3.7%	232,000,000	58,000,000	15.739535	1615860000.00	1,563,000,000.00
Tate & Lyle PLC	52.0%	9.6%	298,000,000	255,000,000	2.4871687	3301752212.85	2,771,000,000.00
Ted Baker PLC	55.4%	12.2%	52,770,000	46,568,000	5.903319	1239974804.88	424,322,000.00
Thomas Cook Group plc	629.8%	0.0%	395,000,000	4,000,000	3.6470096	1339262347.55	6,943,000,000.00
TP ICAP PLC	28.8%	0.3%	58,600,000	43,200,000	0.5560182	2401056863.44	26,013,000,000.00
Travis Perkins PLC	23.7%	0.3%	367,400,000	12,700,000	1.3877075	3630314474.16	4,927,000,000.00
Tullow Oil PLC	224.5%	-5.4%	415,453,000	-486,302,936	1.6066862	2859585088.92	8,756,290,088.00
UDG Healthcare plc	38.0%	4.3%	57,296,894	52,496,141	2.557285	1654467080.21	1,079,331,570.98
Vesuvius PLC	44.0%	2.8%	83,900,000	46,700,000	1.0148544	1072108534.84	2,078,500,000.00
Victrex PLC	0.0%	18.3%	83,400,000	82,500,000	4.1224907	1653851004.35	472,700,000.00
Weir Group PLC	79.5%	1.3%	216,000,000	43,300,000	2.992694	4115254777.20	3,523,700,000.00
William Hill PLC	58.6%	6.9%	265,900,000	164,500,000	2.0311603	2488982162.52	2,442,700,000.00
Wizz Air Holdings PLC	3.5%	16.2%	263,910,418	208,819,436	1.24328	1026818287.11	1,439,920,366.11
Workspace Group PLC	16.8%	4.7%	53,400,000	88,700,000	0.8188382	1292518497.60	1,897,100,000.00

Table C: Board characteristics of companies that changed their auditors

Company Name	BOSIZ	BODIL	BOGDIV	EXEDIV	AUDCOMIND	B. Mem Comp.	BOSTR	BOMEMSKL	GEOCHAIRSEP	BOIND
Croda International PLC	8	7	25	0	100.00	491173	UNI	5.00	F	50
Aggreko PLC	11	6	27.3	25	100	646503	UNI	59.85	F	53.85
AO World plc	8	9	12.5	25	60	245001	UNI	37.5	F	37.5
BAE SYSTEMS PLC	11	11	27.27	0	100	1265007	UNI	63.64	F	54.55
Balfour Beatty PLC	9	11	11.11	0	100	498071	UNI	91.67	F	58.33
Berkeley Group Holdings (The) PLC	13	7	23.08	0	100	374052	UNI	76.92	T	53.85
BP PLC	15	13	20	8.3	100	2991814	UNI	31.25	F	81.25
British American Tobacco PLC	10	9	30	6.25	100	1682008	UNI	58.33	F	66.67
British Land Co PLC	12	10	16.67	14.29	100	890172	UNI	46.15	F	53.85
Brown (N.) Group PLC	10	8	30	33.33	100	582996	UNI	27.27	F	63.64
Bunzl PLC	9	8	11.11	15.38	100	699999	UNI	40	F	60
Close Brothers Group PLC	9	7	33.3	27.7	100	624819	UNI	100	F	44.44
Computacenter PLC	8	9	12.5	0	100	420700	UNI	66.67	F	55.56
Cranswick PLC	7	8	14.30	0	100.00	222,549.00	UNI	100	T	42.86
Devro PLC	6	7	16.7	14.29	100	1101005	UNI	57.14	F	14.29
Diageo PLC	11	7	36.36	5.88	100	1116996	UNI	36.36	F	63.64
Dignity PLC	9	8	22.2	0	100	353000	UNI	55.56	F	44.44
Dunelm Group plc	8	8	25	25	100	100000	UNI	62.5	F	50
Electrocomponents PLC	8	7	12.5	0	100	304998	UNI	50	F	75
Essentra plc	8	6	12.5	7.69	100	444001	UNI	50	F	40
Euromoney Institutional Investor PLC	15	6	13.33	25	50	204332	UNI	64.71	T	23.53
Go-Ahead Group PLC	6	7	16.7	7.69	100	326002	UNI	57.14	F	57.14
Grainger PLC	10	6	20	0	100	376997	UNI	36.36	F	45.45
Hammerson PLC	11	9	18.18	14.29	100	697002	UNI	66.67	F	58.33

Hargreaves Lansdown PLC	9	5	11.11	23.08	100	281666	UNI		F	44.44
Hays PLC	9	7	22.2	0	100	571500	UNI	80	F	70
HSBC Holdings PLC	16	8	37.5	18.18	100	3978001	UNI	80	F	80
Ibstock PLC	6	2	0	0	100	76249	UNI	50	F	33.33
Micro Focus International plc	8	9	12.5	20	83.33	412030	UNI	50	F	41.67
National Grid PLC	13	11	30.8	18.18	100	1173004	UNI		F	66.67
PayPoint plc	8	8	12.50	28.57	100.00	369002	UNI	63.64	F	45.45
Pennon Group PLC	8	11	25	0	100	476999	UNI	62.5	f	62.5
Premier Foods plc	7	15	28.6	0	100	553156	UNI	100	F	62.5
Premier Oil PLC	11	8	18.18	0	100	770797	UNI	66.67	F	58.33
PZ CUSSONS PLC	9	6	33.3	0	60	500759	UNI	55.56	F	33.33
QinetiQ Group plc	9	7	22.22	0	100	585524	UNI	33.33	F	77.78
Rotork PLC	9	9	11.11	8.39	100	320000	UNI	66.67	F	44.44
Royal Mail PLC	11	10	36.4	25	100	310002	UNI	63.64	F	45.45
SAGA PLC	9	6	22.2	23.08	100	496658	UNI	75	F	41.67
Sage Group PLC	7	7	14.29	16.67	100	668995	UNI	60	F	80
Sainsbury(J) PLC	10	8	30	27.27	100	895995	UNI	50	F	60
Schroders PLC	12	5	16.67	15.79	100	736136	UNI	66.67	F	46.15
SEGRO PLC	10	7	10	26.32	100	539002	UNI	81.82	F	54.55
Senior PLC	7	7	28.57	22.22	100.00	369002	UNI	50	F	75.00
Serco Group PLC	10	9	30	0	10	723647	UNI	63.64	F	54.55
Smith & Nephew Plc	12	8	25	27.27	100	1887373	UNI	66.67	F	75
Spectris PLC	9	7	22.2	14.29	100	1783005	UNI	50	F	40
Spirax-Sarco Engineering PLC	12	7	10	0	100	340000	UNI	70	F	50
St. Modwen Properties PLC	9	11	22.2	12.5	100	407003	UNI	81.82	F	54.55
Stagecoach Group PLC	10	6	20	0	100	666002	UNI	80	T	60
The Weir Group PLC	10	9	20	14.29	100	287230	UNI	36.36	F	63.64

Unite Group PLC	9	10	22.2	0	100	344218	UNI	60	F	50
Vodafone Group Plc	13	8	15.38	7.14	100	2408575	UNI	66.67	F	66.67
WH Smith PLC	7	9	28.6	0	100	331001	UNI	77.78	F	66.67
Whitbread PLC	12	10	25	16.67	100	774994	UNI	46.15	F	46.15

Table D: Board characteristics of companies that did not change their auditors

Company Name	BOMEMCOMP	BOMEMSKL	BOSTR	AUDCOMIND	BOSIZ	EXEDIV	BOGDIV	CEOCHAIRSEP	BODIL	BOIND	SIC
A.G.Barr PLC	458,689.00	77.78	Unitary	75.00	9	20.00	11.11	FALSE	6	50.00	4
Ascential PLC	413,256.00	77.78	Unitary	100.00	7	40.00	57.14	FALSE	7	44.44	9
Assura PLC	287,405.95	80.00	Unitary	33.33	5	33.33	20.00	FALSE	10	70.00	8
AVEVA Group PLC	491,667.40	77.78	Two-tier	100.00	7	25.00	14.29	FALSE	8	44.44	9
B&M European Value Retail SA	2,868,886.80	75.00	Unitary	100.00	8	0.00	12.50	FALSE	23	0.00	7
Babcock International Group PLC	752,884.30	83.33	Unitary	100.00	11	0.00	18.18	FALSE	8	38.46	7
Beazley PLC	26,351,369.00	58.33	Unitary	100.00	12	0.00	8.33	FALSE	6	77.78	8
Bellway PLC	540,240.32	71.43	Unitary	100.00	7	0.00	14.29	FALSE	7	100.00	8
Big Yellow Group PLC	254,036.25	55.56	Unitary	100.00	9	20.00	11.11	FALSE	7	62.50	8
Bodycote PLC	405,854.40	75.00	Unitary	100.00	7	25.00	14.29	FALSE	8	60.00	9
Bovis Homes Group PLC	367,955.00	71.43	Unitary	100.00	7	0.00	14.29	FALSE	9	66.67	7
Brewin Dolphin Holdings PLC	626,692.50	44.44	Unitary	66.67	8	33.33	37.50	FALSE	12	66.67	8
Britvic PLC	747,420.79	36.36	Unitary	100.00	9	9.09	22.22	FALSE	10	66.67	4
BTG PLC	723,846.50	55.56	Unitary	100.00	9	33.33	22.22	FALSE	7	25.00	4
Cairn Energy PLC	776,427.84	100.00	Unitary	100.00	9	0.00	11.11	FALSE	7	50.00	1
Capital & Counties Properties PLC	574,857.60	90.91	Unitary	100.00	10	20.00	10.00	FALSE	5	54.55	8
Card Factory PLC	352,156.00	85.71	Unitary	75.00	6	33.33	33.33	FALSE	9	28.57	7
Clarkson PLC	535,382.40	62.50	Unitary	33.33	8	0.00	0.00	FALSE	7	55.56	5
CLS Holdings PLC	313,919.40	35.71	Unitary	100.00	13	0.00	15.38	FALSE	7	80.00	8
Cobham PLC	845,016.00	58.33	Unitary	100.00	10	25.00	20.00	FALSE	10	37.50	4
Crest Nicholson Holdings PLC	345,224.40	83.33	Unitary	80.00	6	0.00	33.33	FALSE	13	50.00	8
CYBG PLC	2,025,397.50	52.94	Unitary	80.00	13	33.33	23.08	FALSE	13	64.71	8
Dairy Crest Group PLC	414,946.20	66.67	Unitary	75.00	6	0.00	16.67	FALSE	9	63.64	4
Dechra Pharmaceuticals PLC	339,609.00	75.00	Unitary	75.00	7	33.33	28.57	FALSE	6	33.33	4

Domino's Pizza Group PLC	807,453.00	77.78	Unitary	75.00	8	33.33	25.00	FALSE	8	54.55	9
Drax Group PLC	569,923.20	75.00	Unitary	100.00	7	14.29	14.29	FALSE	6	14.29	9
Entertainment One Ltd	733,693.80	54.55	Unitary	40.00	10	0.00	10.00	FALSE	6	62.50	7
esure Group PLC	1,818,125.37	91.67	Unitary	100.00	9	28.57	44.44	FALSE	6	50.00	8
FirstGroup PLC	897,375.00	45.45	Unitary	83.33	9	20.00	11.11	FALSE	10	83.33	5
Galliford Try PLC	332,950.00	55.56	Unitary	57.14	9	0.00	22.22	FALSE	8	50.00	3
Genus PLC	558,024.20	50.00	Unitary	40.00	8	25.00	12.50	TRUE	5	20.00	7
Great Portland Estates PLC	648,576.50	81.82	Unitary	60.00	9	33.33	22.22	FALSE	6	83.33	8
Greencore Group PLC	632,936.00	77.78	Unitary	50.00	8	10.00	25.00	FALSE	5	100.00	6
Greene King PLC	622,428.60	71.43	Unitary	100.00	7	33.33	14.29	FALSE	4	100.00	9
Halfords Group PLC	432,802.50	83.33	Unitary	100.00	6	33.33	50.00	TRUE	4	30.77	7
Hikma Pharmaceuticals PLC	981,945.60	58.33	Unitary	100.00	11	16.67	18.18	FALSE	7	20.00	8
Hiscox Ltd	1,492,654.77	54.55	Unitary	100.00	11	11.11	27.27	FALSE	11	83.33	8
Hochschild Mining PLC	1,802,457.40	75.00	Unitary	100.00	8	0.00	0.00	FALSE	5	0.00	2
HomeServe PLC	624,573.00	50.00	Unitary	100.00	8	12.50	12.50	FALSE	10	55.56	9
Howden Joinery Group PLC	680,866.00	66.67	Unitary	100.00	8	11.11	12.50	FALSE	5	100.00	4
Hunting PLC	2,485,704.00	57.14	Unitary	80.00	7	0.00	14.29	TRUE	7	57.14	4
IMI PLC	805,540.80	66.67	Unitary	100.00	9	0.00	22.22	FALSE	6	33.33	4
Inchcape PLC	960,974.40	72.73	Unitary	100.00	10	15.38	30.00	FALSE	9	62.50	7
Inmarsat PLC	1,220,153.76	76.92	Unitary	100.00	13	8.33	23.08	FALSE	7	77.78	9
Intermediate Capital Group PLC	713,057.80	88.89	Unitary	100.00	8	0.00	12.50	FALSE	8	88.89	8
Investec PLC	2,343,502.60	60.00	Unitary	100.00	15	0.00	20.00	FALSE	6	71.43	8
IWG Plc	616,800.00	37.50	Unitary	100.00	8	0.00	25.00	FALSE	9	54.55	8
J D Wetherspoon PLC	836,096.80	66.67	Unitary	100.00	8	12.50	37.50	FALSE	9	54.55	9
James Fisher and Sons PLC	551,419.20	57.14	Unitary	100.00	7	0.00	14.29	TRUE	10	20.00	5
Jardine Lloyd Thompson Group PLC	1,033,756.80	61.54	Unitary	83.33	11	6.25	9.09	FALSE	6	66.67	8
John Laing Group PLC	487,272.00	42.86	Unitary	100.00	7	20.00	14.29	FALSE	11	58.33	9

Jupiter Fund Management PLC	812,942.40	50.00	Unitary	85.71	9	20.00	55.56	FALSE	6	58.33	8
Kaz Minerals PLC	1,459,348.80	62.50	Unitary	75.00	8	25.00	12.50	FALSE	5	63.64	1
Kier Group PLC	624,614.20	75.00	Unitary	100.00	11	0.00	18.18	FALSE	6	72.73	3
Lancashire Holdings Ltd	1,537,476.39	50.00	Unitary	100.00	8	25.00	25.00	FALSE	8	50.00	8
Londonmetric Property PLC	870,623.00	41.67	Unitary	80.00	11	20.00	9.09	FALSE	7	100.00	8
Man Group PLC	1,318,157.11	75.00	Unitary	100.00	10	18.18	10.00	FALSE	7	77.78	8
Meggitt PLC	817,876.80	60.00	Unitary	80.00	10	20.00	20.00	FALSE	10	66.67	4
Merlin Entertainments PLC	671,078.40	90.00	Unitary	100.00	9	33.33	44.44	FALSE	10	40.00	9
Metro Bank PLC	1,080,942.00	90.00	Unitary	100.00	10	40.00	0.00	FALSE	9	0.00	8
Mitchells & Butlers PLC	862,372.00	61.54	Unitary	60.00	11	14.29	9.09	FALSE	4	83.33	9
National Express Group PLC	810,475.20	45.45	Unitary	100.00	11	33.33	18.18	FALSE	7	54.55	5
OneSavings Bank PLC	946,171.20	85.71	Unitary	50.00	12	18.18	25.00	FALSE	8	42.86	8
Pagegroup PLC	560,054.40	75.00	Unitary	100.00	8	12.50	37.50	FALSE	9	71.43	9
Paragon Banking Group PLC	695,460.00	75.00	Unitary	100.00	8	20.00	12.50	FALSE	8	44.44	8
Petrofac Ltd	5,261,304.00	58.33	Unitary	66.67	10	12.50	20.00	FALSE	19	76.92	9
Phoenix Group Holdings	1,518,561.60	69.23	Unitary	100.00	11	10.00	27.27	FALSE	8	75.00	8
Polymetal International PLC	2,015,697.10	44.44	Unitary	80.00	9	11.11	22.22	FALSE	7	44.44	2
Polypipe Group PLC	347,875.20	71.43	Unitary	50.00	6	0.00	16.67	FALSE	6	55.56	4
Provident Financial PLC	845,016.00	85.71	Unitary	100.00	7	0.00	28.57	TRUE	9	66.67	8
Redrow PLC	273,019.00	57.14	Unitary	40.00	7	25.00	42.86	FALSE	6	41.67	3
Renishaw PLC	234,396.80	66.67	Unitary	33.33	9	11.11	22.22	FALSE	10	50.00	4
RPC Group PLC	406,458.00	62.50	Unitary	100.00	7	0.00	28.57	FALSE	6	55.56	4
Savills PLC	612,994.69	50.00	Unitary	100.00	8	0.00	12.50	FALSE	11	37.50	8
Shaftesbury PLC	574,792.50	45.45	Unitary	100.00	11	33.33	27.27	FALSE	7	55.56	8
SIG PLC	614,574.60	37.50	Unitary	100.00	8	0.00	25.00	FALSE	4	85.71	6
Softcat PLC	310,164.02	66.67	Unitary	100.00	6	0.00	16.67	TRUE	9	45.45	9
Spire Healthcare Group PLC	525,020.16	63.64	Unitary	100.00	9	16.67	22.22	FALSE	8	57.14	9

Spirent Communications plc	549,727.40	66.67	Unitary	100.00	8	33.33	25.00	FALSE	11	57.14	5
Superdry PLC	2,904,757.39	50.00	Unitary	100.00	10	16.67	10.00	FALSE	8	50.00	7
Synthomer PLC	642,115.50	50.00	Unitary	66.67	9	0.00	11.11	FALSE	7	77.78	9
Talktalk Telecom Group PLC	1,082,593.20	41.67	Unitary	75.00	12	22.22	16.67	FALSE	7	50.00	9
Tate & Lyle PLC	890,695.00	30.77	Unitary	80.00	13	25.00	30.77	FALSE	7	71.43	4
Ted Baker PLC	276,012.00	66.67	Unitary	66.67	6	0.00	16.67	TRUE	8	44.44	6
Thomas Cook Group plc	957,555.00	44.44	Unitary	100.00	9	33.33	44.44	FALSE	6	100.00	9
TP ICAP PLC	562,445.50	55.56	Unitary	100.00	8	36.36	25.00	FALSE	11	33.33	8
Travis Perkins PLC	6,113,721.60	75.00	Unitary	50.00	8	23.08	25.00	FALSE	10	58.33	6
Tullow Oil PLC	989,964.00	50.00	Unitary	71.43	11	0.00	18.18	FALSE	7	63.64	2
UDG Healthcare plc	608,455.69	81.82	Unitary	100.00	10	0.00	30.00	FALSE	9	50.00	9
Vesuvius PLC	605,697.60	50.00	Unitary	100.00	7	0.00	14.29	FALSE	11	100.00	9
Victrex PLC	2,741,865.32	55.56	Unitary	100.00	9	25.00	33.33	FALSE	6	57.14	4
Weir Group PLC	423,462.00	36.36	Unitary	100.00	10	14.29	20.00	TRUE	18	37.50	4
William Hill PLC	808,527.97	50.00	Unitary	100.00	7	0.00	28.57	FALSE	4	100.00	9
Wizz Air Holdings PLC	520,094.37	50.00	Unitary	60.00	10	11.11	20.00	FALSE	9	57.14	5
Workspace Group PLC	483,233.40	57.14	Unitary	80.00	7	16.67	14.29	FALSE	6	66.67	8

Table E: Abnormal return using the Market Model

Company Name	day 20	day 19	day 18	day 17	day 16	day 15	day 14	day 13	day 12	day 11	day 10	day 9	day 8	day7	day 6	day 5	day 4	day 3	day 2	day 1	day 0	day -1	day -2	day -3
Aberdeen Asset Management PLC	0.0006	0.0052	-0.0113	-0.0039	-0.0050	-0.0131	-0.0108	-0.0036	-0.0138	-0.0154	-0.0230	-0.0013	-0.0092	-0.0097	-0.0090	-0.0117	-0.0070	0.0231	-0.0035	-0.0004	-0.0752	-0.0120	-0.0031	-0.0029
Acal PLC	-0.0155	-0.0050	-0.0008	-0.0057	-0.0044	-0.0122	-0.0024	-0.0115	-0.0084	-0.0261	-0.0113	-0.0107	-0.0041	-0.0218	-0.0099	-0.0148	-0.0255	-0.0053	-0.0179	-0.0007	-0.0004	-0.0018	-0.0051	-0.0164
Accesso Technology Group PLC	-0.0018	-0.0009	-0.0062	-0.0039	-0.0164	-0.0060	-0.0051	-0.0126	-0.0090	-0.0288	-0.0327	-0.0110	-0.0048	-0.0298	-0.0191	-0.0018	-0.0031	-0.0010	-0.0162	-0.0141	-0.0068	-0.0106	-0.0011	-0.0012
AFC Energy Plc	-0.0083	-0.0400	-0.0469	-0.0478	-0.0058	-0.0003	-0.0057	-0.0369	-0.1228	-0.0809	-0.0060	-0.1086	-0.1314	-0.0338	-0.0325	-0.0624	-0.0789	-0.3191	-0.0886	-0.0438	-0.0869	-0.0434	-0.1112	-0.0355
Aggreko PLC	-0.0089	-0.0293	-0.0461	-0.0152	-0.0315	-0.0063	-0.0177	-0.0125	-0.0080	-0.0117	-0.0175	-0.1233	-0.0109	-0.0158	-0.0083	-0.0013	-0.0073	-0.0143	-0.0028	-0.0150	-0.0007	-0.0070	-0.0032	-0.0007
AO World plc	-0.0047	-0.0183	-0.0112	-0.0201	-0.0190	-0.0139	-0.0196	-0.0194	-0.0008	-0.0148	-0.0268	-0.0078	-0.0207	-0.0162	-0.0930	-0.0142	-0.0096	-0.0004	-0.0154	-0.0158	-0.0034	-0.0124	-0.0271	-0.0438
Arrow Global Group PLC	-0.0134	-0.0110	-0.0004	-0.0060	-0.0006	-0.0036	-0.0048	-0.0098	-0.0044	-0.0060	-0.0163	-0.0017	-0.0080	-0.0105	-0.0049	-0.0167	-0.0140	-0.0052	-0.0121	-0.0135	-0.0000	-0.0091	-0.0216	-0.0223
Ashley (Laura) Hldgs PLC	-0.0004	-0.0037	-0.0039	-0.0037	-0.0043	-0.0693	-0.0788	-0.0688	-0.0687	-0.0671	-0.0711	-0.0001	-0.0015	-0.0673	-0.0012	-0.0037	-0.0043	-0.0022	-0.0024	-0.0016	-0.0056	-0.0038	-0.0019	-0.0568
Ashley (Laura) Hldgs PLC	-0.0022	-0.0380	-0.0258	-0.0313	-0.0154	-0.0181	-0.0411	-0.0398	-0.0092	-0.0055	-0.0064	-0.0164	-0.0158	-0.0445	-0.0015	-0.0014	-0.0056	-0.0061	-0.0132	-0.0165	-0.0099	-0.0022	-0.0051	-0.0265
AssetCo PLC	-0.0005	-0.0006	-0.0007	-0.0001	-0.0002	-0.0001	-0.0001	-0.0006	-0.0003	-0.0003	-0.0007	-0.0001	-0.0000	-0.0005	-0.0002	-0.0071	-0.0075	-0.0000	-0.0001	-0.0004	-0.0003	-0.0007	-0.0002	-0.0004
Avanti Capital PLC	-0.0022	-0.0025	-0.0021	-0.0202	-0.0016	-0.0019	-0.0023	-0.0161	-0.0025	-0.0025	-0.0025	-0.0029	-0.0015	-0.0023	-0.0027	-0.0574	-0.3348	-0.0019	-0.0492	-0.0023	-0.0023	-0.0703	-0.0021	-0.0018
BAE SYSTEMS PLC	-0.0098	-0.0230	-0.0118	-0.0106	-0.0147	-0.0097	-0.0036	-0.0097	-0.0023	-0.0015	-0.0119	-0.0088	-0.0121	-0.0001	-0.0024	-0.0011	-0.0001	-0.0012	-0.0056	-0.0059	-0.0006	-0.0055	-0.0066	-0.0013
Balfour Beatty PLC	-0.0061	-0.0023	-0.0006	-0.0144	-0.0058	-0.0201	-0.0059	-0.0030	-0.0005	-0.0051	-0.0061	-0.0019	-0.0015	-0.0037	-0.0030	-0.0095	-0.0014	-0.0186	-0.0413	-0.0277	-0.0032	-0.0121	-0.0012	-0.0193
Bankers Investment Trust PLC	-0.0081	-0.0038	-0.0019	-0.0014	-0.0096	-0.0118	-0.0044	-0.0056	-0.0078	-0.0010	-0.0028	-0.0028	-0.0084	-0.0148	-0.0003	-0.0087	-0.0027	-0.0013	-0.0005	-0.0112	-0.0010	-0.0101	-0.0024	-0.0001
Benchmark Holdings PLC	-0.0190	-0.0110	-0.0465	-0.0039	-0.0047	-0.0358	-0.0267	-0.0020	-0.0038	-0.0114	-0.0096	-0.0291	-0.0139	-0.0100	-0.0358	-0.0432	-0.0907	-0.0228	-0.0072	-0.0242	-0.0230	-0.0058	-0.0033	-0.0062
Berkeley Group Holdings (The) PLC	-0.0163	-0.0128	-0.0211	-0.0050	-0.0185	-0.0427	-0.0087	-0.0048	-0.0087	-0.0080	-0.0013	-0.0159	-0.0278	-0.0057	-0.0080	-0.0019	-0.0242	-0.0128	-0.0091	-0.0014	-0.0861	-0.0092	-0.0093	-0.0025
Blur Group PLC/MAISTRO PLC	-0.0009	-0.0326	-0.0509	-0.0685	-0.0085	-0.0090	-0.0017	-0.0226	-0.0010	-0.0013	-0.0173	-0.1377	-0.0049	-0.0242	-0.0080	-0.0640	-0.0065	-0.0001	-0.0367	-0.0203	-0.0689	-0.0057	-0.0020	-0.0014
Boxhill Technologies PLC	-0.0001	-0.0194	-0.0105	-0.0091	-0.0020	-0.1136	-0.0402	-0.0045	-0.0056	-0.0026	-0.0073	-0.0056	-0.0048	-0.0059	-0.2341	-0.0225	-0.0062	-0.0173	-0.0263	-0.0150	-0.0040	-0.0101	-0.0079	-0.0066
BP PLC	-0.0041	-0.0144	-0.0040	-0.0050	-0.0173	-0.0046	-0.0057	-0.0082	-0.0217	-0.0356	-0.0236	-0.0067	-0.0104	-0.0002	-0.0031	-0.0036	-0.0189	-0.0013	-0.0086	-0.0071	-0.0228	-0.0064	-0.0297	-0.0228
British American Tobacco PLC	-0.0021	-0.0014	-0.0081	-0.0093	-0.0073	-0.0247	-0.0032	-0.0027	-0.0108	-0.0121	-0.0009	-0.0140	-0.0032	-0.0005	-0.0124	-0.0205	-0.0091	-0.0029	-0.0007	-0.0004	-0.0122	-0.0122	-0.0098	-0.0392

British Land Company PLC	0.0012	-0.0082	-0.0010	-0.0022	-0.0061	-0.0052	-0.0136	-0.0117	-0.0054	-0.0083	-0.0005	-0.0024	-0.0067	-0.0086	-0.0024	-0.0089	-0.0093	-0.0188	-0.0028	-0.0111	-0.0072	-0.0053	-0.0143	-0.0060
British Smaller Companies VCT PLC FUND	-0.0006	-0.0004	-0.0002	-0.0003	-0.0004	-0.0004	-0.0003	-0.0060	-0.0004	-0.0005	-0.0004	-0.0002	-0.0003	-0.0005	-0.0004	-0.0004	-0.0006	-0.0003	-0.0003	-0.0197	-0.0003	-0.0003	-0.0003	-0.0006
Brown (N.) Group PLC	-0.0297	-0.0014	-0.0011	-0.0291	-0.0006	-0.0072	-0.0062	-0.0146	-0.0230	-0.0252	-0.0026	-0.0062	-0.0225	-0.0066	-0.0018	-0.0179	-0.0024	-0.0012	-0.0038	-0.0141	-0.0104	-0.0098	-0.0146	-0.0003
Bunzl PLC	-0.0032	-0.0133	-0.0102	-0.0031	-0.0013	-0.0057	-0.0080	-0.0088	-0.0097	-0.0033	-0.0041	-0.0023	-0.0016	-0.0061	-0.0056	-0.0030	-0.0053	-0.0133	-0.0014	-0.0054	-0.0056	-0.0039	-0.0050	-0.0139
Castings PLC	-0.0026	-0.0146	-0.0254	-0.0076	-0.0011	-0.0001	-0.0033	-0.0013	-0.0027	-0.0042	-0.0001	-0.0016	-0.0047	-0.0128	-0.0025	-0.0013	-0.0010	-0.0021	-0.0054	-0.0041	-0.0098	-0.0182	-0.0120	-0.0166
Catalyst Media Group PLC	-0.0009	-0.0006	-0.0011	-0.0004	-0.0009	-0.0003	-0.0006	-0.0003	-0.0007	-0.0005	-0.0007	-0.0009	-0.0009	-0.0010	-0.0008	-0.0009	-0.0007	-0.0009	-0.0007	-0.0503	-0.0649	-0.0150	-0.0322	-0.0307
Chamberlin PLC	-0.0018	-0.0009	-0.0027	-0.0023	-0.0220	-0.0027	-0.0026	-0.0106	-0.0016	-0.0011	-0.0014	-0.0027	-0.0026	-0.0025	-0.0008	-0.0005	-0.0175	-0.0798	-0.0071	-0.0063	-0.0009	-0.0032	-0.0039	-0.0034
Christie Group PLC	-0.0024	-0.0404	-0.0021	-0.0026	-0.0103	-0.0124	-0.0028	-0.0054	-0.0023	-0.0023	-0.0027	-0.0022	-0.0025	-0.0132	-0.0023	-0.0023	-0.0025	-0.0022	-0.0136	-0.0054	-0.0130	-0.0026	-0.0025	-0.0000
Close Brothers Group PLC	-0.0008	-0.0005	-0.0005	-0.0142	-0.0019	-0.0021	-0.0119	-0.0033	-0.0054	-0.0038	-0.0126	-0.0007	-0.0022	-0.0074	-0.0025	-0.0093	-0.0005	-0.0005	-0.0124	-0.0102	-0.0075	-0.0031	-0.0083	-0.0144
Computacenter PLC	-0.0271	-0.0190	-0.0142	-0.0073	-0.0004	-0.0104	-0.0246	-0.0042	-0.0259	-0.0026	-0.0168	-0.0074	-0.0128	-0.0029	-0.0064	-0.0141	-0.0030	-0.0037	-0.0143	-0.0065	-0.0217	-0.0056	-0.0079	-0.0157
Consort Medical PLC	-0.0023	-0.0025	-0.0022	-0.0020	-0.0107	-0.0035	-0.0165	-0.0015	-0.0031	-0.0099	-0.0132	-0.0422	-0.0354	-0.0069	-0.0339	-0.0066	-0.0094	-0.0058	-0.0024	-0.0164	-0.0051	-0.0042	-0.0033	-0.0186
Cranswick PLC	-0.0083	-0.0000	-0.0059	-0.0009	-0.0009	-0.0006	-0.0075	-0.0082	-0.0065	-0.0017	-0.0011	-0.0021	-0.0005	-0.0080	-0.0103	-0.0065	-0.0150	-0.0008	-0.0020	-0.0064	-0.0115	-0.0001	-0.0082	-0.0025
Creightons PLC	-0.0001	-0.0038	-0.0576	-0.0025	-0.0016	-0.0015	-0.0560	-0.0100	-0.0083	-0.0056	-0.0044	-0.0014	-0.0037	-0.0214	-0.0069	-0.0676	-0.0055	-0.0306	-0.1195	-0.0029	-0.0043	-0.0246	-0.0034	-0.0095
Croda International PLC	-0.0049	-0.0012	-0.0083	-0.0008	-0.0136	-0.0044	-0.0017	-0.0132	-0.0014	-0.0085	-0.0412	-0.0036	-0.0105	-0.0128	-0.0133	-0.0100	-0.0094	-0.0012	-0.0009	-0.0006	-0.0026	-0.0142	-0.0075	-0.0099
Daniel Stewart Securities PLC	-0.0241	-0.0083	-0.1888	-0.0202	-0.0066	-0.0087	-0.0009	-0.0045	-0.0052	-0.0125	-0.0057	-0.0043	-0.0655	-0.0058	-0.0016	-0.0383	-0.0028	-0.0101	-0.1579	-0.0026	-0.0021	-0.0009	-0.0049	-0.0004
Derwent London PLC	-0.0063	-0.0005	-0.0021	-0.0000	-0.0094	-0.0076	-0.0012	-0.0037	-0.0054	-0.0063	-0.0007	-0.0062	-0.0020	-0.0058	-0.0103	-0.0027	-0.0035	-0.0094	-0.0042	-0.0030	-0.0127	-0.0042	-0.0016	-0.0028
Devro PLC	-0.0078	-0.0050	-0.0067	-0.0108	-0.0136	-0.0125	-0.0030	-0.0023	-0.0025	-0.0015	-0.0065	-0.0018	-0.0128	-0.0074	-0.0034	-0.0074	-0.0011	-0.0006	-0.0077	-0.0029	-0.0243	-0.0353	-0.0029	-0.0082
Diageo PLC	-0.0047	-0.0117	-0.0126	-0.0053	-0.0147	-0.0034	-0.0046	-0.0257	-0.0119	-0.0008	-0.0108	-0.0003	-0.0125	-0.0019	-0.0051	-0.0070	-0.0018	-0.0006	-0.0100	-0.0013	-0.0034	-0.0146	-0.0044	-0.0106
Diamondcorp Plc	-0.0034	-0.0033	-0.0483	-0.0202	-0.0033	-0.0034	-0.0024	-0.0027	-0.0025	-0.0029	-0.0031	-0.0036	-0.0027	-0.0024	-0.0024	-0.0030	-0.0025	-0.0255	-0.0199	-0.0026	-0.0041	-0.0247	-0.0036	-0.0031
Dignity PLC	-0.0025	-0.0107	-0.0060	-0.0087	-0.0245	-0.0011	-0.0209	-0.0049	-0.0067	-0.0043	-0.0056	-0.0159	-0.0037	-0.0034	-0.0045	-0.0133	-0.0032	-0.0172	-0.0274	-0.0355	-0.0024	-0.0100	-0.0078	-0.0004
Dunelm Group plc	-0.0054	-0.0215	-0.0248	-0.0170	-0.0191	-0.0164	-0.0222	-0.0087	-0.0174	-0.0061	-0.0141	-0.0357	-0.0171	-0.0193	-0.0035	-0.0021	-0.0142	-0.0283	-0.0156	-0.0051	-0.0123	-0.0275	-0.0070	-0.0109
Electrocomponents PLC	-0.0026	-0.0042	-0.0179	-0.0010	-0.0126	-0.0017	-0.0048	-0.0047	-0.0098	-0.0009	-0.0019	-0.0007	-0.0071	-0.0014	-0.0065	-0.0144	-0.0189	-0.0031	-0.0079	-0.0025	-0.0070	-0.0078	-0.0168	-0.0482
Essentra plc	-0.0127	-0.0089	-0.0064	-0.0002	-0.0270	-0.0015	-0.0134	-0.0331	-0.2184	-0.0055	-0.0078	-0.0003	-0.0059	-0.0106	-0.0094	-0.0246	-0.0185	-0.0121	-0.0117	-0.0011	-0.0094	-0.0123	-0.0184	-0.0262

Euromoney Institutional Investor PLC	0.0145	-0.0179	-0.0362	-0.0223	-0.0065	-0.0293	-0.0102	-0.0291	-0.0008	-0.0525	-0.0148	-0.0005	-0.0091	-0.0263	-0.0391	-0.0010	-0.0083	-0.0144	-0.0154	-0.0005	-0.0025	-0.0006	-0.0004	-0.0023
Everyman Media Group PLC	0.0590	0.0425	0.0005	-0.0008	0.0012	0.0182	0.0005	0.0047	0.0007	0.0338	0.0104	0.0110	-0.0021	-0.0025	0.0014	0.0015	0.0024	-0.0113	0.0007	-0.0018	0.0066	-0.0008	0.0014	0.0002
GAME Digital PLC	-0.0461	0.0324	0.0395	0.0083	0.0009	0.0545	-0.0214	-0.0973	-0.0367	-0.0910	-0.0186	-0.0354	-0.0058	-0.0174	-0.0320	-0.0108	-0.0046	-0.0157	-0.0236	-0.0496	-0.0255	-0.0163	-0.0043	-0.0072
Go-Ahead Group PLC	-0.0123	-0.0085	0.0041	-0.0146	-0.0016	0.0007	-0.0065	-0.0187	-0.0019	-0.0005	0.0098	-0.0088	-0.0033	-0.0042	-0.0033	-0.0111	-0.0066	-0.0165	-0.0125	-0.0236	-0.0218	-0.0016	-0.0051	-0.0275
Grainger PLC	-0.0138	-0.0148	-0.0142	-0.0012	-0.0033	-0.0119	-0.0081	-0.0018	-0.0070	-0.0057	-0.0046	-0.0012	-0.0008	-0.0040	-0.0052	-0.0045	-0.0020	-0.0190	-0.0040	-0.0083	-0.0043	-0.0153	-0.0035	-0.0097
Hammerson PLC	-0.0193	-0.0127	-0.0029	-0.0013	-0.0006	-0.0203	-0.0027	-0.0018	-0.0021	-0.0062	-0.0046	-0.0021	-0.0033	-0.0019	-0.0208	-0.0078	-0.0003	-0.0049	-0.0123	-0.0287	-0.0047	-0.0098	-0.0023	-0.0074
Hargreaves Lansdown PLC	-0.0117	-0.0105	-0.0055	-0.0136	-0.0117	-0.0043	-0.0034	-0.0076	-0.0081	-0.0036	-0.0028	-0.0069	-0.0003	-0.0036	-0.0137	-0.0041	-0.0072	-0.0034	-0.0060	-0.0113	-0.0015	-0.0018	-0.0115	-0.0242
Hays PLC	-0.0078	-0.0032	-0.0132	-0.0060	-0.0016	-0.0440	-0.0037	-0.0099	-0.0056	-0.0040	-0.0040	-0.0026	-0.0046	-0.0027	-0.0127	-0.0108	-0.0037	-0.0012	-0.0121	-0.0098	-0.0059	-0.0090	-0.0079	-0.0003
Henderson Opportunities Trust PLC	-0.0037	-0.0049	-0.0016	-0.0069	-0.0051	-0.0065	-0.0052	-0.0045	-0.0045	-0.0099	-0.0005	-0.0032	-0.0001	-0.0064	-0.0034	-0.0052	-0.0054	-0.0084	-0.0004	-0.0060	-0.0002	-0.0075	-0.0033	-0.0012
HSBC Holdings PLC	-0.0007	-0.0068	-0.0039	-0.0020	-0.0148	-0.0063	-0.0218	-0.0003	-0.0050	-0.0001	-0.0085	-0.0063	-0.0080	-0.0030	-0.0142	-0.0161	-0.0001	-0.0086	-0.0096	-0.0058	-0.0085	-0.0169	-0.0019	-0.0013
Huntsworth PLC	-0.0145	-0.0776	-0.0470	-0.0142	-0.0290	-0.0258	-0.0275	-0.0669	-0.0255	-0.0153	-0.0131	-0.0394	-0.0004	-0.0002	-0.0048	-0.0165	-0.0296	-0.0482	-0.0125	-0.0269	-0.0129	-0.0248	-0.0447	-0.0385
hVIVO plc	-0.0303	-0.0404	-0.0017	-0.0016	-0.0130	-0.1032	-0.0087	-0.0347	-0.0054	-0.0214	-0.0303	-0.0395	-0.0021	-0.0018	-0.0319	-0.0108	-0.0016	-0.0467	-0.0188	-0.0135	-0.0378	-0.0045	-0.0387	-0.0144
Ibstock PLC	-0.0147	-0.0112	-0.0296	-0.0043	-0.0042	-0.0047	-0.0032	-0.0051	-0.0001	-0.0117	-0.0081	-0.0257	-0.0083	-0.0032	-0.0007	-0.0027	-0.0057	-0.0104	-0.0018	-0.0084	-0.0086	-0.0064	-0.0049	-0.0010
Image Scan Holdings PLC	-0.0074	-0.0250	-0.0210	-0.0765	-0.0592	-0.0008	-0.1469	-0.0241	-0.1566	-0.1359	-0.0180	-0.0026	-0.0986	-0.0936	-0.0207	-0.0332	-0.1342	-0.0220	-0.0566	-0.0253	-0.1336	-0.0022	-0.0020	-0.0372
Inland Homes PLC	-0.1074	-0.0297	-0.0008	-0.0310	-0.0015	-0.0157	-0.0164	-0.0184	-0.0235	-0.0297	-0.0531	-0.0178	-0.0092	-0.0078	-0.0127	-0.0019	-0.0010	-0.0054	-0.0070	-0.0014	-0.0001	-0.0017	-0.0014	-0.0150
Interserve PLC	-0.0120	-0.0003	-0.0050	-0.0107	-0.0160	-0.0006	-0.0036	-0.0042	-0.0052	-0.0065	-0.0092	-0.0091	-0.0126	-0.0018	-0.0109	-0.0530	-0.0122	-0.0235	-0.0053	-0.0186	-0.0069	-0.0169	-0.0153	-0.0314
IQE	-0.0055	-0.0271	-0.1125	-0.0082	-0.0308	-0.0148	-0.0189	-0.0119	-0.0259	-0.0165	-0.0654	-0.1151	-0.0695	-0.0284	-0.0092	-0.0228	-0.0431	-0.0000	-0.0179	-0.0306	-0.0571	-0.0037	-0.1045	-0.0404
JPMorgan Japan Smaller Co Tst PLC	-0.0026	-0.0069	-0.0069	-0.0053	-0.0051	-0.0056	-0.0052	-0.0114	-0.0025	-0.0046	-0.0099	-0.0174	-0.0105	-0.0065	-0.0062	-0.0084	-0.0053	-0.0036	-0.0058	-0.0006	-0.0181	-0.0142	-0.0009	-0.0159
JPMorgan Smaller Cos IT PLC	-0.0072	-0.0021	-0.0014	-0.0033	-0.0002	-0.0004	-0.0074	-0.0122	-0.0086	-0.0058	-0.0092	-0.0026	-0.0152	-0.0022	-0.0014	-0.0103	-0.0068	-0.0102	-0.0108	-0.0017	-0.0017	-0.0040	-0.0087	-0.0110
Martin Currie Global Portfolio Tst	-0.0038	-0.0109	-0.0088	-0.0166	-0.0064	-0.0151	-0.0029	-0.0129	-0.0061	-0.0196	-0.0045	-0.0059	-0.0032	-0.0076	-0.0019	-0.0039	-0.0009	-0.0034	-0.0048	-0.0029	-0.0123	-0.0133	-0.0126	-0.0005
Micro Focus International plc	-0.0026	-0.0014	-0.0155	-0.0630	-0.0066	-0.0039	-0.0030	-0.0222	-0.0001	-0.0141	-0.0116	-0.0002	-0.0110	-0.0162	-0.0128	-0.0134	-0.0213	-0.0044	-0.0184	-0.0111	-0.0094	-0.0228	-0.0124	-0.0017
Motif Bio PLC	-0.0167	-0.0676	-0.0411	-0.0134	-0.0031	-0.0401	-0.0128	-0.0294	-0.0334	-0.0232	-0.0180	-0.0106	-0.0307	-0.0047	-0.0288	-0.0608	-0.0492	-0.0320	-0.0216	-0.0628	-0.0027	-0.0344	-0.0352	-0.0354

National Grid PLC	0.0049	0.0026	0.0124	0.0053	0.0160	0.0054	0.0023	0.0149	0.0026	0.0202	0.0022	0.0047	0.0067	0.0082	0.0144	0.0038	0.0031	0.0003	0.0056	0.0189	0.0064	0.0168	0.0032	0.0395
NCC Group PLC	0.0112	0.0128	0.0130	0.0166	0.0378	0.0041	0.0222	0.0177	0.0169	0.0250	0.0250	0.0208	0.0174	0.0124	0.0140	0.0264	0.0043	0.0010	0.0023	0.0035	0.0035	0.0022	0.0065	0.0115
Octopus Apollo VCT plc	0.0008	0.0009	0.0283	0.0004	0.0005	0.0009	0.0097	0.0001	0.0007	0.0003	0.0002	0.0004	0.0001	0.0259	0.0012	0.0011	0.0003	0.0001	0.0028	0.0005	0.0006	0.0003	0.0009	0.0006
Outsourcery PLC	0.0070	0.0341	0.0078	0.0080	0.0130	0.0092	0.0074	0.0017	0.0066	0.0088	0.0010	0.0047	0.0713	0.0071	0.0020	0.0015	0.0011	0.0195	0.0081	0.0007	0.0064	0.0012	0.0057	0.0171
Palace Capital PLC	0.0151	0.0004	0.0009	0.0009	0.0012	0.0057	0.0004	0.0091	0.0005	0.0108	0.0001	0.0004	0.0010	0.0045	0.0012	0.0080	0.0002	0.0142	0.0222	0.0001	0.0264	0.0077	0.0010	0.0004
PayPoint plc	0.0051	0.0013	0.0007	0.0092	0.0027	0.0058	0.0067	0.0114	0.0038	0.0158	0.0015	0.0139	0.0028	0.0039	0.0145	0.0226	0.0024	0.0064	0.0096	0.0027	0.0061	0.0021	0.0000	0.0027
Pennon Group PLC	0.0017	0.0213	0.0046	0.0090	0.0035	0.0118	0.0023	0.0003	0.0115	0.0155	0.0057	0.0022	0.0065	0.0058	0.0027	0.0053	0.0087	0.0016	0.0156	0.0080	0.0069	0.0039	0.0112	0.0050
Porta Communications PLC	0.0361	0.0392	0.0990	0.0021	0.0007	0.0025	0.0016	0.0019	0.0630	0.0809	0.0175	0.0044	0.0013	0.0217	0.0033	0.0153	0.0020	0.0179	0.0155	0.0401	0.0345	0.0027	0.0017	0.0329
Porvair PLC	0.0016	0.0056	0.0106	0.0030	0.0211	0.0339	0.0024	0.0011	0.0030	0.0037	0.0034	0.0006	0.0038	0.0009	0.0022	0.0130	0.0029	0.0047	0.0003	0.0002	0.0035	0.0043	0.0092	0.0106
Premier Foods plc	0.0000	0.0049	0.0269	0.0114	0.0023	0.0077	0.0032	0.0257	0.0073	0.0100	0.0000	0.0032	0.0415	0.0147	0.0248	0.0092	0.0172	0.0072	0.0366	0.0150	0.0116	0.0197	0.0306	0.0037
Premier Oil PLC	0.0461	0.0028	0.0485	0.0288	0.1110	0.0454	0.0311	0.0107	0.0558	0.0328	0.0199	0.1196	0.1860	0.0546	0.0062	0.0146	0.0103	0.0078	0.0087	0.0523	0.0180	0.0249	0.0043	0.1294
Premier Veterinary Group PLC	0.0058	0.0562	0.0137	0.0109	0.0071	0.0906	0.0059	0.0009	0.0492	0.0078	0.0138	0.0390	0.0137	0.0470	0.0568	0.0413	0.0019	0.0379	0.0039	0.0201	0.0325	0.0650	0.0077	0.6794
Proton Power Systems PLC	0.0011	0.0015	0.0019	0.0046	0.0047	0.1004	0.0464	0.1412	0.0210	0.0049	0.0011	0.0038	0.0016	0.0006	0.0002	0.0258	0.0008	0.0305	0.0030	0.0001	0.0976	0.0351	0.0010	0.0046
Proton Power Systems PLC	0.1193	0.0621	0.0713	0.0718	0.0018	0.0031	0.0004	0.0007	0.0001	0.0009	0.0694	0.0008	0.0719	0.0011	0.0607	0.0023	0.0009	0.0014	0.0006	0.0001	0.0001	0.0006	0.0003	0.0008
PZ CUSSONS PLC	0.0025	0.0056	0.0037	0.0060	0.0020	0.0012	0.0274	0.0113	0.0003	0.0074	0.0029	0.0075	0.0035	0.0069	0.0031	0.0084	0.0034	0.0003	0.0020	0.0052	0.0088	0.0101	0.0021	0.0071
QinetiQ Group plc	0.0036	0.0022	0.0015	0.0084	0.0013	0.0188	0.0010	0.0022	0.0045	0.0007	0.0093	0.0101	0.0141	0.0037	0.0030	0.0019	0.0142	0.0036	0.0028	0.0105	0.0022	0.0167	0.0045	0.0037
Quarto Group Inc	0.0023	0.0010	0.0011	0.0009	0.0109	0.0010	0.0009	0.0010	0.0011	0.0011	0.0010	0.0009	0.0010	0.0010	0.0110	0.0009	0.0043	0.0009	0.0008	0.0010	0.0009	0.0011	0.0011	0.0010
Regal Petroleum PLC	0.0694	0.0754	0.1073	0.0974	0.0685	0.0873	0.0932	0.0884	0.0088	0.0074	0.0011	0.0030	0.0101	0.0085	0.0027	0.0066	0.0098	0.0002	0.0071	0.0434	0.1154	0.0236	0.1087	0.0723
Rose Petroleum PLC	0.1042	0.0277	0.0900	0.0235	0.0132	0.0327	0.0053	0.0001	0.1822	0.0878	0.0117	0.0810	0.0598	0.0159	0.0010	0.0240	0.0015	0.0780	0.0328	0.0345	0.0512	0.0600	0.0379	0.0078
Rosslyn Data Technologies PLC	0.0023	0.0023	0.0213	0.0023	0.0023	0.0023	0.0023	0.0415	0.0432	0.0127	0.0343	0.1487	0.0023	0.0434	0.0241	0.0731	0.0602	0.0023	0.0275	0.0267	0.0023	0.0023	0.0023	0.0023
Rotork PLC	0.0126	0.0047	0.0009	0.0047	0.0037	0.0009	0.0048	0.0152	0.0007	0.0084	0.0044	0.0051	0.0085	0.0038	0.0063	0.0027	0.0114	0.0022	0.0004	0.0067	0.0067	0.0019	0.0041	0.0102
Royal Mail PLC	0.0121	0.0012	0.0079	0.0001	0.0058	0.0186	0.0145	0.0060	0.0065	0.0402	0.0085	0.0148	0.0211	0.0137	0.0033	0.0047	0.0059	0.0153	0.0089	0.0008	0.0079	0.0089	0.0075	0.0029

RWS Holdings PLC	0.0195	-0.0433	0.0030	0.0346	-0.0083	0.0582	0.0568	0.0520	0.0144	0.0070	0.0257	0.0250	-0.0008	-0.0036	0.0032	0.0290	-0.0696	-0.0052	-0.0110	-0.0031	0.0151	-0.0538	0.0362	-0.0272
Safestore Holdings plc	0.0195	-0.0082	0.0327	0.0429	-0.0073	0.0413	0.0122	-0.0316	-0.0060	0.0060	-0.0143	0.0127	-0.0201	-0.0146	-0.0134	0.0115	-0.0020	-0.0021	0.0144	-0.0175	-0.0001	-0.0097	0.0077	-0.0032
SAGA PLC	0.0071	-0.0110	-0.0036	0.0030	-0.0013	-0.0024	0.0060	-0.0027	-0.0040	-0.0083	-0.0044	0.0098	-0.0078	-0.0008	0.0030	-0.0122	-0.0096	-0.0072	-0.0009	-0.0035	-0.0026	-0.0079	0.0013	-0.0000
Sage Group PLC	-0.0003	0.0002	0.0068	-0.0030	-0.0065	-0.0056	-0.0054	0.0013	-0.0030	-0.0071	-0.0135	-0.0323	-0.0123	-0.0071	-0.0028	-0.0031	-0.0043	-0.0007	-0.0021	-0.0047	-0.0072	-0.0082	-0.0132	-0.0022
Sainsbury(J) PLC	-0.0139	-0.0173	-0.0021	-0.0136	-0.0038	-0.0049	-0.0027	-0.0193	-0.0047	-0.0441	-0.0253	-0.0115	-0.0310	-0.0193	-0.0036	-0.0102	-0.0133	-0.0201	-0.0054	-0.0068	-0.0079	-0.0480	-0.0034	-0.0263
Schroders PLC	-0.0094	-0.0066	-0.0025	-0.0123	-0.0001	-0.0152	-0.0139	-0.0036	-0.0111	-0.0277	-0.0035	-0.0003	-0.0028	-0.0083	-0.0084	-0.0112	-0.0158	-0.0083	-0.0010	-0.0037	-0.0134	-0.0163	-0.0000	-0.0020
Scottish Oriental Smaller Companies Trust PLC	-0.0006	-0.0032	-0.0061	-0.0030	-0.0032	-0.0135	-0.0086	-0.0032	-0.0019	-0.0086	-0.0040	-0.0002	-0.0030	-0.0028	-0.0022	-0.0053	-0.0025	-0.0044	-0.0071	-0.0056	-0.0014	-0.0053	-0.0031	-0.0078
Secure Trust Bank PLC	-0.0040	-0.0051	-0.0029	-0.0011	-0.0040	-0.0016	-0.0051	-0.0062	-0.0011	-0.0082	-0.0043	-0.0068	-0.0043	-0.0026	-0.0034	-0.0066	-0.0009	-0.0013	-0.0132	-0.0051	-0.0112	-0.0055	-0.0025	-0.0004
SEGRO PLC	-0.0039	-0.0053	-0.0042	-0.0091	-0.0063	-0.0029	-0.0031	-0.0039	-0.0034	-0.0030	-0.0047	-0.0080	-0.0089	-0.0032	-0.0010	-0.0110	-0.0017	-0.0033	-0.0021	-0.0012	-0.0109	-0.0005	-0.0097	-0.0012
Senior PLC	-0.0067	-0.0386	-0.0096	-0.0145	-0.0031	-0.0002	-0.0071	-0.0538	-0.0060	-0.0160	-0.0036	-0.0164	-0.0004	-0.0230	-0.0003	-0.0119	-0.0082	-0.0140	-0.0200	-0.0006	-0.0060	-0.0062	-0.0114	-0.0108
Serco Group PLC	-0.0033	-0.0575	-0.0015	-0.0068	-0.0020	-0.0235	-0.0237	-0.0227	-0.0030	-0.0221	-0.0045	-0.0131	-0.0047	-0.0200	-0.0071	-0.0291	-0.0092	-0.0076	-0.0177	-0.0025	-0.0301	-0.0150	-0.1087	-0.0073
Share PLC	-0.0356	-0.0366	-0.1004	-0.0016	-0.0018	-0.0011	-0.0025	-0.0020	-0.0155	-0.0016	-0.0013	-0.0013	-0.0142	-0.0020	-0.0008	-0.0022	-0.0022	-0.0023	-0.0012	-0.0018	-0.0023	-0.0015	-0.0003	-0.0015
Smith & Nephew Plc	-0.0159	-0.0201	-0.0400	-0.0049	-0.0062	-0.0397	-0.0029	-0.0077	-0.0049	-0.0213	-0.0075	-0.0046	-0.0065	-0.0052	-0.0081	-0.0142	-0.0004	-0.0016	-0.0070	-0.0078	-0.0014	-0.0029	-0.0076	-0.0069
Spectris PLC	-0.0028	-0.0028	-0.0078	-0.0057	-0.0007	-0.0118	-0.0023	-0.0318	-0.0006	-0.0092	-0.0077	-0.0028	-0.0063	-0.0095	-0.0175	-0.0152	-0.0107	-0.0006	-0.0073	-0.0065	-0.0058	-0.0020	-0.0031	-0.0032
Spirax-Sarco Engineering PLC	-0.0160	-0.0012	-0.0232	-0.0003	-0.0114	-0.0054	-0.0002	-0.0069	-0.0051	-0.0012	-0.0034	-0.0001	-0.0007	-0.0043	-0.0005	-0.0082	-0.0172	-0.0065	-0.0019	-0.0008	-0.0053	-0.0003	-0.0082	-0.0120
St Modwen Properties PLC	-0.0108	-0.0035	-0.0234	-0.0016	-0.0233	-0.0132	-0.0114	-0.0207	-0.0154	-0.0044	-0.0107	-0.0101	-0.0092	-0.0115	-0.0115	-0.0143	-0.0102	-0.0193	-0.0041	-0.0213	-0.0204	-0.0066	-0.0370	-0.0323
Stagecoach Group PLC	-0.0053	-0.0013	-0.0036	-0.0088	-0.0142	-0.0076	-0.0075	-0.0107	-0.0163	-0.0139	-0.0056	-0.0021	-0.0036	-0.0083	-0.0015	-0.0124	-0.0048	-0.0033	-0.0035	-0.0075	-0.0066	-0.0123	-0.0112	-0.0138
Sutton Harbour Holdings PLC	-0.0298	-0.0008	-0.0973	-0.0365	-0.0004	-0.0068	-0.0004	-0.0006	-0.0020	-0.0091	-0.0030	-0.0095	-0.0165	-0.0249	-0.0015	-0.0171	-0.0160	-0.0267	-0.0346	-0.0258	-0.0014	-0.0023	-0.0316	-0.0012
Telecom Plus PLC	-0.0033	-0.0042	-0.0047	-0.0109	-0.0063	-0.0001	-0.0247	-0.0088	-0.0141	-0.0041	-0.0152	-0.0017	-0.0132	-0.0031	-0.0082	-0.0056	-0.0439	-0.0309	-0.0268	-0.0026	-0.0153	-0.0070	-0.0257	-0.0167
Telit Communications PLC	-0.0180	-0.0053	-0.0060	-0.0295	-0.0178	-0.0580	-0.0092	-0.0186	-0.0887	-0.0169	-0.0558	-0.0611	-0.0647	-0.0272	-0.0009	-0.0062	-0.0026	-0.0533	-0.0830	-0.0038	-0.0007	-0.0030	-0.0019	-0.0126
Tertiary Minerals PLC	-0.0196	-0.0042	-0.0178	-0.0043	-0.0046	-0.0032	-0.0174	-0.0048	-0.0040	-0.0049	-0.0044	-0.0385	-0.0479	-0.0041	-0.0039	-0.0390	-0.0040	-0.0249	-0.0035	-0.0384	-0.0037	-0.0045	-0.0166	-0.0161
The Weir Group PLC	-0.0109	-0.0444	-0.0175	-0.0764	-0.0416	-0.0233	-0.0315	-0.0080	-0.0304	-0.0104	-0.0450	-0.0006	-0.0071	-0.0131	-0.0124	-0.0247	-0.0018	-0.0484	-0.0035	-0.0257	-0.0375	-0.0010	-0.0195	-0.0071
Trans-Siberian Gold PLC	-0.0009	-0.0008	-0.0228	-0.0239	-0.0003	-0.0227	-0.0468	-0.0007	-0.0010	-0.0015	-0.0002	-0.0219	-0.0248	-0.0021	-0.0003	-0.0013	-0.0241	-0.0004	-0.0228	-0.0005	-0.0228	-0.0238	-0.0004	-0.0245

Tribal Group PLC	-0.0302	0.0069	0.0025	-0.0216	-0.0054	0.0111	0.0137	-0.0128	-0.0205	0.0001	-0.0352	-0.0132	-0.0234	-0.0447	0.0037	-0.0439	0.0243	-0.0306	0.0289	-0.0748	-0.0285	0.0088	-0.0253	0.0016
Unite Group PLC	-0.0112	0.0094	-0.0046	0.0089	-0.0067	0.0127	-0.0046	-0.0054	-0.0034	0.0029	0.0063	-0.0071	-0.0096	0.0044	-0.0087	-0.0211	0.0009	0.0003	-0.0066	0.0093	0.0146	0.0004	-0.0015	-0.0161
Upland Resources Limited	-0.0169	-0.0377	-0.0101	-0.0622	-0.0591	-0.1296	-0.0074	-0.0011	-0.0037	-0.0004	-0.0736	-0.0008	-0.0003	-0.0743	-0.0035	-0.0037	-0.0019	-0.0007	-0.0047	-0.0005	-0.0039	-0.0009	-0.0025	-0.0784
Vedanta Resources PLC	-0.0153	-0.0002	-0.0497	-0.0050	-0.0029	-0.0099	-0.0139	-0.0349	-0.0537	-0.0310	-0.0446	-0.0214	-0.0152	-0.0141	-0.0050	-0.0055	-0.0448	-0.0058	-0.0070	-0.0181	-0.0674	-0.0226	-0.0492	-0.0182
Versarien PLC	-0.0003	-0.0014	-0.0014	-0.0010	-0.0002	-0.0127	-0.0127	-0.0011	-0.0479	-0.0013	-0.0013	-0.0007	-0.0000	-0.0000	-0.0004	-0.0015	-0.0007	-0.0008	-0.0020	-0.0032	-0.0014	-0.0006	-0.0022	-0.0012
Virgin Money Holdings (UK) PLC	-0.0017	-0.0609	-0.0097	-0.0154	-0.0012	-0.0083	-0.0007	-0.0191	-0.0160	-0.0058	-0.0087	-0.0078	-0.0047	-0.0178	-0.0003	-0.0071	-0.0174	-0.0020	-0.0036	-0.0021	-0.0189	-0.0059	-0.0007	-0.0176
Vodafone Group Plc	-0.0161	-0.0219	-0.0182	-0.0316	-0.0301	-0.0012	-0.0070	-0.0062	-0.0051	-0.0014	-0.0039	-0.0043	-0.0208	-0.0361	-0.0251	-0.0264	-0.0034	-0.0021	-0.0118	-0.0184	-0.0046	-0.0024	-0.0107	-0.0024
WH Smith PLC	-0.0205	-0.0030	-0.0056	-0.0155	-0.0021	-0.0013	-0.0254	-0.0041	-0.0021	-0.0071	-0.0032	-0.0106	-0.0270	-0.0139	-0.0070	-0.0030	-0.0141	-0.0036	-0.0227	-0.0064	-0.0038	-0.0108	-0.0014	-0.0144
Whitbread PLC	-0.0124	-0.0084	-0.0045	-0.0041	-0.0071	-0.0064	-0.0040	-0.0053	-0.0008	-0.0026	-0.0058	-0.0170	-0.0061	-0.0019	-0.0079	-0.0006	-0.0026	-0.0100	-0.0035	-0.0077	-0.0092	-0.0038	-0.0039	-0.0077
Zegona Communications PLC	-0.0023	-0.0065	-0.0027	-0.0104	-0.0026	-0.0019	-0.0025	-0.0025	-0.0071	-0.0303	-0.0024	-0.0020	-0.0021	-0.0102	-0.0063	-0.0020	-0.0140	-0.0099	-0.0021	-0.0067	-0.0318	-0.0025	-0.0028	-0.0019

Table F: Abnormal return using the Mean-Adjusted Return

Company Name	day20	day19	day18	day17	day16	day15	day14	day13	day12	day 11	day10	day 9	day 8	day7	day 6	day 5	day 4	day 3	day 2	day 1	day 0	day -1	day -2	day -3
Aberdeen Asset Management PLC	-0.0130	-0.0131	-0.0111	-0.0054	0.0066	0.0007	0.0083	-0.0116	-0.0058	0.0076	-0.0258	-0.0041	0.0045	-0.0108	0.0033	-0.0115	0.0027	0.0326	0.0231	-0.0098	0.0778	0.0214	0.0006	0.0013
Acal PLC	-0.0149	0.0062	0.0027	0.0035	0.0027	0.0124	0.0046	0.0092	-0.0027	0.0293	0.0094	0.0126	-0.0027	0.0247	0.0136	-0.0147	0.0227	-0.0035	0.0135	0.0027	0.0027	0.0027	0.0027	0.0190
Accesso Technology Group PLC	-0.0013	0.0013	0.0044	0.0038	-0.0163	0.0031	-0.0050	0.0113	0.0070	0.0245	0.0284	-0.0096	0.0013	0.0265	0.0219	-0.0013	0.0099	0.0007	0.0202	-0.0147	0.0122	0.0008	0.0022	-0.0033
AFC Energy Plc	0.0044	-0.0421	0.0401	-0.0488	0.0044	0.0044	0.0044	-0.0401	-0.1182	0.0844	0.0044	-0.1134	-0.1222	-0.0364	-0.0348	-0.0697	0.0785	0.3181	-0.0957	-0.0421	-0.0826	-0.0364	-0.1089	0.0307
Aggreko PLC	-0.0133	-0.0336	0.0477	-0.0168	-0.0288	0.0057	-0.0109	0.0124	-0.0025	0.0170	-0.0284	-0.1290	-0.0124	-0.0210	0.0069	-0.0022	-0.0079	0.0198	-0.0033	-0.0118	-0.0091	-0.0155	-0.0114	0.0056
AO World plc	-0.0053	-0.0280	-0.0044	-0.0030	-0.0005	-0.0081	-0.0131	-0.0313	-0.0012	-0.0163	-0.0114	-0.0100	-0.0290	-0.0106	-0.0949	-0.0055	-0.0069	-0.0115	-0.0208	-0.0132	-0.0017	-0.0045	-0.0169	-0.0202
Arrow Global Group PLC	-0.0155	-0.0134	-0.0031	-0.0040	-0.0002	-0.0010	-0.0011	-0.0073	-0.0043	-0.0044	-0.0220	-0.0032	-0.0125	-0.0109	-0.0088	-0.0131	-0.0224	-0.0107	-0.0128	-0.0181	-0.0019	-0.0132	-0.0231	-0.0235
Ashley (Laura) Hldgs PLC	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0663	-0.0717	-0.0663	-0.0717	-0.0663	-0.0717	-0.0027	-0.0027	-0.0663	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0027	-0.0618
Ashley (Laura) Hldgs PLC	-0.0025	-0.0387	-0.0258	-0.0311	-0.0152	-0.0181	-0.0419	-0.0404	-0.0091	-0.0061	-0.0062	-0.0167	-0.0165	-0.0453	-0.0015	-0.0015	-0.0057	-0.0058	-0.0131	-0.0161	-0.0095	-0.0022	-0.0051	-0.0268
AssetCo PLC	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0077	-0.0078	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
Avanti Capital PLC	-0.0021	-0.0021	-0.0021	-0.0201	-0.0021	-0.0021	-0.0021	-0.0159	-0.0021	-0.0021	-0.0021	-0.0021	-0.0021	-0.0021	-0.0021	-0.0572	-0.3348	-0.0021	-0.0492	-0.0021	-0.0021	-0.0702	-0.0021	-0.0021
BAE SYSTEMS PLC	-0.0155	-0.0233	-0.0104	-0.0096	-0.0023	-0.0016	-0.0051	-0.0106	-0.0001	-0.0014	-0.0137	-0.0086	-0.0125	-0.0006	-0.0017	-0.0064	-0.0053	-0.0077	-0.0111	-0.0077	-0.0022	-0.0002	-0.0045	-0.0048
Balfour Beatty PLC	-0.0006	-0.0047	-0.0132	-0.0244	-0.0035	-0.0297	-0.0091	-0.0037	-0.0036	-0.0048	-0.0036	-0.0006	-0.0006	-0.0036	-0.0078	-0.0048	-0.0160	-0.0198	-0.0502	-0.0263	-0.0093	-0.0050	-0.0038	-0.0211
Bankers Investment Trust PLC	-0.0072	-0.0074	-0.0028	-0.0072	-0.0161	-0.0145	-0.0074	-0.0014	-0.0103	-0.0001	-0.0015	-0.0060	-0.0133	-0.0192	-0.0090	-0.0091	-0.0045	-0.0060	-0.0031	-0.0181	-0.0015	-0.0090	-0.0029	-0.0000
Benchmark Holdings PLC	-0.0028	-0.0335	-0.0517	-0.0051	-0.0051	-0.0456	-0.0193	-0.0029	-0.0051	-0.0051	-0.0051	-0.0341	-0.0129	-0.0102	-0.0362	-0.0453	-0.0907	-0.0232	-0.0051	-0.0235	-0.0238	-0.0051	-0.0051	-0.0042
Berkeley Group Holdings (The) PLC	-0.0255	-0.0113	-0.0238	-0.0166	-0.0214	-0.0461	-0.0068	-0.0062	-0.0130	-0.0043	-0.0063	-0.0116	-0.0263	-0.0112	-0.0106	-0.0039	-0.0005	-0.0156	-0.0076	-0.0101	-0.1058	-0.0062	-0.0051	-0.0269
Blur Group PLC/MAISTRO PLC	-0.0012	-0.0315	-0.0512	-0.0692	-0.0091	-0.0091	-0.0012	-0.0223	-0.0012	-0.0012	-0.0169	-0.1382	-0.0056	-0.0256	-0.0079	-0.0631	-0.0058	-0.0012	-0.0371	-0.0204	-0.0677	-0.0054	-0.0012	-0.0012
Boxhill Technologies PLC	-0.0026	-0.0026	-0.0026	-0.0026	-0.0026	-0.1107	-0.0325	-0.0026	-0.0026	-0.0026	-0.0026	-0.0026	-0.0026	-0.0026	-0.2410	-0.0241	-0.0026	-0.0026	-0.0293	-0.0026	-0.0026	-0.0026	-0.0026	-0.0026
BP PLC	-0.0033	-0.0132	-0.0035	-0.0056	-0.0193	-0.0048	-0.0055	-0.0091	-0.0210	-0.0357	-0.0235	-0.0078	-0.0103	-0.0003	-0.0023	-0.0018	-0.0172	-0.0007	-0.0101	-0.0083	-0.0239	-0.0062	-0.0323	-0.0221
British American Tobacco PLC	-0.0051	-0.0076	-0.0007	-0.0109	-0.0048	-0.0137	-0.0037	-0.0042	-0.0146	-0.0231	-0.0116	-0.0116	-0.0150	-0.0108	-0.0142	-0.0299	-0.0119	-0.0051	-0.0193	-0.0067	-0.0107	-0.0126	-0.0030	-0.0343
British Land Company PLC	-0.0004	-0.0047	-0.0054	-0.0025	-0.0054	-0.0099	-0.0205	-0.0078	-0.0092	-0.0092	-0.0086	-0.0042	-0.0102	-0.0043	-0.0028	-0.0109	-0.0012	-0.0214	-0.0027	-0.0137	-0.0176	-0.0063	-0.0033	-0.0048
British Smaller Companies VCT PLC FUND	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0060	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0199	-0.0003	-0.0003	-0.0003	-0.0003
Brown (N.) Group PLC	-0.0366	-0.0025	-0.0120	-0.0351	-0.0007	-0.0032	-0.0091	-0.0071	-0.0231	-0.0231	-0.0004	-0.0068	-0.0123	-0.0002	-0.0033	-0.0249	-0.0002	-0.0020	-0.0114	-0.0060	-0.0096	-0.0089	-0.0164	-0.0041
Bunzl PLC	-0.0047	-0.0072	-0.0156	-0.0178	-0.0028	-0.0117	-0.0086	-0.0098	-0.0009	-0.0032	-0.0045	-0.0032	-0.0015	-0.0038	-0.0050	-0.0009	-0.0010	-0.0122	-0.0045	-0.0021	-0.0082	-0.0051	-0.0158	-0.0032
Castings PLC	-0.0031	-0.0175	-0.0254	-0.0086	-0.0003	-0.0003	-0.0015	-0.0015	-0.0000	-0.0036	-0.0003	-0.0018	-0.0045	-0.0113	-0.0017	-0.0000	-0.0030	-0.0029	-0.0044	-0.0074	-0.0095	-0.0178	-0.0106	-0.0177

Catalyst Media Group PLC	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0503	0.0648	0.0150	0.0325	0.0310
Chamberlin PLC	0.0022	0.0022	0.0022	0.0022	0.0233	0.0022	0.0022	0.0126	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0176	0.0770	0.0077	0.0088	0.0022	0.0022	0.0022
Christie Group PLC	0.0025	0.0403	0.0025	0.0025	0.0099	0.0123	0.0025	0.0050	0.0025	0.0025	0.0025	0.0025	0.0025	0.0126	0.0025	0.0025	0.0025	0.0025	0.0129	0.0053	0.0132	0.0025	0.0025	0.0025
Close Brothers Group PLC	0.0026	0.0124	0.0221	0.0097	0.0096	0.0033	0.0116	0.0020	0.0064	0.0153	0.0201	0.0007	0.0030	0.0094	0.0001	0.0075	0.0007	0.0001	0.0117	0.0063	0.0026	0.0019	0.0143	0.0093
Computacenter PLC	0.0213	0.0166	0.0188	0.0138	0.0046	0.0039	0.0246	0.0033	0.0226	0.0032	0.0277	0.0069	0.0120	0.0011	0.0062	0.0157	0.0011	0.0097	0.0167	0.0103	0.0249	0.0079	0.0065	0.0197
Consort Medical PLC	0.0013	0.0012	0.0003	0.0018	0.0073	0.0018	0.0176	0.0029	0.0034	0.0043	0.0115	0.0402	0.0304	0.0085	0.0353	0.0076	0.0081	0.0045	0.0023	0.0158	0.0038	0.0044	0.0038	0.0210
Cranswick PLC	0.0067	0.0047	0.0036	0.0017	0.0020	0.0030	0.0104	0.0070	0.0040	0.0010	0.0040	0.0013	0.0060	0.0105	0.0149	0.0051	0.0162	0.0003	0.0010	0.0068	0.0162	0.0027	0.0034	0.0027
Creightons PLC	0.0000	0.0000	0.0522	0.0000	0.0000	0.0000	0.0496	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0328	0.0000	0.0645	0.0000	0.0317	0.1214	0.0000	0.0000	0.0290	0.0000	0.0000
Croda International PLC	0.0068	0.0069	0.0101	0.0086	0.0133	0.0087	0.0003	0.0160	0.0032	0.0052	0.0416	0.0014	0.0098	0.0158	0.0119	0.0107	0.0088	0.0016	0.0035	0.0037	0.0056	0.0157	0.0077	0.0126
Daniel Stewart Securities PLC	0.0031	0.0031	0.1869	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0625	0.0031	0.0031	0.0448	0.0031	0.0031	0.1541	0.0031	0.0031	0.0031	0.0031	0.0031
Derwent London PLC	0.0133	0.0072	0.0033	0.0090	0.0207	0.0067	0.0075	0.0074	0.0130	0.0097	0.0024	0.0063	0.0075	0.0021	0.0091	0.0052	0.0006	0.0150	0.0107	0.0002	0.0183	0.0033	0.0006	0.0045
Devro PLC	0.0015	0.0037	0.0075	0.0098	0.0093	0.0089	0.0032	0.0055	0.0046	0.0020	0.0067	0.0011	0.0072	0.0020	0.0041	0.0024	0.0041	0.0002	0.0015	0.0020	0.0296	0.0239	0.0072	0.0080
Diageo PLC	0.0131	0.0134	0.0183	0.0043	0.0154	0.0075	0.0093	0.0244	0.0155	0.0007	0.0064	0.0004	0.0156	0.0020	0.0086	0.0088	0.0020	0.0001	0.0110	0.0004	0.0047	0.0194	0.0062	0.0102
Diamondcorp Plc	0.0030	0.0030	0.0485	0.0200	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0260	0.0200	0.0030	0.0030	0.0260	0.0030	0.0030
Dignity PLC	0.0029	0.0141	0.0029	0.0015	0.0292	0.0005	0.0248	0.0032	0.0032	0.0055	0.0045	0.0218	0.0009	0.0005	0.0080	0.0166	0.0050	0.0183	0.0311	0.0387	0.0116	0.0089	0.0113	0.0002
Dunelm Group plc	0.0057	0.0240	0.0284	0.0159	0.0231	0.0213	0.0230	0.0086	0.0122	0.0135	0.0098	0.0323	0.0175	0.0098	0.0012	0.0062	0.0276	0.0275	0.0171	0.0024	0.0144	0.0278	0.0050	0.0000
Electrocomponents PLC	0.0106	0.0080	0.0118	0.0235	0.0373	0.0155	0.0081	0.0006	0.0108	0.0043	0.0043	0.0006	0.0070	0.0081	0.0158	0.0200	0.0227	0.0033	0.0198	0.0006	0.0123	0.0245	0.0154	0.0498
Essentra plc	0.0093	0.0094	0.0069	0.0058	0.0274	0.0008	0.0096	0.0240	0.2269	0.0022	0.0002	0.0062	0.0118	0.0119	0.0043	0.0285	0.0271	0.0130	0.0003	0.0210	0.0023	0.0164	0.0200	0.0196
Euromoney Institutional Investor PLC	0.0229	0.0153	0.0416	0.0174	0.0052	0.0260	0.0125	0.0312	0.0005	0.0562	0.0184	0.0052	0.0198	0.0257	0.0464	0.0046	0.0026	0.0173	0.0161	0.0094	0.0045	0.0053	0.0014	0.0014
Everyman Media Group PLC	0.0597	0.0419	0.0000	0.0000	0.0000	0.0162	0.0000	0.0054	0.0000	0.0333	0.0114	0.0115	0.0000	0.0000	0.0000	0.0000	0.0000	0.0115	0.0000	0.0000	0.0057	0.0000	0.0000	0.0000
GAME Digital PLC	0.0455	0.0330	0.0339	0.0089	0.0014	0.0507	0.0122	0.1058	0.0333	0.0833	0.0121	0.0293	0.0044	0.0037	0.0280	0.0195	0.0037	0.0042	0.0037	0.0424	0.0295	0.0147	0.0109	0.0035
Go-Ahead Group PLC	0.0082	0.0021	0.0063	0.0191	0.0084	0.0053	0.0095	0.0166	0.0044	0.0009	0.0198	0.0119	0.0002	0.0049	0.0060	0.0084	0.0085	0.0187	0.0149	0.0236	0.0229	0.0039	0.0055	0.0284
Grainger PLC	0.0284	0.0149	0.0295	0.0043	0.0165	0.0049	0.0133	0.0108	0.0134	0.0029	0.0045	0.0014	0.0128	0.0067	0.0034	0.0041	0.0025	0.0211	0.0096	0.0080	0.0063	0.0210	0.0105	0.0173
Hammerson PLC	0.0089	0.0109	0.0110	0.0270	0.0090	0.0145	0.0054	0.0072	0.0019	0.0018	0.0160	0.0035	0.0035	0.0001	0.0125	0.0053	0.0143	0.0107	0.0053	0.0215	0.0054	0.0035	0.0001	0.0177
Hargreaves Lansdown PLC	0.0007	0.0035	0.0007	0.0066	0.0148	0.0116	0.0047	0.0017	0.0207	0.0054	0.0036	0.0026	0.0016	0.0037	0.0027	0.0024	0.0109	0.0007	0.0185	0.0135	0.0072	0.0019	0.0154	0.0299
Hays PLC	0.0362	0.0221	0.0183	0.0300	0.0157	0.0632	0.0005	0.0107	0.0069	0.0121	0.0042	0.0012	0.0034	0.0056	0.0157	0.0084	0.0033	0.0063	0.0200	0.0235	0.0161	0.0119	0.0026	0.0041
Henderson Opportunities Trust PLC	0.0032	0.0078	0.0014	0.0059	0.0059	0.0096	0.0059	0.0014	0.0041	0.0078	0.0033	0.0014	0.0014	0.0051	0.0014	0.0052	0.0014	0.0070	0.0014	0.0062	0.0024	0.0129	0.0023	0.0004

HSBC Holdings PLC	0.0103	0.0168	0.0032	0.0018	0.0106	0.0143	0.0295	0.0011	0.0088	0.0073	0.0090	0.0151	0.0092	0.0045	0.0021	0.0099	0.0003	0.0093	0.0141	0.0028	0.0168	0.0155	0.0022	0.0028
Huntsworth PLC	0.0132	0.0762	0.0484	0.0130	0.0271	0.0263	0.0270	0.0675	0.0260	0.0123	0.0131	0.0383	0.0004	0.0004	0.0029	0.0162	0.0268	0.0475	0.0129	0.0267	0.0127	0.0264	0.0455	0.0399
hVIVO plc	0.0299	0.0405	0.0017	0.0017	0.0131	0.1030	0.0091	0.0343	0.0052	0.0210	0.0300	0.0398	0.0017	0.0017	0.0320	0.0110	0.0017	0.0461	0.0189	0.0133	0.0379	0.0045	0.0391	0.0145
Ibstock PLC	0.0105	0.0160	0.0342	0.0082	0.0020	0.0063	0.0015	0.0031	0.0018	0.0020	0.0083	0.0221	0.0110	0.0026	0.0056	0.0020	0.0035	0.0124	0.0031	0.0078	0.0080	0.0117	0.0075	0.0035
Image Scan Holdings PLC	0.0038	0.0225	0.0237	0.0746	0.0601	0.0038	0.1463	0.0218	0.1565	0.1359	0.0204	0.0038	0.1014	0.0937	0.0232	0.0308	0.1344	0.0248	0.0586	0.0302	0.1393	0.0038	0.0038	0.0338
Inland Homes PLC	0.1363	0.0595	0.0061	0.0326	0.0008	0.0026	0.0262	0.0120	0.0252	0.0380	0.0590	0.0244	0.0107	0.0076	0.0123	0.0009	0.0009	0.0059	0.0042	0.0024	0.0009	0.0009	0.0009	0.0176
Interserve PLC	0.0188	0.0006	0.0111	0.0006	0.0066	0.0098	0.0110	0.0168	0.0208	0.0051	0.0006	0.0064	0.0232	0.0064	0.0064	0.0530	0.0197	0.0286	0.0036	0.0151	0.0124	0.0245	0.0243	0.0275
IQE	0.0049	0.0252	0.1156	0.0096	0.0328	0.0178	0.0215	0.0098	0.0288	0.0173	0.0649	0.1162	0.0687	0.0282	0.0068	0.0240	0.0457	0.0020	0.0200	0.0297	0.0597	0.0020	0.1103	0.0473
JPMorgan Japan Smaller Co Tst PLC	0.0007	0.0007	0.0007	0.0007	0.0044	0.0007	0.0007	0.0007	0.0094	0.0058	0.0161	0.0146	0.0161	0.0044	0.0044	0.0007	0.0094	0.0093	0.0007	0.0057	0.0210	0.0162	0.0045	0.0111
JPMorgan Smaller Cos IT PLC	0.0059	0.0012	0.0012	0.0059	0.0012	0.0036	0.0083	0.0083	0.0084	0.0037	0.0086	0.0012	0.0161	0.0038	0.0012	0.0114	0.0065	0.0117	0.0115	0.0014	0.0014	0.0037	0.0066	0.0089
Martin Currie Global Portfolio Tst	0.0085	0.0089	0.0056	0.0074	0.0012	0.0099	0.0088	0.0185	0.0074	0.0136	0.0064	0.0145	0.0057	0.0133	0.0142	0.0147	0.0107	0.0223	0.0138	0.0118	0.0108	0.0165	0.0071	0.0002
Micro Focus International plc	0.0005	0.0028	0.0137	0.0601	0.0061	0.0038	0.0038	0.0163	0.0073	0.0125	0.0091	0.0032	0.0126	0.0260	0.0144	0.0109	0.0168	0.0150	0.0220	0.0068	0.0084	0.0235	0.0162	0.0035
Motif Bio PLC	0.0095	0.0669	0.0424	0.0116	0.0020	0.0233	0.0273	0.0480	0.0221	0.0331	0.0094	0.0149	0.0361	0.0209	0.0191	0.0612	0.0649	0.0362	0.0273	0.0648	0.0014	0.0182	0.0243	0.0609
National Grid PLC	0.0029	0.0040	0.0122	0.0061	0.0224	0.0036	0.0019	0.0081	0.0003	0.0155	0.0049	0.0018	0.0099	0.0103	0.0170	0.0034	0.0136	0.0035	0.0094	0.0093	0.0036	0.0139	0.0012	0.0372
NCC Group PLC	0.0116	0.0126	0.0110	0.0168	0.0355	0.0035	0.0233	0.0202	0.0160	0.0243	0.0244	0.0223	0.0222	0.0109	0.0154	0.0249	0.0050	0.0005	0.0050	0.0035	0.0026	0.0005	0.0073	0.0136
Octopus Apollo VCT plc	0.0003	0.0003	0.0278	0.0003	0.0003	0.0003	0.0103	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0239	0.0003	0.0003	0.0003	0.0003	0.0018	0.0003	0.0003	0.0003	0.0003	0.0003
Outsourcery PLC	0.0047	0.0346	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0672	0.0047	0.0047	0.0047	0.0047	0.0210	0.0047	0.0047	0.0047	0.0047	0.0047	0.0212
Palace Capital PLC	0.0149	0.0003	0.0003	0.0003	0.0003	0.0074	0.0003	0.0080	0.0003	0.0124	0.0003	0.0003	0.0003	0.0043	0.0003	0.0078	0.0003	0.0149	0.0229	0.0003	0.0270	0.0079	0.0003	0.0003
PayPoint plc	0.0022	0.0000	0.0022	0.0098	0.0043	0.0076	0.0075	0.0129	0.0043	0.0140	0.0011	0.0175	0.0012	0.0011	0.0153	0.0219	0.0022	0.0045	0.0099	0.0056	0.0044	0.0011	0.0001	0.0055
Pennon Group PLC	0.0051	0.0171	0.0000	0.0094	0.0019	0.0136	0.0006	0.0012	0.0081	0.0148	0.0104	0.0042	0.0067	0.0067	0.0031	0.0031	0.0080	0.0049	0.0147	0.0116	0.0055	0.0068	0.0068	0.0081
Porta Communications PLC	0.0365	0.0378	0.0981	0.0021	0.0021	0.0021	0.0021	0.0021	0.0631	0.0795	0.0166	0.0021	0.0021	0.0207	0.0021	0.0166	0.0021	0.0177	0.0159	0.0398	0.0357	0.0021	0.0021	0.0343
Porvair PLC	0.0001	0.0063	0.0099	0.0021	0.0215	0.0332	0.0021	0.0008	0.0037	0.0051	0.0029	0.0020	0.0063	0.0018	0.0030	0.0121	0.0021	0.0047	0.0011	0.0007	0.0026	0.0051	0.0086	0.0105
Premier Foods plc	0.0023	0.0101	0.0421	0.0218	0.0134	0.0101	0.0055	0.0341	0.0294	0.0132	0.0054	0.0023	0.0352	0.0171	0.0271	0.0121	0.0095	0.0023	0.0464	0.0126	0.0051	0.0322	0.0275	0.0195
Premier Oil PLC	0.0461	0.0036	0.0528	0.0235	0.1015	0.0487	0.0348	0.0036	0.0580	0.0339	0.0267	0.1139	0.1859	0.0547	0.0151	0.0148	0.0145	0.0141	0.0036	0.0393	0.0219	0.0148	0.0145	0.1371
Premier Veterinary Group PLC	0.0057	0.0562	0.0137	0.0109	0.0075	0.0901	0.0056	0.0010	0.0493	0.0075	0.0137	0.0389	0.0139	0.0467	0.0570	0.0413	0.0016	0.0376	0.0046	0.0196	0.0322	0.0648	0.0075	0.6798
Proton Power Systems PLC	0.0011	0.0015	0.0019	0.0046	0.0047	0.1004	0.0464	0.1412	0.0210	0.0049	0.0011	0.0038	0.0016	0.0006	0.0002	0.0258	0.0008	0.0305	0.0030	0.0001	0.0976	0.0351	0.0010	0.0046
Proton Power Systems PLC	0.1184	0.0625	0.0723	0.0717	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0704	0.0006	0.0710	0.0006	0.0612	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006

PZ CUSSONS PLC	0.0012	0.0140	0.0024	0.0080	0.0018	0.0076	0.0305	0.0150	0.0006	0.0081	0.0003	0.0091	0.0047	0.0050	0.0043	0.0105	0.0027	0.0006	0.0034	0.0016	0.0075	0.0043	0.0043	0.0137
QinetiQ Group plc	0.0049	0.0013	0.0023	0.0097	0.0013	0.0232	0.0023	0.0013	0.0060	0.0024	0.0086	0.0085	0.0206	0.0024	0.0024	0.0013	0.0175	0.0013	0.0013	0.0088	0.0025	0.0177	0.0051	0.0051
Quarto Group Inc	0.0023	0.0010	0.0010	0.0010	0.0109	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0110	0.0010	0.0044	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Regal Petroleum PLC	0.0713	0.0827	0.1063	0.1007	0.0760	0.0980	0.0886	0.0830	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0108	0.0028	0.0442	0.1066	0.0154	0.1276	0.0600
Rose Petroleum PLC	0.1014	0.0267	0.0809	0.0253	0.0196	0.0339	0.0045	0.0045	0.1771	0.0864	0.0157	0.0794	0.0645	0.0151	0.0045	0.0241	0.0052	0.0800	0.0325	0.0339	0.0524	0.0591	0.0393	0.0130
Rosslyn Data Technologies PLC	0.0023	0.0023	0.0213	0.0023	0.0023	0.0023	0.0023	0.0415	0.0432	0.0127	0.0343	0.1487	0.0023	0.0434	0.0241	0.0731	0.0602	0.0023	0.0275	0.0267	0.0023	0.0023	0.0023	0.0023
Rotork PLC	0.0147	0.0064	0.0103	0.0092	0.0099	0.0064	0.0004	0.0181	0.0026	0.0026	0.0095	0.0198	0.0104	0.0019	0.0060	0.0034	0.0225	0.0026	0.0003	0.0015	0.0103	0.0046	0.0031	0.0146
Royal Mail PLC	0.0106	0.0069	0.0083	0.0018	0.0080	0.0177	0.0158	0.0102	0.0087	0.0424	0.0060	0.0174	0.0206	0.0162	0.0041	0.0044	0.0070	0.0127	0.0160	0.0055	0.0129	0.0173	0.0114	0.0011
RWS Holdings PLC	0.0210	0.0431	0.0016	0.0334	0.0112	0.0601	0.0570	0.0536	0.0151	0.0084	0.0252	0.0245	0.0016	0.0048	0.0016	0.0276	0.0682	0.0045	0.0105	0.0016	0.0137	0.0576	0.0367	0.0257
Safestore Holdings plc	0.0169	0.0106	0.0310	0.0347	0.0081	0.0414	0.0283	0.0283	0.0199	0.0135	0.0198	0.0032	0.0268	0.0237	0.0231	0.0087	0.0147	0.0134	0.0053	0.0179	0.0006	0.0076	0.0018	0.0028
SAGA PLC	0.0081	0.0093	0.0001	0.0037	0.0004	0.0053	0.0043	0.0037	0.0034	0.0044	0.0017	0.0048	0.0097	0.0007	0.0043	0.0131	0.0113	0.0107	0.0032	0.0006	0.0058	0.0109	0.0041	0.0042
Sage Group PLC	0.0021	0.0049	0.0004	0.0021	0.0130	0.0057	0.0022	0.0047	0.0037	0.0040	0.0141	0.0317	0.0084	0.0071	0.0014	0.0070	0.0016	0.0029	0.0060	0.0017	0.0094	0.0066	0.0092	0.0061
Sainsbury(J) PLC	0.0170	0.0031	0.0000	0.0071	0.0048	0.0041	0.0127	0.0193	0.0222	0.0481	0.0298	0.0060	0.0252	0.0097	0.0045	0.0037	0.0236	0.0306	0.0005	0.0053	0.0085	0.0516	0.0214	0.0382
Schroders PLC	0.0062	0.0096	0.0002	0.0110	0.0036	0.0136	0.0187	0.0016	0.0092	0.0281	0.0003	0.0022	0.0014	0.0043	0.0112	0.0139	0.0205	0.0055	0.0046	0.0078	0.0133	0.0219	0.0018	0.0025
Scottish Oriental Smaller Companies Trust PLC	0.0016	0.0007	0.0000	0.0052	0.0023	0.0049	0.0053	0.0006	0.0039	0.0052	0.0006	0.0032	0.0006	0.0029	0.0006	0.0043	0.0007	0.0020	0.0045	0.0097	0.0013	0.0090	0.0032	0.0019
Secure Trust Bank PLC	0.0041	0.0052	0.0029	0.0012	0.0040	0.0015	0.0051	0.0062	0.0012	0.0082	0.0043	0.0068	0.0043	0.0026	0.0032	0.0065	0.0010	0.0012	0.0133	0.0052	0.0111	0.0055	0.0027	0.0005
SEGRO PLC	0.0094	0.0151	0.0101	0.0124	0.0164	0.0045	0.0118	0.0021	0.0053	0.0077	0.0021	0.0028	0.0243	0.0103	0.0127	0.0150	0.0052	0.0076	0.0028	0.0004	0.0215	0.0019	0.0161	0.0115
Senior PLC	0.0094	0.0315	0.0056	0.0134	0.0017	0.0056	0.0097	0.0605	0.0101	0.0020	0.0062	0.0062	0.0021	0.0104	0.0021	0.0062	0.0148	0.0063	0.0105	0.0021	0.0191	0.0021	0.0021	0.0148
Serco Group PLC	0.0972	0.0463	0.0256	0.0012	0.0042	0.0689	0.0103	0.0453	0.0090	0.0508	0.0163	0.0099	0.0003	0.0190	0.0086	0.0388	0.0090	0.0059	0.0081	0.0059	0.0337	0.0122	0.1170	0.0017
Share PLC	0.0356	0.0368	0.1001	0.0017	0.0017	0.0017	0.0017	0.0017	0.0143	0.0017	0.0017	0.0017	0.0140	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017
Smith & Nephew Plc	0.0157	0.0209	0.0433	0.0046	0.0077	0.0362	0.0079	0.0097	0.0076	0.0240	0.0095	0.0055	0.0094	0.0114	0.0107	0.0144	0.0020	0.0077	0.0019	0.0030	0.0019	0.0069	0.0038	0.0157
Spectris PLC	0.0040	0.0014	0.0024	0.0060	0.0007	0.0172	0.0051	0.0381	0.0004	0.0147	0.0129	0.0024	0.0001	0.0050	0.0287	0.0279	0.0143	0.0036	0.0004	0.0051	0.0067	0.0081	0.0018	0.0023
Spirax-Sarco Engineering PLC	0.0108	0.0042	0.0217	0.0037	0.0026	0.0089	0.0041	0.0061	0.0037	0.0069	0.0048	0.0016	0.0003	0.0097	0.0016	0.0142	0.0197	0.0070	0.0011	0.0018	0.0038	0.0013	0.0200	0.0107
St. Modwen Properties PLC	0.0130	0.0053	0.0285	0.0038	0.0291	0.0232	0.0038	0.0187	0.0231	0.0071	0.0104	0.0071	0.0092	0.0136	0.0137	0.0138	0.0106	0.0227	0.0006	0.0346	0.0197	0.0007	0.0362	0.0373
Stagecoach Group PLC	0.0080	0.0069	0.0032	0.0107	0.0415	0.0084	0.0110	0.0268	0.0359	0.0265	0.0046	0.0312	0.0005	0.0145	0.0155	0.0225	0.0040	0.0141	0.0076	0.0141	0.0040	0.0141	0.0291	0.0259
Sutton Harbour Holdings PLC	0.0301	0.0007	0.0977	0.0346	0.0007	0.0077	0.0007	0.0007	0.0007	0.0091	0.0007	0.0090	0.0160	0.0256	0.0007	0.0158	0.0161	0.0258	0.0332	0.0244	0.0007	0.0007	0.0315	0.0007
Telecom Plus PLC	0.0040	0.0037	0.0060	0.0108	0.0057	0.0002	0.0256	0.0087	0.0164	0.0031	0.0147	0.0031	0.0135	0.0021	0.0085	0.0055	0.0435	0.0311	0.0267	0.0029	0.0158	0.0073	0.0248	0.0166

Telit Communications PLC	0.0180	0.0062	0.0062	0.0295	0.0176	0.0586	0.0092	0.0184	0.0895	0.0175	0.0557	0.0611	0.0650	0.0272	0.0005	0.0062	0.0024	0.0529	0.0828	0.0039	0.0006	0.0028	0.0028	0.0129
Tertiary Minerals PLC	0.0190	0.0040	0.0185	0.0040	0.0040	0.0040	0.0180	0.0040	0.0040	0.0040	0.0040	0.0386	0.0465	0.0040	0.0040	0.0386	0.0040	0.0250	0.0040	0.0377	0.0040	0.0040	0.0162	0.0158
The Weir Group PLC	0.0182	0.0518	0.0104	0.0748	0.0268	0.0252	0.0213	0.0192	0.0266	0.0079	0.0616	0.0014	0.0023	0.0084	0.0395	0.0267	0.0034	0.0610	0.0196	0.0104	0.0501	0.0006	0.0280	0.0022
Trans-Siberian Gold PLC	0.0002	0.0002	0.0233	0.0238	0.0002	0.0232	0.0463	0.0002	0.0002	0.0002	0.0002	0.0239	0.0243	0.0002	0.0002	0.0002	0.0238	0.0002	0.0232	0.0002	0.0227	0.0233	0.0002	0.0239
Tribal Group PLC	0.0307	0.0067	0.0068	0.0240	0.0108	0.0110	0.0180	0.0087	0.0207	0.0050	0.0316	0.0042	0.0132	0.0479	0.0000	0.0374	0.0253	0.0315	0.0370	0.0735	0.0242	0.0057	0.0262	0.0061
Unite Group PLC	0.0055	0.0023	0.0135	0.0046	0.0092	0.0202	0.0058	0.0196	0.0100	0.0028	0.0020	0.0040	0.0014	0.0046	0.0109	0.0235	0.0002	0.0107	0.0139	0.0110	0.0222	0.0023	0.0048	0.0242
Upland Resources Limited	0.0007	0.0548	0.0007	0.0533	0.0564	0.1244	0.0007	0.0007	0.0007	0.0007	0.0683	0.0007	0.0007	0.0734	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0748
Vedanta Resources PLC	0.0202	0.0054	0.0600	0.0069	0.0017	0.0235	0.0122	0.0275	0.0489	0.0329	0.0368	0.0188	0.0054	0.0186	0.0025	0.0013	0.0518	0.0444	0.0278	0.0007	0.0622	0.0518	0.0231	0.0323
Versarien PLC	0.0008	0.0008	0.0008	0.0008	0.0008	0.0115	0.0116	0.0008	0.0472	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0042	0.0008
Virgin Money Holdings (UK) PLC	0.0049	0.0572	0.0106	0.0013	0.0033	0.0036	0.0131	0.0150	0.0194	0.0035	0.0121	0.0048	0.0043	0.0160	0.0032	0.0063	0.0184	0.0082	0.0032	0.0049	0.0074	0.0048	0.0044	0.0132
Vodafone Group Plc	0.0234	0.0140	0.0171	0.0372	0.0359	0.0036	0.0114	0.0214	0.0224	0.0080	0.0060	0.0074	0.0217	0.0395	0.0292	0.0271	0.0035	0.0065	0.0181	0.0147	0.0017	0.0027	0.0027	0.0005
WH Smith PLC	0.0290	0.0091	0.0108	0.0216	0.0048	0.0039	0.0273	0.0024	0.0124	0.0006	0.0031	0.0149	0.0129	0.0015	0.0041	0.0021	0.0042	0.0057	0.0015	0.0075	0.0021	0.0221	0.0033	0.0246
Whitbread PLC	0.0195	0.0077	0.0084	0.0028	0.0068	0.0020	0.0029	0.0020	0.0162	0.0086	0.0057	0.0178	0.0020	0.0008	0.0002	0.0020	0.0064	0.0112	0.0085	0.0077	0.0250	0.0115	0.0076	0.0008
Zegona Communications PLC	0.0024	0.0065	0.0024	0.0106	0.0024	0.0024	0.0024	0.0024	0.0065	0.0305	0.0024	0.0024	0.0024	0.0103	0.0063	0.0024	0.0141	0.0101	0.0024	0.0062	0.0325	0.0024	0.0024	0.0024

APPENDIX B

Figure A: Firm's characteristics: changing auditors vs. non- changing auditors

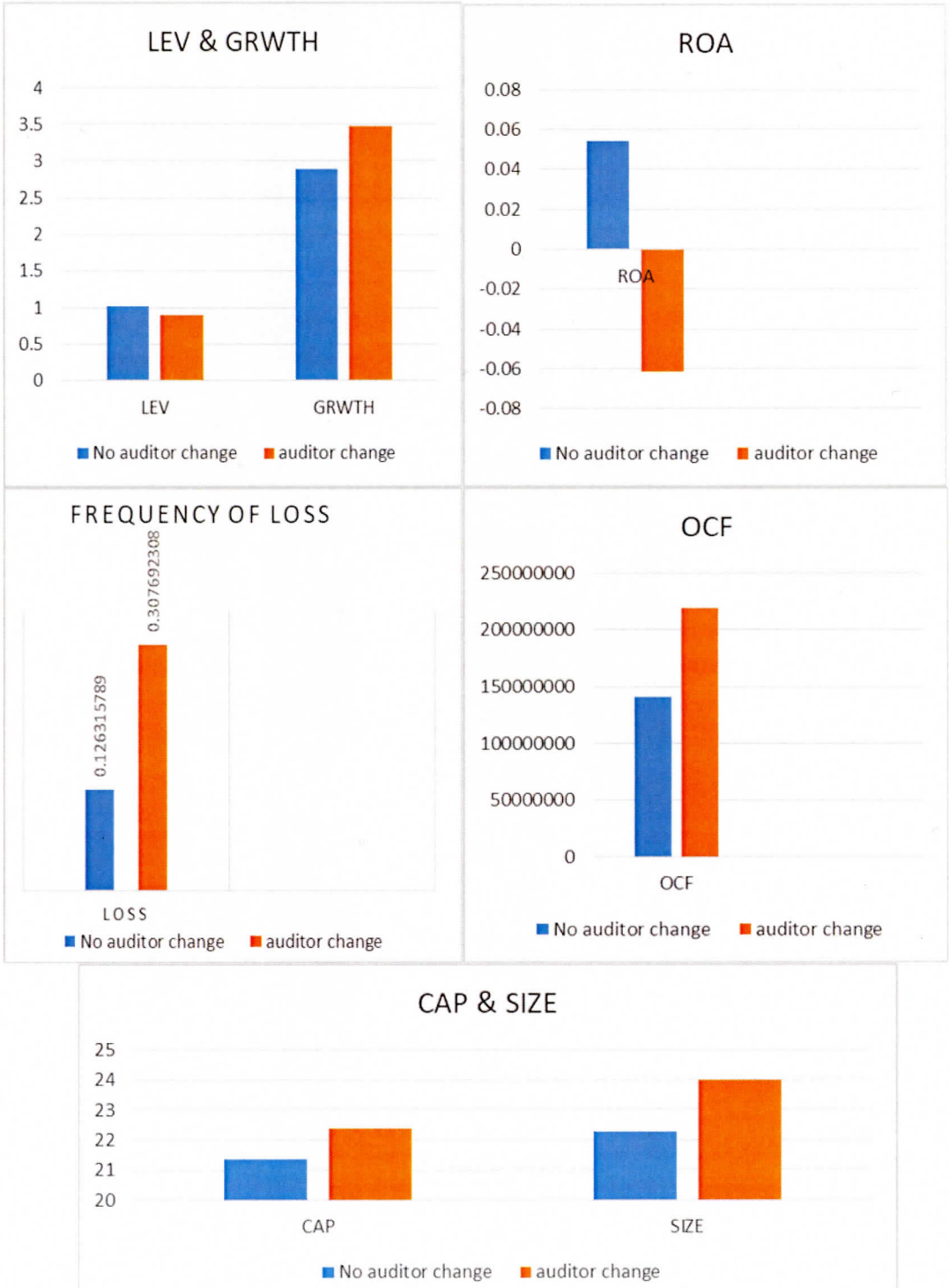
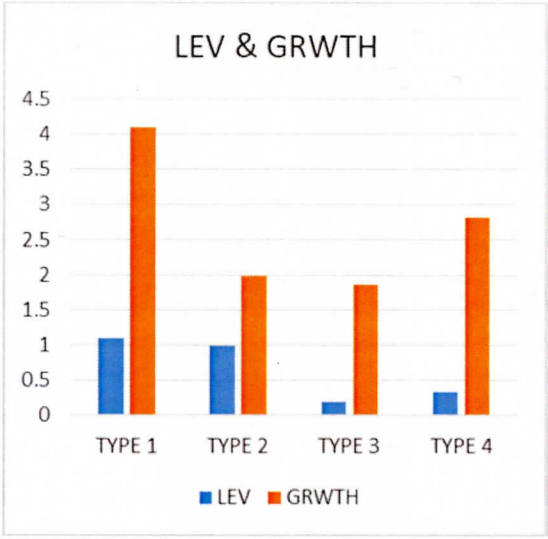
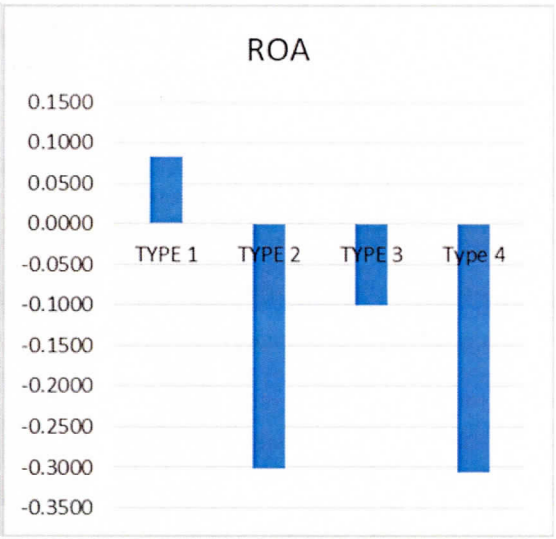
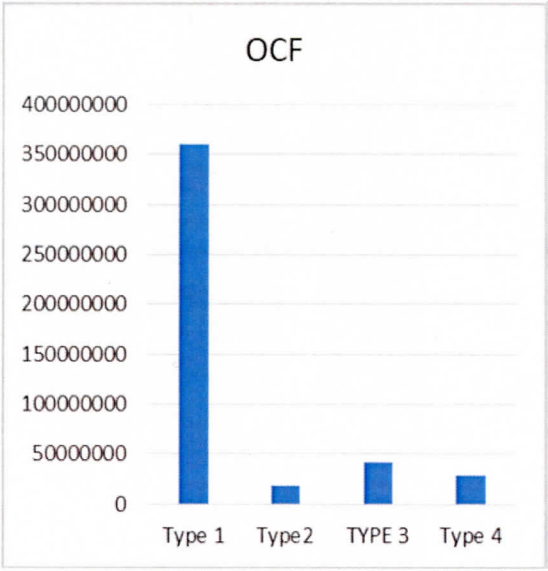
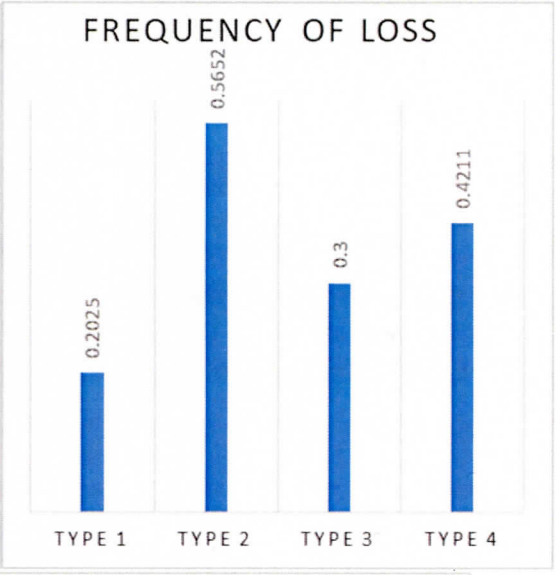


Figure B: Firm's Characteristics by auditor types









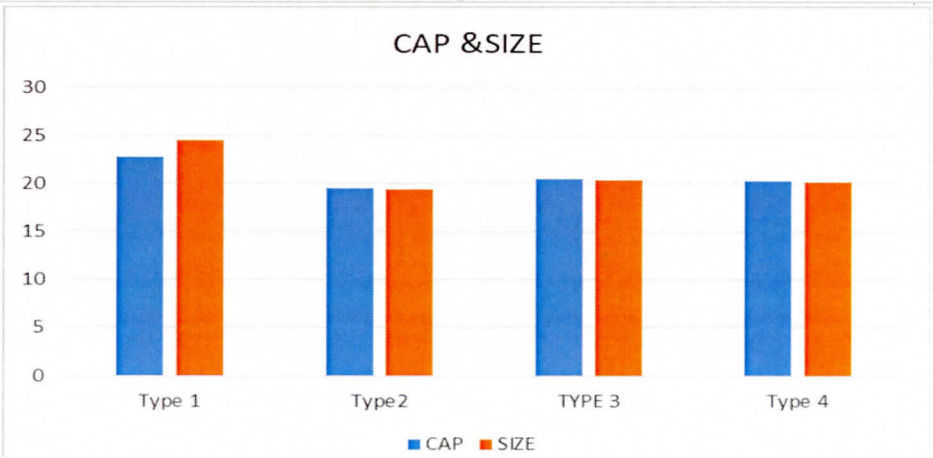
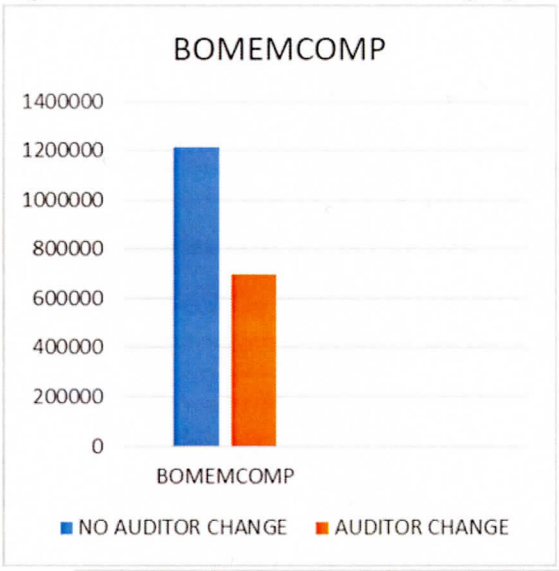
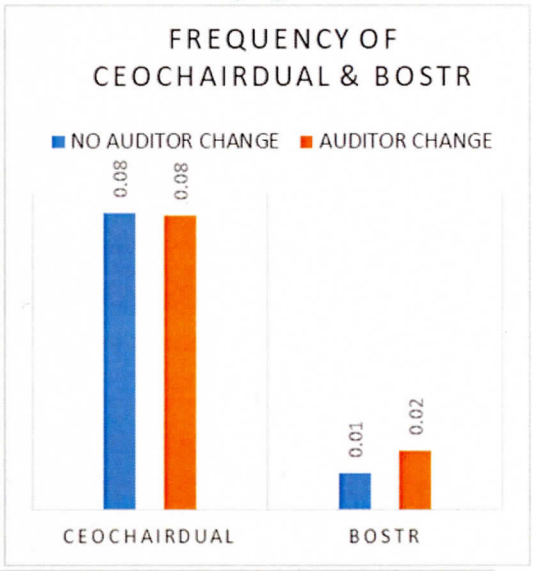


Figure C: Board characteristics: changing auditors vs. non-changing auditors





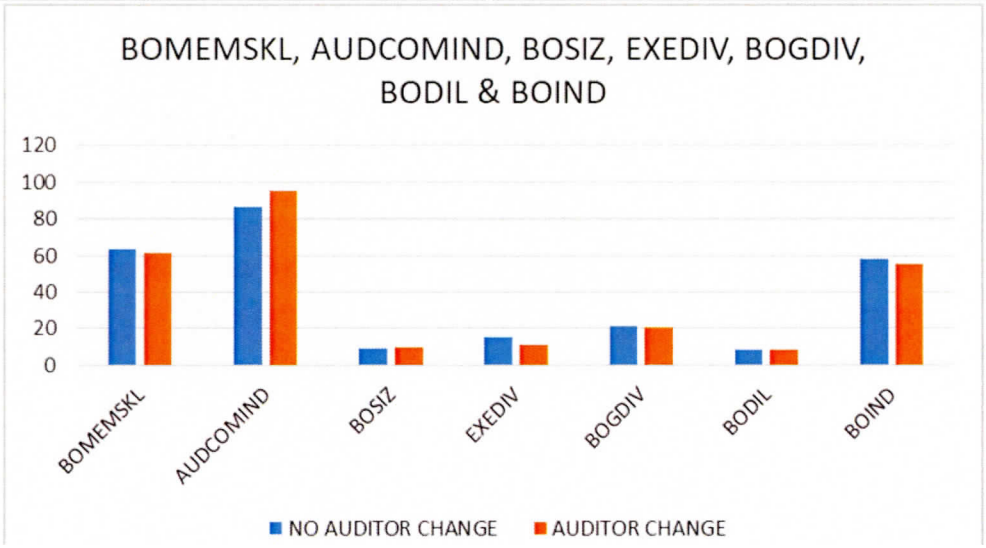


Figure D: Board characteristics by auditor types