

The Effect of Audit Committee Chair Characteristics in Earnings Management: Evidence from the UK

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Abstract

The primary objective of this study is to examine the impact of audit committee chair characteristics on earnings management. Previous studies have paid little attention to the audit committee chair characteristics and their effect on earnings management. The audit committee chair's role is significantly essential to increase the ability of the audit committee to carry out their responsibilities effectively and drive the work of the audit committee (Ghafran & Yasmin, 2018). The audit committee chair has a greater responsibility than other members in the audit committee regarding the failure of the financial report (Ghafran & Yasmin, 2018). Thus, the chair of the audit committee plays a significant role in influencing the quality of financial reporting. However, previous audit committee researches do not distinguish the audit committee chair's characteristics from other audit committee members. Thus, this study goes further to highlight the audit committee chair using a sample selected from the FTSE 350 firms listed on the London Stock Exchange over the period 2005 - 2015. This study measures earnings management using accrual based, the results show that audit committee chair age, social networking and industry are positively associated with earnings management. However, audit committee chair tenure, pre-tenure, education, non-foreign and accounting and finance expertise have significant adverse effects on the level of earnings management.

These findings consequently contribute to existing literature and policymaking by enabling the UK and other countries that have a similar environment to make better decisions regarding the audit committee. For example, a policymaker can consider the characteristics of the audit committee when issuing regulations regarding audit committee to improve the effectiveness of this committee and thereby, firms' financial reporting.

Keywords: Audit Committee Chair and Earnings Management

المخلص:

الهدف الأساسي من هذه الدراسة هو فحص تأثير خصائص رئيس لجنة المراجعة على إدارة الأرباح. أولت الدراسات السابقة القليل من الاهتمام لخصائص رئيس لجنة التدقيق وتأثيرها على إدارة الأرباح. يعد دور رئيس لجنة التدقيق ضروريًا بشكل كبير لزيادة قدرة لجنة التدقيق على الاضطلاع بمسؤولياتها بفعالية ودفع عمل لجنة التدقيق (Ghafran & Yasmin, 2018). يتحمل رئيس لجنة التدقيق مسؤولية أكبر من الأعضاء الآخرين في لجنة التدقيق فيما يتعلق بفشل التقرير المالي (Ghafran & Yasmin, 2018). وبالتالي، يلعب رئيس لجنة التدقيق دورًا مهمًا في التأثير على جودة التقارير المالية. ومع ذلك، فإن أبحاث لجنة التدقيق السابقة لا تميز بين خصائص رئيس لجنة التدقيق وأعضاء لجنة التدقيق الآخرين. وبالتالي، فإن هذه الدراسة تذهب أبعد من ذلك لتبسيط الضوء على رئيس لجنة التدقيق باستخدام عينة مختارة من FTSE 350 شركة مدرجة في بورصة لندن خلال الفترة 2000 - 2015. تقيس هذه الدراسة إدارة الأرباح باستخدام إدارة اساس الأرباح التراكمية، كما تظهر النتائج أن عمر رئيس لجنة التدقيق والعلاقات الاجتماعية والخبرة في القطاعات المختلفة ترتبط ارتباطًا إيجابيًا بإدارة الأرباح. ومع ذلك، فإن مدة رئاسة لجنة التدقيق، وفترة ما قبل الحياة، وتعليم رئيس لجنة التدقيق، والخبرة المحاسبية والمالية والجنسية، لها آثار سلبية كبيرة على مستوى إدارة الأرباح.

تساهم هذه النتائج في تطوير الأدبيات المحاسبية وصنع السياسات المالية من خلال تمكين المملكة المتحدة والدول الأخرى التي لديها بيئة مماثلة لاتخاذ قرارات أفضل بشأن لجنة التدقيق من خلال النظر في خصائص لجنة التدقيق عند إصدار لوائح لجنة التدقيق لتحسين فعالية هذه اللجنة و وبالتالي ، التقارير المالية للشركات. الكلمات المفتاحية: خصائص رئيس لجنة المراجعة، إدارة الأرباح.

Introduction

The topic of corporate governance topic has received considerable attention and has been the subject of an investigation by researchers (Compernelle & Richard, 2018). This issue is given impetus by financial market globalisation, new regulations and different cultural environments, giving rise to an awareness of the need for improved accounting quality and better corporate governance that promotes the transparency of the financial statements (Kallamu & Saat, 2015). There is a growing body of literature that addresses the impact of corporate governance on accounting quality, such as Cohen et al. (2002); Bédard et al. (2004); Turley and Zaman (2007); Beasley et al. (2009); Anum Mohd Ghazali (2010); Cohen et al. (2013) ; Leventis et al. (2013); Beattie et al. (2014); Shrivies and Brennan (2015); Boussaid et al. (2015); Januarsi and Hartanto (2015); Cho and Choi (2016); Mohammed et al. (2017); Baioco and Almeida (2017); Compernelle and Richard (2018), Ghafran and Yasmin (2018) and Sultana et al. (2019). However, few studies examine the impact of audit committee chairperson's characteristics on accounting quality.

Investigating this impact is essential for several reasons. First, audit committee characteristics, especially those of the chair, have been considered crucial corporate governance mechanisms. For example, the chair has played an essential decisive role in solving recent scandals, such as the London Whale¹. Second, the audit committee chair contributes to the effectiveness of the audit committee in ensuring beneficial corporate governance (UKCGC, 2018). The audit committee chair's role is significantly essential to increase the ability of the audit committee to carry out their responsibilities effectively and drive the work of the audit committee (Ghafran & Yasmin, 2018). Third, Ernst & Young (2011) and Schmidt and Wilkins (2012) view the audit committee chair as the chief executive officer of a committee and the critical nexus between the audit committee and internal and external auditors, as well as the board of directors. Fourth, the audit committee chair has a greater responsibility than other members in the audit committee regarding the failure of the financial report (Ghafran & Yasmin, 2018). Thus, the chair of the audit committee plays a significant role in influencing the quality of financial reporting.

In an attempt to achieve a better accounting quality, many changes have occurred in the codes of corporate governance in developed countries. For example, the UK Corporate Governance Code (UKCGC, 2018), the French Corporate Governance Code (FCGC, 2015) and the German Corporate Governance Code (GCGC, 2015) have been modified in order to enhance corporate governance and accounting information quality. For example, these codes guide firms' boards on setting rules pertaining to the audit committee chairperson's background and audit committee role and primary responsibilities, meetings, remuneration, training and experience, and skills of members (UKCGC, 2018).

¹ "JPMorgan's AC chairman, Laban Jackson, stepped out of the AC chairperson's usual behind-the-scenes position and took up a role as a publicly operating crisis communicator. In autumn 2013, while JPMorgan's mortgage securities, hiring practices and currency trading¹ were facing an investigation by the Securities and Exchange Commission, the U.S. Senate and the U.S. Department of Justice, Laban Jackson participated in conferences organized by institutions promoting good governance, that is, the Council of Institutional Investors² and the National Association of Corporate Directors.³ He was working to maintain the credibility of his bank's management and governance (notably by supporting the JPMorgan CEO and offering apologies to shareholders)" (Compernelle & Richard, 2018:1-2). For more information about this scandal see this website: <https://www.hitc.com/en-gb/2017/08/03/the-london-whale-strikes-back-and-blames-jp-morgan-ceo/>

The UK Financial Reporting Council guidance on board effectiveness 2018 considers that the audit committee chair holds a crucial position. Previous studies, such as Tanyi and Smith (2014), Turley and Zaman (2007), Thiruvadi (2018), Ghafran and Yasmin (2018) find that the audit committee chair plays a significant role in guiding the audit committee members by providing adequate knowledge flows from and to the committee. Thus, the UKCGC (2018) indicates that the audit committee chair should be independent and should not stay as a chair for more than nine years. Moreover, the UKFRC (2018) expects that the audit committee chair should have a good understanding of the business, build good relationships with executive directors and the chief executive, and use his/her skills, knowledge and experience to drive the discussion productively within the board.

The chair of the audit committee is represented in previous studies as playing a gatekeeping role, linking to audit committee effectiveness (Beattie et al., 2014; 2015). Accordingly, the audit committee chair acts as a mediator between internal and external auditors; and between the management and the audit committee to help the audit committee in its roles, such as setting the audit committee meeting agenda, solving financial issues between the management and the auditors, and monitoring the chief external auditor (Turley & Zaman, 2007).

Recently, Compernelle and Richard (2018) find that the audit committee chair adds power to the audit committee, provides information that enhances the understanding of the process of the committee, and is involved in a web of rules to ensure best practices. Ghafran and Yasmin (2018) view that the audit committee chair role supports and improves the ability of the audit committee to fulfil its responsibilities effectively. However, previous literature on the audit committee and its relationship with earnings management have not focused on the chair of this committee. Bromilow and Keller (2011) view that the responsibilities of the audit committee chair are higher than those of other audit committee members and that s/he draws the line of the audit committee effectiveness. For example, Compernelle and Richard (2018) view that the audit committee chair has more responsibility than other audit committee members. Tanyi and Smith (2014) report that the audit committee chair is responsible for overseeing the process preparing of the financial statement and is accountable when something goes wrong.

Despite the crucial role of the audit committee chair, which has a direct effect on the behaviour of the audit committee and its duties, researchers have not paid much attention to the impact of the audit committee chair characteristics, such as age, tenure, social networking, experience, nationality, industry experience and education background on earnings management. Pfeffer (1979) argues that it is crucial to understand how such characteristics, besides other demographic descriptive statistics affect the organisation. Previous researchers, such as Pettigrew (2008) relate top managers' characteristics to organisation outcomes. For example, Kimberly and Evanisko (1981) find that when the education level of senior managers is high, they are more receptive to innovation. Beasley (1996) finds that directors gain more specific knowledge of the firm when they have served longer on the board and this gives them better understanding to guide the committee through complicated proceedings as well as to improve the performance of the committee. He also adds that fraud in financial reporting is less when members have more extended service on the boards. Bédard et al. (2004) confirm that the long tenure of the audit committee members reduces the level of earnings management.

Recently, Ghafran and Yasmin (2018) find that the audit committee chair's financial, monitoring and experiential expertise improve the effectiveness of the audit committee. More specifically, they find that when the audit committee chair serves longer, the timeliness of the financial reporting improves significantly. This expertise has practical positive side effects on the audit committee chair's role in terms of improving his/her effectiveness in the committee.

Previous researchers on accounting and governance have paid considerable attention to the relationship between the financial expertise of the audit committee members and earnings management. For example, He and Yang (2014) find that a high ratio of accounting and financial expertise on the audit committee leads to lower earnings management. Other researchers, such as Krishnan and Visvanathan (2008) find that the quality of the financial reporting improves due to the accounting and financial expertise of the audit committee. Recent researchers have shown considerable interest in the audit committee chair's accounting and financial expertise. For example, Ghafran and Yasmin (2018) find a negative relationship between the audit committee chair who has accounting and financial expertise and delay in financial reporting. Schmidt and Wilkins (2012) investigate whether if there is an improvement in the timeliness of financial reporting when the audit committee members have financial and accounting experience. They measured the timeliness of the financial reporting by the financial statement restatement duration "dark period". They find that the audit committee members who have financial expertise specifically accounting, improve the timeliness of the financial reporting by shorting the dark period in the firm and providing timely disclosure. Their findings also show that the audit committee chair who has accounting and financial expertise provides most timely disclosure by reducing the dark period more by around 38%. Despite these indications and the focus on the audit committee chair, researchers have not paid sufficient attention to investigating the relationship between the audit committee chair's accounting and financial expertise and earnings management. Therefore, this study extends the literature by investigating the effect of the audit committee chair accounting and financial expertise and more other characteristics in earnings management. Moreover, the findings of this study contribute to the literature showing the importance of the audit committee chair characteristics, such as age, tenure, nationality and accounting and financial experience in the firm and how s/he effects the quality of the financial reporting.

Board directors are able to monitor and oversee the process of financial reports (Klein, 2002). There are many ways that are used to manage earnings using accruals (Mohanram, 2003). For example, managers create accruals by using the method of selling on credit; although cash is not received, the sale is accompanied by account receivable and recognized. Another way is by transferring income among periods by increasing sales and revenue in a period. Another example of earnings management is for managers to capitalize on some items, such as intangible assets and research and development, using their judgement for manipulation.

The literature on the audit committee emphasises the contribution of the audit committee in improving the quality of financial reporting and decreasing information asymmetries (Mangena & Pike, 2005; Rainsbury et al., 2008). The overall results on the audit committee role emphasise the fact that the audit committee is essential for enhancing the quality of financial reports. For example, Klein (1998); Chan and Li (2008); and Aldamen et al. (2012) find that the characteristics of the audit committee (independence, size, and expertise) enhance the performance and the value of firms. Other researchers argue that these characteristics also improve financial reporting quality (Bronson et al., 2009).

While the above arguments suggest the importance of investigating the governance role of the audit committee characteristics on the quality of financial statements, few studies have examined the impact of the audit committee chair's characteristics on earnings management. For example, Qi and Tian (2012) find a significant negative relationship between audit committee members' characteristics, such as age, work experience and gender and earnings management. However, they find no meaningful relationship between education background and earnings management. Given the evidence of the significance of members' characteristics, the audit committee chair's characteristics may significantly impact earnings management, and it is essential to investigate the association between the audit committee chair's characteristics and earnings management in the UK to improve the quality of financial reporting. Thus, this study strictly focuses on the audit

committee chair characteristics as the chair has a greater responsibility than other members on this committee. Focusing on earnings management is crucial to reduce information asymmetry and promote transparency and the accuracy of the financial information, which improves the quality of financial reporting. Providing relevant information that has high transparency and credibility likely will impact the behaviour of the stakeholders. Indeed, one possible reason for earnings management is that the conflict of interest between the owners and the managers (agency relationship). Consequently, the audit committee chair as an independent from the management conducts effective monitoring to reduce earnings management (Al-Shaer & Zaman, 2017).

This study is distinctive in applying two theories which are the stewardship theory and upper echelons theory together to test the relationship between the audit committee chair characteristics and earnings management. This helps to test these theories empirically by finding how the steward (the audit committee chair) contributes to firm performance, to find out how each characteristic of the audit committee chair (age, tenure, education background, firm experience, nationality and social networking) affects earnings management and find out how the audit committee chair affects earnings management. To get a better understanding of the stewardship theory, the agency theory will also be mentioned to frame this relationship.

Based on the agency theory, the manager is an agent and s/he works to maximise her/his interest rather than that of the owner. Stewardship Theory views that stewards can limit stakeholders' conflict which occurs between the principal (the owner) and the agent (the management) as a result of self-interest (Hernandez, 2012). This means that stewards aim to protect the principal's welfare in the long and short term. Based on the Stewardship Theory, the existence of the audit committee chair as a steward may improve the quality of financial reports by reducing the level of earnings manipulation. However, the presence of the chair is not sufficient to guarantee the high quality of financial statements. Thus, the chair of the audit committee should have specific characteristics to increase the quality of financial reports. Stewards' background is also found to have a crucial effect on firm performance (Hambrick & Mason, 1982). Zalata et al. (2018) view that the audit committee members' background should include certain qualities, such as age, experience and gender. In this respect, the upper echelons theory may also be helpful to frame the theoretical stand of this study in terms of which qualities that the audit committee chair should have, to decrease the level of earnings management.

Research Aim and Objectives

The main objective of this study is to investigate the impact of the audit committee chair characteristics, namely age, tenure, pre-tenure, accounting and finance expertise, social networking, industry experience, education background, and non-foreign on earnings management in the context of the UK. This study uses a sample of non-financial firms indexed in the FTSE 350 between 2005 and 2015.

Accrual is measured by Kothari et al. (2005) models. To investigate the relationship between the audit committee chair characteristics and earnings management, several regressions models will run, such as dynamic system GMM.

Audit Committee Chair

The primary responsibilities of audit committees are, according to Bryce et al. (2015): first, to review and monitor the process of the financial statements regarding integrity and accuracy. Second, to make recommendations on the framework of risk management integrity and the internal control system. Third, to monitor the performance and independence of external auditors (Badolato et al., 2014). Moreover, the audit committee provides more information and knowledge about

financial reporting (Pincus et al., 1989). Therefore, the audit committee plays a significant role in enhancing the quality of the financial statement by reducing earnings management.

In line with the stewardship theory, it is found that reported earnings accounting is more reliable and of better quality when the opportunistic behaviour of managers is monitored by an active audit committee (Dechow et al., 1996; Wild, 1996). Dechow et al.(1996) report that earnings are manipulated when the audit committee does not exist. Carcello and Neal (2003) indicate that the audit committee plays an essential role in guaranteeing the financial reporting quality and corporate accountability (Klein, 2002). In addition, referring to the upper echelons theory, firms' performance and strategic choices are determined by top managers' cognitions, perceptions, and values (Hambrick & Mason, 1982). Carpenter et al. (2004) view top managers' characteristics, including age, educational background, experience and gender as fundamental in their perceptions, cognitions and values. Qi and Tian (2012) argue that monitoring the level of earnings management depends on the values and cognition of the audit committee, which are influenced by age, education, gender, and experience.

Following previous literature on the effect of the audit committee on earnings management, this study focuses on the impact of audit committee chair characteristics including tenure, firm experience, educational background, age, social networking and industry experience on earnings management.

The chair of the audit committee is considered to play a gatekeeping role, linked to audit committee effectiveness (Beattie et al., 2014; 2015). Accordingly, the audit committee chair acts as a mediator between internal and external auditors, as well as between the management and audit committee. This will help the audit committee in its roles, such as setting the audit committee meeting agenda, solving financial issues between the management and the auditors, and monitoring the chief external auditor (Turley & Zaman, 2007). Recently, Compernelle and Richard (2018) find that the audit committee chair adds power to the activity of the audit committee, provides information that enhances the understanding of this process, and is involved in a web of rules to ensure best practices.

Compernelle and Richard (2018) identify that the chair of the audit committee deals with uncertainty and uses power in three areas: rule manager, cicerone, and marginal-secant, which are associated with administrative, rational, and collaborative oversight respectively. The primary responsibility of the audit committee chair as rule manager is to work hard in using rules as the chair acts as the timekeeper of the schedule to preserve formal authority at the audit committee meeting. In contrast, as a marginal secant, the audit committee chair develops trust in the environment by expanding networks. In this case, the oversight of the audit committee chair becomes collaborative. When s/he acts as cicerone, the audit committee chair tries to offer an opinion in a targeted and timely manner (Compernelle & Richard, 2018).

UKCGC (2018) has not defined the role of the audit committee chair. However, documents offer some guidance, such as Deloitte (2015); Ernst&Young (2012); and FEE, ICAA, & Centre for Audit Quality (2016) emphasise some of these roles. For example, the audit committee chair sets the agenda, ensures the balance between managers and auditors with the audit committee, leads the audit committees' discussion during their official meetings, and discusses with auditors and managers, which contribute to the audit committee's effectiveness. Regulators in different contexts, such as European regulations, also specify the audit committee members' duties, which include oversight of the process of financial reporting, internal and external audit, risk management, business expertise, and independence. However, these regulations do not specifically address the role of the audit committee chair (Compernelle & Richard, 2018).

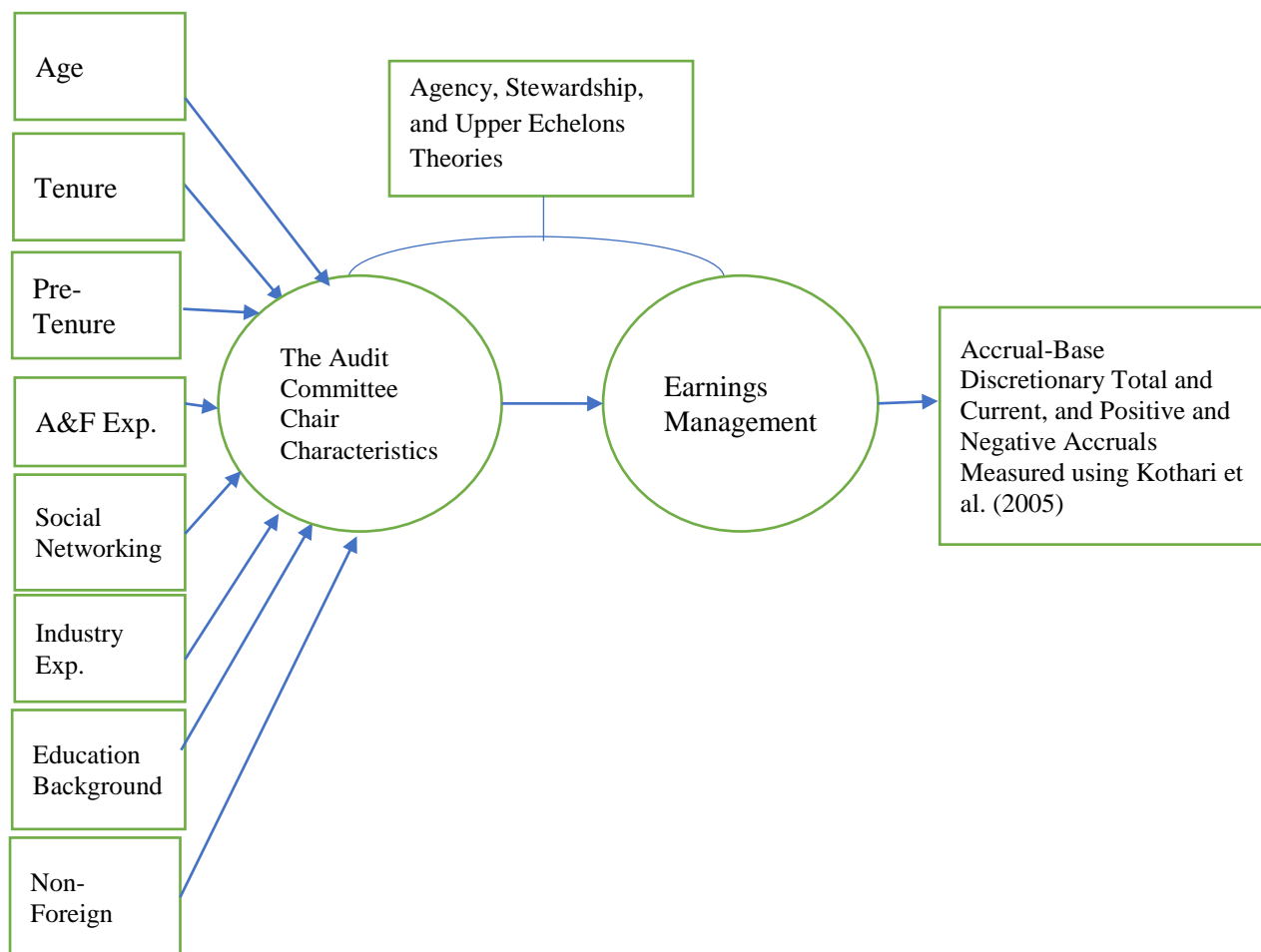
Beattie et al. (2011) address the relationship between the audit committee chair, Chief Financial Officer (CFO), and audit partner regarding their agreement when solving issues in the financial reporting. Beattie et al. (2011) find that the audit committee chair plays a filtering role; s/he meets informally with the audit partner and CFO to choose the issues that will be addressed at official meetings. Beattie et al. (2015) indicate that the audit committee chair plays a significant role in managing the relationship with the audit partner and CFO by solving issues rather than seeking an agreement or confrontation. Beattie et al. (2014) study the engagement of the audit committee and its chair with an audit partner and CFO in solving 32 issues in financial reports by using a wide-ranging survey. They find that the audit committee prefers to focus on fraud and does not fully engage in deciding all financial reporting aspects. They also find that the audit committee chair is a boundary spanner and plays an additional role as a gatekeeper with her/his committee and the board. In this case, the audit committee chair links different governance mechanisms in the firm. Other researchers, such as Cohen et al. (2010) recognise the importance of the audit committee chair's role regarding her/his interaction with internal auditors and the board. These results are in line with the study of Turley and Zaman (2007). They find that the audit committee chairperson's power plays in different roles as an ally, threat source, and judge, depending on the circumstances. Previous researchers, such as Hambrick and Mason (1982) consider that there are some management elements, such as values, perceptions, and cognitions, that may predict a firm's performance and strategic decisions. Carpenter et al. (2004) add that the age, experience, gender, education level and other characteristics of top managers underly differences in the values, cognition and perceptions of top managers. Carpenter et al. (2004) claim that the outcomes of the firm are influenced by the values, perceptions and cognition of the management, which are mostly related to Upper Echelons Theory.

Qi and Tian (2012) state that personal characteristics of the audit committee have a potential effect which might be positive or negative, on earnings management. This may be for several reasons; first, the audit committee effort used to monitor earnings management reflects the values, perceptions, and cognition of the committee members. Second, the values, perceptions, and cognition of the audit committee are a function of the age, experience, gender, education level and other characteristics of the audit committee. Thus, the audit committee characteristics are associated with the quality of financial reporting. Qi and Tian (2012) come to the conclusion that the characteristics of the audit committee may potentially affect earnings management.

Based on the discussions above, the hypotheses is formulated as follows:

- H1:** The Audit committee chair age is positively associated with earnings management.
- H2:** The tenure of the audit committee chair is negatively associated with earnings management.
- H3:** The firm experience (pre-tenure) of the audit committee chair is negatively associated with earnings management
- H5:** The audit committee chair's social networking is positively associated with earnings management.
- H6:** The audit committee chair's industry experience is negatively associated with earnings management.
- H7a:** The education level of the audit committees chair is negatively associated with earnings management.
- H7b:** The education level of the audit committees chair is positively associated with earnings management.
- H8:** The audit committee chair who is non-foreign is negatively associated with earnings management.

Figure 1.1 Audit Committee Chair Characteristics and Earning Management

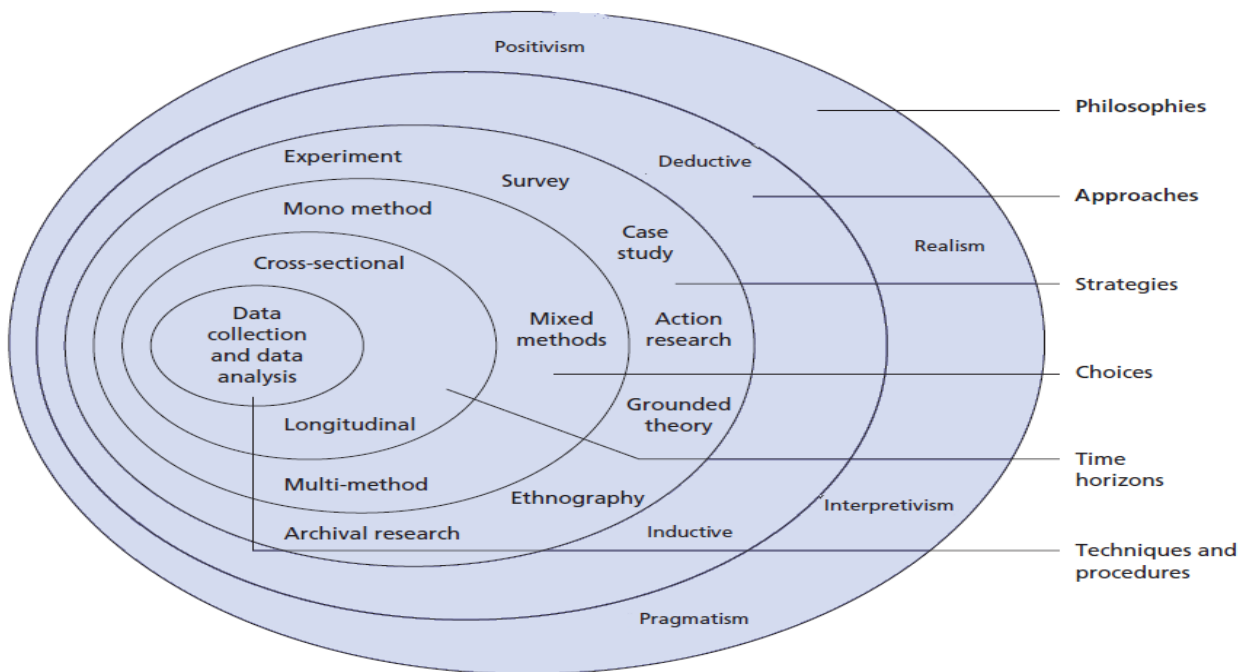


1. Research Methodology and Design

Research Methodology

The research methodology is applied to examine the impact of the audit committee chair characteristics on earnings management. The research methodology includes two aspects, which are the research approach and philosophy and research method and strategy. Saunders et al. (2011) provide a diagram called the research onion to present the elements of the research methodology and design in the business field. The research onion consists of seven layers, which should be linked together to give life to research. Researchers should peel these layers, making appropriate choices in each segment to reach the centre and so to answer their research questions. **Error! Reference source not found.** below represents this research onion.

Figure 2.1 Research Onion



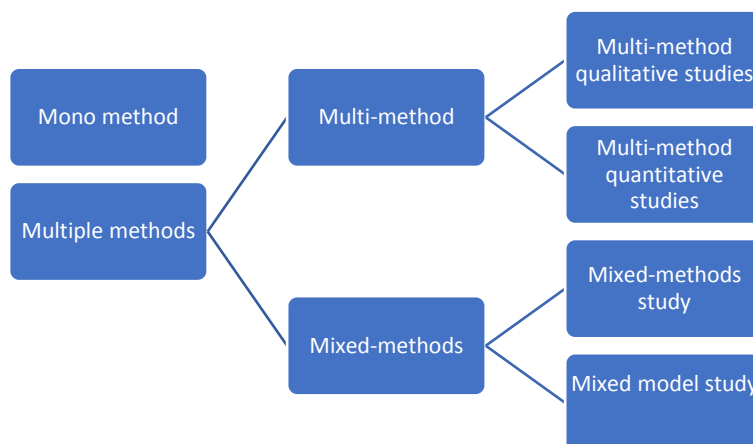
Source: Saunders et al. (2011:138)

A research methodology is a way of finding knowledge, studying method, approach and structure (Johnson & Clark, 2006). The methodology depends on the researcher’s view of the world (Tuli, 2010). Saunders et al. (2011) view the research methodology as concerned with the researcher’s choice of how to answer the research questions. It also determines the method, the strategy and data collection and analysis of researchers. A research methodology is divided into two aspects: research philosophy and approach.

Research Methods

There are two main methodological choices that researchers can apply in their research. These methods are mono, and multiple methods (Saunders et al., 2011). Multiple method is divided into two types, which are multi-method and mixed methods. Multi-method includes multi-method qualitative studies and multi-method quantitative studies, while mixed-method includes mixed method study involving both qualitative and quantitative methods and mixed model study (Saunders et al., 2011). Figure 2.2 below shows this classification.

Figure 2.2 Methods Selection



Source: Saunders et al. (2011)

This research adopts a mixed model by using a quantitative technique and quantized qualitative data. This research collects data by using quantitative techniques (secondary, primary) and a qualitative technique (quantizing qualitative data) and analysing this data quantitatively.

Sample Selection

The initial sample of this study consists of FTSE 350 firms listed on the London Stock Exchange during the period of 2005 to 2015². Data of financial variables, audit committee, and board characteristics are obtained from Bloomberg and DataStream, while audit committee chair characteristics data are hand-collected from firms' annual reports.³

Following previous studies, such as DeFond et al. (2005); Klein (2002) and Arun et al. (2015) financial and utilities firms are excluded because they are subject to different regulations and they have unique characteristics. This results in excluding 201 firms, such as banks, financial, life insurance, non-life insurance, equity investment and utility firms. The final sample includes 149 non-financial firms, corresponding to 1,639 firm year-observations. Table 1-2 presents the construction of the sample .

Table 1-2 Sample Selection

Initial sample (350 firms*11 years)	
Less financial firms and missing firms' data	3,850
Banks	88
Financial services	187
Life insurance	66
Non-life insurance	99
Equity Investment	176
Utility	66
Missing audit committee data	1089
Missing financial and board data	440
Total financial firms and firms with missing data	(2,211)
Final firm-year observations	1,639

Research Model

The study investigates the impact of the audit committee chair characteristics on earnings management. Following Arun et al. (2015), this study uses the following OLS model to test the hypotheses as a base model. Industry $INDUSTRY_{it}$ and time $YEAR_{it}$ dummies are added to the regression model to control for the fixed effect of industry and year (Arun et al., 2015). This would help to avoid time and industries effect and make better decision on testing this relationship.

$$DA_{it} = \beta_0 + \beta_1 ACC_AGE_{it} + \beta_2 ACC_TENURE_{it} + \beta_3 ACC_PRE_TENURE_{it} + \beta_4 ACC_A\&F_{it} + \beta_5 ACC_INDUSTRY_{it} + \beta_6 ACC_NETWORK_{it} + \beta_7 ACC_EDUCATION_{it} + \beta_8 ACC_NON_FORIEGN_{it} + \beta_9 AC_MEETING_{it} + \beta_{10} AC_SIZE_{it} + \beta_{11} BOD_SIZE_{it} + \beta_{12} BOD_MEETING_{it} + \beta_{13} BOD_COMPAN_{it} + \beta_{14} BOD_WOMEN_{it} + \beta_{15} BOD_MINDEP_{it} + \beta_{16} BOD_CHINDEP_{it} + \beta_{17} ROA_{it} + \beta_{18} LEVERAG_{it} + \beta_{19} GROWTH_{it} + \beta_{20} FIRM_SIZE_{it} + \beta_{21} \Delta OCF / TASSETS_{it} + \beta_{22} LOSS_{it} + INDUSTRY_{it} + YEAR_{it} + \varepsilon_{it} \text{ (main model)}$$

² This period was chosen because the audit committee become compulsory in the UK from 2005 and this research started in 2015, so the latest data available about the firms was in 2015.

³ Some ACC data, related to some firms, such as nationality, education background and age were not found in firms' annual reports. Therefore, they were obtained from the Google website.

The definitions of variables are provided in Table 2-2

Table 2-2 Variable Definitions

Items	Variable definitions
Dependent variable	
DA	Discretionary accruals as measured Kothari et al. (2005).
Independent variables	
ACC_AGE	The age of the audit committee chair.
ACC_TENURE	The number of years that audit committee chair has served as a chair in the same firm.
ACC_PRE_TENURE	The number of years that audit committee chair has served in the company before s/he becomes a chair of the audit committee.
ACC_A&F	A dummy variable that takes the value of 1 if the audit committee chair has an accounting and finance education background and 0 otherwise.
ACC_INDUSTRY	Number of industries in which the audit committee chair has had experience.
ACC_NETWORK	Number of board members with whom the audit committee chair is connected in different organisations.
ACC_EDUCATION	Number of certificates that the audit committee chair holds.
ACC_NON_FOREIGN	A dummy variable that takes the value of 1 if the audit committee chair is non-foreign and 0 otherwise
Control variables	
AC_SIZE	The number of directors on the audit committee.
AC_MEETING	The number of annual meetings of the audit committee held during the fiscal year.
BOD_SIZE	The number of directors on the board.
BOD_MEETING	The number of annual meetings of the board of directors held during the fiscal year.
BOD_COMPAN	The natural log of compensation earned by all board of directors.
BOD_WOMEN	The ratio of women on the board, measured as the number of women on the board divided by the total number of board directors.
BOD_MINDEP	The ratio of independent ⁴ directors on the board, measured as the number of independent directors divided by the total number of board of directors.
BOD_CHINDEP	A dummy variable that takes the value of 1 if the board chair is independent and 0 otherwise.
ΔOCF/TASSETS	The change in annual net cash flow from operating activities divided by the total assets at the end of the fiscal year.
ROA	Profit before tax at the end of the fiscal year divided by the total assets at the end of the discal year.
LEVERAGE	The ratio of total liabilities to total assets.
GROWTH	Yearly percentage of sales change.
FIRM-SIZE	The natural log of total assets.
LOSS	A dummy variable that takes the value of 1 if the firm makes a loss and 0 otherwise.
<i>INDUSTRY_{it}</i>	Dummies for the UK ICB code industry group.
<i>YEAR_{it}</i>	Dummies for the fiscal years.

⁴ See <https://www.frc.org.uk/getattachment/ca7e94c4-b9a9-49e2-a824-ad76a322873c/UK-Corporate-Governance-Code-April-2016.pdf>, for more information regarding the definition of board independence

Accrual Earnings Management Measurement

Following previous studies, such as Dechow et al. (1995), Kothari et al. (2005) and Juhmani (2017), discretionary accruals (abnormal accruals) are used as a proxy for earnings management and it captures the distortions of accounting regulations' application, while normal accruals capture the change of fundamental performance.

Several models are used in previous studies to separate the discretionary accruals component, including Jones (1991), Dechow et al. (1995), Kothari et al. (2005), Dechow (2002) and Francis (2005). Dechow⁵ et al. (2010) evaluate these models based on their abilities in identifying normal and abnormal accruals and mitigating type one and two errors⁶.

This study uses Jones (1991) model as modified by Kothari et al. (2005) to measure earnings management as it is the most used models in the literature to measure earnings management (Juhmani, 2017). Jones (1991) defines accruals as a function of gross property, plant and equipment, and sales growth. It is found that the Jones (1991) model explains approximately 10% of accrual variance (Dechow et al., 2010). Gross property, plant and equipment, and sales growth have a positive correlation with total accruals (Dechow et al., 2003) and earnings performance, and a negative relationship with the performance of cash flow (Dechow et al., 1995). These characteristics increase the rate of type 1 error. This model also fails to detect earnings management where it exists. Dechow et al. (1995) modified the Jones (1991) model by adjusting credit sales growth to decrease type 2 error. This helps to enhance the power of the Jones (1991) model. Also, the firm's economic transactions and its credit policies are controlled by the Dechow et al. (1995) model.

The modified Jones model assumes that earnings management causes all credit sales' changes in the event period, and managers find that revenue recognition on credit sales (Dechow et al., 1995). Dechow et al. (1995) find that non-discretionary accruals as measured by Jones' (1991) model are overestimated, while discretionary accruals are underestimated because the revenues are considered as non-discretionary. Dechow and Skinner (2000) state that modified Jones (1991) is the best model to detect earnings management. However, Kothari et al. (2005) find that when financial performance is extreme, both Jones and modified Jones models measure earnings management poorly because the Jones model as modified by Dechow 1991 treats all revenue receivable as discretionary, so it underestimates non-discretionary and overestimates discretionary accruals. Therefore, Kothari et al. (2005) add return on assets as an additional independent factor to the Dechow et al. (1995) model to control for the performance of the firm. Thus, this study uses Kothari et al. (2005) to measure discretionary accruals and follows previous studies, such as Malikov et al. (2017), Katmon and Farooque (2015), Arun et al. (2015) and Athanasakou (2009) in using at least six companies in each industry. Consistent with previous studies, such as Dechow et al. (1995) and

⁵ Dechow et al. (2010) review more than 300 studies that examine earnings quality using a variety of proxies in order to measure it. They classify the proxies of earnings quality into three categories. The first category is earnings properties, which includes accruals and persistence of earnings, earnings smoothing, timely loss recognition and timeliness, and target beating (earnings management). The second category is the responsiveness of investors to earnings, which includes the coefficient of earnings response (ERC) and another construct of ERC, such as auditor quality. The third category is the misstatement of earnings of external indicators, which includes enforcement of auditing and accounting, the internal control, and restatement. This study focuses on the first category, particularly on earnings management as a proxy for earnings quality using discretionary accruals models.

⁶ A type I error occurs when the null hypothesis is rejected when it should not be rejected, in other words, when it is concluded that there is a relationship between the phenomena being investigated, when in fact there is not. A type II error occurs when the null hypothesis is not rejected when it should be rejected; in other words, when it is concluded that there is not a relationship between the phenomena being investigated, when in fact there is.

Kothari et al. (2005) total discretionary accruals, $TDA_{i,t}$, is the difference between net incomes before extraordinary items and operating cash flows divided by the lag of total assets. The equation below shows the computation of total accruals:

$$TDA_{i,t} = \frac{(NETINCOME_{i,t} - CASHFLOW_{i,t})}{ASSETS_{i,t-1}} \quad (1)$$

The total accruals are regressed on change in sales and property plant and equipment level as follows

$$\frac{TDA_{i,t}}{ASSETS_{i,t-1}} = \beta_0 \left(\frac{1}{ASSETS_{i,t-1}} \right) + \beta_1 \left(\frac{\Delta REV_{i,t}}{ASSETS_{i,t-1}} \right) + \beta_2 \left(\frac{PPE_{i,t}}{ASSETS_{i,t-1}} \right) + \varepsilon_{i,t} \quad (2)$$

where $TDA_{i,t}$ is total accruals for firm i in year t , $ASSETS_{i,t}$ is total assets for firm i in year t , $\Delta REV_{i,t}$ is the change in sales for firm i in year $t-1$ and year t , $PPE_{i,t}$ is property, plant and equipment for firm i in year t . Non-discretionary accruals are estimated by using the coefficient of regression from equation (2), and as used by Dechow et al. (1995), the change in sales is modified by subtracting account receivable change $\Delta REC_{i,t}$, and as used by Kothari et al. (2005), return on assets for firm i in year t $ROA_{i,t}$ is modified by adding to the equation as follows:

Modified Jones (1991) model by Dechow et al. (1995):

$$\frac{NDA_{i,t}}{ASSETS_{i,t-1}} = \hat{\beta}_0 \left(\frac{1}{ASSETS_{i,t-1}} \right) + \hat{\beta}_1 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{ASSETS_{i,t-1}} \right) + \hat{\beta}_2 \left(\frac{PPE_{i,t}}{ASSETS_{i,t-1}} \right) \quad (3a)$$

Modified Jones (1991) model by Kothari et al. (2005):

$$\frac{NDA_{i,t}}{ASSETS_{i,t-1}} = \hat{\beta}_0 \left(\frac{1}{ASSETS_{i,t-1}} \right) + \hat{\beta}_1 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{ASSETS_{i,t-1}} \right) + \hat{\beta}_2 \left(\frac{PPE_{i,t}}{ASSETS_{i,t-1}} \right) + \hat{\beta}_3 ROA_{i,t} \quad (3b)$$

where $NDA_{i,t}$ is non-discretionary accrual for firm i in year t and $ROA_{i,t}$ is the return on assets.

The discretionary accruals $DA_{i,t}$ is computed as follows:

$$\frac{DA_{i,t}}{ASSETS_{i,t-1}} = \frac{TDA_{i,t}}{ASSETS_{i,t-1}} - \frac{NDA_{i,t}}{ASSETS_{i,t-1}} \quad (4)$$

Equation (3b) is used to replace $NDA_{i,t}$ in equation (4) to find $DAC_{i,t}$ based on Kothari et al. (2005). Following Jiraporn et al. (2008) the absolute discretionary accruals are used as a proxy for earnings management to capture both effect of discretionary accruals (income-increasing and decreasing).

Where :

$TDA_{i,t}$	Total discretionary accruals.
$NDA_{i,t}$	Non-discretionary accruals.
$DA_{i,t}$	Discretionary Accruals.

$\Delta REV_{i,t}$	Change in revenues measured as revenues in year t minus revenue in year $t - 1$.
$PPE_{i,t}$	Gross property plant and equipment as measured gross property plant and equipment in year $t - 1$
$TASSETS_{i,t-1}$	The total assets at the end of the year $t - 1$.
$NETINCOME_{i,t}$	Net income at the end of the financial year.
$CASHFLOW_{i,t}$	Cash flow from operating activities at the end of the fiscal year.
$ROA_{i,t}$	The return on assets calculated as profit before tax at the end of the year divided by the total assets.
$\Delta REC_{i,t}$	Changes in accounts receivable measured as accounts receivable in year t minus accounts receivable in year $t - 1$.

The Audit Committee Chair Characteristics

The data of Audit Committee Chair (ACC) characteristics, which include age, tenure, pre-tenure, accounting and financial expertise, social networking, industry experience, educational background, and nationality, are hand-collected from the profile of non-executive directors in the firm's annual report.

Following prior studies, such as Huang and Hilary (2018), Ghafran and Yasmin (2018) and Dhaliwal et al. (2010), this study measures audit committee chair tenure, ACC_TENURE , by the number of years that the chair of the audit committee has served as chair of the audit committee at the firm. This is encouraged by the UK corporate governance rules where non-executives with more than nine years of tenure are considered not to be independent.

The audit committee chair's pre-tenure experience ACC_PRE_TENURE , is measured by the number of years that the chair of the audit committee served at the firm before s/he became chair of the audit committee.

Following Thiruvadi (2018), this study measures audit committee chair age ACC_AGE by the age of the audit committee chair.

Previous researchers, such as Dechow et al. (1995) construct the industry expertise by using the SIC code (the first two digits). Faleye et al. (2018) use the director's current and previous history of employment within a given industry. ACC industry expertise, $ACC_INDUSTRY$, is measured by the number⁷ of industries that the audit committee chair has experience in.

Chiu et al. (2012) test the influence of social networking of the board director on accounting choices, such as earnings management. Chiu et al. (2012) measure social networking by the links between the firm board members and other board members in other firms. Thus, this study also measures social networking $ACC_NETWORK$ ⁸, by the number of external board directors (at other firms) whom the audit committee chair has known.

To measure the ACC accounting and finance expertise, this study follows Krishnan and Visvanathan (2008) and Ghafran and Yasmin (2018) and measures the accounting and financial experience of an audit committee chair by the number of jobs that linked to auditing and accounting expertise s/he has held (recently or previously), such as certified public accounting, auditor, chief accounting/financial officer, and controller. The audit committee chair is considered as not having accounting and financial expertise if s/he is financial analyst, CEO, firm president, investment banker, or has experience gained while supervising the financial report preparation (Ghafran &

⁷ This number is obtained from the ACC profile/ background.

⁸ Bloomberg shows how many external board directors that the ACC has links with.

Yasmin, 2018). Accounting and finance expertise *ACC_A&F*, is measured by a dummy variable that takes the value of 1 if the audit committee chair has expertise in accounting and finance, such as an auditor, CPA, chief accounting and financial officer, or accounting education background (bachelor in accounting and finance) and zero otherwise.

Harjoto et al. (2018) test the relationship between board nationality and corporate social responsibility, and they use the board director's national citizenship as a measurement to capture the nationality. Following Harjoto et al. (2018), this study measures the nationality of the audit committee chair *ACC_NONFOREIGN*, using a variable which takes the value of 1 if the chair of the audit committee's citizenship is British and zero otherwise.

The audit committee education is measured in previous studies, such as Aldamen et al. (2018) by academic qualifications such as an accounting and finance degree and professional certification as CPA, CMA, and CFA. For the purpose of this study, the number of academic and non-academic certificates that the audit committee chair holds measure the ACC educational background *ACC_EDUCATION*.

2. Data Analysis

Descriptive Statistics

Regarding audit committee chair characteristics, Table 1-3 shows that the average age of the audit committee chair is 57.9 years while the minimum is 30 with a median of 58 years. The mean of the audit committee age is quite similar for each year as shown in **Error! Reference source not found.**, while based on industry, Table 2-3 shows that the means of the age of the audit committee chair in industry groups 7000 and 9000 are the lowest, at 55 and 56 years old, respectively. Further analysis in **Error! Reference source not found.** indicates that 37% of the audit committee chairs are more than 60 years old and 59% are aged between 45 and 60 years old.

Regarding the audit committee chair tenure, the average tenure of the audit committee chair is 3.46 years (this is quite similar to the average tenure for each industry, see Table 2-3 while the mean is between 4 and 4.6 years from the year 2010 to 2015. These results are consistent with Ghafran and Yasmin (2018) who find that the average tenure of the audit committee chair for the FTSE 350 in the UK is 4.5 years. Further investigation in **Error! Reference source not found.** shows that 59% of the audit committee chairs have three years tenure or less and 11% have more than six years as chair of the audit committee. Also, Table 1-3 reports that the audit committee chair served at the same firm on average for two years before becoming a chair of the audit committee. However, Table 2-3 shows that the means of pre-tenure in industry groups 7000 and 1 are 3.83 and 0.95 respectively. For additional investigation **Error! Reference source not found.** shows that 27% of the chairs had at least one year experience in the same firm before they chaired the audit committee.

It can be seen from Table 1-3 that 86% of the ACC have accounting and financial expertise. This percentage is similar for each year (see **Error! Reference source not found.**), but based on industry analysis, Table 2-3 shows that the mean of ACC accounting and financial expertise of industry group 7000 is the lowest with 64%; all other groups have means between 79% and 95%. Arun et al. (2015) find that 94% of ACC of UK firms are financial experts and Ghafran and Yasmin (2018) find that 0.92 of the ACC are financial and accounting experts. This finding is quite similar to this study and the small difference could be because of the difference in the period and the sample size.

Table 1-3 also represents that the median values for ACC social networking and industry experience are ten people and seven sectors respectively. In addition, Table 2-3 and **Error! Reference source not found.** show that the means of these variables fluctuated slightly from year to year among industries except one difference in social networking for industry group 9000. The ACCs in that

group seem to know far fewer board members in other firms, since the mean of social networking of industry group 9000 is 7.62, while in other groups the lowest mean is 11.93, in group 8000, and the highest mean is 20.82, in group 1000. For further investigation, social networking is categorised into three categories, the first category is 10 people or less, the second category is from 11 to 20 people and the third category is more than 20 people. As shown in **Error! Reference source not found.**, 52% of ACC have links with 10 board members from other firms and 29% more than 20. The ACC industry experience is divided into two categories which are less than 7 (the median) and more than 7.

Table 1-3 shows that the mean of the ACC gender is 0.94 which means that most ACC are male and only 6% are female. Table 1-3 also presents that 82% of the ACC are British. **Error! Reference source not found.** shows that 59% of the ACC hold one qualification and 41% of the ACC hold from two to six.

In respect of audit committee meetings and size, the means are 4.55 meetings and 3.86 members in the audit committee, with a median of 4 for both meetings and size. This means that on average, UK firms have three members of the audit committee and meet four times a year. These results confirm that UK firms meet the requirements of the UK Financial Reporting Council (UKFCG, 2018) which require at least three members on the audit committee and that they should meet at least three times a year. AC size is divided into two categories: 3 or fewer members and more than 3 members. **Error! Reference source not found.** shows that 42% of UK firms have 3 members in the AC. The number of annual meetings and the size of the AC are the same for each year and industry (see Table 2-3 and **Error! Reference source not found.**).

Table 1-3 also represents that the average number of board members is 9.61, for industry level. Table 3-2 shows that the mean is between 9.95 (group 1) and 8.6 (group 7000) while these means are quite similar for each year as shown in **Error! Reference source not found.** Regarding board meetings, from Table 1-3 it can be seen that the mean is 8.53, and the number is in the same range for each industry and year as presented in Table 3-2 and **Error! Reference source not found.** These results are consistent with Katmon and Farooque (2015) (who find the mean number of board meetings is 8.71 and board size 9.49) and with Al-Shaer and Zaman (2017) who find that the average board size is 9.416 and number of board meetings 8.87. Table 3-1 provides evidence that in average 14% of the directors on the board are female, the median is 1, and the maximum is 4. This finding is consistent with Arun et al. (2015) who find that the average number of a woman on UK firms' boards is 1, and 4 is the maximum number. Also, **Error! Reference source not found.** reports that the percentage of women on the board was 11% in 2005 and increased every year to reach 17% in 2015. This means that UK firms tend to respond more to a woman on the board. Previous research finds that this percentage was 4.5% in 1999 and 10.5% in 2005 (Gros vold et al., 2007).

From Table 1-3 it is clear that the ratios of independent board members and chair are 0.58 and 0.06 respectively. This result is higher than that of Arun et al. (2015) who report that 48% of board members were independent for the period from 2005 to 2011. This means that UK firms seem to have more members who are independent. Table 1-3, Table 3-2 and **Error! Reference source not found.** show that the mean of the log of board compensation is about 13 for each year and industry. Table 1-3 shows that 98% of UK firms are audited by the Big 4 this is consistent with Arun et al. (2015) who find that 95% of UK firms are audited by the Big 4.

Regarding firm-specific characteristics, the means of return on assets, leverage, sale growth, firm size (total assets) and cash flow to total assets are 6.85, 4.6, 8.4, 2.3 and 0.0004 respectively. These results are quite similar to Arun et al. (2015) who find that the means of leverage, sale growth and return on assets are 9, 5.9 and 2 respectively. The sales growth in the years 2005, 2006 and 2007 is

about 11, while it decreases dramatically in 2008 (8) and 2009 (5). This might be as a result of the financial crisis. Other firm variables based on each year and industry are quite similar.

Table 1-3 also shows the means of discretionary accruals (DA) (the dependent variable) as measured by Kothari et al. (2005) is -0.01. This result is consistent with the previous studies of Kassamany et al. (2017) who find that the mean of DAC measured using Kothari et al. (2005) is -0.01. The results show that, on average, UK firms tend to engage in negative earnings management being more conservative. Table 1-3 shows consistent values of firm-specific variables with those found in previous UK studies. Following previous studies, such as Cornett et al. (2009) and Katmon and Farooque (2015) all continuous variables are winsorized at 1% top and bottom, to decrease the effect of outliers.

Table 3-1 Descriptive Statistics for all Industries and Years

Stats	Obs	Mean	p50	Sd	p25	p75	skew	Kurt
DAKit	1,300	-0.018	-0.014	0.218	-0.102	0.053	0.450	7.522
ACC_AGE	1,610	57.90	58.00	6.695	53.00	63.00	-0.203	3.194
ACC_TENURE	1,618	3.464	3.000	2.216	2.000	5.000	0.884	3.218
ACC_PRE_TENURE	1,618	2.068	1.000	3.198	0.000	2.000	3.446	17.96
ACC_A&F	1,639	0.862	1.000	0.345	1.000	1.000	-2.101	5.412
ACC_NETWORK	1,584	15.06	10.00	15.33	4.000	24.00	1.411	4.977
ACC_INDUSTRY	1,585	7.283	7.000	4.117	4.000	10.00	0.631	3.502
ACC_GENDER ⁹	1,619	0.936	1.000	0.244	1.000	1.000	-3.576	13.78
ACC_EDUCATION	1,562	1.576	1.000	0.834	1.000	2.000	1.794	7.262
ACC_NON_FOREIGN	1,618	0.820	1.000	0.383	1.000	1.000	-1.672	3.797
AC_MEETING	1,639	4.559	4.000	1.787	3.000	5.000	1.626	6.718
AC_SIZE	1,639	3.860	4.000	0.959	3.000	4.000	1.126	4.411
BOD_SIZE	1,639	9.617	9.000	2.677	8.000	11.00	0.870	3.867
BOD_MEETING	1,639	8.534	8.000	2.860	7.000	10.00	1.474	8.708
BOD_COMPAN	1,575	13.05	13.07	0.823	12.61	13.59	-0.387	3.108
BOD_WOMEN	1,638	0.141	0.143	0.096	0.083	0.214	0.141	2.527
BOD_MINDEP	1,638	0.588	0.583	0.133	0.500	0.667	-0.385	3.705
BOD_CHINDEP	1,638	0.060	0.071	0.059	0.000	0.111	0.182	1.474
ROA	1,639	6.851	5.614	7.121	1.676	10.64	0.759	3.142
AUDIT_BIG4 ¹⁰	1,612	0.980	1.000	0.142	1.000	1.000	-6.78	47.02
LEVERAGE	1,639	0.046	0.027	0.051	0.019	0.043	2.511	8.285
GROWTH	1,639	0.084	0.061	0.165	-0.007	0.160	0.609	3.417
FIRM_SIZE	1,420	2.389	2.368	0.443	2.092	2.618	0.482	2.965
ΔOCF/ TASSETS	1,628	0.000	0.000	0.001	0.000	0.000	5.171	37.37
LOSS	1,606	0.118	0.000	0.323	0.000	0.000	2.364	6.587

DAKit = Discretionary accruals as measured by Jones (1991) model as modified by Kothari et al. (2005). ACC_AGE = The age of the audit committee chair. ACC_TENURE = The number of years that the audit committee chair has served as a chair in the same firm. ACC_PRE_TENURE = The number of years that the audit committee chair has served in the company before s/he becomes a chair of the audit committee. ACC_A&F = A dummy variable that takes the value of 1 if the audit committee chair has an accounting and finance education background and 0 otherwise. ACC

⁹ The ACC gender was addressed at the first stage in the model, but the descriptive statistics shows that most ACC are male with a mean of 0.936. Thus, gender is excluded from the regression.

¹⁰ AUDIT_BIG4 was addressed at the first stage in the model, but the descriptive statistics shows that most firm are audited by Big4 with a mean of 0.98. Thus, AUDIT_BIG4 is excluded from the regression.

_NETWORK = Number of board members with whom the audit committee chair is connected in different organisations. **ACC_INDUSTRY** = Number of industries in which the audit committee chair has had experience. **ACC_GENDER** = A dummy variable that takes the value of 1 if the audit committee chair is male and zero otherwise. **ACC_EDUCATION** = Number of certificates that the audit committee chair holds. **ACC_NON_FOREIGN** = A dummy variable that takes the value of 1 if the audit committee chair is non-foreign and 0 otherwise. **AC_MEETING** = The number of annual meetings of the audit committee held during the fiscal year. **AC_SIZE** = The number of directors on the audit committee. **BOD_SIZE** = The number of directors on the board. **BOD_MEETING** = The number of annual meetings of the board of directors held during the fiscal year. **BOD_COMPAN** = The natural log of compensation earned by all board directors. **BOD_WOMEN** = The ratio of women on the board, measured as the number of women on the board divided by the total number of board directors. **BOD_MINDEP** = The ratio of independent¹¹ directors on the board, measured as the number of independent directors divided by the total number of directors. **BOD_CHINDEP** = A dummy variable that takes the value of 1 if the board chair is independent and 0 otherwise. **ROA** = Profit before tax at the end of the fiscal year divided by the total assets at the end of the discal year. **AUDIT_BIG4** = A dummy variable that takes the value of 1 if the firm audited by big 4 audit company and zero otherwise. **LEVERAGE** = The ratio of total liabilities to total assets. **GROWTH** = Yearly percentage of sales change. **FIRM-SIZE** = The natural log of total assets. **ΔOCF/TASSETS** = The change in annual net cash flow from operating activities divided by the total assets at the end of the fiscal year. **LOSS** = A dummy variable that takes the value of 1 if the firm makes a loss and 0 otherwise.

¹¹ See <https://www.frc.org.uk/getattachment/ca7e94c4-b9a9-49e2-a824-ad76a322873c/UK-Corporate-Governance-Code-April-2016.pdf>, for more information regarding the definition of board independence

Table 2-3 Descriptive Statistics Industry Group¹² Mean

Stats/Group	1	1000	2000	3000	4000	5000	7000	8000	9000
DAKit	1.11E-19	1.68E-19	-0.04	-0.02	-1.43E-09	-0.02	1.43E-09	-0.01	-1.43E-09
ACC_AGE	57.35	59.61	57.85	58.00	60.62	57.01	55.16	59.49	56.14
ACC_TENURE	3.47	3.49	3.39	3.36	4.01	3.54	3.37	3.45	3.47
ACC_PRE_TENURE	0.95	2.20	1.93	2.10	1.27	2.35	3.83	2.38	1.43
ACC_A&F	0.93	0.82	0.89	0.92	0.82	0.83	0.64	0.79	0.95
ACC_NETWORK	18.48	20.82	16.13	14.44	17.81	11.95	20.89	11.93	7.62
ACC_INDUSTRY	7.86	8.21	6.72	8.19	8.40	6.31	8.65	6.78	8.26
ACC_GENDER	0.92	0.81	0.94	0.98	0.97	0.98	0.81	0.89	0.98
ACC_EDUCATION	1.32	1.81	1.46	1.80	1.54	1.39	2.53	1.56	1.46
ACC_NON_FOREIGN	0.84	0.65	0.83	0.88	0.66	0.85	0.64	0.87	0.95
AC_MEETING	4.16	4.11	4.61	4.61	4.27	4.88	4.53	4.66	4.10
AC_SIZE	4.19	4.07	3.82	3.67	3.80	4.23	3.53	3.55	3.75
BOD_SIZE	9.95	9.69	9.60	9.74	9.58	9.63	8.60	9.87	9.44
BOD_MEETING	8.77	8.92	8.68	7.93	8.65	8.88	8.40	8.09	8.17
BOD_COMPAN	13.16	13.31	13.01	13.11	12.91	13.16	12.83	12.91	13.07
BOD_WOMEN	0.17	0.16	0.15	0.13	0.13	0.14	0.09	0.12	0.17
BOD_MINDEP	0.62	0.61	0.58	0.61	0.58	0.59	0.54	0.56	0.59
BOD_CHINDEP	0.06	0.07	0.07	0.06	0.05	0.06	0.02	0.05	0.07
ROA	5.79	6.28	6.09	9.10	6.67	7.13	9.30	5.01	7.49
LEVERAGE	0.03	0.08	0.05	0.03	0.06	0.05	0.02	0.06	0.03
GROWTH	0.08	0.07	0.08	0.10	0.08	0.09	0.11	0.08	0.05
FIRM_SIZE	2.28	2.40	2.46	2.42	2.39	2.34	2.35	2.35	2.26
ΔOCF/ TASSETS	0.0001	0.0007	0.0005	0.0004	0.0002	0.0005	0.0016	0.0002	0.0005
LOSS	0.14	0.13	0.15	0.13	0.07	0.10	0.09	0.08	0.08

DAKit = Discretionary accruals as measured by Jones (1991) model as modified by Kothari et al. (2005). ACC_AGE = The age of the audit committee chair. ACC_TENURE = The number of years that audit committee chair has served as a chair in the same firm. ACC_PRE_TENURE = The number of years that audit committee chair has served in the company before s/he becomes a chair of the audit committee. ACC_A&F = A dummy variable that takes the value of 1 if the audit committee chair has an accounting and finance education background and 0 otherwise. ACC_NETWORK = Number of board members with whom the audit committee chair is connected in different organisations. ACC_INDUSTRY = Number of industries in which the audit committee chair has had experience. ACC_GENDER = A dummy variable that takes the value of 1 if the audit committee chair is male and zero otherwise. ACC_EDUCATION = Number of certificates that the audit committee chair holds. ACC_NON_FOREIGN = A dummy variable that takes the value of 1 if the audit committee chair is non-foreign and 0 otherwise. AC_MEETING = The number of annual meetings of the audit committee held during the fiscal year. AC_SIZE = The number of directors on the audit committee. BOD_SIZE = The number of directors on the board. BOD_MEETING = The number of annual meetings of the board of directors held during the fiscal year. BOD_COMPAN = The natural log of compensation earned by all directors. BOD_WOMEN = The ratio of women on the board, measured as the number of women on the board divided by the total number of board directors. BOD_MINDEP = The ratio of independent directors on the board, measured as the number of independent directors divided by the total number of directors. BOD_CHINDEP = A dummy variable that takes the value of 1 if the board chair is independent and 0 otherwise. ROA = Profit before tax at the end of the fiscal year divided by the total assets at the end of the fiscal year. LEVERAGE = The ratio of total liabilities to total assets. GROWTH = Yearly percentage of sales change. FIRM-SIZE = The natural log of total assets. ΔOCF/TASSETS = The change in annual net cash flow from operating activities divided by the total assets at the end of the fiscal year. LOSS = A dummy variable that takes the value of 1 if the firm makes a loss and 0 otherwise.

¹² The industry group represents the classification of the firms based on their sector using the ICB code

3. Empirical Tests and Results

Stationarity and Cointegration Test

This section presents the empirical results of the effect of the audit committee chair characteristics on earnings management measured by accruals and real earnings in the UK context. Before the empirical results, some pre-tests are shown to check variables' stationarity and cointegration, since this study uses panel data it is very crucial to apply stationarity and cointegration tests to ensure that the results are not spurious. This chapter covers basic regression OLS based on Kothari et al. (2005) using total and current discretionary accruals, panel data models (fixed and random effect), and GMM. Also, this chapter reports the empirical findings of real earnings measurement using same these tests Previous empirical and theoretical literature on the audit committee has not paid attention to applying unit roots and cointegration tests to check for stationarity and long-run relationship between variables used to test the relationship between audit committee characteristics and earnings management, although using non-stationary variables which are not cointegrated leads to spurious regression (Kao, 1999). Therefore, this study applies unit roots and cointegration tests to test all the variables used to test the hypotheses. This makes the results more trustworthy, and ensures they are not spurious.

Recent studies, such as Nazlioglu and Karul (2017), Omay et al. (2017) Im et al. (2003), Hadri (2000), and Levin et al. (2002) have increasingly considered non-stationarity and heterogeneity problems in panel data models. Stationarity of a variable means that the variance and the mean of the variable are constant (Bhattacharai, 2016). Baffes (1997) reports that a model is valid and can be used to test hypotheses if the variables used in the model are stationary. Non-stationary variables are not useful to interpret the results of hypotheses. Mahalik et al. (2017) add that when variables are non-stationary, the results of the model will be spurious. However, if these variables are cointegrated, the models, in this case, are valid for estimation purposes (Bhattacharai, 2016). Therefore, it is crucial to check variables' stationarity using the unit root test, to be sure that the audit committee chair and earnings management variables provide correct information with which to test their relationship in the series. When the actual value is bigger than a critical value which is computed by the unit root test, the variable is stationary. If not, a difference of the variable should be taken to achieve stationarity in the variable. Stationarity might occur from the first or second or third difference (Bhattacharai, 2016). In time series data, various tests can be used to check for variables' stationarity, such as DF, ADF, and PP. In panel data, LLC, IPS, Hadri, and Fisher tests are used to check for stationarity.

Stationarity and cointegration tests support the results of the regression. The Dickey-Fuller test is used to test whether the variables contain unit roots, while Kao's (1999) cointegration test is applied to check whether the panel of variables is cointegrated.

The results of the unit root test in **Error! Reference source not found.** panel A shows that the p-value of the audit committee, board and firm variables is less than 0.05. This means that these variables do not contain a unit root. Therefore, the null hypothesis of the Dickey-Fuller test, that all panels contain unit roots, is not accepted. On the other hand, **Error! Reference source not found.**, Panel B shows that the p-value of ACC variables is more than 0.05, which means that the null hypothesis regarding all panels containing unit roots is accepted. This means that the ACC variables, including age, accounting and financial experience, firm experience, social networking, industry experience, and gender have unit-roots. In this case, these variables have to be made stationary by taking the first, second etc difference until they become stationary, unless they are cointegrated (have a long-run relationship). If non-stationary variables are cointegrated, there is no need to make them stable and the non-stationary variables can be used in the model to test the hypotheses.

A cointegration test is used to check for the combination of the variables in the model. There are a variety of types of this test that can be used in time series data, e.g. Engle-Granger (for a single equation), and Johansen (for multiple equations) and panel data, such as Pedroni, Kao, Johansen, Fisher, and KPSS (Bhattacharai, 2016). If Z is equal to $I(0)$, this means that these variables are cointegrated. In this case, non-stationary variables can be used. When the cointegration test shows that the p is significant, this means these variables are not cointegrated. Therefore, the first difference has to be applied to achieve cointegration (Bhattacharai, 2016). Bhattacharai (2016) reports that when there is cointegration of a series of variables at order 1, an error correction model should be applied to correct the data representation. Therefore, an error correction model will be employed in this study if there is a cointegration issue. This model is shown below:

$\Delta y_t = \Delta x_t + \rho (y_{it-1} - x_{it-1}) + u_{it}$ When ρ is between -1 and 1, this means that the error is corrected.

Error! Reference source not found. panel A shows the Kao test for all variables (stationary and non-stationary variables) to check whether they are cointegrated or not. It can be seen from **Error! Reference source not found.** panel A in the Appendix that the P-value is less than 0.05, which means that the null hypothesis (no cointegration) is not accepted. Since these variables are cointegrated, these non-stationary variables can be used to estimate the model. Also, **Error! Reference source not found.** panel B presents the cointegration test for non-stationary variables. The p-value for Modified Dickey-Fuller t and Dickey-Fuller t is also less than 0.05, which means that these variables have a long-run relationship and are cointegrated. Thus, there is no need to apply an error correction model.

Empirical results of the Audit Committee Chair Characteristics and Discretionary Accruals

This section will provide a various test, such as OLD as a base model to test the relationship between the audit committee chair characteristics and earnings management. some other model will also be shown in this section, such as panel data and GMM which is used to solve the endogeneity issue.

OLS Model based on Kothari et al. (2005) Using Total Discretionary Accruals

The model that was shown in section 3.5 will be used to find how the audit committee chair characteristics and other control variables affect the level of earnings management as measured by total discretionary accruals based on Kothari et al. (2005) ($DAKT_{it}$).

Table 1-4 shows the findings of discretionary accruals measured using Kothari et al. (2005) (the proxy of earnings management) and other independent variables including ACC, firm, AC and Board characteristics using pooled ordinary least squares (OLS). M1 in Table 1-4 represents the regression results of firm-specific characteristics as a baseline model to test their potential effect on earnings management. The ACC characteristics are added to M2 in Table 1-4 to examine the impact of these variables on earnings management .

Table 1-4OLS Model Using Kothari et al. (2005 (

VARIABLES	M1	M2	M3	M4
ROA	0.002** (2.103)	0.001 (1.377)	0.001 (1.576)	0.001 (1.350)
LEVERAGE	-0.111 (-1.122)	-0.298*** (-2.734)	-0.304*** (-2.753)	-0.217* (-1.701)
GROWTH	0.032 (1.064)	0.022 (0.708)	0.016 (0.528)	0.006 (0.203)
FIRM_SIZE	0.017* (1.712)	0.021** (2.103)	0.022** (2.180)	0.022** (2.078)
ΔOCF/ TASSETS	22.455*** (3.776)	29.428*** (4.707)	27.549*** (4.396)	23.748*** (3.749)
LOSS	0.031* (1.859)	0.021 (1.224)	0.022 (1.312)	0.018 (1.067)
ACC_AGE		0.002*** (2.921)	0.002*** (2.803)	0.002*** (2.742)
ACC_TENURE		-0.006*** (-2.613)	-0.006*** (-2.615)	-0.007*** (-2.976)
ACC_PRE_TENUR		-0.001 (-0.775)	-0.002 (-0.923)	-0.002 (-1.255)
ACC_A & F		-0.011 (-0.906)	-0.014 (-1.226)	-0.006 (-0.493)
ACC_NETWORK		0.001*** (2.748)	0.001** (2.449)	0.001** (2.358)
ACC_INDUSTRY		-0.001 (-0.901)	-0.001 (-0.550)	-0.001 (-0.435)
ACC_EDUCATION		0.008 (1.145)	0.007 (1.087)	0.008 (1.218)
ACC_NON_FOREIGN		0.010 (0.773)	0.004 (0.312)	0.000 (0.027)
AC_MEETING			-0.002 (-0.597)	0.002 (0.728)
AC_SIZE			-0.015*** (-3.074)	-0.010* (-1.961)
BOD_SIZE				-0.003 (-1.264)
BOD_MEETING				-0.002 (-1.004)
BOD_COMPAN				-0.018** (-2.433)
BOD_WOMEN				-0.098* (-1.913)
BOD_MINDEP				0.016 (0.411)
BOD_CHINDEP				0.035 (0.343)
Constant	0.035 (1.280)	-0.095* (-1.654)	-0.021 (-0.335)	0.234** (2.167)
Industry dummies	Included	Included	Included	included
Year dummies	Included	Included	Included	included
Observations	1,220	1,127	1,127	1,109
R-squared	0.192	0.208	0.215	0.226

T-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

ROA = Profit before tax at the end of the fiscal year divided by the total assets at the end of the fiscal year. LEVERAGE = The ratio of total liabilities to total assets. GROWTH = Yearly percentage of sales change. FIRM-SIZE = The natural log of total assets. Δ OCF/TASSETS = The change in annual net cash flow from operating activities divided by the total assets at the end of the fiscal year. LOSS = A dummy variable that takes the value of 1 if the firm makes a loss and 0 otherwise. ACC_AGE = The age of the audit committee chair. ACC_TENURE = The number of years that audit committee chair has served as a chair in the same firm. ACC_PRE_TENURE = The number of years that audit committee chair has served in the company before s/he becomes a chair of the audit committee. ACC_A&F = A dummy variable that takes the value of 1 if the audit committee chair has an accounting and finance education background and 0 otherwise. ACC_NETWORK = Number of board members with whom the audit committee chair is connected in different organisations. ACC_INDUSTY = Number of industries in which the audit committee chair has had experience. ACC_EDUCATION = Number of certificates that the audit committee chair holds. ACC_NON_FOREIGN = A dummy variable that takes the value of 1 if the audit committee chair is non-foreign and 0 otherwise. AC_MEETING = The number of annual meetings of the audit committee held during the fiscal year. AC_SIZE = The number of directors on the audit committee. BOD_SIZE = The number of directors on the board. BOD_MEETING = The number of annual meetings of the board of directors held during the fiscal year. BOD_COMPAN = The natural log of compensation earned by all board of directors. BOD_WOMEN = The ratio of women on the board, measured as the number of women on the board divided by the total number of board directors. BOD_MINDEP = The ratio of independent directors on the board, measured as the number of independent directors divided by the total number of directors. BOD_CHINDEP = A dummy variable that takes the value of 1 if the board chair is independent and 0 otherwise.

From Table 1-4M1, the results show that return on assets, firm size (measured by total assets), change on cash flow to total assets, and loss are significant ($p < 0.05, 0.1, 0.1$ and 0.01 respectively) and positively related with earnings management. The result of firm size is inconsistent with Arun et al. (2015) and Meek et al. (2007). This means that large firms prefer to manage earnings. One possible explanation is that large firms have greater market pressure since investors closely scrutinize them (Richardson, 2000). Thus, large firms “are more likely to adopt aggressive accounting policies which lead to income-increasing earnings management practices” (Arun et al., 2015:3).

The finding regarding return on assets is consistent with Arun et al. (2015). The finding of this study regarding changing operation of cash flow divided by total assets is inconsistent with Arun et al. (2015), while it is consistent with Albersmann and Hohenfels (2017).

The findings in previous studies of leverage are mixed. This study finds that leverage and earnings management are negatively associated. This result is consistent with Dechow and Skinner (2000). This means that when the firm has high *Leverage*, managers increase the level of earnings management. Likewise, the finding for loss shows that loss is significantly and negatively associated with earnings management. This result is consistent with Healy (1985) and Francis and Yu (2009). The findings indicate that the growth of the firm has no relationship with earnings management.

The main independent variables are audit committee chair characteristics including age (ACC_AGE), tenure (ACC_TENURE), pre-tenure (ACC_PRE_TENURE), accounting and finance expert (ACC_A&F), social networking (ACC_NETWORK), industry experience (ACC_INDUSRTY), education background (ACC_EDUCATION), and nationality (ACC_NATIONALITY). Table 1-4M2 shows the OLS regression estimation findings of ACC characteristics. Table 1-4M2 presents that audit committee chair age and networking are significantly ($p (0.01 >$ and positively associated with earnings management. Similarly, education

background and nationality of the audit committee chair also have a positive relationship with earnings management, but they are not significant. Other audit committee chair characteristics are negatively associated with earnings management, with the exception of the audit committee tenure, which is negatively and significantly ($p < 0.01$) with earning management.

Despite the view of Paulsen et al. (2012) and Gardner and Steinberg (2005) who find that older people tend to take less risk than younger people, the results show that the age of the audit committee is significant and positively impacts earnings management. One possible explanation is that when the audit committee members get older, they are less able to grasp new ideas or deal with challenging cases, and have less mental and physical energy (Qi & Tian, 2012). In addition, the finding is similar to that for board directors' age and earnings management, which tested by Faleye et al. (2018). This is because older audit committee members affect the audit committee effectiveness negatively by bringing disadvantages to the this committee by being set in their ways, and they are not able to face a business change (Sultana et al., 2019). Also, the productivity of older members of the audit committee is lower than that of younger members due to the absence of adaptability and competition (Magd, 2003). This suggests that an older audit committee chair has more experience and can manage earnings. Therefore, it can be argued that an older audit committee chair has a positive impact on earnings management. Thus, the finding of the audit committee chair age provides empirical evidence to support the first hypothesis of this study.

The findings in Table 1-4M2 show that the tenure of the chair of the audit committee is significant (p value < 0.1) and negatively associated with earnings management. This result is consistent with the Kosnik (1990) who addresses tenure of board directors and dealing with complicated processes in the committee. He finds that board directors can deal with complicated processes in the committee better when they stay longer on the board. Moreover, Beasley (1996) find that board directors who have more tenure reduce financial fraud. Other researchers, such as Bédard et al. (2004) and Sun and Liu (2014) find that the tenure of audit committee members affect negatively earnings management and bank risk respectively. Abernathy et al. (2014) find that the tenure of audit committee members decreases the time of audit reporting. Therefore, this result indicates that an audit committee chair with more years' experience as a chair of the audit committee affects earnings management negatively. Thus, this finding offers empirical evidence to support the second hypothesis. The finding shows no significant relationship between firm experience (pre-tenure) and earnings management. Thus, H3 is not supported empirically.

Table 1-4M2 also suggests that an audit committee chair who has accounting and finance experience has no impact on earnings management. This finding is consistent with Van Der Zahn and Tower (2004) who find no relationship between the audit committee financial expertise and earnings management. However, the finding is inconsistent with Choi et al. (2004) and Kusnadi et al. (2016). One possible explanation is that based on the UK Corporate Governance Code (UKCGC, 2018) and the European Audit Committee Guidance (2011), which require the audit committee to include members with accounting and finance expertise, the audit committee chair may not be the only member of the committee who has accounting and finance experience. This means that more than one member of the audit committee with expertise makes no difference to earnings management. Thus, the findings do not support the third hypothesis.

The results in Table 1-4M2 show that social networking of the audit committee chair is significant (p value > 0.01) and positively linked with earnings management. This means that the audit committee chair is influenced by other board directors in different firms (Granovetter, 1985) through their actions, feelings and thoughts (Hirshleifer & Hong Teoh, 2003). The finding is consistent with Hwang and Kim (2012) who find that social networking of the audit committee members with the CEO is positively associated with earnings management. One possible explanation is that more social networking between the audit committee chair and other board

directors in other firms provides an opportunity to transfer the knowledge and corporate practices of those directors (Chiu et al., 2012) to the audit committee chair. Another possible explanation is that the chair of the audit committee engages in social networking with other directors who hold shares in the firm. For example, Fracassi (2016) documents that when there is more social networking between directors and the CEO, the accuracy of accounting information will be less due to the education in the effectiveness of board monitoring. Thus, the results provide statistical evidence to support the fourth hypothesis.

The finding shows that the audit committee chair's industry experience, shown in Table 1-4M2, is negatively associated with earnings management. This finding is in line with the results of Faleye et al. (2018), Malmendier and Nagel (2011) and Xie et al. (2003). The results suggest that an audit committee chair who has more industry experience reduces earnings management. One possible explanation is that more working experience leads the chair of the audit committee to have more understanding of earnings management behaviour (Xie et al., 2003). Therefore, this may help to reduce the level of earnings management. This means that the audit committee chair does not prefer to manage earnings due to getting more industry experience. A second possible explanation is that the chair of the audit committee will recognise and understand information that is more suitable to the decision (Dearborn & Simon, 1958), and so make better and more acceptable decisions (Birnbaum & Stegner, 1979). This means that the audit committee chair gains more understanding of the industry and s/he will enhance the effectiveness of the audit committee by decreasing the level of earnings management. Thus, the findings offer empirical evidence to support the fifth hypothesis.

In line with Qi and Tian (2012), the education background coefficient of the chair of the audit committee in the OLS regressions is positive and not significant (coefficient=0.008 and $t=1.145$). This result suggests that the number and type of certificates (academic and non-academic) that the audit committee chair holds have no effect on managing earnings. One possible explanation is that according to the results of descriptive statistics in Table 1-3 all chairs of the audit committee have at least one higher education certificate, academic or professional, which means that they already have a high level of understanding of the firm (Herrmann & Datta, 2006) and high cognitive processing and information analysis skills (Wiersema & Bantel, 1992; Papadakis & Barwise, 2002). These findings provide empirical evidence that leads to rejection of hypothesis six.

M3 in Table 1-4 shows other control variables related to the audit committee characteristics including the audit committee meetings and size. It can be seen from Table 1-4M3 that the audit committee meetings and size are negatively associated with earnings management. The size of the audit committee is significant at the 0.01 level (p value >0.01), while the meetings of the audit committee are not significant (coefficient=-0.015, $t=-3.074$ and coefficient=-0.002, $t=-0.597$ respectively). The results for audit committee size are consistent with Menon and Williams (1994); Xie et al. (2003); Choi et al. (2004); Abbott et al. (2004); Yang and Krishnan (2005) and Vafeas (2005); Siregar and Utama (2008); Li et al. (2012); Metawee (2013); Mnif Sellami and Borgi Fendri (2017). One possible explanation is that when there are more members on the audit committee, they are more likely to be more independent, which helps to improve the effectiveness of the audit committee (Smith, 2003; Xie et al., 2003; Mangena & Pike, 2005; Li et al., 2012; Mnif Sellami et al., 2017). Another possible explanation is that having more audit committee members increases the range of different expertise, which may reduce the level of earnings management (Xie et al., 2003). The results in Table 1-4M3 also show that there is no significant relationship between the number of meetings of the audit committee during the fiscal year and earnings management. This result is inconsistent with Klein (2002); Xie et al. (2003); Choi et al. (2004); Lin et al. (2006) and Lin and Hwang (2010).

Table 1-4M4 includes six board characteristics as control variables. Board size, meetings, compensation and ratio of women in the board are negatively associated with earnings management, while the ratio of independent members on the board and board chair independence are positively associated with earnings management. Board compensation and the ratio of women on the board are significant (p value is >0.05 , 0.1 respectively). The first of these findings suggests that when boards have more female members, and the board members receive more compensation, the level of earnings management will decrease. This indicates that women tend to be more conservative than men. This finding is in line with Peni and Vähämaa (2010); Gaviious et al. (2012), Arun et al. (2015) and Isa and Farouk (2018). Therefore, the results confirm that firms that have a high number of female members on the board are more likely to have income-decreasing earnings management than other firms that have fewer women on the board. One possible explanation is that women are more likely prefer to avoid risk (Wilson & Daly, 1985; Fellner & Maciejovsky, 2007) and women deal better with complex tasks because they can recognise differences, deal with the information, and participate in making a decision efficiently and accurately (Liu, 2017).

The finding also provides empirical evidence that when the board directors have more compensation, the level of earnings management will be lower. This finding is consistent with Beasley (1996), who finds that fraud level reduces due to high compensation of board directors, Laux and Laux (2009) and Liao and Hsu (2013) who report an increase in financial reports' quality as board directors receive higher compensation.

It is evident from Table 1-4M4 that board size and meetings are not significant. These results are consistent with Eisenberg et al (1998) .and Yermack (1996) (who find better firm performance with a small number of board directors. The findings suggest that a large number of board directors has no impact on earnings management. Board meeting results show that number of board meetings during the fiscal year is negative but not significant. This finding is in line with Xie et al. (2003) who find a non-significant and negative relationship between board meetings and earnings management and inconsistent with Bédard et al. (2004); Carcello and Neal (2003) who find that earnings management and board independent are negatively associated.

Kusnadi et al. (2016) report an increase in the quality of financial reports when board directors are independent. However, the results are consistent with Klein (1998); Bhagat and Black (2000); Bradbury et al. (2006) and Sarkar and Sarkar (2009) who find no significant relationship between outside directors and financial performance. Thus, these findings are in contrast to the expectation and show the weakness of this mechanism in monitoring earnings management. One potential interpretation is that on the board, the duty of non-executive directors is to advise rather than to monitor board function (Peasnell et al., 2005). Another possible explanation for the non-significant relationship between board independence and earnings management may be due to the individual proxy used to investigate board independence (Larcker et al., 2007).

Concern for Endogeneity

In a dynamic panel data model the current variable $y_{i,t}$ is regressed on its past value $y_{i,t-1}$ as $E(y_{i,t-1}\varepsilon_{it})$ assuming that $\varepsilon_{it} = \rho \varepsilon_{i,t-1} + u_{it}$. Since, $y_{i,t-1} = \gamma y_{i,t-2} + \beta x_{it} + \alpha_{it} + \varepsilon_{it}$, this means that $E(y_{i,t-1}\varepsilon_{it})$ is not equal to zero. y_{it} is dependent on the error from its period and the error from the previous period, and the error and dependent variable $y_{i,t-1}$ are not orthogonal (Bhattacharai, 2016). This is called an endogeneity problem, which could cause the OLS and panel data estimators to be biased and inconsistent.

In corporate governance studies, it is crucial to address the endogeneity issue, which technically occurs under different conditions. These conditions are: first, when the independent variables are correlated with the error term at the model. In the case of this study, the audit committee chair

characteristics and other control variables are correlated with the error term. Second, simultaneity bias which occurs when the dependent variable causes the independent variables and the independent variables cause dependent variable. This means that the dependent variable (earnings management) and other independent variables (the audit committee chair characteristics, the audit committee, board and firm variables) are endogenously determined by causing each other. Thus, to control for this endogeneity problem, Bozec and Laurin (2008) use the lagged of discretionary accruals (measured at time $t-1$) along with all other independent variables that measured at time t is incorporated at the right side of the model. Third, omitted variable bias which means important variables are omitted from the model. For example, it might be there are other variables that are omitted from the model, which also affect the other independent variables (audit committee chair characteristics and other control variables). Finally, selection bias means when the sample of the study is biased, in the case of this study choosing the top 350 firms from the London exchange.

Previous studies use OLS regression to test the relationship between earnings management and corporate governance. However, Coles et al. (2012) view that the governance factors may be a subject of endogeneity which causes regression models to be problematic. Thus, researchers such as McKnight and Weir (2009) and Coles et al. (2012) indicate that simultaneous models are more appropriate to solve the endogeneity issue in corporate governance. Other researchers view that the best solution to this problem is to use an instrumental variable as shown by Hansen (1982) who proposes the generalized method of moment (GMM) estimation method. Here, $y_{i,t-2}$ is a good instrument for $y_{i,t-1}$ because it is orthogenous to error $E(y_{i,t-2}\varepsilon_{it})$ is equal to zero. In the case of a within-group estimator or within group fixed effects estimator, the variance will be around the group means while for between-group effects, the variance of group means will be around the overall mean.

GMM models is cover OLS model and two-stage least squares. In this case, two-stage least squares is a particular case of the GMM, which is a good estimator to find out whether the GMM is equivalent to the OLS model. The regression results reported above might be subject to an endogeneity problem. In this case, these results may be spurious and misleading. Therefore, this potential problem should be solved to ensure that the results are not affected by endogeneity. To tackle endogeneity, previous studies use many methods including maximum likelihood, two or three-stage least squares (equation estimator), panel data, or instrumental variables (e.g. lagged independent variables as instruments).

An equation estimator model is an efficient approach that can be used to address endogeneity; however, Pindado and De la Torre (2006) report that this method does not address unobservable heterogeneity. Therefore, Larcker and Rusticus (2010) view that using a panel data fixed effect model is an effective way to deal with the unobservable heterogeneity over industries, but at the same time, the fixed effect model indicates that the variation happens over industries, although it is more likely to be endogenous, not within industries. Moreover, it is argued that a panel data model (fixed effect) might not be useful to deal with the endogeneity problem, because this model does not totally remove the omitted variables that are changing over time or solve reverse causality (Zhou, 2001). Other researchers, such as Coles et al. (2012) add that when the structure of the fixed effect model is not well-specified, endogeneity is not effectively resolved.

The instrumental variables method is an appropriate approach to address the endogeneity. However, Larcker et al. (2007) argue that is very challenging to find a good exogenous variable as an instrument that correlated with the endogenous variable but not correlated with the error term and does not have an effect on the dependent variable.

In the case of this study, it is difficult to find appropriate instrumental variables that are correlated with the audit committee chair characteristics (the endogenous variables) but do not have a

correlation with the error term and do not have a direct effect on discretionary accruals. Larcker and Rusticus (2010) argue that the difficulty of finding an appropriate instrument lies in finding an economic theory to explain the association between endogenous and exogenous variables, to enable the exogenous strict identification. Thus, Larcker and Rusticus (2010) state that if the instrumental variables are not selected properly and they are weak, the OLS model is better than two-stage least squares. Thus, following Hansen (1982), McKnight and Weir (2009) and Coles et al. (2012), this study will apply GMM and two-stage least squares (2SLS)

Error! Reference source not found., M1, M2, M3 and M4 shows the results of Anderson Canon LM, CD Wald, Sargan and Durbin statistical tests to test for under-identification, weak identification, over-identification and endogeneity of the independent variables respectively. Under identification means that the instruments' variables are less as compared to endogenous variables, while over-identification means that the instruments, variables are not correlated with the error term. Weak identification shows how powerful the instruments' variables are to explain the endogenous variables. **Error! Reference source not found.** reports that some p-values of Durbin to test the endogeneity of the independent variables are significant, which means that these variables are endogenous, such as return on assets, sale growth, cash flow, the audit committee chair tenure and per tenure. **Error! Reference source not found.** also reports that the identification test of CD Wald F statistic is bigger than the Stock-Yogo weak ID test critical values. This means that the instrument variables are not weak and they have good explanatory power to explain the endogenous variables. **Error! Reference source not found.** shows that the model is not under or over-identified, since the p-value is > 0.01 for both Anderson Canon LM and Sargan statistic test. The Pagan-Hall general test shows that the p-value is > 0.001 , which means that there is no heteroscedasticity. The 2SLS test also tackles the auto-collinearity issue by dropping these variables. In the case of this study there is no auto- collinearity issue.

GMM is used to control for endogeneity which covers the bias of omitted variables, the heterogeneity of unobserved panel, and error measurement. There are two main types of GMM, which are difference and system GMM. Arellano and Bond (1991) view that difference GMM transforms all regressors through differencing and removes fixed effect in the process to solve endogeneity. However, difference GMM magnifies the gap if it is used in unbalanced panel data. This is because it subtracts the previous observation from the current one. System GMM was proposed by Arellano and Bond (1991) and Blundell and Bond (1998) and it corrects the endogeneity by transforming the instruments to remove the correlation with fixed effect. It decreases the chance of losing data because it uses the orthogonal deviation to subtract the average instead of previous observation from current one (as difference GMM does). Blundell and Bond (1998) view that the performance of first difference GMM is poor, because despite using first differencing to remove the fixed effect, the endogeneity problem still exists, because the lag of the dependent variable used as the instrument will be correlated with the first difference of the error term.

In this case, the lagged dependent variable is poor instrument and provides bias and inefficient estimation. Thus, using system GMM is applicable for several reasons. First, the first difference is used as instruments in the first equation and in the second equation is expressed in the first difference with levels, which involves huge number of moment conditions. Second, the system GMM (two step) deals with heteroscedasticity and serial correlation (Bond et al., 2001). Bond et al. (2001) suggest that OLS (as upper bound estimation) and fixed effect (as lower bound estimation) should be applied first and first difference GMM should be run. So, if the difference GMM estimate is below or close to the fixed effect estimate, system GMM should be applied. This is because the first difference estimate is biased, because of the weakness in the instruments.

In the GMM estimation, Hansen (1982) and Sargan (1985) tests are used to test for the validity of the instruments after the estimation. Also, testing for the autocorrelation of the error term with the lagged dependent variable as an instrument is significantly important to ensure that the error term should be uncorrelated (Roodman, 2009). This means that there is no second order correlation with the original error term and that the moment conditions are specified correctly. The GMM estimator generates many instruments variables, but these should not be too many. This is because when the number of these instruments' quadrat the element number in moments' estimated variance matrix, the finite sample can lack the adequate information which estimates a large matrix badly. Also, when the number of the instruments is large, the endogenous variables are over-fitted. In addition, in 2SLS, when the numbers of instruments and observations' number are equal, first stage regression's R2 will be 1 and the results of the second stage will be biased, which becomes clear in the instrument variables (Roodman, 2009).

Table 2-4 below represents the results of 2SLS normal GMM, and Dynamic GMM¹³ two step system models, which represented by M1, M2 and M3. From Table 2-4 it can be seen that the results of 2SLS and GMM are nearly the same as the OLS regression results; most variables have the same sign and stay significant. Furthermore, Table 2-4M3 provides empirical evidence that the results of dynamic system GMM solve the endogeneity problem and provide better estimation, since more variables of interest become significant, such as audit committee education, industry and nationality. The Hansen test is 0.554 which is not significant. This means that the instruments are not weak. Also, the results show the Arellano-Bond test for AR (2) is 0.228. This means that there is no second order correlation. Difference GMM two was also run. However, the results are ignored because Hansen test was > 0.05 , which mean the instruments are weak.

¹³ Xtabond2 command is used in this study to run the GMM. Xtabond2 refers to difference GMM (the original estimator) and system GMM (the augmented estimator). Xtabond2 is used because it solves the issue of instrument proliferation, implements two estimators, makes the correlation of finite sample available to 2 step covariance matrix, and leads the robust two step to be more efficient than the robust one step (Bond, 2002). There are some option that are used with Xtabond2, such as nolevelq (to inform Stata that difference GMM estimator is applied), nodiffsagan (to prevent reporting difference in Sargan/Hansen), robust (to provide variance covariance matrix of heteroscedastic and autocorrelation), and small (to report t and f stas instead of z and Wald stas).

Table 2 2-4SLS ,Normal GMM and Two Step System GMM Using Kothari et al. (2005) based on Total Discretionary Accruals

VARIABLES	M1	M2	M3
L. DAKTit			-0.033 (-1.273)
ROA	0.001 -0.729	0.002 -1.21	-0.003*** (-3.115)
LEVERAGE	-0.092 (-0.460)	-0.108 (-0.558)	-0.273 (-0.534)
GROWTH	0.259 -1.409	0.31 -1.544	-0.265*** (-7.005)
FIRM_SIZE	0.034*** -2.795	-0.027 (-0.678)	0.023 (1.261)
ΔOCF/ TASSETS	43.446*** -5.153	44.297*** -3.531	8.424 (0.796)
LOSS	0.036 -1.296	0.159* -1.656	-0.124*** (-6.603)
ACC_AGE	0.002** -2.572	0.002** -2.566	0.003*** (2.651)
ACC_TENURE	-0.010** (-2.428)	-0.008** (-2.197)	-0.013*** (-3.546)
ACC_PRE_TENUR	0.002 -0.969	0.001 -0.583	-0.002* (-1.878)
ACC_A & F	-0.001 (-0.099)	0.014 -0.804	-0.000 (-0.010)
ACC_NETWORK	0.002*** -4.277	0.002*** -3.324	0.001*** (3.297)
ACC_INDUSTRY	-0.002 (-1.630)	-0.001 (-0.398)	0.009*** (7.097)
ACC_EDUCATION	0.016** -2.454	0.014* -1.686	-0.029*** (-4.217)
ACC_NON_FOREIGN	-0.011 (-0.799)	0.002 -0.138	-0.069*** (-3.507)
AC_MEETING	0.007* -1.77	0.007 -1.32	-0.006** (-2.000)
AC_SIZE	-0.007 (-1.062)	-0.003 (-0.386)	-0.020** (-2.557)
BOD_SIZE	0 (-0.171)	0.001 -0.375	0.004 (0.961)
BOD_MEETING	-0.003 (-1.239)	-0.003 (-0.939)	0.008*** (3.285)
BOD_COMPAN	-0.030*** (-2.791)	-0.039*** (-3.405)	-0.049*** (-2.699)
BOD_WOMEN	-0.073 (-1.131)	0 (-0.000)	-0.158** (-2.222)
BOD_MINDEP	0.04 -0.858	0.081 -1.3	0.175*** (2.803)
BOD_CHINDEP	-0.062 (-0.624)	-0.121 (-0.810)	-0.087 (-0.937)
Constant	0.292** -1.986	0.430** -2.419	0.604*** (2.649)
Industry dummies	Included	Included	included
Year dummies	Included	Included	included
Observations	1,108	1,099	994
Number of ID			120

T-statistics in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. L. DAKTit = lag total discretionary accruals based on Kothari et al. (2005). ROA = Profit before tax at the end of the fiscal year divided by the total assets at the end of the discal year. LEVERAGE = The ratio of total liabilities to total assets. GROWTH = Yearly percentage of sales change. FIRM-SIZE = The natural log of total assets. Δ OCF/TASSETS = The change in annual net cash flow from operating activities divided by the total assets at the end of the fiscal year. LOSS = A dummy variable that takes the value of 1 if the firm makes a loss and 0 otherwise. ACC_AGE = The age of the audit committee chair. ACC_TENURE = The number of years that audit committee chair has served as a chair in the same firm. ACC_PRE_TENURE = The number of years that audit committee chair has served in the company before s/he becomes a chair of the audit committee. ACC_A&F = A dummy variable that takes the value of 1 if the audit committee chair has an accounting and finance education background and 0 otherwise. ACC_NETWORK = Number of board members with whom the audit committee chair is connected in different organisations. ACC_INDUSTRY = Number of industries in which the audit committee chair has had experience. ACC_EDUCATION = Number of certificates that the audit committee chair holds. ACC_NON_FOREIGN = A dummy variable that takes the value of 1 if the audit committee chair is non-foreign and 0 otherwise. AC_MEETING = The number of annual meetings of the audit committee held during the fiscal year. AC_SIZE = The number of directors on the audit committee. BOD_SIZE = The number of directors on the board. BOD_MEETING = The number of annual meetings of the board of directors held during the fiscal year. BOD_COMPAN = The natural log of compensation earned by all board of directors. BOD_WOMEN = The ratio of women on the board, measured as the number of women on the board divided by the total number of board directors. BOD_MINDEP = The ratio of independent directors on the board, measured as the number of independent directors divided by the total number of directors. BOD_CHINDEP = A dummy variable that takes the value of 1 if the board chair is independent and 0 otherwise.

4. Conclusion

This study response to the calls by a number of researchers, such as Compennolle and Richard (2018), Ghafran and Yasmin (2018), Talbi et al. (2015) and Ali and Kamardin (2018) for more research to investigate the corporate governance area, particularly the audit committee chair and financial reports. So, this study extends the accounting and governance literature, which has paid less attention to the audit committee chair as a governance mechanism. Thus, this study offers empirical evidence on the association between the audit committee chair characteristics and earnings management in the UK context. This study finds out the answer to the question how are the characteristics of the audit committee chair, including age, tenure, firm experience (pre-tenure), accounting and finance expertise, industry experience, education background, social networking, and nationality associated, negatively or positively, with earnings management?

Based on a sample of 1639 firm year observations of 149 firms listed on London exchange market (149 firms taken from FISTE 350 after excluding banks, financial services, life and non-life insurance, equity investment, utility and some firms with missing data). This study uses the accrual base and real earnings management base to measure the dependent variable (earnings management). Discretionary accruals determination may prone to measurement of errors. Thus, this study tried to limit the effect of such errors by using Jones' mode modified by Kothari et al. (2005). This study also considered total and current discretionary accruals in measuring earnings management. Moreover, this study addresses whether discretionary accruals is positive or negative to test the relationship between earnings management and the audit committee chair characteristics. Univariate and OLS regressions are used as base models to test this relationship. Also, other models, such as Panel data (fixed effect), 2SLS, one and two steps GMM (difference and system), are used in this study to check the robustness of the results.

Based on the Kothari et al. (2005) model and total discretionary accruals, the results of OLS regression show that some of the audit committee chair characteristics have effects on earnings management level, some of them positive and some negative. The audit committee chair age and networking are significantly and positively associated with earnings management. These results indicate that older audit committee chair are associated with higher level of earnings management. Also, when the audit committee chair has more links with other board directors in different firms, the level of earnings management increases. Similarly, education background and nationality of the audit committee chair also have positive relationships with earnings management, but they are not significant. Other audit committee chair characteristics are negatively associated with earnings management, but not significant, with the exception of the audit committee tenure, which is negatively and significantly associated with earning management. This result presents that the tenure of the audit committee chair increases the effectiveness of the audit committee by decreasing the level of earnings management. Other models, such as system GMM provides better results than the OLS findings. This is because the OLS is a subject to endogeneity issue and the GMM solved this issue.

From the analysis of positive and negative earnings management based on Kothari et al. (2005) the findings show that when the company has negative discretionary accruals, the audit committee chair does not affect the level of earnings management.

Based on stewardship theory which view that the present of the steward will improve the performance, the findings of this study provide statistical evidence that it is not necessarily that the existing of the steward will enhance the performance as the findings show that the characteristics of the steward are crucial and some of them have positive effect in the quality of financial reports, while some other have negative effect. Based on upper echelon theory which view that the characteristics of the top managers are matter and it is important to investigate these characteristics, the findings provide evidence that catachrestic of the audit committee chair do not have similar effect in the quality of financial reports. For example, age has negative effect in the quality of financial reports, while tenure has positive effect in the financial quality. The differences in the findings is mainly because old people will react less to the technology and they are not able to grip new idea as young people.

The main conclusion can be summarised as that earnings management is influenced by the audit committee chair characteristics some negatively and others positively. For example, the audit committee chair tenure, pre-tenure, non-foreign, accounting and finance experience and education background have negative effects on earnings management, while, age, education level and social networking have positive effects on earnings management. Also, by categorising the audit committee chair characteristics, such as age, tenure, pre-tenure, social networking, industry experience and education level, the results show that younger audit committee chairs, more year's tenure and pre-tenure and less connection with external board directors in other firms affect earnings management negatively. On the other hand, older audit committee chairs with fewer years' tenure and pre-tenure, and more connections with external board directors in other firms, affect earnings management positively.

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