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Essays on the Implications of Accounting and Audit Regulations

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Joseph Akadeagre Agana
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List of studies

This dissertation consists of the following three studies

1. Agana, J. A., Alon, A., and Zamore, S. Self-regulation and re-regulation: audit fees research. Revise and resubmit due May, 2021 in *Accounting and the Public Interest*.
2. Agana, J. A., Zori, G.S. and Alon, A. IFRS adoption approaches in Africa: Implications for accounting quality. Under second review in *The International Journal of Accounting*.
3. Agana, J. A. Use of experts in key audit matters.

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**Overview of the dissertation: Essays on the implications of
accounting and audit regulations**

1. Introduction

Globally, the accounting and audit environment has witnessed a wave of significant changes particularly concerning the application of international financial reporting and auditing standards. These changes are largely driven by the rise of the multinational business enterprise alongside an increased demand by investors for comparable financial information (Chua & Taylor, 2008; Haller, 2002). For example, companies seeking listing in foreign markets and global accounting firms have facilitated the move by national regulatory bodies to pursue regulations aimed at harmonization of accounting and auditing standards (Canibano & Mora, 2000; Herman, 2020). Consequently, several countries around the globe have since abandoned their domestic accounting and auditing standards and embraced IFRS and International Standards on Auditing (ISAs) (Boolaky & Soobaroyen, 2017; Koning, Mertens, & Roosenboom, 2018). The IFRS are a set of high-quality principle-based accounting standards promulgated by the International Accounting Standards Board (IASB) aimed at creating a harmonized global financial reporting environment (De George, Li, & Shivakumar, 2016). Similarly, the International Standards on Auditing (ISAs) are regarded as high quality principles for the conduct of financial statement audits.

The adoption of international accounting and auditing standards in the form of the IFRS and ISAs represent a significant development in the global accounting and auditing environment (Daske, Hail, Leuz, & Verdi, 2008). Before the emergence of these international standards, various countries had developed and used their local Generally Accepted Accounting Principles (GAAP) and auditing standards (De George et al., 2016). For instance, companies operating within these countries were required to comply with local GAAP, thus multinational corporations with subsidiaries in several countries had series of reconciliations to do in preparing their consolidated financial statements (De George et al., 2016; Soderstrom & Sun, 2007). The development and application of international accounting and auditing standards was therefore great news at least to multinational corporations and global audit firms though challenging to some countries due to the changes that must be made with respect to the purpose and scope of financial reporting.

Moreover, significant regulatory, and technological changes alongside the global diffusion of IFRS and ISAs collectively impacted the audit of financial statements. For example, the changes in the regulation of the audit profession following the passage of the Sarbanes–Oxley Act of 2002 by the United States Congress introduced a period of state oversight in place of the previous self-regulation by the audit profession (Kinney, 2005). Further, the technological advancement in the 21st century brought about the digital age and the associated increased use of electronic business, thus significantly impacting business transactions and the auditing profession (Kotb & Roberts, 2011; Omoteso, Patel, & Scott, 2010). The above developments have varied implications for the auditing and accounting profession, yet many questions still exist about the impact of these changes in financial reporting and audit.

In this dissertation, some questions relating to the implications of these developments, particularly regarding audit pricing, accounting quality, and auditors' use of experts are examined. In the first essay, a bibliometric review of the literature is conducted to synthesize the academic research with a focus on insights about the impact of these regulatory and technological changes on audit fees. Given that audit fees is a function of audit effort, stakeholders including regulators, practitioners, and investors have been interested in understanding the impact of accounting and audit regulations on audit fees. Secondly, accounting quality is often cited as a major motivation for regulatory changes. The second study examines the impact of IFRS adoption approaches on accounting quality. Countries use different approaches to implement international accounting standards. Some adopt the standards without changes, others adopt with changes aimed at incorporating their local context into these standards. Although these two approaches are particularly common in Africa, questions about the impact of these approaches on accounting quality are yet to be empirically examined. The final study focuses on a recent development in the audit environment following the adoption of ISA 701: Communicating Key Audit Matters. This relatively new standard is a response to the longstanding criticism of the audit report. Users assert that the audit report is standardized and boilerplate thereby not providing client-specific information beyond the pass or fail opinion (Bédard, Coram, Espahbodi, & Mock, 2016; Mock et al., 2012). The associated increased transparency has provided a rare insight into the

internal working of audit firms, especially in relation to their use of experts in the most significant areas of the audit. Consequently, the study exploits this unique information to empirically examine the factors associated with auditors' use of experts in an audit.

The rest of this introductory chapter proceeds as follows. Section 2 provides an overview of key accounting and audit regulations. Section 3 presents the theoretical frameworks applied in the dissertation. Section 4 contains an overview of the research design, research context, and data sources as well as the methods used. Section 5 provides a summary of the studies contained in the dissertation highlighting the implications of the key findings.

2. Overview of accounting and audit regulation

Many accounting and audit regulations are governments' response to stock market failures and financial reporting scandals (Kinney, 2005). For instance, the stock market crash of 1929 and the Great Depression of the 1930s were key events leading to the enactment of the US Securities and Exchange Act of 1934. The Act required public interest entities (PIEs) to file audited financial statements (Doron, 2016; Kinney, 2005; Stettler, 1994). Additionally, the 1997/98 Asian financial crisis prompted a global discussion about the quality of banking supervision, corporate governance, and financial reporting. This resulted in a recommendation by the Group of 7 most industrialized countries (G7) Financial Stability Forum (FSF) for countries to adopt international accounting and auditing standards (IFRS and ISA) (Humphrey, Loft, & Woods, 2009). Similarly, regulators in the US responded to the 2000-2002 accounting scandals at Enron, WorldCom, Global Crossing, Tyco, and the demise of Arthur Andersen by passing the Sarbanes-Oxley Act (SOX) in 2002. The outcome is the establishment of stringent accountability measures for auditors and corporate boards (Kinney, 2005). Although the US was the epicenter of the 2000-2002 accounting scandals, the European Commission implemented key reforms in corporate governance and audit similar to those contained in the US Sarbanes-Oxley Act (Lannoo & Khachaturyan, 2004).

More recently, regulators around the globe, particularly in the US and Europe, embarked on further reforms in response to the 2007/2008 financial crisis. These

regulations are aimed at increasing investor protection, corporate governance, and the quality of financial reporting and audit transparency (Kandemir, 2013; Kend & Basioudis, 2018; Lo, 2009; Posner & Véron, 2010). For example, the EU introduced Regulation 537/2014 and the amended Audit Directive (2014/56/EU) which required an expanded audit report (EAR), mandatory audit firm rotation, restrictions on the provision of non-audit services, and a fee capping on the provision of non-audit services (Horton, Tsipouridou, & Wood, 2018; Kend & Basioudis, 2018). The expanded audit report was aimed at increasing transparency around audit through a requirement for disclosures on client-specific information relating to key risks. This received global attention with the US Public Company Accounting Oversight Board (PCAOB) initiating similar requirements in the new audit report which now include a section for Critical Audit Matters (CAMs) and the International Auditing and Assurance Standards Board's (IAASB) new auditing standard on Key Audit Matters (KAMs) (Lawson, O'Hara, & Spencer, 2017). These new disclosures in the audit report are currently applied across several countries through the adoption of the International Standard on Auditing 701: Communicating Key Audit Matters in the auditors' report.

Several bodies including the EU have championed the harmonization of accounting and auditing rules around the globe through their endorsement of IFRS and ISAs. For example, the EU endorsed and adopted IFRS for listed companies in 2005 through Regulation 1606/2002 (Jermakowicz & Gornik-Tomaszewski, 2006). It also adopted the IAASB ISAs in 2006 through Audit Directive 2006/43/EC (EC, 2006a; Humphrey, Kausar, Loft, & Woods, 2011; Humphrey & Loft, 2013). Given the global influence and economic importance of the EU and its common market, its endorsement and requirement for companies within the EU market to apply IFRS and ISAs gave a significant boost to the legitimacy and global diffusion of IFRS and ISAs around the globe especially in African, Caribbean, and Asian countries (Chua & Taylor, 2008; Newman & Bach, 2014; Ramanna & Sletten, 2014).

3. Theoretical framework

3.1 Institutional theory

The adoption of international standards has been explained from the theoretical lens of institutional isomorphism. The institutional theory has its roots in sociology specifically in the works of Meyer and Rowan (1977), which was subsequently extended by several studies (DiMaggio & Powell, 1983; Scott, 2008). Central to the institutional theory is the concept of legitimacy in the form of general acceptability or conformity to institutionalized patterns/structures (Chen & Roberts, 2010). Organizations in their search for legitimacy choose structures and policies that have previously attained social acceptability (Meyer & Rowan, 1977). Institutional theory focuses more specifically on the pressures and constraints of the institutional environment including regulatory structures, governmental agencies, laws, courts, and professions (Scott, 2013).

The theory is founded on the premise that organizations have influence on and are also influenced by the institutions of society (economic, political, social, and cultural norms) within which they operate. Thus, prior institutional theorists such as Meyer and Rowan (1977) focused on how organizations are shaped by forces of the environment in the form of expectations from relevant institutions of society through established economic, political, social, and cultural norms. These institutions are often deemed acceptable and authoritative within the society, thus, compliance with them is critical to ensure existence. In other words, organizations obtained their legitimacy by acting in accordance with what is generally perceived to be acceptable within the socio-politico-economic environment (Kondra & Hinings, 1998).

DiMaggio and Powell (1983) first introduced the concept of institutional isomorphism in explaining the influence of the institutionalized environment on organizations. They initially identified competitive isomorphism and institutional isomorphism. Subsequently, Scott (2001) built upon the initial classification by re-classifying it into three dimensions of coercive isomorphism, normative isomorphism, and mimetic isomorphism. These three forms of isomorphism are briefly discussed below.

The coercive dimension of institutional isomorphism, also known as power isomorphism, emanates from rules and regulations, often imposed by institutions of society to ensure socially accepted corporate behavior (Meyer & Rowan, 1977). These rules and regulations can take the form of laws such as the Companies Act, Security and Exchange Commission Directives, accounting standards, among others, and are expected to be followed by relevant actors within the society (Scott, 2008).

The normative isomorphic pressure relates to the social norms often seen as best practices and professional norms defining ‘rules of the game’. This perceived professionalism and best practice becomes a source of attraction for other actors yielding a form of normative pressure.

Similarly, the mimetic pressure is described as the emulation of practices from organizations or countries perceived to be more successful or developed (Rodrigues & Craig, 2007).

Given the emphasis of institutional theory on the effects of institutionalized environment on structural conformity and isomorphism by organizations and countries, international accounting scholars have applied the theoretical lens of the institutional theory in examining the global diffusion of IFRS (e.g. Alon & Dwyer, 2014; Boolaky, Tawiah, & Soobaroyen, 2020; Wysocki, 2011; Zeghal & Mhedhbi, 2006). Generally, these studies have highlighted that the global diffusion of IFRS is driven by coercive, normative, and mimetic forces of institutional isomorphism. For instance, the spread of IFRS in developing countries has been attributed to coercive forces in the form of monetary and technical assistance by international bodies such as the World Bank (WB) and the International Monetary Fund (IMF) (Boolaky et al., 2020; Irvine, 2008; Zegha & Mhedhbi, 2006). As organizations are influenced by the institutional environment and norms of the countries within which they operate, the effects of IFRS could differ for companies due to differences in the quality of institutional mechanisms (Houque, van Zijl, Dunstan, & Karim, 2012; Isidro & Raonic, 2012). Consequently, institutional mechanisms such as the efficiency of court systems and protection of minority interest shareholders could have implications for firm-level financial reporting outcomes like value relevance of accounting information, earnings management, and timely loss recognition.

3.2 Signaling theory

At the core of signaling theory is the fundamental objective of reducing information asymmetry between those with more information (e.g. sellers, management) and those with less information (e.g. buyers, investors) (Akerlof, 1970; Spence, 1973, 1974, 2002). The theory was developed within the context of the information asymmetry prevalent in the job market (Connelly, Certo, Ireland, & Reutzel, 2011). Spence (1973) used the job market setting to argue that job applicants signal their competence and ability to provide high utility to the employer through education and training. Notably, since employers cannot ascertain ex-ante a prospective employee's productive capability, employees tend to communicate their productive capabilities through signals such as education and training. Due to the cost associated with education and training (signaling cost), it is assumed that employees invest in these signals to enable them command a wage premium in the labor market (Spence, 1973). Conceptually, the theory has three main components: sender, receiver, and signal (Connelly et al., 2011; Morris, 1987; Spence, 1973). The sender is the party with more information (e.g. sellers, prospective employees, management) about the product or service while the receiver (e.g. buyers, prospective employers, investors) is the party with limited information. The sender is assumed to choose signals that will enable the receiver evaluate the underlying quality of the sender's work. In the case of the job market, individuals are assumed to select signals such as higher education, specialized training, etc., to communicate their capability to provide high utility to the prospective employer. Recent studies have generally applied the theory in the context of imperfect markets to understand the actions, behaviors or disclosures pursued by parties with more information (e.g. management) in resolving information asymmetry about the unobservable quality underlying their work (Connelly et al., 2011). In the auditing literature, researchers have employed signaling theory to provide insights on companies' choice of auditors (Abbott & Parker, 2000; Bewley, Chung, & McCracken, 2008; Kang, 2014). In these studies, the senders are typically the management of companies while the receivers are investors. The company uses the selection of a particular type of auditor as a signal of its underlying commitment to financial reporting quality. Notably, these studies report that firms choose perceived high-quality auditors

(Big N and industry specialist auditors) to demonstrate their commitment to financial reporting quality (Habib, Wu, Bhuiyan, & Sun, 2019). Although these auditors are associated with high reputation for audit quality, the unobservable nature of the audit process and the binary audit opinion (qualified vs unqualified) makes it difficult to discern how these firms deliver comparatively high-quality audit (Bergner, Marquardt, & Mohapatra, 2020). Moreover, the relationship between the auditor and users of the audit report is characterized by a huge information gap similar to the information asymmetry that exists between management and investors as the actual work, particularly the procedures performed by the auditor are not disclosed (Bédard et al., 2016). Therefore, the recent requirement (ISA 701) for disclosures on key audit matters (KAMs), where auditors are mandated to state the specific procedures they performed in addressing key audit matters, presents a natural setting to ascertain whether auditors engage in signaling. Specifically, as auditors are now required to disclose information about the key issues encountered in the audit and the procedures performed in addressing those issues, auditors might use this to signal the depth of work and diligence underlying their opinion.

4. Research design

Generally, the research design is *“a logical plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions”* (Yin, 2017, p. 26). A critical issue underpinning the research design is the philosophical stance of the researcher due to its effect on the researcher’s view about *the nature of reality, the nature of knowledge and what can be known, and how an inquirer can go about finding knowledge* (Bisman, 2010).

4.1 Philosophical position

Different schools of thought exist about the philosophy of science. Generally, three philosophical stances: positivism, critical realism, and constructivism, are dominant in business and management studies (Easterby-Smith, Thorpe, & Jackson, 2012). The positivist approach is characterized by key elements such as formal propositions, hypothesis testing, random sampling, aggregation, precision, and

quantifiable measures of variables (Stiles, 2003). The positivist philosophical stance contends that there is one truth (reality) independent of the observer while constructivists focus on understanding the phenomenon as far as human experiences are concerned (Bisman, 2010; Piekkari, Welch, & Paavilainen, 2009). Critical realists are within the continuum between positivists and constructivists (Bisman, 2010; Piekkari et al., 2009). Thus, the critical realist uses elements of both positivism and constructivism to provide new methods for developing knowledge. In that sense, they acknowledge the role of subjective knowledge of social actors in a given situation as well as the existence of independent structures (Baker, 2011). The above three main philosophical positions are commonly used in business and management, but most archival accounting and auditing research are typically dominated by the positivist philosophical stance due to the emphasis on the analysis of numbers and hypothesis testing (Baker, 2011; Bisman, 2010). Although the positivist paradigm has its limitations including its extreme emphasis on the absolute truth independent of the researcher, it is the most suitable and dominant perspective for archival studies aimed at explaining relationships between a given set of variables, hence, the position adopted in this dissertation.

4.2 Context and data sources

Studies in this dissertation are based on data from different jurisdictions. The first study which is a bibliometric citation analysis of audit fees research is largely dominated by empirical studies that used data from North America. This is attributable to the early availability of archival data on audit fees in North America. The data (articles) are retrieved from accounting and auditing journals indexed in the Web of Science database due to its reputation for indexing only journals of high quality. The second study is based on archival panel data (3946 firm-year observations) from six (6) African countries adopting IFRS. The African continent is the second most populous IFRS continent yet questions about the diffusion and effects of IFRS in the region are largely unexplored (Boolaky et al., 2020). It provides an interesting setting to explore questions relating to IFRS. Secondly, it presents a suitable context to examine questions about different IFRS adoption approaches due to the differences in IFRS diffusion

across the continent. This enables an empirical investigation of the longstanding IFRS question of whether countries should adopt IFRS with or without modifications. The data are retrieved from various sources including DataStream, WorldScope, and the World Bank. The final study is based on Norwegian listed companies and focuses on ISA 701: Communicating Key Audit Matters. The requirement for auditors to disclose KAMs in the audit report became effective in December 2016. The Norwegian accounting and audit environment is characterized by strict adherence to accounting and auditing rules (Brown, Preiato, & Tarca, 2014) and is similar to the EU and EEA audit environment (Sormunen, Jeppesen, Sundgren, & Svanström, 2013). The archival data (414 firm-year observations) used in this paper are manually collected from annual reports of companies listed on the Oslo Stock Exchange while some control variables are retrieved from Thomson Reuters Eikon database. The study period spanned from 2016 to 2018.

4.3 Analytical approaches

The first study employs the bibliometric citation analysis technique in evaluating the impact of regulatory developments on audit fees research. This technique enables researchers to scientifically identify the patterns and intellectual structure within a field (Locke & Perera, 2001). Previous studies in accounting have applied this technique to examine the intellectual structure of international accounting (Locke & Perera, 2001) and business ethics research in accounting (Uysal, 2010). The second and third studies are based on panel data estimation techniques such as random effects regression models, random effects logistic regression, and Poisson regression. Regarding the use of panel data estimation techniques, Nikolaev and Van Lent (2005) argue that such techniques are suitable for accounting research since it enables researchers to mitigate endogeneity bias. Moreover, the panel data techniques can control for unit heterogeneity, unobserved fixed effects (omitted variable bias), and gives more variability, degrees of freedom, minimizes problems of multicollinearity while enhancing efficiency (Baltagi, 2013; Wooldridge, 2010).

5. Summary of studies and conclusion

The dissertation consists of three related studies examining the implications of accounting and audit regulations. The accounting and audit environment has witnessed significant changes following the adoption of international accounting and audit standards and the 2007/2008 financial crisis. However, questions relating to the impact of these developments on audit fees, accounting quality, and auditors' resource utilization, though important, are underexplored. Consequently, the overall aim of this dissertation is to contribute to our understanding of the impact of accounting and audit regulations on audit fees, accounting quality, and auditors' use of experts. These studies have benefited from comments and contributions from international academic conferences including the European Accounting Association Annual Congress, the European Financial Reporting Workshop (EUFIN), and the International Accounting Section conference of the American Accounting Association. The first two studies have benefited from peer-review comments from the *Accounting and the Public Interest* (API) and *The International Journal of Accounting* (TIJA) respectively.

The first study adopts a bibliometric citation technique in exploring academic insights relating to the impact of regulatory, professional, and technological changes on audit fees. Notably, regulatory changes such as the Sarbanes–Oxley Act of 2002 significantly impacted the audit profession and reintroduced state oversight. Although regulatory changes are always motivated by a desire to improve audit quality, unintended consequences exist around audit cost. Consequently, the cost of these regulations is borne by auditees and passed along to shareholders. The review covers academic literature examining various aspects of regulatory changes on audit fees from 1980-2019, a total of 453 articles are analyzed. The review highlights a significant shift in the factors underlying audit pricing from auditor to client attributes, such as governance and the structure of engagements. Research gaps and regulatory trends that have implications for the audit market, audit practices, and public interest are also identified.

The second study examines accounting quality which is one of the main motivations for accounting regulation. The global diffusion of IFRS is anchored on its promise of delivering high-quality accounting numbers, nonetheless, its effects on

accounting quality remain ambiguous particularly for countries with underdeveloped capital markets. Additionally, although countries adopt international accounting rules differently, questions about the implications of different adoption approaches are important but largely unexplored. These two issues are examined by focusing on Africa, the continent that has received little empirical attention in the literature yet represents the second most populated region where IFRS standards are adopted. Generally, the results indicate that IFRS adoption was not associated with reduced earnings management, timeliness of loss recognition, and value relevance of accounting numbers. This notwithstanding, firms applying an unmodified version of IFRS experienced a relatively lower decline in earnings management and an increase in timely loss recognition but recorded a reduction in value relevance than those that applied a modified version of IFRS. Overall, these results provide insight into longstanding questions related to the implications of local IFRS modifications for accounting quality.

The final study addresses an aspect of recent auditing reforms which required auditors to disclose in the audit report those matters in the audit that they considered to be most significant. Specifically, given that the audit processes are opaque to investors, auditors may use the new disclosure requirements to signal that they do sufficient work including consultation with experts in key areas of the audit. Consequently, this paper examines areas and factors associated with auditors' use of experts in key audit matters (KAMs). Auditor and engagement attributes including auditor's industry specialization, number of KAMs, and audit fees are predicted to be associated with the use of experts in KAMs. Archival data from companies listed on the Oslo Stock Exchange were hand-collected and analyzed using panel data techniques. The results show that auditors seek expert assistance in audit areas typically associated with high risk and estimation uncertainty (impairment and valuation). Consistent with the predictions, auditor industry specialization, number of KAMs, and audit fees are significantly associated with a greater likelihood of using experts in key areas of the audit. Generally, these results suggest that due to the unobservable nature of audit processes and quality, industry specialist auditors, auditors confronted with more risks, and those charging higher fees employ experts to signal that sufficient work was performed. As there is a

lack of archival data on auditors' use of experts, these findings provide insights relevant for regulators, practitioners, standard setters, and academics interested in audit processes. Theoretically, the study contributes to the signaling theory by demonstrating that auditors' judgments and procedures can be explained from the theoretical perspective of signaling.

Overall, the findings in this dissertation demonstrate that recent developments in the accounting and audit environment have implications for audit fees, auditors' use of experts, and accounting quality. Regarding audit fees, these changes have resulted in an increased emphasis on client attributes and engagement structure in the audit pricing model. Empirically, the findings on auditors' use of experts corroborate this trend in the literature by highlighting the dominance of clients' risk and complexity in auditors' resource utilization. Moreover, given that accounting quality is primarily a major motivation for changes in accounting regulations, especially for countries adopting international standards in place of local rules, the lack of improvement in accounting quality post-IFRS adoption in Africa raises critical questions about the suitability of international standards for countries that do not have the underlying institutional structures to support these changes. The relatively higher accounting quality in terms of timely loss recognition and earnings management for companies listed in countries adopting IFRS without changes suggest adoption without modification might be suitable for countries without institutional capacity to develop and implement their own local accounting rules. On the other hand, the recorded higher value relevant accounting information for those applying a modified version of IFRS implies that a more nuanced approach is needed in adopting international standards.

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Study 1: Self-regulation and re-regulation: audit fees research

Self-regulation and re-regulation: Audit fees research

Abstract

The audit of financial statements has evolved over the years due to regulatory, professional, and technological changes. Importantly, with the Sarbanes–Oxley Act of 2002, the self-regulation by the profession was replaced with state oversight. The re-regulation sought to improve audit quality but has also affected other areas, including audit cost. The cost of new regulation tends to be borne by the enterprises and passed along to the shareholders. We focus on how the regulatory changes influenced the audit fees literature. Utilizing bibliometric citation analysis to synthesize the literature, we review a sample of 453 articles published during 1980 – 2019. Our analysis indicates that the emphasis of the audit fees research has shifted from the auditor to client attributes, including governance, and the structure of engagements. We also identify research gaps and highlight regulatory trends that have implications for the audit market, audit practices, and public interest.

JEL classification: M40, M41, M42, M48, H83

Keywords: Audit fees; non-audit fees; regulation; Sarbanes–Oxley Act; bibliometric citation analysis

1. Introduction

The term ‘audit’ originates from ‘audire,’ the Latin word for ‘hear.’ Auditors evaluate the financial statements of a company and express an opinion on whether management follows applicable financial reporting standards. Since information is crucial for capital markets, the audit function plays an important role in maintaining investor confidence. When companies announce significant restatements, frauds, or file for bankruptcy without warning from the auditors, investors lose confidence and question the value and quality of audits. As a reaction to accounting and financial scandals, regulators tend to introduce new audit rules and requirements to improve audit quality and protect shareholders (Benau, Barbadillo, Humphrey, & Husaini, 1999; Dey & Lim, 2018; Humphrey et al., 2011).

In the early 2000s, in response to corporate scandals and audit failures, the self-regulation of audit by the profession in the U.S. was replaced with standard-setting and oversight by the government (Kinney, 2005). Consequently, after years of deregulation, audit has experienced re-regulation with increased government oversight. New regulations intended to improve audit quality have also affected other areas, including the audit market and audit practices. As the cost of regulation tends to be borne by companies and passed to shareholders (Draeger, Herrmann, & Lawson, 2016), audit fees literature provides insight into how these costs are determined and change over time. This study aims to investigate the impact of regulatory changes on audit fees, highlight gaps in the literature and provide suggestions on how future research can contribute to our understanding of the impact of regulation on audit.

Since Simunic (1980) first identified the complexity, risk, and size of the clients as determinants of audit fees, this stream of research has experienced significant growth. Prior literature reviews provide an overview of the findings and generally divide the determinants of audit fees into client, auditor, and engagement categories (Hay, 2013; Hay, Knechel, & Wong, 2006). We built on their insights and, in addition, recognize the importance of regulatory changes for the audit firms, preparers, and shareholders.

We make the following contributions. First, we focus on a comprehensive set of papers published during 1980 - 2019 to identify influential as well as overlap themes. In contrast to the traditional review approach in which major articles are selected and discussed (Ferguson, 2005; Hay, 2017) and the meta-analysis (Habib, 2012; Hay, 2013; Hay et al., 2006), we utilize bibliometric citation analysis which demonstrates the interconnectedness of existing research and identifies emerging themes (e.g., Locke & Perera, 2001; Zamore et al., 2018). The pattern of citations is significant as it impacts knowledge creation (Roberts, 2018).

Second, the analysis of the most cited papers shows that the audit fee literature can be categorized into four main streams: (1) the audit firm's attributes, (2) the client's attributes, (3) the engagement's attributes, and (4) regulation. Recognition of regulatory changes as a factor impacting audit fees provides insights into how auditors, clients, and engagements have been impacted by these changes. The client attributes have become increasingly more important as factors impacting audit fees. The internal control requirements of Sarbanes–Oxley Act (SOX) Section 404 are costly but compel companies to improve internal processes as clients that remediate previously-identified internal control weaknesses were found to pay lower audit fees than those that fail to remediate (Hammersley, Myers, & Zhou, 2012; Hoag & Hollingsworth, 2011). Regulation related to the restrictions on non-audit services brought about the revaluation of the auditor-client links and had implications for consulting practices of the audit firms. Rotation of the audit partner also remains a public interest as SOX reduced the auditor tenure from seven to five years. Overall, our analysis indicates that the emphasis of the audit fee research has shifted from the auditor and emphasizes client attributes, including corporate governance and the structure of engagements.

Finally, although regulation of audit is increasingly state-driven, approaches continue to vary across jurisdictions and we are interested in the implications of those differences. For example, in the U.S., the Public Company Accounting Oversight Board (PCAOB) is responsible for oversight and standard-setting for the audits of public entities. The European Union (EU) and European Economic Area (EEA) countries have a multi-

level governance approach where regulatory decisions are made at the national and transnational levels (Hooghe, Marks, & Marks, 2001). As noted by Baggott (1989), while different regulatory approaches have implications “for the relationship between the state, society and private organizations” (p. 435), the aim of regulation is to ensure that the system is effective and operates within a framework of public accountability. We explore how differences in regulatory approaches are acknowledged in the audit fees literature and the implications of such variability for the generalizability of findings. We also discuss areas for future research as currently there are several issues that standard setters and regulators in different jurisdictions are introducing or evaluating. Examples include mandatory firm rotations, joint audit, further limitations on non-audit services. In addition to improving the informativeness of the audit report, standard setters are looking into the impact of data analytics on audit processes as well as approaches to audit that meet the needs of less complex entities.

The study proceeds as follows. First, we discuss self-regulation and re-regulation trends in audit and the determinants of audit fees. The next sections contain the discussion of the methods utilized and the research streams and topics. The paper concludes with opportunities for future research.

2. Self-regulation and re-regulation of audit

Significant developments for the audit practice in the U.S. occurred following the stock market crash of 1929 and the Great Depression of 1930s. With the Securities and Exchange Act of 1934, the Securities and Exchange Commission (SEC) was created and the filing of audited financial statements became a requirement for public companies. Auditing standards and oversight were left to the profession (Byrnes et al., 2012; Niemeier, 2007; Zeff, 2003). With the growth of consulting services provided by the auditors to their clients in 1990s, auditor’s ability to remain independent and to protect public interest was questioned. There were concerns that auditors were sacrificing professional principles for profitability. Although attempts were made to introduce more governmental oversight, the profession was able to maintain self-regulation (Zeff, 2003).

In the U.S., self-regulation ended abruptly with the implementation of SOX in 2002. It was passed in response to accounting and auditing scandals, such as Enron in 2001 and WorldCom in 2002. Increasingly, the public wanted to know, ‘Who audits the auditor?’. SOX introduced broad changes for auditors and preparers. Senior executives became personally responsible for the accuracy and completeness of financial reports. The Act also specified how auditors and corporate audit committees need to interact. The most significant change that came with SOX was the creation of the PCAOB which was granted the remit to set auditing, independence, and quality control standards (Kinney, 2005). Consequently, auditors of the U.S. public companies became subject to external oversight by the PCAOB.

Other countries also undertook regulatory initiatives to introduce broader audit oversight (Needles, 2013). In 2005, the European Commission (EC) established the European Group of Auditors’ Oversight Bodies (EGAOB) to build cooperation among national public oversight bodies across the EU and EEA (EC, 2005). In 2016 it was replaced with the Committee of European Auditing Oversight Bodies (CEAOB) to further deepen cooperation among national bodies in line with the EU’s 2014 Audit Regulation and Directive (CEAOB, 2018). At the global level, the International Forum of Independent Audit Regulators (IFIAR) was formed in 2006 (Needles, 2013). IFIAR includes audit regulators from 55 jurisdictions across the globe and is tasked with “helping the members to coordinate their actions, informing about problematic issues concerning audit, and acting as a spokesperson for members in communicating with regulatory bodies with an interest in audit” (Humphrey & Loft, 2013, p. 337). Overall, auditors are increasingly accountable to national and transnational oversight bodies.

Although the scope of the changes has varied across jurisdictions, the trend has been to add additional mechanisms to improve audit quality, ensure auditor’s independence and reduce the potential for fraud. For example, the range of non-audit services that auditors can offer their clients is an area of focus for regulatory bodies. Non-audit services could impair auditor’s independence due to the economic bonding between the auditor and the client. Key factors that influence audit fees are discussed next.

3. Determinants of audit fees

Simunic (1980) proposed a model in which the pricing of audit services is a function of the expected costs of the audit (including normal profit margin) and business risk. Houston, Peters, and Pratt (1999) decomposed the expected costs into two types of business risk: audit and non-audit risk. Audit risk is the risk of issuing an unqualified audit opinion when the financial statements are materially incorrect. Undetected material misstatements expose the auditor to litigation risk, which is the probability that an auditor will be sued for audit failure (Simunic, 1980; Simunic & Stein, 1996). Non-audit risk can contribute to costs unrelated to material misstatements such as the potential damage to the auditor's reputation from association with a particular audit client (Houston, Peters, & Pratt, 2005).

Business risk is an important factor that auditors consider in the pricing of audit services. Auditors must become familiar with the client's environment, processes, and internal controls. Weak internal controls increase audit risks and have implications for audit fees (Houston, Peters & Pratt, 1999). Audit quality is considered another important determinant of audit fees as additional effort results in higher fees. Next, we discuss the methodology applied in this study to examine how regulatory changes influenced and were recognized in the audit fees literature.

4. Method

In general, the review studies tend to utilize several approaches, including traditional review, meta-analysis, and bibliometric analysis. In a traditional review, the researcher manually selects and reviews major studies (i.e., there is no structured article selection process). Meta-analysis aims to summarize results by aggregating the findings of individual articles (Wolf, 1986). Bibliometric analysis is a quantitative method used to examine the development of research streams and publication trends and has been utilized to examine a wide range of topics. In accounting, Locke and Perera (2001) used the technique to review the nature and structure of international accounting research in the early 1990s. while Uysal, (2010) used the technique to identify important accounting articles on business ethics (Uysal, 2010). Roberts (2018) utilized it to examine themes

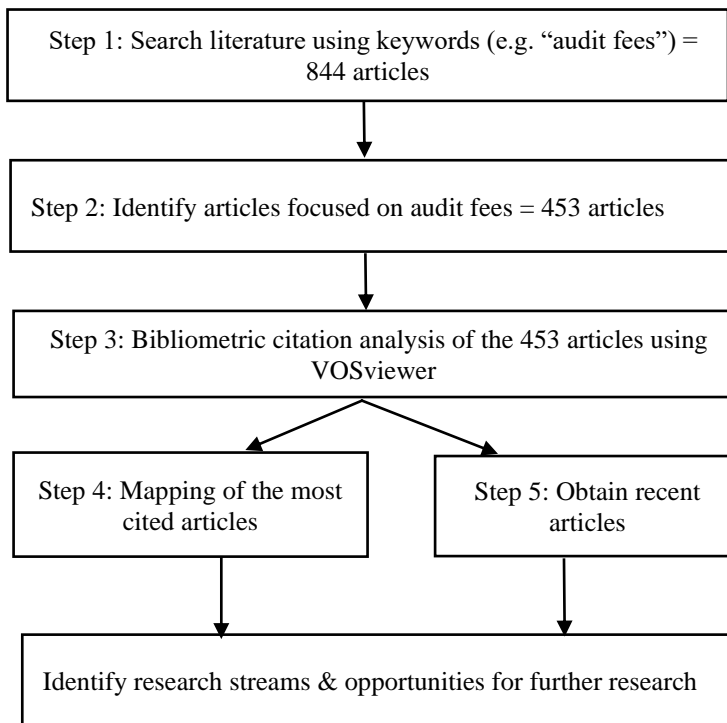
published in the *Accounting and the Public Interest* journal. The basic assumption regarding bibliometric analysis is that scholars build on published journal articles and then publish their work in similar scholarly journals (Van Raan, 2003). The unit of analysis is the article, and the focus is on the citations (J. Kim & McMillan, 2008; Zupic & Čater, 2015). A citation analysis shows how many times an article is cited by other articles. Although not a perfect measure of impact, the number of citations is generally accepted as an objective indicator of the influence of an article (Beattie & Goodacre, 2006; Staszkievicz, 2019).

We utilize the bibliometric approach and complement it with a content analysis of the articles. Doing so allows us to synthesize the research on audit fees, identify research streams and highlight future research directions. We retrieved the data from the Institute of Scientific Information (ISI) Web of Science (WoS) database. Web of Science is one of the leading databases that houses articles from academic journals and is used in bibliometric reviews (Beattie & Goodacre, 2006). To conduct the citation analysis, we used Van Eck and Waltman (2010) VOSviewer package for bibliometric mapping of the articles and identification of key clusters, authors, and journals. Specifically, we utilize VOSviewer's bibliographic coupling (based on number of cited references two articles have in common) to cluster top-cited audit fees articles.

First, we searched for articles that have treated audit fees as a topic (this is the default search criterion in WoS). This search involves the use of common audit-fee-related keywords often found in the titles, abstracts, and keyword lists of academic papers. To ensure a comprehensive search, we used different permutations of keywords. Specifically, we typed the following into the search area of WoS: “audit fees” or “pricing of audit” or “audit price” or “nonaudit fees” or “non-audit fees” or “auditor compensation” or “auditor remuneration.” This search yielded 844 publications from 1980 to 2019. Next, we filtered the publications by document type (articles), discipline (WoS categories: business finance, management, economics, business, public administration, etc.), and language (English). Then, we verified that each article selected had audit fee or non-audit fee as a dependent variable. This process resulted in 453 academic articles as our final sample for which we

extracted the full record (e.g., titles, author name(s) and affiliation, abstracts, journals, date of publication, etc.) for the bibliometric analysis. Figure 1 summarizes the steps in the data collection process and analysis.

Figure 1: Data collection and analysis



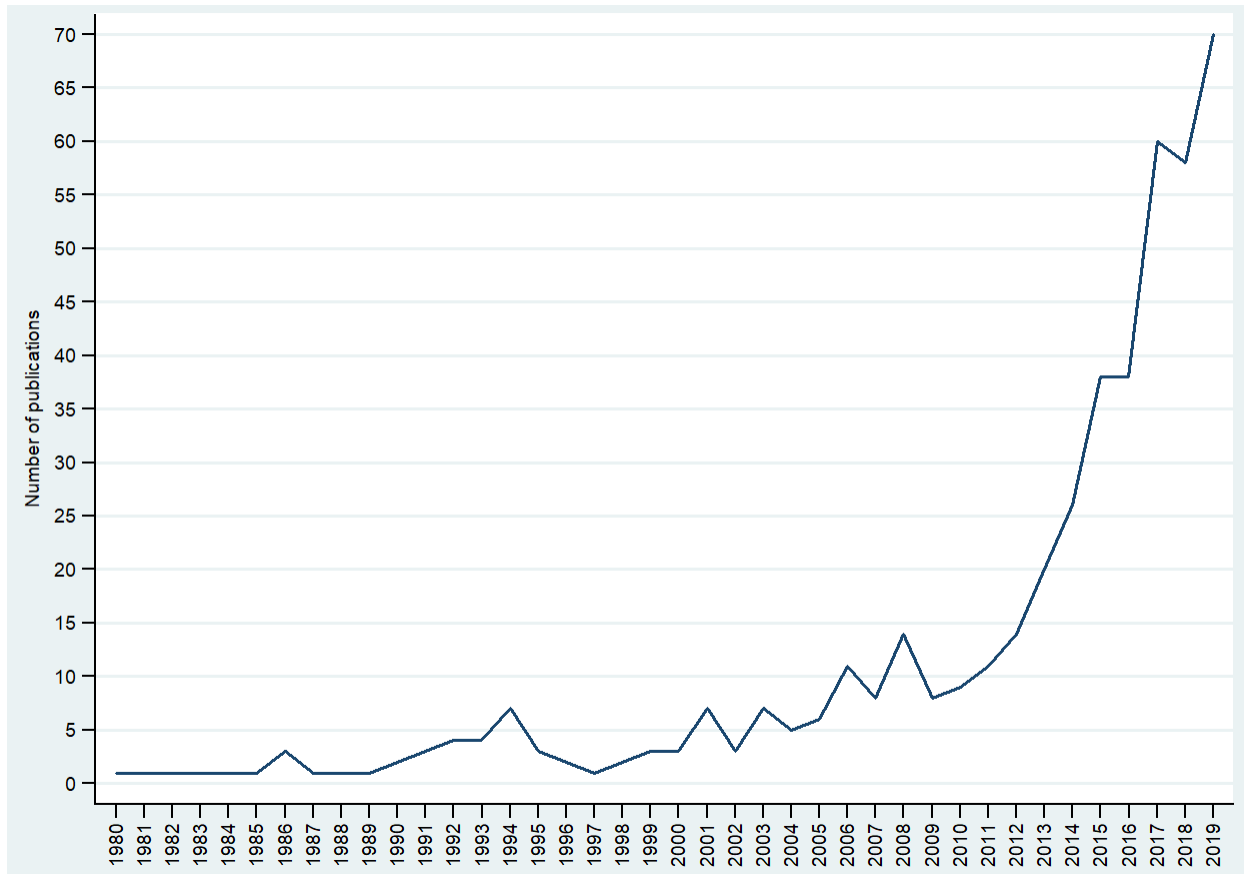
Based on this data, we used VOSviewer for bibliographic coupling to visualize clusters around top-cited articles. As in prior bibliometric studies (Apriliyanti & Alon, 2017; Zamore et al., 2018), we focused on 30 top-cited articles. According to the Web of Science as of June 30, 2020, citations for those ranged between 129 and 872. In addition, to ensure the completeness of the clusters and themes identified, we conducted a content analysis of recent articles that, due to recent publication date, did not have sufficient citations to be picked up in the top 30. Since we are interested in audit regulation (with a focus on the U.S. market), from the full sample of 453, we identified a sub-sample of 40 articles that mentioned SOX or other related keywords (e.g., Sarbanes-Oxley, Sarbanes Oxley) and ran a separate visualization based on 30 top-cited articles. Next, we discuss how the audit fees literature has evolved over time within the context of self-regulation and re-regulation.

5. Results: Regulation and audit fees

5.1 Trends in publications

Using the complete sample of 453 articles, we prepared a chronological overview of the identified regulatory changes that have influenced the audit fees research. The results appear in Figure 2. There has been a continuing increase in the publications on the topic over time. The number rose from 1 in 1980 to 60 in 2017, declined marginally to 58 in 2018, and rose sharply to 70 in 2019.

Figure 2: Trends in audit fee publications per year (1980 – 2019)



Notably, there was an increase in the number of articles in 2003, 2008, and a sharp increase from 2011 and thereafter. The increase in 2003 is tied to SOX in the U.S. and the European Commission's Recommendation 2002/590/EC on auditor independence, which also mandated the disclosure of audit fees (EC, 2002). There was also an increase in 2008 that could be linked to a new EU Directive 2006/43/EC with rules concerning the statutory

audit of annual and consolidated accounts (EC, 2006b). Another significant regulatory milestone occurred in 2014 with Audit Regulation (EU) No. 537/2014 (EU, 2014). It introduced restrictions for audits of public interest entities (PIEs). According to this regulation, non-audit fees should not exceed 70 percent of the average audit fees earned in the last three years, and total audit fees for each PIE should not exceed 15 percent of the total fee income the auditor received from all PIEs in the previous financial year. It also specified which non-audit services the auditor is prohibited from providing to their audit clients, such as payroll and legal services. Further, since its establishment, the PCAOB issued new standards that modified audit processes, including Auditing Standard (AS) 5 from 2007 related to integration of internal control and financial statement audits and AS3101 driving changes in the audit report for 2017 statements. The trend of published articles indicates that regulatory changes spur research activity. We explore in a more detailed review of the articles to ascertain whether they examine if regulatory and standard modifications have intended effects and what costs are borne by the auditors, preparers, and shareholders.

5.2 Data overview

Tables 1 and 2 summarize the audit fees articles used in the bibliographic mapping. Table 1 contains 30 top-cited articles and Table 2 presents 30 top-cited SOX-related articles. Overall, the majority were published in *The Accounting Review*, *Auditing: A Journal of Practice and Theory*, and *Journal of Accounting Research* using archival and survey data from the U.S. Specifically, the majority of the top 30 articles were based on the U.S. data (73 percent) and followed by Australian (17 percent). In general, top-cited studies tend to be U.S.-focused and increasingly rely on archival data.

Table 1: Overview of the 30 top-cited audit fees articles

Study	Type	Firms	Country	Year	Topic	Main findings
Simunic (1980)	Survey	397	U.S.	1977	Pricing of audit services	There is price competition in the audit market. Large audit firms are associated with lower fees (economies of scale)
Francis (1984)	Archival	136	Australia	1974-78	Audit firm's size and fees	Big 8 is associated with higher audit fees than non-Big 8. Finding holds for both large and small clients.
Palmrose (1986)	Survey	361	U.S.	1980-81	Audit firm's size and fees	Big 8 is associated with higher audit fees than non-Big 8 auditors, suggesting that the Big 8 designation reflects higher quality.
Francis & Simon (1987)	Survey	220	U.S.	1984-85	Audit firm's size and fees	Big 8 firms earn a fee premium, which suggests product differentiation. They also discount fees during initial engagements.
Simon & Francis (1988)	Archival	440	U.S.	1979-84	Auditor change and fees	Auditors cut fees on initial engagements and continuing engagements up to the third year. However, in the fourth year, the fees increased to normal levels for continuing engagements.
Felix et al. (2001)	Survey	70	U.S.	1996	Internal audit and fees	Internal audit function helps reduce audit fees.
Goodwin-Stewart (2006)	Survey	401	Australia	2000	Audit committee, internal audit, and fees	Audit committee and internal audit are associated with higher audit fees. Specifically, audit fees increase when both audit committee independence and frequency of meetings are low.
Pratt & Srice (1994)	Survey	243	U.S.	1988-90	Client's characteristics and fees	Poor financial condition of the client is significantly related to fees. Audit fees reflect a litigation risk premium.
Craswell et al. (1995)	Archival	1484	Australia	1987	Industry specialization, auditor's brand, and fees	Among the Big 8, those with industry specialization earned a higher fee premium than non-specialists. The Big 8 brand name is associated with a higher premium compared to non-Big 8 auditors.
Simunic & Stein (1996)	Survey	249	U.S.	1989	Litigation risk and fees	Audit fees reflect differences in litigation risk. The litigation risk component of the fees is sufficient to cover litigation costs.
DeFond et al. (2000)	Archival	348	Hong Kong	1992	Market segmentation and fees	Market segmentation partly explains why specialization yields different outcomes in terms of fees for Big 6 and non-Big 6.
Carcello et al. (2002)	Survey / archival	258	U.S.	1992-93	Board characteristics and fees	Board independence, diligence, and expertise are positively associated with audit fees.
Seetharaman et al. (2002)	Archival	550	U.K.	1996-98	Litigation risk and fees	UK auditors charge higher fees to clients cross-listed in the US than those cross-listed in other markets. The higher fees reflect risk variations across liability regimes.
Abbott et al. (2003)	Archival	492	U.S.	2001	Audit committee and fees	Audit fees are higher when clients have audit committees that are independent and have financial expertise.
Whisenant et al. (2003)	Archival	2666	U.S.	2000	Determinants of audit and non-audit fees	In contrast to prior studies, no relationship between audit and non-audit fees is found.
Chaney et al. (2004)	Archival	15484	U.K.	1994-98	Self-selection of auditors and fees	There is no evidence of a Big 5 premium among private firms. Private firms do not necessarily choose Big 5 but rather choose the lowest-cost provider.
Gul (2006)	Archival	740	Malaysia	1996-98	Political connections and audit fees	Politically connected companies incurred higher audit fees. Capital controls lowered the risk of financial misstatements and reduced audit fees.
Choi et al. (2008)	Archival	3080	15 countries	1996-02	Legal liability and fees	The legal liability period of a country is associated with higher fees. Big 4 fees are higher during the legal liability period. Big 4 premiums decline as the legal liability period decreases.
Bell et al. (2001)	Survey	422	U.S.	1989	Business risk and fees	Business risk has a positive influence on audit hours but not hourly rate. Additional hours result in higher fees.

Study	Type	Firms	Country	Year	Topic	Main findings
Gul et al. (2003)	Archival	648	Australia	1993	Discretionary accruals, incentives, and fees	Discretionary accruals and fees are positively related. This relationship is negatively moderated by managerial ownership.
Bedard & Johnstone (2004)	Archival	1000+ ¹	U.S.	2000-01	Earnings manipulation, governance and fees	Audit fees are higher among clients with aggressive earnings management and inadequate corporate governance.
Raghunandan & Rama (2006)	Archival	660	U.S.	2003-04	Internal control quality and fees	Internal control material weakness disclosures are positively related to audit fees in 2004 but not in 2003.
Hogan & Wilkins (2008)	Archival	284	U.S.	2002-04	Internal control quality and fees	Internal control deficiencies are positively related to audit fees. Clients with deficiencies have higher levels of inherent and information risk and these risks are positively related to audit fees.
Hoitash et al. (2008)	Archival	2501	U.S.	2004-05	Internal control quality and fees	Internal control deficiencies are positively related to audit fees. Audit fees vary according to severity of the weaknesses in internal controls. Clients that disclose material weaknesses under SOX continue to pay higher fees the following year.
Venkataraman et al. (2008)	Archival	142	U.S.	2000-02	Litigation risk, audit quality, and fees	Audit fees are higher for IPO engagements than post-IPO engagements. Both audit quality and fees are higher in high legal liability period.
Ferguson et al. (2003)	Archival	1046	Australia	1998	Industry specialization and fees	Big 5 with city-level and national industry leadership earn fee premiums. Those that hold only national-level industry leadership do not earn a premium.
Mayhew & Wilkins (2003)	Archival	2294	U.S.	1991-97	Industry specialization and fees	A differentiation strategy for audit firms is positively associated with audit fees.
Casterella et al. (2004)	Survey	651	U.S.	1993	Industry specialization, client's bargaining power, and fees	Audit fees are higher when the clients are small and have little bargaining power, but are lower when clients are large and have bargaining power.
Francis et al. (2005)	Archival	1997	U.S.	2000-01	Industry specialization and fees	The findings are similar to Ferguson et al. (2003) above.
Choi et al. (2010)	Archival	3250	U.S.	2000-05	Firm office size and fees	Firm office size and fees are positively related. This means that large local offices provide higher audit quality which warrants higher fees compared to small local offices.

Note: The table presents summaries of the top 30 articles used in Figure 3 and presents them in chronological order per each VOSviewer cluster (i.e., color in Figure 3).

¹ The authors of the article indicated that they had been requested not to show the exact number of clients.

Table 2: Overview of the 30 top-cited audit fees articles related to SOX

Study	Type	Firms	Country	Year	Topic	Main findings
<i>Raghunandan & Rama (2006)</i> ²						Same as in Table 1.
Sneller & Langendijk (2007)	Case study	1	U.S.	2005	SOX compliance costs	Audit fees increased by 50 percent in the first year of Section 404 compliance.
<i>Hogan & Wilkins (2008)</i>						Same as in Table 1.
<i>Hoitash et al. (2008)</i>	Archival	172	U.S	2003-05	Costs to comply with SOX section 404	Same as in Table 1.
Krishnan (2008)	Archival	139	U.S.	2003-2006	Internal control monitoring technology and fees	Total SOX 404 audit costs are positively associated with company size and the presence of material internal control weaknesses.
Masli et al. (2010)	Archival	13670	U.S	2004-2007	Internal control quality and fees	Implementation of internal control monitoring technology was associated with lower likelihood of material weaknesses and smaller increases in audit fees post-SOX.
Hoag and Hollingsworth (2011)	Archival	1563	U.S	2006-2008	Auditing standard (AS) 5 and audit fees	Audit fees were higher both in the presence of a material weakness and for companies that remediated this material weakness. Audit fees decline in the first 2 years after the remediation of a material weakness but still higher than those clients that never reported material weaknesses. Fee premiums nearly double for companies reporting consecutive adverse 404 opinions.
Krishnan et al (2011)	Archival	255	U.S.	2004-2006	Internal control quality and fees	Generally, AS5 had a negative effect on audit fees. Specifically, audit fees were lower in the first two years of implementation of AS5 relative to the last year of AS2.
Hammersley et al. (2012)	Archival	995	U.S.	2010-2013	PCAOB inspections, audit quality, and fees	Companies failing to remediate material internal control weaknesses experience larger increases in audit fees and a higher likelihood of auditor resignation as the number of material weaknesses increases.
Defond & Lennox (2017)	Archival	2026*	U.S	2000-2011	Frequency of PCAOB inspection and fees	Higher PCAOB inspection deficiency rates lead to higher audit fees and higher likelihood of adverse internal control opinion.
Tanyi & Litt 2017	Archival	6514	U.S.	2003-2004	Internal control quality and fees	More frequent PCAOB inspections lead to higher audit fees. This suggests that more inspections exert pressure on the auditor to do more work resulting in higher compensation.
Ettredge et al. (2018)	Archival	1345	U.S.	2000-04	Specialization, client's bargaining power, and fees	Both large accelerated filers (LAFs) and small accelerated filers (SAFs) experienced audit fee increase attributable to SOX 404(b).
Huang et al. (2007)	Archival	3879	U.S.	2000-05	Regulation and fees	Similar results to Casterella et al. (2004) on industry specialist premiums but differ as to client's bargaining power post-SOX. Bargaining power had a negative effect on fees for both small and large clients.
Ghosh & Pawlewicz (2009)	Archival					Big 4 audit fees increased post SOX. Small audit firms continue to offer fee discounts on initial engagements.

² Italicized articles were also part of the 30 most cited listed in Table 1.

Study	Type	Firms	Country	Year	Topic	Main findings
Huang et al. (2009)	Archival	1691 & 1992	U.S.	2001 & 2006	Initial engagement pricing	Fee discounting by the Big 4 in the pre-SOX period but not in the post-SOX period. Big 4 auditors appear to be conservative in the post-SOX regarding client acceptance.
Chen et al. (2012)	Archival	3209	U.S.	2000-2006	Disclosures, audit fees, and audit resignations	Pre-SOX, pro forma earnings are associated with higher audit fees and a higher likelihood of auditor resignations. The findings are pronounced in the post-SOX period.
Fung et al. (2012)	Archival	2150	U.S.	2000-2007	Industry specialization, audit firm size, and fees	Industry specialists' fee premium and scale discounts exist in pre- and post-SOX periods. However, only clients of specialist auditors get the scale discounts. Clients of non-specialist auditors only get scale discounts when they have strong bargaining power.
Desir et al (2014)	Archival	2570	U.S	2007-2010	Initial engagement fees	Both Big 4 and non-Big 4 discounted initial year audit fees post SOX (2007–2010) with fee discounts ranging from 16 to 34 percent.
Evans & Schwartz (2014)	Archival	3305	U.S.	2000-2010	Concentration, regulation, and fees	Regulation increases fees and places a large burden on small clients.
Shaw & Terando (2014)	Archival	130	U.S.	2001-2005	SOX compliance cost	Audit fees increased by 88 percent following the implementation of SOX.
Halperin & Lia (2015)	Archival	2128*	U.S.	2004-2008	Tax service fee and audit fees	Auditor-provided tax fees and audit fees are positively associated. This suggests that auditors cross-sell non-audit services to their audit clients.
Li & Luo (2017)	Archival	6378	U.S.	2001-2012	Managerial ability and fees	Managerial ability is negatively associated with audit fees. Auditors reduce their fees for clients with competent management. This finding is pronounced in the post-SOX period.
Bedard & Johnstone (2010)	Survey	500+ ³	U.S.	2002-2003	Audit partner tenure, planning, and fees	Audit fees are lower following partner rotation. New partners' increased engagement efforts are not compensated by clients. Audit fees are higher on audits when partner tenure is longer than five years.
Charles et al. (2010)	Archival	1080	U.S.	2000-2003	Financial reporting risk and fees	Positive relationship between financial reporting risk and audit fees paid to Big 4, particularly in post SOX period.
Krishnan et al. (2013)	Archival	1216	U.S.	2002-2008	Client risk management	Auditors charge clients higher audit fees for earnings management and the likelihood of their resignation is higher among such clients.
Gietzmann & Pettinicchio (2014)	Archival	4702	U.S.	2004-2008	Client business risk and fees	Auditors adjust audit fees upwards in the period in which clients received a comment letter (CL) from the SEC. In subsequent periods an initial rise in audit fee persists.
Chen et al (2015)	Archival	2078	U.S	2000-2010	Executive incentives and fees	Audit firms incorporate executive risk-taking incentives in their fees. The relationship is weaker post SOX but stronger for firms with older CEOs and in firms where the CEO is also a chairman of the board.
Khan et al. (2015)	Archival	1473	U.S.	2000-2008	Director liability protection and audit fees	There is a positive relationship between director protection and audit fees. The protected directors do not monitor management carefully and that is associated with higher audit fees.
Kim et al. (2017)	Archival	1460	U.S.	2003-2010	Audit committee expertise and fees	Companies with accounting experts on audit committees are more likely to pay higher audit fees. The effect is less pronounced for companies where CEOs have longer tenure.

³ The authors of the article indicated that they had been requested not to show the exact number of clients.

Study	Type	Firms	Country	Year	Topic	Main findings
Mitra et al. (2019)	Archival	2515	U.S.	2003-2011	Managerial overconfidence, ability, firm-governance, and audit fees	Managerial overconfidence and audit fees are positively related. Managerial ability moderates that relationship negatively.

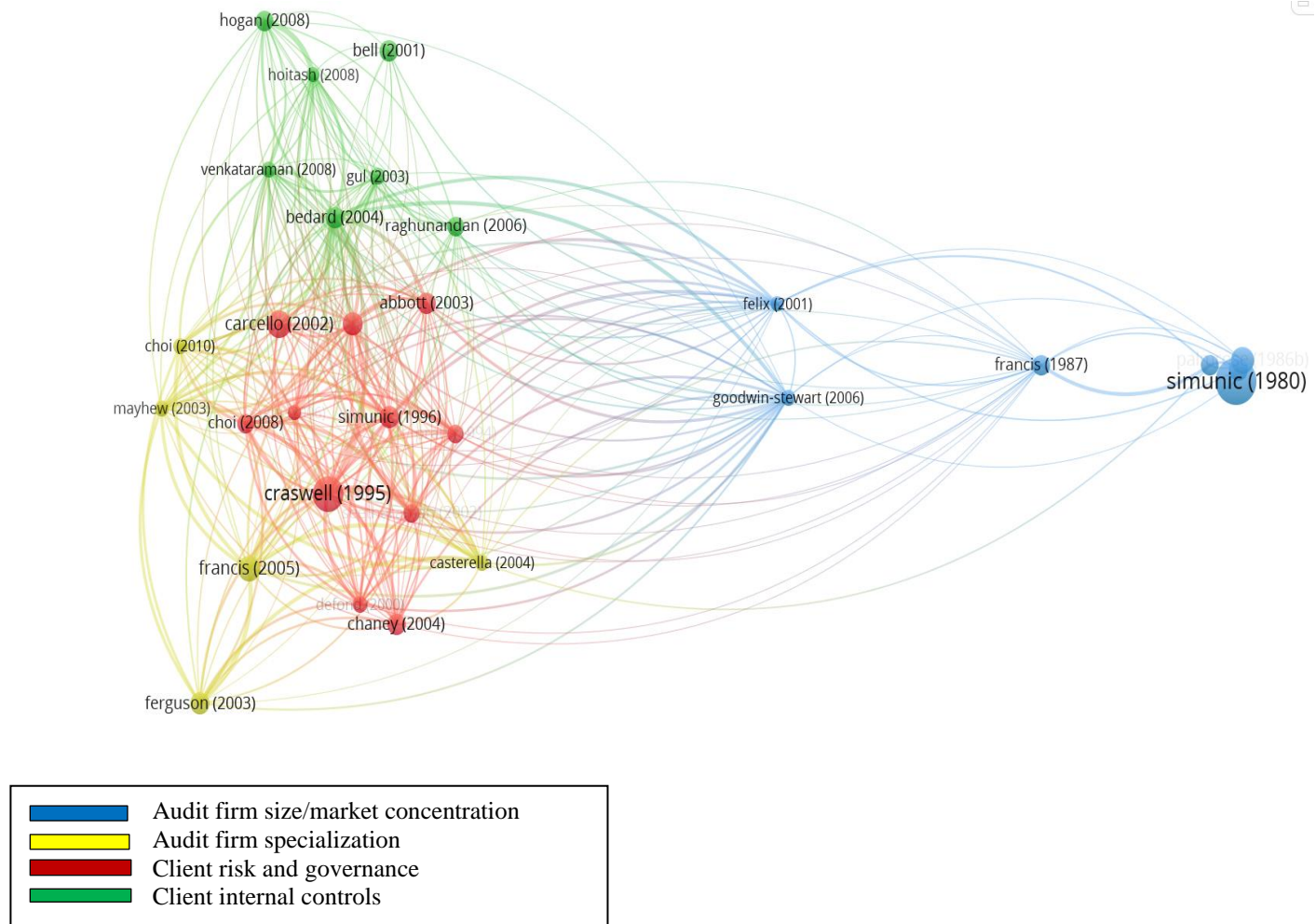
Notes: The table presents summaries of the top 30 SOX-related articles used in Figure 4 and presents them in chronological order per VOSviewer cluster (i.e. color in Figure 4).
 *Number of companies is estimated based on firm-year observations and period.

5.3 Bibliographic mapping of the audit fees research

The bibliographic mapping of the 30 top-cited articles is produced using VOSviewer program and presented in Figure 3. The size of the circle reflects the number of citations of an article (larger circles indicate more citations). For instance, Simunic (1980) has the largest circle and is the most cited article within the sample. VOSviewer organizes articles based on bibliographic coupling into clusters where articles with same color belong to the same cluster. Accuracy of the clustering is verified via content analysis of the articles.

Based on the clustering and the content analysis of those included in the citation maps and other articles published during the study period, we identified *main* themes and *sub-themes*. Sub-themes related to the attributes of the firm that influence audit fees are the *audit firm's size*, *audit market concentration*, and *industry specialization*. These sub-themes are represented by the blue (audit firm size/market concentration) and yellow (industry specialization) clusters in Figure 3. The other two colors (red and green in Figure 3) represent attributes of the client and deal with sub-themes such as client's *risk* and *corporate governance*, including *ownership*, *board structure*, and *internal controls*.

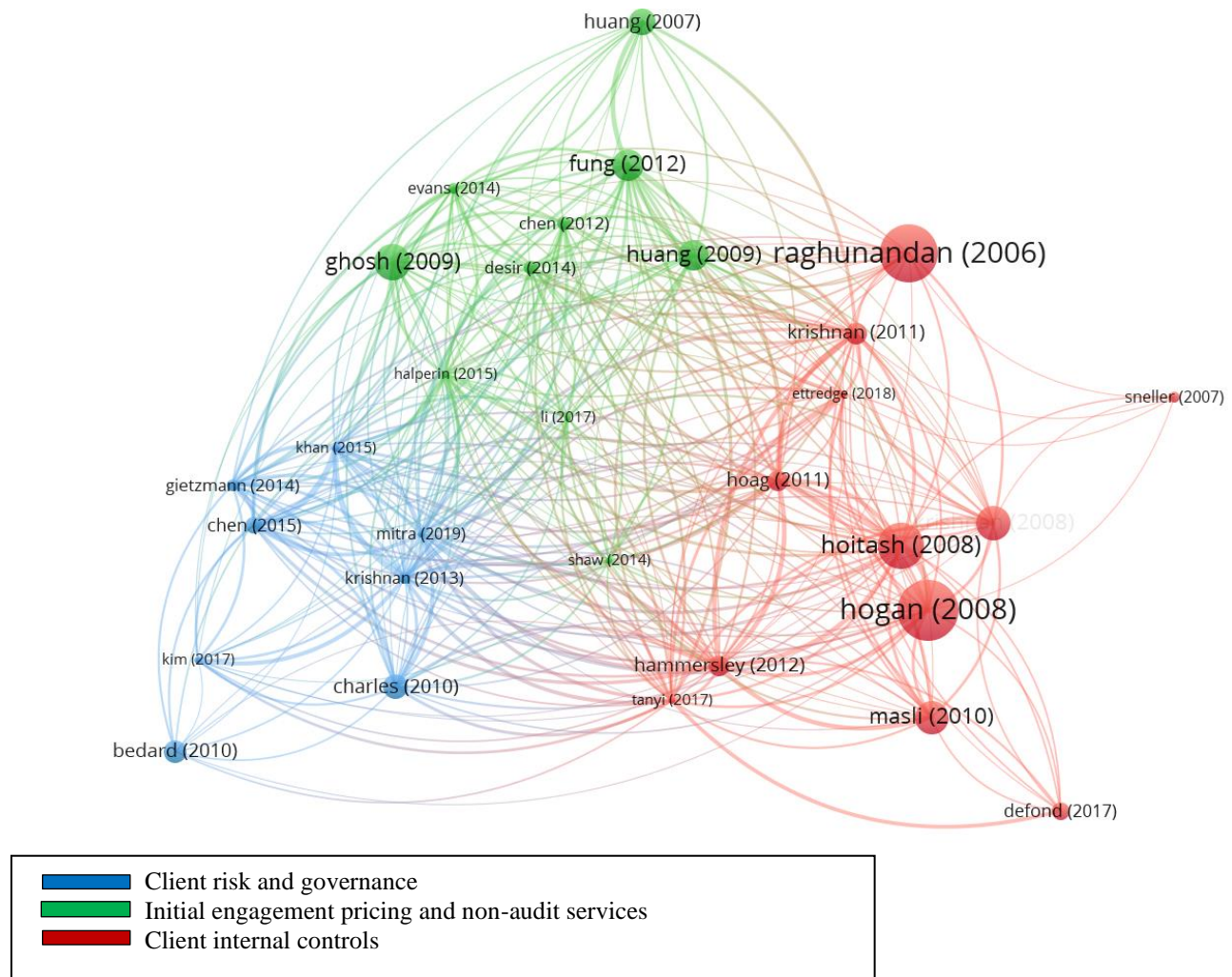
Figure 3: Clustering of the 30 top-cited audit fees articles



Notes: This graph visualizes, based on VOSviewer's bibliographic coupling, the top-cited audit fees articles as per number of citations on Web of Science as of June 30, 2020. Summaries of these articles are provided in Table 1.

We discuss each cluster within the context of self-regulation and re-regulation and utilize clustering of SOX-related articles (Figure 4) to complement general clusters with insight as to how literature changed during the re-regulation period. The blue cluster represents client risk and governance, the red cluster focuses on internal control quality, and the green on engagement attributes, including initial engagement pricing and non-audit services. The client and engagement attributes became more evident in the post-SOX period. We also identify studies that specifically examine impact of regulation and discuss those separately.

Figure 4: Clustering of the 30 top-cited SOX-related articles



Notes: This graph visualizes, based on VOSviewer's bibliographic coupling, top 30 audit fees articles that are related to SOX as per number of citations on Web of Science as of June 30, 2020. Summaries of these articles are provided in Table 2.

5.4 Audit firm attributes

The main research questions addressed in this stream relate to the influence of audit firm attributes on audit fees. Specifically, this literature discusses how the audit firm's size, audit market concentration, specialization, and audit practices affect audit fees.

Audit firm size and market concentration: The articles in this group focus on whether the size of the audit firm impacts audit fees. Do the clients of large audit firms (e.g., Big N) pay higher audit fees? The audit firm's size is also a common measure of the audit quality because large firms can invest more in technology, support, and training

(Chaney, Jeter, & Shivakumar, 2004; Palmrose, 1986a). The argument is that a higher level of audit quality is expected to result in higher audit fees to compensate the auditor for the investment. In general, most of the size-related articles find evidence to support a positive relationship between size and audit fees (Choi, Kim, Kim, & Zang, 2010; Francis, 1984; Francis & Simon, 1987; Francis & Stokes, 1986; Palmrose, 1986a).

On the other hand, Chaney et al. (2004) did not find that the size of the audit firm affects fees. They showed that private companies choose the lowest-cost audit available, which may or may not be a Big N firm. The authors also argued that the clients in their sample do not regard Big N services as sufficiently superior to justify a fee premium. In contrast to other studies that tend to focus on public companies, Chaney et al. (2004) concentrated on private enterprises that are not as exposed to the pressure to select a certain audit firm. During the self-regulation period, firm size was a heavily researched topic. The dominance of the large audit firms raised doubts about the existence of competition among auditors. Simunic (1980), using a cross-sectional survey conducted in 1977 of 397 U.S. public companies, concluded that there is price competition and the Big 8 are not monopolizing the market for audit services. Other studies came to similar conclusions (Copley & Doucet, 1993; Sanders, Allen, & Korte, 1995). In fact, after the two mergers in 1989 that resulted in the Big 6, Iyer and Iyer (1996) found that audit fees were not affected. Using a sample from the Canadian municipal sector, where non-Big 6 companies are dominant, Bandyopadhyay and Kao (2004) found that higher audit fees were associated with non-Big 6 firms. McMeeking, Peasnell, and Pope (2007) examined the impact of firm mergers on audit fees and reported higher audit fees but attributed them to product differentiation, not anti-competitive pricing. During the re-regulation period, the implications of market concentration for pricing has sparked increased interest because the dominant role of the Big 4 in the audits of public companies remains a concern for regulators.

Specialization: Audit firms differentiate themselves by focusing on certain industries and/or locations. By specializing in a particular industry, audit firms gain industry-specific knowledge that allows them to provide differentiated products, build

reputation and increase market share (Craswell, Francis, & Taylor, 1995). Articles in this area examine whether and how specialization affects audit fees. In line with the differentiation strategy (Porter, 1985), specialization is expected to contribute to an audit firm's ability to charge a fee premium because the demand for focused audit services gives specialists greater power in pricing (Casterella, Francis, Lewis, & Walker, 2004; Craswell et al., 1995; Zerni, 2012).

Scholars have examined how industry specialization at the global level (e.g., Carson, 2009) national level (e.g., Craswell et al., 1995), city (office) level (e.g. Ferguson et al., 2003), and partner level (e.g., Zerni, 2012) impacts audit fees. The general finding is that audit firms/partners that specialize can earn a fee premium (Casterella et al., 2004; Craswell et al., 1995; Ferguson, Francis, & Stokes, 2003; Francis, Reichelt, & Wang, 2005; Mayhew & Wilkins, 2003). However, the fee premium is contingent on the client's bargaining power. Indeed, those with strong bargaining power do not pay a fee premium (Casterella et al., 2004; Fung, Gul, & Krishnan, 2012; Huang, Liu, Raghunandan, & Rama, 2007; Mayhew & Wilkins, 2003). Fung et al. (2012) found that the fee premiums for industry specialists increased in the post-SOX period. Industry specialization has received more attention during the re-regulation period. The growth in articles can be attributed to the increased scrutiny, litigation, and concerns about auditors' ability to provide needed services (Fung et al., 2012). With more regulation and changes in standards, we can expect to see a continuing focus on different aspects of specialization.

5.5 Client attributes

This stream investigates the implications of the client attributes for the pricing of audits. The research questions tend to be as follows: What types of risk factors related to the client are considered when pricing audit services? Do corporate governance mechanisms have implications for audit pricing? To what extent do the client's internal control deficiencies affect audit pricing?

Risk: The evaluation of risk is widely recognized as a key aspect of audit planning. The audit fee literature identifies several client factors that increase risk, including financial

restatements, stock price volatility, bribery, and political connections. To compensate for the additional effort and/or possible legal costs, riskier clients pay more in audit fees. Specifically, audit fees are higher among clients who: embark on an initial public offering (Venkataraman, Weber, & Willenborg, 2008); were delisted, filed for bankruptcy or were the subject of lawsuits (Beatty, 1993); experienced irregularities (e.g., stock price volatility) (Firth, 1985; Houston, et al., 1999); face poor financial conditions (Pratt & Stice, 1994); were involved in fraud or opportunistic earnings management (Bedard & Johnstone, 2004; Charles, Glover, & Sharp, 2010; L. Chen, Krishnan, & Pevzner, 2012; Gul, Chen, & Tsui, 2003; G. V. Krishnan, Sun, Wang, & Yang, 2013) operate in litigious environments (Choi, Kim, Liu, & Simunic, 2008, 2009; Seetharaman, Gul, & Lynn, 2002); pay bribes (Lyon & Maher, 2005); have overconfident management (Mitra, Jaggi, & Al-Hayale, 2019); and are politically connected (Gul, 2006). Gietzmann and Pettinicchio (2014) found that clients that received comment letter from the SEC paid more in audit fees due to higher risk. While the client risk factors have remained an important research topic throughout both periods, one area that has seen large growth with re-regulation is how various aspects of corporate governance affect audit fees and is discussed next.

Ownership, boards, and internal controls: Corporate governance refers to the system by which companies are directed and controlled. The ownership structure has implications for audit fees. In general, public companies have a greater risk of litigation than privately held companies (Abbott, Gunny, & Pollard, 2017; Badertscher, Jorgensen, Katz, & Kinney, 2014). Therefore, it is not surprising that Badertscher et al. (2014) reported that audit fees are higher for public companies than private equity companies. Furthermore, audit fees are higher for companies with institutional investors due to increased involvement and oversight by these shareholders (Abbott et al., 2017). Family ownership also has implications for audit pricing. Some researchers have argued that the audit of family-owned companies requires less effort because of fewer principal-agent problems (Ali, Chen, & Radhakrishnan, 2007) and results in lower audit fees (Ghosh & Tang, 2015).

The mechanisms of an effective governance system include board independence, diligence, and expertise (Cohen & Hanno, 2000). On an independent board, the majority

of the directors are non-executives (outsiders) (Carcello, Hermanson, Neal, & Riley, 2002). Board diligence is measured by the frequency of meetings and the attitude of board members (e.g., preparation for meetings), while board expertise refers to the competence and experience of board members (Carcello et al., 2002). The academic literature tends to present two perspectives. The demand-based view holds that the demand for high-quality audit services is greater among companies with good corporate governance because their boards seek high-quality financial information (Cohen, Krishnamoorthy, & Wright, 2004; Hay, Knechel, & Ling, 2008). This demand results in higher audit fees due to the greater effort involved in conducting the audit (Abbott, Parker, Peters, & Raghunandan, 2003; Knechel & Willekens, 2006; Zaman, Hudaib, & Haniffa, 2011). On the other hand, from the risk-based perspective, clients with weak governance mechanisms pay higher audit fees because auditors price in the risk of litigation. Moreover, clients with weak governance mechanisms require more auditor effort, and hence, higher fees (Bedard & Johnstone, 2004; Y. Chen, Gul, Veeraraghavan, & Zolotoy, 2015).

Certain corporate governance factors contribute to lower audit fees. Peel and Clatworthy (2001) documented that the ownership of shares by directors is associated with lower audit fees. Beck and Mauldin (2014) reported an interesting dynamic related to the role of audit committees and chief financial officers (CFOs) in audit fee negotiations. They found that fee reductions were larger for companies with influential CFOs (based on tenure) and smaller if audit committees were more dominant. This result suggests that although audit committees are responsible for negotiating the auditor's remuneration, CFOs can still play an influential role. H. Kim, Kwak, Lim, and Yu (2017) revealed that audit committee's accounting expertise has a positive effect on audit fees, suggesting that accounting experts probably demand higher audit effort which results in higher audit fees. However, this positive effect disappears in the presence of influential CEO (in terms of longer tenure). Khan and Wald (2015) reported that audit fees increased among companies whose directors are protected against litigation either by state laws or companies' charter. Felix, Gramling, and Maletta (2001) showed that an internal audit is an important internal monitoring mechanism that helps reduce the external auditor's fees. In contrast, Goodwin-

Stewart and Kent (2006) found that the use of internal audit is associated with higher external audit fees. They interpreted this finding to mean that companies that “engage in greater internal monitoring through the use of internal audit also demand higher quality external auditing” (p. 388).

A functioning system of internal controls is an essential part of corporate governance (Von Solms, 2001). Following the passage of SOX, there has been a great deal of interest in how a client’s internal controls influence audit fees. Section 404 of SOX requires auditees to disclose internal controls over financial reporting and the auditors to issue a separate report on these internal controls. This requirement has been the subject of heated debate among many stakeholders, including professionals and academics, regarding implementation costs and related audit fees (Ernst & Young, 2005; J. Krishnan, Rama, & Zhang, 2008). This regulatory change has broadened the scope of the audit, requiring more effort and higher audit fees in the post-SOX period (Hammersley et al., 2012; Hoag & Hollingsworth, 2011; Hogan & Wilkins, 2008; Hoitash, Hoitash, & Bedard, 2008; Raghunandan & Rama, 2006; Sneller & Langendijk, 2007). Similarly, Evans and Schwartz (2014) found that a significant proportion of the increase in audit fees post-SOX is attributed to the internal control review requirement of SOX and the cost to comply with this requirement was a significant burden for small clients. Raghunandan and Rama (2006) found an increase in audit fees among companies that disclosed material weaknesses in their internal controls such as problems in reconciling accounts, the quality and training of accounting personnel, and problems in specific types of transactions. Other studies that reported similar findings include Hoitash et al. (2008), Hogan and Wilkins (2008), and Hammersley et al. (2012). Munsif, Raghunandan, Rama, and Singhvi (2011) examined how auditors react to the remediation of internal control problems. They found that compared to clients without internal control issues, audit fees were higher among clients who addressed previously disclosed material weaknesses but lower than for clients who continued to have material weaknesses in internal controls. Masli, Peters, Richardson, and Sanchez (2010) showed that technology could help improve internal controls and hence reduce audit fees. In summary, most corporate governance-focused studies were performed

during the re-regulation period and signal an increased focus on the clients' management and structure as they relate to the auditors' ability to price risk and effort.

5.6 Engagement attributes

Engagement attributes became increasingly more relevant during the re-regulation period due to the changing requirements related to *audit tenure* and *scope of services*. The main questions address whether the mandatory rotation of the audit partner or a firm rotation affects audit fees. Whether and when the audit fees for initial and continuous audit engagements differ? How does the delivery of non-audit services impact the pricing of audit services?

There were persistent concerns that auditors' extended tenure impairs independence and objectivity due to long-term relationship with the clients. The two approaches to address this issue are: (1) a required partner rotation within the same firm and/or (2) audit firm change. In the U.S., in 1978 AICPA introduced a seven-year audit partner rotation requirement. Section 203 of SOX shortened the period and requires partner rotation after five years. Mandatory audit partner rotation was expected to have implications for audit quality and fees. Lennox, Wu, and Zhang (2014) found that mandatory rotation improved audit quality and Bedard and Johnstone (2010) highlighted that longer partner tenure was associated with higher audit fees.

Related to these are studies examining pricing for initial engagements when a new auditor takes over. In general, pre-SOX studies reported evidence of fee discounting (Craswell & Francis, 1999; Francis & Simon, 1987; Kanodia & Mukherji, 1994; Schatzberg, 1990; Simon & Francis, 1988). For instance, Simon and Francis (1988) tested the existence of fee discounting during initial engagements among clients who changed auditors between 1979 and 1984. The results showed evidence of fee discounting, at least during the first three years of engagement, and a return to normal levels after that. Post-SOX, Ghosh and Pawlewicz (2009) documented fee discounting by smaller firms during initial audit engagements but Huang, Raghunandan, and Rama (2009) found initial-year audit fee premium among Big 4 clients. They also concluded that Big 4 auditors became

more selective in choosing clients. With the passage of time since SOX, Desir, Casterella, and Kokina (2014) re-examined fee discounting due to PCAOB's concern about the unrealistic pricing of initial engagements (PCAOB, 2011) and found evidence of fee discounting among both Big 4 and non-Big 4 audit firms based on 2007-2010 sample. The impact of partner and firm change on pricing is expected to remain of interest as required audit firm rotation was implemented in the EU in 2016. As studies of initial engagement pricing indicate, firm changes will have implications for pricing and audit practices.

The types of services that audit firms provide to their clients is another area of focus for regulators. During the self-regulation period, a broad range of additional services were offered and the main issue was whether the provision of non-audit services influences audit quality and audit fees. Palmrose (1986b), Davis, Ricchiute, and Trompeter (1993), and Halperin and Lai (2015) investigated the relationship between non-audit and audit fees and found a positive effect where clients who purchased both audit and non-audit services from the incumbent auditor paid more in audit fees. In contrast, Whisenant, Sankaraguruswamy, and Raghunandan (2003) concluded that non-audit fees do not affect audit fees. They maintained that the two types of fees are determined simultaneously. Regulators pushed to limit the scope of services that auditors provide to their clients following audit scandals of 2000s. Significant revenues for consulting services that Arthur Anderson received from Enron prior to its collapse were considered one of the main factors undermining auditor's independence and objectivity. With SOX, the practice of offsetting audit losses with consulting fees was expected to decline due to limitations on the non-audit services (Desir et al., 2014).

5.7 Regulation

The changes in regulations have led scholars to evaluate the consequences of regulation for audits and to examine whether intended impact was achieved. Francis and Wang (2005) found that the mandatory public disclosure of audit fees in the U.S. resulted in the improved precision of audit pricing. Specifically, the disclosure requirement has reduced variances in audit fees between years and increased the bargaining power of

clients. Studies examining the impact of SOX found that audit fees generally increased in the post-SOX period due to increased effort (Ettredge, Sherwood, & Sun, 2018; Evans & Schwartz, 2014; Ghosh & Pawlewicz, 2009) and because “the risk associated with auditing increased dramatically” (C. Li, 2009, p. 207). For instance, Sneller and Langendijk (2007) found that audit fees increased by 50 percent in the first year of Section 404 compliance, Ghosh and Pawlewicz (2009) found that audit fees increased by 74 percent in the post-SOX period but there was a reduction in non-audit fees, and Shaw and Terando (2014) found that audit fees increased by 88 percent. Y. Li and Luo (2017) documented that managerial ability had a negative effect on audit fees which is more pronounced in the post-SOX period when management is required to take a more active role in financial reporting (i.e., certification of financial statements required by SOX 302). The finding suggests that managerial ability lowers litigation risk, hence, lowers audit fees. Thus, SOX increased not only audit fees but also auditor’s price sensitivity to non-financial information (e.g., managerial ability) (Y. Li & Luo, 2017; Mitra et al., 2019).

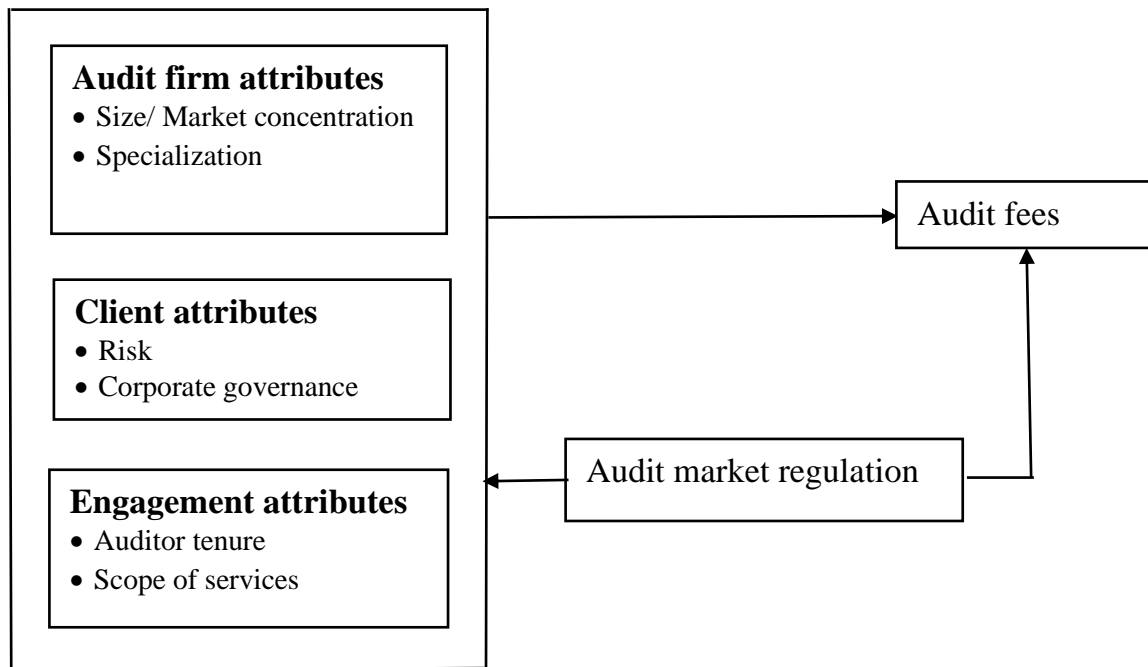
With SOX, PCAOB was granted oversight remit where firms working on audits of publicly registered companies are monitored by the agency. PCAOB performs inspections to ensure that firms comply with relevant standards. This was a significant change in how the profession is organized and studies have examined the impact of the inspections on audit fees. DeFond and Lennox (2017) and Tanyi and Litt (2017) found that PCAOB’s inspections of internal control audits resulted in higher audit fees. DeFond and Lennox (2017) studied the content of PCAOB’s inspection reports and found that when audit firms received deficiency comments for their internal control audits, they took measures to improve their internal control audit procedures which resulted in higher audit fees. Tanyi and Litt (2017) studied PCAOB’s inspection frequency (i.e., annually or triennially based on number of public clients) and found that clients of annually inspected audit firms had lower likelihood of misstating their financial statements and they paid more in audit fees compared to clients of triennially inspected firms. The inspections compel auditors to do more work to prevent deficiencies, hence, higher compensation is required.

Also, it is important to examine the implications of new and revised auditing standards. For example, PCAOB replaced Auditing Standard (AS) 2 with AS 5 with an aim to reduce audit cost by applying risk-based approach to the audit of internal controls and removing unnecessary audit procedures. The impact of this transition was examined by Doogar, Sivadasan, and Solomon (2010) and J. Krishnan, Krishnan, and Song (2011) who found that AS 5 indeed resulted in lower audit fees. However, Krishnan et al. (2011) found that the expected cost savings for smaller and less complex companies did not occur; only more complex companies (with multiple segments and international operations) benefited from the cost savings. Next, we discuss recent regulatory changes and future research opportunities.

6. Discussion and conclusion

The re-regulation of audit function was undertaken to improve audit quality and rebuild confidence of investors in auditor's ability to protect their interests. Studies in the identified streams are interconnected and mainly focus on the attributes of the audit firms, clients, and engagements. Our overview demonstrates how regulatory changes impacted the focus of audit fees research where the attributes of the clients and engagements have gained importance. Figure 5 provides an overview of the streams and recognizes the direct impact of regulation on audit fees as well as the indirect effect through its influence on audit firms, clients, and engagements. In terms of methodology, studies of audit fees tend to utilize archival data. Additional insights can be obtained by relying on or supplementing the findings with interviews and experimental studies that can shed light on actual audit practices.

Figure 5: Audit fees overview



6.1 Audit firm attributes

This research stream examines how audit firm attributes, including size and industry specialization, influence audit fees. Yen, Lim, Wang, and Hsu (2018) emphasized that more can be done to examine the moderating impact of audit firm attributes (i.e., industry expertise, size) on audit fees. To recognize the importance of the institutional infrastructure, Riccardi, Rama, and Raghunandan (2018) suggested evaluating the impact of regulatory quality on the audit fees of specialized auditors to determine whether fee premiums are due to higher audit quality or due to more extensive demands on auditors in jurisdictions with higher regulatory quality. Another avenue for future research relates to the efficiency of the auditors. Studies have found that technical and allocative inefficiencies result in lower billing rates (Chang, Kao, Mashruwala, & Sorensen, 2018; Dopuch, Gupta, Simunic, & Stein, 2003). Given that companies vary in their utilization of data analytics and technology, it is important to examine how these capabilities affect audit practices and fees in firms of different sizes. The actual audit practices of the firms and how they change fees and practices in response to regulatory changes is an underexplored area and requires more observation and interview-based studies.

6.2 Client attributes

Our review highlights the increased interest in the characteristics of the auditees and their corporate governance mechanisms. Given that the audit fee reflects auditor's effort and audit risk, the choice of clients becomes an important issue for the auditor due to risks associated with corporate governance weaknesses. The ownership structure of companies differs as does the regulation for different types of enterprises. While some jurisdictions require a broad range of public and private companies to be audited, others focus on public companies. The pricing and approaches to audits of private, small, and state-owned companies require further study (Barroso, Ben Ali, & Lesage, 2018). In addition, the examination of the implications of organizational changes such as re-organizations, mergers, and acquisitions is relevant. Other areas to consider are approaches to internal controls and external monitoring by analysts and the media (Gul & Ng, 2018).

6.3 Engagement attributes

The auditor's tenure and the scope of services have been impacted by SOX in the U.S. and are also the focus of recent EU regulations aimed to ensure auditor independence (EU, 2014). The regulatory environment of the EU block is complex as jurisdictions must comply with the EU regulation but can implement more restrictive requirements. For example, the EU 2006 Audit Directive provides a baseline as to which companies fall into the public interest entity (PIE) category (i.e., public entities, credit institutions, and insurance undertakings) and require statutory audits. The EU definition can be adopted as it is or modified at the national level. In some countries the definition of a PIE is broad, and public companies make up less than 10 percent of audited PIEs (Portugal 4 percent; Ireland 5 percent; Romania 9 percent), while in other countries public companies account for a much higher proportion of PIEs (Germany 70 percent; Bulgaria 73 percent; Greece 72 percent) (Accountancy Europe, 2017). Consequently, the wide variability in the types of companies that need to be audited across the EU contributes to differences in the audit providers and the type of audits that are provided. The more recent Directive 2014/56/EU and Regulation 537/2014 introduced several changes and limited audit firm's tenure for

PIEs to ten years, with some exceptions. Audit partner and firm rotations are specified at the EU level but shorter periods for both can be adopted by the member states (Cameran, Negri, & Pettinicchio, 2015). The goal of regulators in limiting the duration of the auditor's tenure is to "address the familiarity threat and therefore reinforce the independence of statutory auditors and audit firms" (EU, 2014, p. 81). The required firm rotation was previously introduced in various countries but subsequently abandoned due to cost concerns (Cameran et al., 2015). Examples include Canada (introduced in 1920s and abolished in 1991), Spain (introduced in 1988 and abolished in 1995), and Singapore (introduced in 2002 and abolished in 2008). Scholars have argued that the switching costs incurred by the new audit firm outweigh the benefits (Cameran et al., 2015). Evidence from Italy (the only EU member state with mandatory audit firm rotation since 1975) showed that audit quality declined following the rotation of audit firms (Cameran, Francis, Marra, & Pettinicchio, 2013; Cameran, Prencipe, & Trombetta, 2016), and a study based on a Spanish sample established a positive relationship between an audit firm's tenure and audit quality (Garcia-Blandon, Argiles, & Ravenda, 2020). Future studies can examine whether firm rotations affect audit fees and whether there are differences when the rotation is voluntary or mandatory (Stewart, Kent, & Routledge, 2016). Since audit firm rotation can create opportunities for mid-tier firms to compete with the Big 4, scholars can investigate the impact of firm rotation on competition and auditor choice (A. G. Köhler, Quick, & Willekens, 2016). Considering the findings of prior studies, the consequences of the EU's firm rotation requirement will need to be carefully examined to evaluate the implications for the fees and quality of audits and determine whether the targeted aims were achieved.

Joint audits are currently utilized in France for public companies where two firms are responsible for the audit. The UK is considering joint audits to reduce the dependence on the Big 4, but it is not clear whether joint audits produce higher-quality audits. André, Broye, Pong, and Schatt (2016) found that mandatory joint audits are associated with higher audit fees. An opportunity for future research is to explore and identify the drivers of extra costs, such as the mix of responsibilities, coordination, and duplication, that can occur in joint audits.

The 2014 EU audit regulation also introduced restrictions on the provision of non-audit services. Given that the member states can modify the types of services that are included in the prohibited category and make them more restrictive, researchers have an opportunity to examine whether and how the prohibition of certain types of services affects the auditor's independence, fees, and quality. Furthermore, the EU regulation capped non-audit fees at 70 percent of the average audit fees paid by a PIE in the last three years. Future research could assess retrospectively whether auditor independence or audit quality were impaired if non-audit fees exceeded that level. It would also be helpful to assess whether the 70 percent cap is appropriate for improving the quality of the audit (A. G. Köhler et al., 2016). Evidence from Denmark suggests that the EU cap is too high to increase auditor independence (Van Liempd, Quick, & Warming-Rasmussen, 2019). Future research could validate this finding using data from other EU member states.

In summary, we use bibliometric and content analyses to synthesize the growing body of scholarly work on audit fees. The purpose of the review is to (1) highlight the regulatory events that influenced audit fee research, (2) identify the leading research streams, and (3) motivate future research. We consider the context of the self-regulation and re-regulation of the auditing profession. Specifically, we highlight the regulatory changes and their implications for the pricing of audits and provide suggestions on how future research can contribute to our understanding of the regulatory impact on audits. Overall, the focus on the consequences of regulation has increased and represents an important area where academics can contribute to the discussion, evaluate the proposals, and share the experiences of other jurisdictions. Researchers can help regulators with insight as to implications of regulation and help to manage the tension between producing regulation that improves audit quality but also not place an unnecessary burden and cost on preparers and, indirectly, shareholders. We note that some of the regulations that have been introduced have already been tried in other jurisdictions, but it does not appear that prior experiences and the impact of these changes have been fully considered.

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**Study 2: IFRS adoption approaches in Africa: Implications for
accounting quality**

IFRS adoption approaches in Africa: Implications for accounting quality

Abstract

Amid the widespread diffusion of the International Financial Reporting Standards (IFRS) across the globe, its effect on accounting quality continues to be debated. Moreover, questions about the implications of different adoption approaches are important but largely unexplored. We investigate these two issues by focusing on Africa, the continent that has received little empirical attention in the literature, yet the region is industrializing and attracting investors. We examine accounting quality for pre-and post-IFRS reporting based on 3946 firm-year observations from six African countries over eighteen years. Based on the mandatory adoption approach undertaken at the country level, IFRS ‘as is’ or with local modifications, we further classify companies as *users* and *adapters*. Results indicate that IFRS adoption was not associated with reduced earnings management, timeliness of loss recognition, and value relevance of accounting numbers. The type of standard used is not as important as the institutional framework of the country. More importantly, we observe differences in reporting between the users and adapters. First, with respect to earnings management and timely loss recognition, it is adapters that experienced a greater decline in accounting quality. Conversely, the adapters had more value relevant accounting information than the users. These results provide insight into longstanding questions related to implications of local IFRS modifications for accounting quality.

JEL classification: M40, M41, M48

Keywords: IFRS adoption; IFRS adaption; accounting quality; Africa

IFRS adoption approaches in Africa: Implications for accounting quality

1. Introduction

Amid the widespread diffusion of the International Financial Reporting Standards (IFRS) across the globe, its effect on accounting quality continues to be debated. The issue has received attention in cross-country research but research on Africa is limited (Tawiah and Boolaky (2019). The continent represents an important market due to ongoing industrialization and economic development. As of January 2019, forty out of 54 African countries require or permit the use of IFRS for financial reporting of listed companies (IFRS Foundation, 2020b). The conjectures about suitability of IFRS have persisted due to the coercive pressures from funding agencies that drove the adoption of IFRS in many of these countries (Boolaky et al., 2020; Irvine, 2008; Nurunnabi, 2015) as well as “illiquid stock markets, asset price ineffectiveness, and higher managerial/shareholder agency conflicts” (Hillier, Hodgson, & Ngole, 2016, p. 239). We focus on the implications of IFRS adoption for the accounting quality in Africa and examine the mode of adoption to provide insight into the longstanding questions about the effect of IFRS on markets with different legal and economic frameworks.

The reviews of IFRS literature note that different conclusions were reached about the use of IFRS and accounting quality (e.g. K. Ahmed, Chalmers, & Khelif, 2013; De George et al., 2016). For example, Barth, Landsman, and Lang (2008), using a sample from 21 countries, reported an increase in accounting quality for a group of voluntary adopters. Based on a sample of 20 countries, A. S. Ahmed, Neel, and Wang (2013) documented a reduction in accounting quality after mandatory IFRS adoption. From the African continent, only South Africa was included in both studies. African states, like other developing markets, tend to be at the periphery of transnational standard-setting. Also, when adoption is externally driven, the adopting country may become a label adopter where the rules-on-paper vary from the rules-in-use (Kan, Agbodjo, & Gandja, 2020). It has been argued that IFRS benefits hinge on jurisdiction-specific attributes rather than the

universal nature of the standards (P. Brown, 2011; Houque et al., 2012; Pope & McLeay, 2011; Sunder, 2011; Wysocki, 2011). IFRS-based accounting quality outcomes differ from one jurisdiction to the other due to underlying institutional mechanisms and enforcement regimes (Y. L. Chua, Cheong, & Gould, 2012; P. Kim, Marchini, & Siciliano, 2019).

Nobes and Zeff (2016) note that African countries tend to adopt IASB standards as published by the International Accounting Standards Board (IASB). It is described as a *single-step* approach where IASB's version of IFRS is adopted without modifications and additional approvals by the national or regional authorities. That is in contrast to the more common *multi-step* approach where IFRS standards have to be approved and can be modified at the national (e.g., Australia) or regional levels (e.g., the EU). IASB and other proponents of IFRS recommend the single-step approach to maintain comparability and consistency in standards (Zeff & Nobes, 2010) but the impact of different adoption approaches has not been examined. Our sample consists of 3946 firm-year observations from six African countries over an eighteen-year period. The data was categorized into pre- and post-IFRS adoption where accounting quality between the two groups is compared. Based on Nobes and Zeff (2016), we further classify our observations under two broad forms of IFRS adoption: *users* - utilize the single-step approach and adopt IFRS as is, and *adapters* - utilize the multi-step approach and apply a national version of IFRS. This classification enables us to empirically test the accounting quality differences between users and adapters.

Prior studies have mostly focused on countries where institutional infrastructure of standard-setting and enforcement is well established but implications for states with different institutions remain underexplored. We did not observe improvement in accounting quality post-IFRS adoption. Specifically, IFRS reporting was not associated with a reduction in earnings management. Similarly, there was no significant improvement in timely loss recognition. Moreover, companies utilizing IFRS experienced a decline in value relevance of accounting information. These results are largely consistent with single-country studies of Nigeria (Abdul-Baki & Haniffa, 2020) and Egypt (Ebaid, 2016; Elbannan, 2011). There are several possible explanations for why adoption was not

associated with an improvement in accounting quality. First, inadequate compliance with IFRS requirements. Alternatively, countries increasingly use IFRS as a basis for national standards. Even prior to the formal adoption of IFRS, many local standards incorporated elements of IFRS and the differences subsequent to the formal adoption may not appear significant. Institutions remain a key driver of quality reporting, irrespective of the standards that are formally used.

Studies tend to overlook the adoption approach and focus on whether the adoption of IFRS occurred or not. Consequently, we do not know the implications of adopting standards as is or with modifications. We recognize adoption process differences and observe two interesting findings related to reporting of adapters and users of IFRS. First, with respect to the various metrics for earnings management and timely loss recognition, users of full IFRS demonstrate reduced earnings management and increased timely loss recognition. On the other hand, adapters, in our case the Egyptian companies, exhibit greater value relevance than the users, suggesting that accounting information based on the locally-adapted IFRS yields higher benefits for capital market participants. Our study is exploratory and, given these differences in accounting quality metrics between users and adapters, our results call for a broader discussion about modifications that countries make to IFRS and implications of these differences for financial reporting and comparability between jurisdictions.

The rest of the paper proceeds as follows: section 2 presents the literature review and hypothesis, section 3 presents the research design, section 4 presents and discusses the results, and section 5 concludes.

2. Literature review and hypotheses development

2.1 IFRS adoption

The adoption of IFRS in countries around the globe is driven by institutional, economic, and cultural factors. Specific to developing countries, two factors dominate the discussion: economic incentives and institutional isomorphic pressures. First, economic incentives, such as an anticipated increase in foreign direct investment (FDI) and

improvement in the competitiveness of financial markets, drive the decision to adopt international accounting standards (e.g. Gordon, Loeb, & Zhu, 2012; Peavy & Webster, 1990; Taylor, Evans, & Joy, 1986). Tyrall, Woodward, and Rakhimbekova (2007) found that IFRS adoption in Kazakhstan was related to increase in foreign direct investment. As IFRS tends to be associated with enhanced disclosures and transparency (Y. L. Chua et al., 2012), it is a way to boost investors' confidence and the competitiveness of capital markets. Owolabi and Iyoha (2012), based on a survey, reported that preparers and users of annual reports in Africa perceived IFRS adoption as beneficial for investors' confidence.

In contrast, other researchers argue that IFRS adoption occurs as a result of coercive isomorphic pressure coming from the World Bank (WB) and the International Monetary Fund (IMF) and not economic rationalization (e.g. Boolaky et al., 2020; Hassan, Rankin, & Lu, 2014; Irvine, 2008; Nurunnabi, 2015). Judge, Li, and Pinsker (2010) show that dependence on foreign aid was a significant predictor of a country's IFRS adoption. Before IFRS, many countries in Africa applied accounting standards with limited disclosure requirements. Boolaky et al. (2020) asserted that significant differences that existed between various national standards and IFRS were behind the WB's and IMF's recommendation⁴ to adopt IFRS given to the majority of the African countries. Authors highlight that pressure to adopt IFRS also came from the local accountancy bodies affiliated with the proponents of IFRS, including International Federation of Accountants (IFAC) (Boolaky et al. (2020)). As such, when adoption is externally driven, the adopting country may become a label adopter where the rules-on-paper vary from the rules-in-use. Consequently, benefits expected from IFRS reporting may not materialize. Next, we discuss the literature on IFRS and accounting quality.

2.2 Accounting quality and enforcement

IFRS are considered high-quality standards and the expectation is that expanded disclosures will enhance transparency and quality of information (Dye, 2001; Healy &

⁴ Recommendations were voiced in the WB and IMF funded Reports on Observance of Standards and Codes (ROSC).

Palepu, 2001) and will result in an improvement in the overall financial reporting environment (Horton, Serafeim, and Serafeim (2013). Studies note that increase in disclosures at the firm level has positive consequences on the quality of a firm's information environment and market values (e.g. Dye, 2001; Healy & Palepu, 2001). Further, it has been argued that IFRS reporting enhances transparency (Soderstrom & Sun, 2007) and thereby restricts manager's ability to misreport financial results. Moreover, Horton et al. (2013) showed that after mandatory transition to IFRS, analyst forecast accuracy improved mainly due to the improvement of reporting quality and comparability.

Despite the potential to improve accounting quality, extant literature shows conflicting results where some show improvement with IFRS (e.g. Barth et al., 2008; Dimitropoulos, Asteriou, Kousenidis, & Leventis, 2013; Key & Kim, 2020; O. Kim, 2016) or highlight that IFRS is not associated with improvement in accounting quality (e.g. Abdul-Baki & Haniffa, 2020; A. S. Ahmed et al., 2013; Jeanjean & Stolowy, 2008). Others show mixed results as in Zeghal, Chtourou, and Fourati (2012) who, based on the adoption in the EU, find an increase in the accounting-based attributes (less earnings smoothing, decrease in discretionary accruals) but a decrease in the market-based measures (less value relevance).

It has been argued that IFRS benefits hinge on jurisdiction-specific attributes rather than the universal nature of the standards (P. Brown, 2011; Pope & McLeay, 2011; Sunder, 2011; Wysocki, 2011). The institutional mechanisms and enforcement of rules within an adopting jurisdiction constitute an important factor in determining accounting quality (Jeanjean & Stolowy, 2008; P. Kim et al., 2019; Soderstrom & Sun, 2007). Some studies (e.g. Ball, Robin, & Wu, 2003; Barth et al., 2008; Hodgdon, Tondkar, Harless, & Adhikari, 2008; Houqe et al., 2012) have argued that the nature of the accounting standards, without adequate enforcement and investor protection, is not sufficient to induce improvements in accounting quality. Daske et al. (2008) demonstrate that firms operating in countries with greater incentives for transparency and enforcement of rules experienced increased economic benefits post-IFRS adoption. Ball et al. (2003) focused on four Asian countries and argued that accounting quality in weak regulatory settings is driven largely by

managerial incentives rather than the quality of the accounting standards in use. Their findings are consistent with arguments that incentives and other institutional factors have first-order effect on financial reporting outcomes (Holthausen, 2003; Isidro & Raonic, 2012). Similarly, Ding, Hope, Jeanjean, and Stolowy (2007) emphasized that substantial improvements in accounting quality can't be realized with IFRS without corresponding changes to capital markets and the regulatory environment.

Given that developing countries are often associated with weak enforcement regimes, accounting quality benefits related to the adoption of IFRS cannot be assumed (Hillier, Hodgson, & Ngole, 2016). Although a number of African states have adopted IFRS and many were among the early adopters, the setting has not been broadly examined. The cross-country studies that examine accounting quality only include South Africa in the sample, or African companies represent a small portion of the sample (e.g., A. S. Ahmed et al. (2013); Barth et al. (2008)). A study of five African countries reported value relevance for book and earnings coefficients after IFRS adoption. Ebaid (2016) found that in Egypt accounting quality, proxied by earnings management, declined post-IFRS adoption due to the lack of complementary improvements in the underlying financial reporting framework and failure to introduce a more effective enforcement system. Given the efforts of many jurisdictions to converge national standards with IFRS prior to actual adoption, we contend that the quality of enforcement is more important for accounting quality than the formal type of standard that is utilized⁵. Consistent with Barth et al. (2008), we measure accounting quality through three conventional metrics: earnings management, timely loss recognition, and value relevance. Specifically, we state our hypotheses as follows:

H1: The quality of enforcement is more important for accounting quality than the adoption of IFRS.

2.3 IFRS adoption approach and accounting quality

The adoption of IFRS at a country level occurs via a *single-step* or a *multi-step* approach (Nobes & Zeff, 2016). With a *single-step*, a country legislates the use of IFRS as

⁵ We would like to thank the reviewer for bringing this point to our attention.

issued by the IASB. This approach is preferred by the advocates for standardization of financial reporting and by the IFRS Foundation due to consistency in standards as no changes are made to the IASB's version. We refer to such jurisdictions as *users* of the standards. Notwithstanding the greater likelihood of harmonized global financial reporting, countries that want to maintain sovereignty over the standard-setting, choose a more complex *multi-step* process where standards go through a national or regional review and approval and can potentially be modified. We refer to such jurisdictions as *adapters*. For example, Australia uses the multi-step approach where IFRS are reviewed and approved by the Australian Accounting Standards Board (AASB) and renamed as Australian Accounting Standards (Nobes & Zeff, 2016). Felski (2017) observed that the AASB modified nineteen accounting standards by adding disclosures or eliminating choices. Countries with well-developed accounting and regulatory infrastructure or those that belong to economic blocs are more likely to use a multi-step process. Othman and Kossentini (2015) highlight that jurisdictions with limited capacity to develop their own standards or make alternations are more likely to use IFRS without modifications.

The rising influence of IFRS and how standards are utilized in different jurisdictions have revived questions about IFRS adoption approaches and whether countries should adopt IFRS as issued by the IASB or adapt these standards to suit their specific context (Othman & Kossentini, 2015). Specific to Africa, most countries adopt the IASB's version of IFRS but Egypt⁶ is one of the few countries that has pursued convergence through the multi-step approach and develops national accounting standards based on IFRS. As described by Ebaid (2016), the Ministry of Investment (MoI) issued Decree No. 243 requiring the establishment of a new set of Egyptian Accounting Standards (EAS) based on the 2005 version of IFRS which became mandatory for listed firms from January 2006. The Standards Committee of the Egyptian Society of Accountants and Auditors is responsible for the standards and developed the IFRS-based version of EAS. The standards

⁶ Egypt has a rich accounting tradition dating back to 1883 when the country enacted the Commerce Act with the required set of records to be maintained by businesses for accounting and tax purposes (Farag, 2009).

continue to be revised based on the IASB's modifications to IFRS. EAS mostly follows IFRS, except in areas such as accounting for leases, foreign exchange, and share-based payments where significant differences exist due to applicable Egyptian laws and regulations. In general, multi-step approach allows countries' flexibility to draw on IFRS but also customize the standards based on national priorities.

Empirically, little is known about whether the adoption approach has implications for accounting quality. In contrast to 'as is' IFRS adoption, countries adapting the IFRS can modify standards to suit their institutional and regulatory environment (Felski, 2017). Notably, since developing countries are at the periphery of the transnational standard-setting and have limited lobbying influence on the IASB (Botzem, Quack, & Zori, 2017; Jorissen, Lybaert, Orens, & Van der Tas, 2013; Wingard, Bosman, & Amisi, 2016), the decision to use the multi-step approach affords them greater opportunity to carve out portions that are incongruent with local legislation and to incorporate local needs. Moreover, these countries continue to support and fund local accountancy and standard-setting bodies that can play a critical role in the interpretation and implementation of these standards. Arguably, this approach can boost the development of local expertise and institutional capacity in financial reporting regulation thereby engendering compliance and improving accounting quality. Given the above, we contend that countries adapting IFRS will experience higher accounting quality than those adopting 'as is'. Using proxies for accounting quality, we expect lower earnings management, more timely loss recognition, and greater value relevance of accounting information for adapters. We state our overarching hypothesis as follows:

H2: Adapters will have better accounting quality than users of IFRS.

3. Research design

We utilize three widely used metrics of accounting quality: earnings management, timely loss recognition, and value relevance (Barth et al. (2008). Generally, our empirical models are based on Barth et al. (2008) and Lang, Raedy, and Wilson (2006).

3.1 Accounting quality measures and models

3.1.1 Earnings management

Earnings management is measured using three proxies for earnings smoothing and a single proxy capturing earnings management toward a specific target (Barth et al., 2008; Key & Kim, 2020). The first proxy for earnings smoothing is the variability of earnings measured as the variance of the residuals obtained from regressing change in net income (ΔNI)⁷ on the identified controls in equation 1. To evaluate the variability of earnings between the two groups (non-IFRS and IFRS observations), the variance of the residuals of change in net income obtained from the regression model in equation 1 is compared between the groups to ascertain whether significant differences exist. Consistent with Lang et al. (2006), we interpret a smaller variance of the residuals as indicative of earnings smoothing and lower accounting quality. All variables are defined in Appendix 1. The regression model is stated as follows:

$$\Delta NI_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 GROWTH_{it} + \alpha_3 LEV_{it} + \alpha_4 DISSUE_{it} + \alpha_5 TURN_{it} + \alpha_6 CF_{it} + \alpha_7 CPI_{it} + \alpha_8 COM_{it} + \alpha_9 PMI_{it} + \alpha_{10} GDPPC_{it} + \alpha_{11} ROL_{it} + \alpha_{12} TRADE_{it} + \beta_{13} Industry Dummy_i + \varepsilon_{it} \quad (1)$$

The second proxy for earnings smoothing is based on the mean ratio of the variability of change in net income to the variability of change in operating cash flows. Consistent with Barth et al. (2008), we employed this proxy to control for the fact that companies that have more volatile cash flows, generally have a more unstable net income. Notably, a higher ratio signals less earnings smoothing and therefore an indicator of higher accounting quality.

$$\Delta CF_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 GROWTH_{it} + \alpha_3 LEV_{it} + \alpha_4 DISSUE_{it} + \alpha_5 TURN_{it} + \alpha_6 CF_{it} + \alpha_7 CPI_{it} + \alpha_8 COM_{it} + \alpha_9 PMI_{it} + \alpha_{10} GDPPC_{it} + \alpha_{11} ROL_{it} + \alpha_{12} TRADE_{it} + \beta_{13} Industry Dummy_i + \varepsilon_{it} \quad (2)$$

The final proxy for earnings smoothing is derived from the Spearman correlation between the cash flows of a company (CF) and the accruals (ACC). Consistent with Barth

⁷ The absolute change in net income scaled by total assets is used as negative and positive value represents a change.

et al. (2008), we compare residuals from equations (3) and (4), CF^* and ACC^* . Conventionally, a more negative correlation between CF^* and ACC^* is indicative of earnings smoothing implying that firms may be using accruals to smooth variability in cash flows (Barth et al., 2008; Lang et al., 2006).

$$CF_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 GROWTH_{it} + \alpha_3 LEV_{it} + \alpha_4 DISSUE_{it} + \alpha_5 TURN_{it} + \alpha_6 CPI_{it} + \alpha_7 COM_{it} + \alpha_8 PMI_{it} + \alpha_9 GDPPC_{it} + \alpha_{10} ROL_{it} + \alpha_{11} TRADE_{it} + \beta_{12} Industry Dummy_i + \varepsilon_{it} \quad (3)$$

$$ACC_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 GROWTH_{it} + \alpha_3 LEV_{it} + \alpha_4 DISSUE_{it} + \alpha_5 TURN_{it} + \alpha_6 CPI_{it} + \alpha_7 COM_{it} + \alpha_8 PMI_{it} + \alpha_9 GDPPC_{it} + \alpha_{10} ROL_{it} + \alpha_{11} TRADE_{it} + \beta_{12} Industry Dummy_i + \varepsilon_{it} \quad (4)$$

The last earnings management proxy captures the extent to which firms manage earnings towards a specific target ($SPOS$). Consistent with Barth et al. (2008), the $SPOS$ variable is measured as a dummy which takes the value 1 if net income scaled by total assets is between 0 and 0.01. Given the opportunity, managers might seek to achieve small positive earnings, since this creates the impression that the company is improving steadily (Lang et al., 2006). To be able to account for the effect of the country-level control variables on $SPOS$, we estimated a logit model where $SPOS$ is the dependent variable. The model is stated below.

$$SPOS(0,1)_{it} = \alpha_0 + \alpha_1 POST_IFRS_{it} + \alpha_2 SIZE_{it} + \alpha_3 GROWTH_{it} + \alpha_4 LEV_{it} + \alpha_5 DISSUE_{it} + \alpha_6 TURN_{it} + \alpha_7 CF_{it} + \alpha_8 CPI_{it} + \alpha_9 COM_{it} + \alpha_{10} PMI_{it} + \alpha_{11} GDPPC_{it} + \alpha_{12} ROL_{it} + \alpha_{13} TRADE_{it} + \beta_{14} Industry Dummy_i + \varepsilon_{it} \quad (5)$$

In estimating the extent to which firms manage earnings towards a specific target ($SPOS$) for the user and adapt categories of IFRS adopters, we re-estimate equation 5 replacing $POST_IFRS$ with the dummy variable $ADAPTION$ where 1 represents observations that used an adapted version of IFRS and 0 for those applying IFRS as issued by the IASB.

$$SPOS(0,1)_{it} = \alpha_0 + \alpha_1 ADAPTION_{it} + \alpha_2 SIZE_{it} + \alpha_3 GROWTH_{it} + \alpha_4 LEV_{it} + \alpha_5 DISSUE_{it} + \alpha_6 TURN_{it} + \alpha_7 CF_{it} + \alpha_8 CPI_{it} + \alpha_9 COM_{it} + \alpha_{10} PMI_{it} + \alpha_{11} GDPPC_{it} + \alpha_{12} ROL_{it} + \alpha_{13} TRADE_{it} + \beta_{14} Industry Dummy_i + \varepsilon_{it} \quad (6)$$

3.1.2 Timely loss recognition

Timely loss recognition is measured by large negative earnings (*LNEG*), similar to Barth et al. (2008) where *LNEG* equals one for observations in which annual net income *NI*, divided by total assets is less than -0.20, and zero otherwise. From the logit model stated in equation 7, a positive coefficient for *POST_IFRS* is indicative that firms are more likely to recognize large losses on a timely basis in the post-IFRS period than the pre-IFRS period.

$$LNEG(0,1)_{it} = \alpha_0 + \alpha_1 POST_IFRS_{it} + \alpha_2 SIZE_{it} + \alpha_3 GROWTH_{it} + \alpha_4 LEV_{it} + \alpha_5 DISSUE_{it} + \alpha_6 TURN_{it} + \alpha_7 CF_{it} + \alpha_8 CPI_{it} + \alpha_9 COM_{it} + \alpha_{10} PMI_{it} + \alpha_{11} GDPPC_{it} + \alpha_{12} ROL_{it} + \alpha_{13} TRADE_{it} + \beta_{14} Industry\ Dummy_{it} + \varepsilon_{it} \quad (7)$$

In comparing the timely loss recognition proxy (*LNEG*) between the user and adapt categories, we re-estimate equation 7 replacing the *POST_IFRS* indicator variable with the dummy variable *ADAPTION* where 1 represents the adapters and 0 for those applying IFRS as issued by the IASB. A positive coefficient for *ADAPTION* is indicative that firms in the adapt category are more likely to recognize large losses on a timely basis than those in the adopt category. The model testing *LNEG* for these two categories is stated below.

$$LNEG(0,1)_{it} = \alpha_0 + \alpha_1 ADAPTION_{it} + \alpha_2 SIZE_{it} + \alpha_3 GROWTH_{it} + \alpha_4 LEV_{it} + \alpha_5 DISSUE_{it} + \alpha_6 TURN_{it} + \alpha_7 CF_{it} + \alpha_8 CPI_{it} + \alpha_9 COM_{it} + \alpha_{10} PMI_{it} + \alpha_{11} GDPPC_{it} + \alpha_{12} ROL_{it} + \alpha_{13} TRADE_{it} + \beta_{14} Industry\ Dummy_{it} + \varepsilon_{it} \quad (8)$$

3.1.3 Value relevance

We estimate value relevance of accounting information using the price model. It is based on the explanatory power (effectively the *adjusted R*²) obtained from the regression of stock price on net income and equity book value. To ensure that the accounting information is available in the public domain, the stock price (*P*) is measured six months after the fiscal year-end. To control for country and industry fixed effects, country-level controls and industry dummies are included in the first-level regression where *P* is regressed on these variables. The residuals of *P*, (*P**) are then estimated from the first-level regression and used as a dependent variable in the second-level regression where the equity

book value per share (*BVEPS*), and the net income per share (*NIPS*) are independent variables (Barth et al., 2008; Lang et al., 2006).

$$P_{it}^* = \beta_0 + \beta_1 BVEPS_{it} + \beta_2 NIPS_{it} + \varepsilon_{it} \quad (9)$$

3.2 Institutional and country-specific variables

The institutional environment where accounting is practiced has significant implications for the quality of accounting information. The importance of enforcement can't be understated. Due to the lack of direct measure of accounting enforcement for countries in our sample, we follow a study of African countries by Hillier, Hodgson, and Ngole (2016) and use the rule of law index from the World Bank as a proxy for how effectively society enforces accounting standards.

We also include several country-level control variables used in prior studies, including corruption perception index (CPI), the type of legal system, and protection of minority shareholders' interests. Generally, corruption affects the extent to which rules and regulations are applied across various sectors in a country and has direct consequences on enforcement of accounting rules and, consequently, affects accounting quality. Relative to financial reporting, results in Riahi-Belkaoui (2004) show that high levels of corruption are significantly related to aggressive earnings management. The type of legal system was identified by Zehri and Chouaibi (2013) as a factor influencing a country's IFRS adoption decision, and can affect compliance and accounting quality outcomes. For example, compared to code law countries, common law countries are often associated with higher accounting quality due to assertions that investor protection is better under common law than under civil law (Barth et al., 2008; Francis & Wang, 2008). To account for this, we include the type of legal system, a binary variable where 1 denotes a common-law system, and 0 for other types. Houque et al. (2012) found a positive impact on earnings quality following mandatory IFRS adoption when a country's investor protection regime provides stronger protection. We include a proxy for investor protection where the score for each country ranges from 0 to 7 where 0 indicates the absence of investor protection and enforcement laws and 7 signifying the presence of strong protection and enforcement

mechanisms for minority shareholders. Finally, given the differences in economic development within our sample, we include measures of economic development such as the gross domestic product per capita and trade. Measures and sources of data are summarized in Appendix 1.

3.3 Sample and data

Our data collection focused on 16⁸ African countries with accounting information available in the DataStream⁹ database. Data on publicly listed firms from these countries was collected for an eighteen-year period (2000-2017). As in Hillier, Hodgson, and Ngole (2016), our next selection criteria was that a country started to require all listed companies to use IFRS during the period of study. Although we retrieved data on 16 countries, we had to exclude 10 countries for various reasons such as partial adoption, local standards are not based on IFRS or IFRS is not required (Morocco and Tunisia¹⁰), lack of observations for pre-IFRS period (Malawi, Rwanda, Mauritius, Kenya, Uganda, Zimbabwe, Tanzania, and Zambia). For example, Kenya, Uganda, and Zimbabwe all adopted IFRS before the year 2000 and pre-IFRS data was not available as our study spans from 2000 to 2017. Additionally, consistent with prior studies (e.g. Houque et al., 2012; Leuz, Nanda, & Wysocki, 2003; Van Tendeloo & Vanstraelen, 2005; Zeghal, Chtourou, & Fourati, 2012), we exclude all types of financial institutions due to the fundamental differences in financial reporting between financial and other sectors. There are additional regulations that focus on these sectors, thus, their inclusion could confound our inferences about the full sample. Table 1 presents a summary of our sample selection.

⁸ These 16 countries are Botswana, Egypt, Ghana, Kenya, Mauritius, Malawi, Morocco, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

⁹ At the start of the data collection, the WorldScope data was integrated into the DataStream database and thus we accessed the data from DataStream.

¹⁰ Morocco uses the Moroccan GAAP which differs significantly from IFRS and requirement to use IFRS is not legally binding (<https://www.ifac.org/about-ifac/membership/country/morocco> accessed on 8 May 2020). Similarly, Tunisia applies Tunisian Accounting Standards which are not aligned with IFRS (<https://www.ifac.org/about-ifac/membership/country/tunisia> accessed on May 8, 2020).

Table 1: Sample selection

Total number of observations retrieved from the selected countries (2000-2017)	16,884
Less: Banks and all other financial institutions	(4610)
Less: Observations with missing data on dependent and independent variables	(7358)
Less: Observations from countries without pre-IFRS adoption data	(970)
Final sample	3,946

Our sample is categorized into IFRS-reporting (those that used IFRS¹¹ in their financial statements) and non-IFRS observations (those that did not apply IFRS but used local GAAP). Based on two broad adoption approaches discussed by Zeff and Nobes (2010), we further classify the sample into users and adapters. Specifically, we identify Egypt as an adapter whereas the rest of the sampled countries are users. The adapter requires firms to apply a locally modified version of IFRS whereas users require firms to apply the IASB version of IFRS. Table 2, Panel A contains information about observations by country and divided into non-IFRS (210) and IFRS (3736) for a total of 3946 observations for both groups. It also shows distribution of the observations by country and the version of IFRS used at the country level. Out of the 3736 IFRS observations, 2661 applied an IASB version of IFRS, and 1075 observations are based on a national version of IFRS. Panel B and C provide information on industry, the distribution of the sample by country, and year of mandatory IFRS adoption. About 31% of the sample as shown in Panel B are drawn from the industrials sector. From Panel C, South Africa and Namibia were the first in our sample to require IFRS (both in 2005) and Nigeria was last in 2012. Botswana and Ghana have fewer than 100 firm-year observations and South Africa and Egypt have more than 1000. Generally, the sample is skewed towards these two countries as they account for about 88% of our sample. We perform sensitivity analysis and re-test sub-samples of the data.

¹¹IFRS were called International Accounting Standards (IAS) until 2001. Collectively, the IAS and IFRS are now referred to as IFRS.

Table 2: Sample distribution**Panel A: Observations pre & post-IFRS and by adoption approach**

Country	non-IFRS vs. IFRS			Users vs. Adapters		
	non-IFRS	IFRS	Total	Users	Adapters	Total
Botswana	5	26	31	26	0	26
Egypt	97	1075	1172	0	1075	1075
Ghana	6	69	75	69	0	69
Namibia	5	99	104	99	0	99
Nigeria	33	214	247	214	0	214
South Africa	64	2253	2317	2253	0	2253
Total	210	3736	3946	2661	1075	3736

Panel B: Observations by country and industries

ICB Industry name	Country							% of Total
	Botswana	Egypt	Ghana	Namibia	Nigeria	South Africa	Total	
Basic Materials	23	164	0	24	30	340	581	14.72
Consumer Discretionary	0	177	0	7	15	356	555	14.06
Consumer Staples	0	239	31	17	50	246	583	14.77
Energy	0	16	11	0	26	85	138	3.50
Health Care	0	105	0	0	21	91	217	5.50
Industrials	8	314	33	10	104	761	1230	31.17
Real Estate	0	122	0	17	0	177	316	8.01
Technology	0	0	0	29	0	223	252	6.39
Telecommunications	0	35	0	0	1	38	74	1.88
Total	31	1172	75	104	247	2317	3946	100

Panel C: Distribution by country and years

Country	Year of adoption	Years																		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Botswana	2007	0	0	0	0	1	2	2	2	2	1	3	3	3	3	3	2	2	2	31
Egypt.	2006	0	0	0	0	0	97	95	98	97	90	87	86	88	88	87	85	86	88	1172
Ghana	2007	0	0	0	0	0	2	4	6	6	7	7	6	4	7	6	6	7	7	75
Namibia	2005	0	1	1	1	2	6	6	7	7	7	8	9	9	9	8	8	8	7	104
Nigeria	2012	0	0	0	0	0	0	0	1	3	2	6	21	34	37	36	36	36	35	247
South Africa	2005	1	2	4	6	60	210	208	202	194	191	180	175	169	160	151	142	133	129	2317
Total		1	3	5	7	63	317	315	316	309	298	291	300	307	304	291	279	272	268	3946
% of Total		0.03	0.08	0.13	0.18	1.60	8.03	7.98	8.01	7.83	7.55	7.37	7.60	7.78	7.70	7.37	7.07	6.89	6.79	100

4. Results

4.1 Descriptive statistics

Table 3 presents the descriptive statistics for the variables used in the multivariate analysis to examine the various dimensions of accounting quality. Generally, we observe significant differences between the non-IFRS and IFRS observations in terms of the change in net income variable (ΔNI), book value of equity per share ($BVEP$) leverage (LEV), firm size ($SIZE$), turnover ($TURN$). Specifically, the mean (-0.02) of the change in net income variable (ΔNI) is significantly lower for the IFRS observations than that of the non-IFRS, which shows a positive amount. In contrast, the IFRS observations recorded significantly higher $BVEP$ than the non-IFRS observations. In relation to other test variables, such as managing earnings towards a small positive net income ($SPOS$) and timely loss recognition ($LNEG$), we do not observe any significant differences between the groups in terms of the proportion of the observations that recorded small positive net income and those that recognized large losses on a timely basis. Specifically, unlike Barth et al. (2008) who reported fewer incidents of small positive incomes for their IFRS firms, our IFRS observations do not have significantly lower proportion of firms engaging in $SPOS$. Regarding the descriptive statistics for the user and adapter categories, significant differences are noticeable between the two groups in respect to two key test variables: $SPOS$, and $LNEG$. For example, the incidence of managing earnings towards a specific target is significantly higher among the adapt category than the user group. The proportion of firms recognizing large losses on a timely basis is significantly higher for the user group than the adapt observations.

Subsequently, we performed various diagnostic tests to ensure that important assumptions underlying our estimation techniques are met. First, multicollinearity is not a problem as the variance inflation factor (VIF) and the tolerance level for all variables are less than the recommended threshold of 10 and 0.1 respectively (Craney & Surles, 2002; Hair, Black, Babin, Anderson, & Tatham, 1998). We address indications of heteroskedasticity by following the recommendations of Cameron and Trivedi (2010) by estimating our regression models with robust standard errors. Consistent with

Christensen, Lee, Walker, and Zeng (2015), we winsorized variables¹² with extreme outliers at 5% due to the sensitivity of metrics based on variability. Additionally, given that our data is panel in structure with different firms observed over different years, we performed diagnostics to ascertain whether pooled OLS or random effects are suitable. The results of the Breusch and Pagan Lagrangian multiplier test indicated that there are panel effects thereby leading us to perform the Hausman test to ascertain whether fixed effects model or random effects model is more suitable for our panel data and found that the random effects¹³ model is appropriate.

¹² In our case, these variables include CF, GROWTH, Δ CF and Δ NI.

¹³ The Hausman test Prob>chi2 = 0.5536 shows suitability of the random effects model.

Table 3: Descriptive statistics**Panel A: Non-IFRS and IFRS observations**

	non-IFRS (n=210)			IFRS (n=3736)		
	Mean	Std. dev	Median	Mean	Std. dev	Median
<i>Test variables</i>						
ΔNI	0.10*	0.85	0.00	-0.02	1.00	0.02
ΔCF	0.02	0.93	0.00	-0.02	1.04	0.01
ACC	-0.04	0.18	-0.03	-0.08	2.12	-0.03
CFO	0.21	1.14	0.21	0.10	1.01	0.10
$SPOS$	0.05	0.22	0.00	0.04	0.21	0.00
$LNEG$	0.04	0.20	0.00	0.05	0.21	0.00
NI/PS	0.10	0.30	0.08	0.12	3.20	0.07
Price	29.51	70.83	9.42	65.81	544.77	10.96
BVEP	10.12	19.65	5.31	17.89***	39.42	6.69
NIPS	2.02	12.51	0.73	2.64	9.82	0.61
<i>Firm-level control variables</i>						
GROWTH	-0.10	0.50	-0.28	-0.01	0.92	-0.13
LEV	3.30***	20.95	1.02	1.57	7.47	0.86
DISSUE	0.11	0.61	0.00	0.69	10.79	0.08
TURN	0.96	0.78	0.77	1.09**	0.94	0.90
SIZE	13.88	2.47	13.68	14.26**	2.32	14.25
<i>Country-level control variables</i>						
ROL	2.30	0.58	2.48	2.34**	0.52	2.59
TRADE	0.63***	0.13	0.73	0.57	0.14	0.60
GDPPC	2502.25	1575.94	1840.20	4873.76***	1923.22	5502.70
CPI	3.70	0.81	3.40	4.04***	0.76	4.30
COM	0.23	0.42	0.00	0.11	0.31	0.00
PMI	4.70	0.91	4.00	5.26***	0.84	6.00

The table contains descriptive statistics and test of means for variables used in the analysis. A t-test comparison of means is conducted for variables between the two groups, variables that are significantly higher than the comparing group are denoted with *for 10%, ** for 5%, and *** for 1% significance levels. Variable descriptions are provided in Appendix A.

Panel B: Descriptive statistics - users and adapters

	Users (n=2661)			Adapter (n=1075)		
	Mean	Std. dev	Median	Mean	Std. dev	Median
<i>Test variables</i>						
ΔNI	-0.02	1.06	0.02	-0.01	0.81	0.04
ΔCF	-0.02	1.01	0.00	-0.01	1.11	0.02
<i>ACC</i>	-0.10	2.52	-0.03	-0.02	0.13	-0.02
<i>CFO</i>	0.12*	0.99	0.15	0.05	1.05	-0.04
<i>SPOS</i>	0.04	0.19	0.00	0.07***	0.25	0.00
<i>LNEG</i>	0.06***	0.23	0.00	0.03	0.16	0.00
<i>NIPS</i>	0.14	3.79	0.07	0.07	0.19	0.06
<i>P</i>	80.28***	642.40	11.00	30.00	90.35	10.82
<i>BVEP</i>	19.54***	42.22	6.47	13.82	31.08	6.95
<i>NIPS</i>	2.77	9.37	0.71	2.31	10.84	0.47
<i>Firm-level control variables</i>						
<i>GROWTH</i>	-0.03*	0.87	-0.14	0.03	1.02	-0.13
<i>LEV</i>	1.64	7.35	0.92	1.40	7.74	0.71
<i>DISSUE</i>	0.88*	12.75	0.09	0.21	1.18	0.07
<i>TURN</i>	1.23***	0.99	1.05	0.76	0.70	0.60
<i>SIZE</i>	14.59***	2.48	14.83	13.45	1.63	13.32
<i>Country-level control variables</i>						
<i>ROL</i>	2.44***	0.58	2.61	2.11	0.19	2.05
<i>TRADE</i>	0.60***	0.13	0.61	0.51	0.15	0.48
<i>GDPPC</i>	5782.63***	1456.74	5806.00	2624.00	703.16	2602.48
<i>CPI</i>	4.39*	0.60	4.50	3.17	0.28	3.20
<i>COM</i>	0.15	0.36	0.00	0.00	0.00	0.00
<i>PMI</i>	5.63*	0.65	6.00	4.33	0.47	4.00

The table contains descriptive statistics and test of means for variables used in the analysis between users and adapters of IFRS. A t-test comparison of means is conducted for variables between the two groups, variables that are significantly higher than the comparing group are denoted with * for 10%, ** for 5%, and *** for 1% significance levels. Variable descriptions are provided in Appendix A.

Panel C: Mean scores for country-level variables

	ROL	CPI	PMI	TRADE	GDPPC
Botswana	3.12	6.04	4.77	1.01	6517.13
Egypt	2.14	3.19	4.30	0.52	2503.51
Ghana	2.54	4.15	4.51	0.72	1583.42
Namibia	2.69	4.68	5.00	0.89	4717.35
Nigeria	1.46	2.64	4.01	0.31	2610.36
South Africa	2.62	4.52	5.87	0.51	6190.58

Variable descriptions are provided in Appendix A.

4.2 Accounting quality: Pre- and post-IFRS

In this section, we examine accounting quality for pre-and post-IFRS reporting without regard to the adoption approach. Specifically, both users and adapters of IFRS are treated as IFRS adopters, thus, observations prior to adoption are non-IFRS and those after are IFRS observations. The empirical results are presented in Tables 4, 5, and 6.

4.2.1 *Earnings management*

We investigate two dimensions of earnings management: earnings smoothing and managing earnings towards a specific target (*SPOS*). Table 4 provides results for earnings smoothing. The first proxy, variability of change in net income (ΔNI^*) is based on the variance of residuals obtained from regressing ΔNI on the control variables specified in equation 1 thus, it measures fluctuations in net income where a smaller variation is indicative of earnings smoothing. The IFRS observations have higher variability of change in net income (0.832) than the non-IFRS observations (0.811) but the difference is not statistically significant. Additionally, the second proxy builds on the first proxy to capture the variations in net income and operating cash flows: ΔNI^* divided by ΔCF^* . Here, all other things being equal, we expect the ratio of net income variability to cash flow variability to be higher post-IFRS. The results show no statistically significant difference between the two groups suggesting that there was no change post-adoption. Similarly, we do not find any significant difference between the non-IFRS observations and IFRS observations with regard to the Spearman correlation between accruals (ACC^*) and cash flows from operations (CF^*) implying the two groups are not significantly different when it comes to the extent to which firms use accruals to smooth cash flow volatility. Generally, the three earnings smoothing metrics show that there was no change in accounting quality post-IFRS adoption.

Table 4: Earnings smoothing: non-IFRS and IFRS observations**Panel A: Variability of change in net income between non-IFRS and IFRS (model 1)**

	non-IFRS	IFRS	Mean non-IFRS	Mean IFRS	Mean Diff	St_Err	t_statistic	p_value
ΔNI^*	210	3726	0.811	0.832	-0.019	0.037	-0.55	0.597

Panel B: Variability of change in net income over changes in cash flows between non-IFRS and IFRS (model 1 & 2)

	non-IFRS	IFRS	Mean ratio non-IFRS	Mean ratio IFRS	Mean Diff	St_Err	t_statistic	p_value
$\Delta NI^*/\Delta CF^*$	210	3736	1.163	1.143	0.019	0.072	0.25	0.786

Panel C: Spearman correlations between CF^* and ACC^* (model 3 & 4)

	Spearman's rho	Prob > t	Z statistic/p_value
non-IFRS (210 observations)	-0.4356	0.000	
IFRS (3736 observations)	-0.4510	0.000	-0.268/0.788

Notes: The variability of change in net income between the two groups is based on the estimated variance of residuals obtained from regressing change in net income on control variables specified in equation 1. This estimation is based on the approach applied in Lang et al. (2006) and Barth et al. (2008). Generally, a higher variance is indicative of low earnings smoothing while a lower variance is suggestive of high earnings smoothing and lower accounting quality. The variability of change in net income over changes in cash flows controls for the fact that firms with more volatile cash flows typically have more volatile earnings. The comparison between the two groups is based on the variance of the residuals obtained from models 1 and 2. Specifically, the mean ratio of $\Delta NI^*/\Delta CF^*$ is compared between the two groups where a higher ratio is indicative of less earnings management. The correlation of ACC^* and CF^* is the Spearman correlation between residuals obtained from models 3 and 4. Consistent with Lang et al. (2006), we interpret a more negative correlation of ACC^* and CF^* as indicative of earnings management since it suggests that firms use accruals to smooth variability in cash flows. Variable descriptions are provided in Appendix A.

Regarding the tendency to manage toward a specific target (*SPOS*), the negative coefficient of the *POST_IFRS* variable (*-0.019*), although indicative of a lower likelihood of managing earnings towards a positive target, is not significant (Table 5). The firm-level control variables such as turnover and cash flows suggest that firms with higher turnover and better cash flows were less likely to engage in managing earnings towards a specific target. On the contrary, large firms proxied by market value of equity were more likely to engage in *SPOS*. In line with some prior studies (e.g. A. S. Ahmed et al., 2013; Devalle, Onali, & Magarini, 2010; Hessayri & Saihi, 2015; Jeanjean & Stolowy, 2008), we do not find evidence of a reduction in earnings management post-IFRS adoption. Institutional environment was relevant for accounting quality. Consistent with Francis and Wang (2008), our results indicate that firms operating in

common law jurisdictions were less likely to engage in managing earnings toward a specific target.

Table 5: Small positive incomes and timely loss recognition: Pre-and post-IFRS

	(1) SPOS	(2) LNEG
POST IFRS	-0.019 (0.016)	-0.019 (0.016)
SIZE	0.005** (0.002)	-0.011*** (0.002)
GROWTH	-0.001 (0.003)	-0.005* (0.003)
LEV	0.000 (0.000)	0.000 (0.000)
DISSEE	-0.000 (0.001)	0.000 (0.000)
TURN	-0.027*** (0.007)	-0.004 (0.004)
CFO	-0.016*** (0.004)	-0.027*** (0.003)
COM	-0.038** (0.016)	0.005 (0.016)
ROL	-0.039 (0.027)	-0.030 (0.024)
TRADE	0.022 (0.043)	0.015 (0.040)
GDPPC	0.017 (0.016)	0.035** (0.014)
CPI	-0.002 (0.010)	0.017** (0.009)
PMI	-0.010 (0.009)	-0.001 (0.007)
INDUSTRY Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	-10.271 (60.399)	-172.5** (71.589)
Insig2u	-.206 (.319)	.386 (.302)
Observations	3946	3946
Wald chi2	72.31***	221.03***
LR test of rho=0	21.46***	30.24***

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

This table list random-effects logistic regression results based on model 5 and 6 for managing earnings towards a small positive income and timely loss recognition metric. The dependent variable in model 1 is a dummy where 1 indicates observations with small positive net income (*SPOS*) and 0 otherwise. In model 2, the dependent variable *LNEG* is an indicator variable that takes the value 1 for observations with timely loss recognition and 0 otherwise. The reported coefficients in all models are the marginal effects of the random-effects logistic regression. Variable descriptions are provided in Appendix A.

4.2.2 *Timely loss recognition and value relevance*

IFRS reporting was not associated with change in the timeliness of loss recognition (*LNEG*) (Table 5). Consistent with our finding that large firms were more likely to manage earnings toward a specific target, we find that such firms were also less likely to recognize losses on a timely basis. Regarding institutions, firms operating in countries that are perceived to be less corrupt were more likely to recognize large losses in a timely manner.

The value relevance testing is presented in Table 6. The reasoning behind the value relevance dimension of accounting quality relates to the ability of accounting values to faithfully reflect the underlying economics of a firm which invariably will be captured by market prices. The results from the price model show that the *adjusted R*² for non-IFRS observations (0.215) is significantly higher than that of IFRS observations (0.027), indicating a reduction in the ability of accounting information to influence share prices.

There are several possible explanations for why adoption was not associated with an improvement in accounting quality. First, inadequate compliance with IFRS requirements, especially in the context of developing countries, has been highlighted (Brüggemann, Hitz, & Sellhorn, 2013). For instance, our results differ from the empirical evidence by Y. L. Chua et al. (2012), Barth et al. (2008), and Christensen et al. (2015) who focused on developed markets but is consistent with Abdul-Baki and Haniffa (2020) and Ebaid (2016) that examined developing countries. These observed differences in accounting quality between some developed and developing economies may be attributable to the institutional mechanisms and incentives underlying financial reporting in these markets. Moreover, Elbannan (2011) provides evidence from Egypt that IFRS-based accounting standards did not result in an increase in the level of timely loss recognition, arguing that such may be due to insufficient compliance with IFRS requirements and the lack of enforcement. Alternatively, countries increasingly use IFRS as a basis for national standards. Even prior to the formal adoption of IFRS, many local standards incorporated elements of IFRS and the differences subsequent to the formal adoption may not appear significant. Although our proxy for enforcement was

not significant, other institutional components, including legal system and the level of corruption, where associated with accounting quality. Institutions remain a key driver of quality reporting, irrespective of the standards that are formally used. How modification of the standards impacts accounting quality is examined next.

Table 6: Value relevance: non-IFRS and IFRS

	(1) Price (non-IFRS)	(2) Price (IFRS)
BVEPS	1.488** (0.592)	1.604*** (0.317)
NIPS	1.796* (0.929)	3.238** (1.273)
Constant	-68.751*** (7.861)	-40.436*** (9.561)
Observations	210	3736
R-squared	0.223	0.027
Adjusted R ²	0.215	0.027
F Statistic	29.69***	52.42***
Vuong test		
Z Statistic		2.68
P-Value		0.007

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

Consistent with Barth et al. (2008), we estimate the price model using a two-stage regression where Price (P), the share price after six months of the year-end is first regressed on the identified controls. The regression residuals are then estimated as P^* which is used as dependent variable on book value of equity and net income per share. Similar to Barth et al. (2008) we tested for significant differences between the adjusted R² of the two groups. We performed the Vuong (1989) test to ascertain these differences. Variable descriptions are provided in Appendix A.

4.3 Accounting quality: IFRS users and adapters

In this section, we compare the accounting quality of IFRS users and adapters. The analysis is based on 3736 observations split into 2661 observations for users and 1075 observations for adapters. Users are those that utilize IFRS as issued by the IASB whereas adapters apply a national version of IFRS, in our case, as adapted by Egypt. The expectation underlying our empirical tests is that countries adapting IFRS can carve out portions that are not suitable for their local context and also incorporate items that are peculiar to their setting, thereby increasing the suitability of IFRS for the local context and improving accounting quality. The empirical results are presented in Tables 7, 8, and 9.

4.3.1 Earnings management

The results in Table 7 show that, contrary to our expectations, all earnings smoothing metrics for the adapt group are indicative of greater earnings management compared to the user group. The variability of ΔNI^* of 0.905 for firms applying IFRS as issued by the IASB is significantly higher at the 1% level than those applying a national version of IFRS with a variability of ΔNI^* of 0.649, an indication of lower earnings smoothing. Additionally, the variability of ΔNI^* over ΔCF^* of the user group (1.278) is significantly higher than the adapt group (0.811) at 1% significance level, signaling that firms in the adapt group engage in more aggressive earnings smoothing than the user group. Consistent with the first two metrics, firms in the adapt category have a more negative correlation between ACC^* and CF^* (user group -0.4696 adapt = -0.591, *z*-value of -4.745 and a relative *p*-value of 0.000), indicating that these firms may be using accruals to smooth volatility in cash flows.

Table 7: Earnings smoothing: Users and adapters**Panel A: Variability of change in net income between users and adapters (model 1)**

	Users	Adapt	Mean(Users)	Mean(Adapt)	Mean Diff	St_Err	t_statistic	p_value
ΔNI^*	2661	1075	0.905	0.649	0.256	0.018	13.95	0.000

Panel B: Variability of change in net income over changes in cash flows between users and adapters (model 1 & 2)

	Users	Adapt	Mean Users	ratio	Mean ratio Adapt	Mean Diff	St_Err	t_statistic	p_value
$\Delta NI^*/\Delta CF^*$	2661	1075	1.278		0.811	0.468	0.033	14.25	0.000

Panel C: Spearman correlations between CF^* and ACC^* (model 3 & 4)

	<i>Spearman's rho</i>	Prob > t	Z statistic/p_value
Users (2661 observations)	-0.4696	0.000	
Adapter(1075 observations)	-0.5914	0.000	-4.745/0.000

Notes: The variability of change in net income between the two groups is based on the variance of the residuals obtained from regressing change in net income on control variables specified in equation 1. This estimation is based on the approach applied in Lang et al. (2006) and Barth et al. (2008). Generally, a higher variance is indicative of low earnings smoothing while a lower variance is suggestive of high earnings smoothing and lower accounting quality. The variability of change in net income over changes in cash flows controls for the fact that firms with more volatile cash flows typically have more volatile earnings. The comparison between the two groups is based on the variance of the residuals obtained from equations 1 and 2. Specifically, the mean ratio of $\Delta NI^*/\Delta CF^*$ is compared between the two groups where a higher ratio is indicative of less earnings management. The correlation of ACC^* and CF^* is the Spearman correlation between residuals obtained from equations 3 and 4. Consistent with Lang et al. (2006), we interpret a more negative correlation of ACC^* and CF^* as indicative of earnings management since it suggests that firms use accruals to smooth variability in cash flows. Variable descriptions are provided in Appendix A.

Related to the tendency to engage in managing earnings toward a specific target, there was no significant relationship between *ADAPTION* and the *SPOS* metric (Table 8). Firms with higher turnover and better cash flows were less likely to manage earnings toward a specific target. Additionally, large firms were more likely to do that. In the post-IFRS period, we observe that the rule of law (*ROL*) index and the protection of minority interest proxy are associated with a lower likelihood of firms engaging in managing earnings towards a specific target at 10% significance level. Similar to the pre-post IFRS analysis, firms operating in common law countries were less likely to manage earnings.

In general, there is some evidence that reporting of the user group is associated with less earnings management. The observed differences in earnings management between the user and adapter groups could be attributed to the significant differences between national versions of IFRS and IFRS as issued by the IASB. In the case of Egypt which represents the adapter group, EAS contain significant deviations from IFRS in areas such as accounting for leases, reporting of certain foreign exchange differences not in profit and loss but in other comprehensive income, and the treatment of share-based payments as a direct charge against equity instead of an expense. Arguably, these differences are fundamental to the reporting of accounting incomes and may allow management more room to manage earnings.

4.3.2 Timely loss recognition and value relevance

Similar to the earnings management metrics, the results in Table 8 show that contrary to our expectations, the adapter companies are less likely to recognize large negative earnings. The negative and significant coefficient of -0.054 implies that significant differences exist between the users and adapters indicating that compared to the user group, the adapter group is less likely to recognize large losses on a timely basis. Firm-level and country-level control variables, including *SIZE*, *GROWTH*, *CFO*, and *PMI*, are significantly associated with a lower likelihood of firms recognizing large losses on a timely basis, highlighting the dominant role of the firm and country characteristics in accounting quality.

Table 8: Small positive incomes and timely loss recognition: Users and adapters

	(1) SPOS	(2) LNEG
ADAPTION	-0.028 (0.023)	-0.054** (0.022)
SIZE	0.004* (0.000)	-0.012*** (0.002)
GROWTH	-0.002 (0.003)	-0.005* (0.003)
LEV	0.000 (0.000)	0.000 (0.000)
DISSUE	-0.000 (0.000)	0.000 (0.000)
TURN	-0.027*** (0.007)	-0.007* (0.004)
CFO	-0.015*** (0.004)	-0.027*** (0.003)
COM	-0.060** (0.027)	-0.033 (0.022)
ROL	-0.050* (0.029)	-0.030 (0.026)
TRADE	0.047 (0.046)	0.029 (0.043)
GDPPC	0.011 (0.019)	0.013 (0.016)
CPI	-0.007 (0.010)	0.013 (0.009)
PMI	-0.016* (0.010)	-0.015* (0.009)
INDUSTRY Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	-19.353 (60.386)	-170.805** (70.345)
Insig2u	-.263 (.338)	.431 (.303)
Observations	3736	3736
Wald chi2	69.54***	206.42***
LR test of rho=0	18.14***	30.99***

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

This table list random-effects logistic regression results based on equation 7 and 8 for managing earnings towards a small positive income and timely loss recognition metric. The dependent variable in model 1 is a dummy where 1 indicates observations with small positive net income (*SPOS*) and 0 otherwise. In model 2, the dependent variable *LNEG* is an indicator variable that takes the value 1 for observations with timely loss recognition and 0 otherwise. The reported coefficients in all models are the marginal effects of the random-effects logistic regression. Please, see Appendix A for a full description of variables.

One fundamental argument underlying claims of poor fit of IFRS for developing economies is the market-oriented nature of IFRS (Balfoort, Baskerville, & Fulbier, 2017). Countries modifying IFRS are presumed to be able to address these concerns by incorporating their unique market circumstances in financial reporting requirements. Consistent with this expectation, the results in Table 9 show that adapters have higher value relevance than the users. For instance, the price model for the adapt category shows an *adjusted R*² of about 63% higher than that of the user group of approximately 2%. The Vuong (1989) z statistic of 19.75 shows that the explanatory power of the adapt group is significantly higher. These findings are informative and highlight the need for more research into the impact of modified IFRS on accounting quality and reporting in general.

Table 9: Value relevance: Users and adapters

	(1)	(2)
	Price (users)	Price (adapters)
BVEPS	1.787*** (0.438)	0.908*** (0.072)
NIPS	2.729 (1.972)	4.405*** (0.207)
Constant	-44.472*** (13.445)	-28.881*** (1.812)
Observations	2661	1075
R-squared	0.023	0.628
Adjusted R ²	0.022	0.627
F statistic	31.23***	904.27***
Vuong test		
Z statistic		19.75
P-Value		0.000

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

Consistent with Barth et al. (2008), we estimate the price model using a two-stage regression where Price (P), the share price after six months of the year-end is first regressed on the identified controls. The regression residuals are then estimated as P^* which is used as dependent variable on book value of equity and net income per share. We performed the Vuong (1989) test to ascertain these differences. Variable descriptions are provided in Appendix A.

4.4 Robustness Checks

We performed a series of robustness checks¹⁴ to mitigate concerns that the uneven distribution of firm-year observations across countries may skew our inferences. Following Houque et al. (2012), we performed several checks, including the exclusion of countries with fewer observations as well as those that have greater dominance in the sample. In our sample distribution, as shown in Table 2, approximately 59% of the firm-year observations are from South Africa. We excluded South Africa in our pre-and post-IFRS analysis and re-ran the models. We find consistent results with the full sample in three out of the four metrics used. Spearman correlation of accruals and cash flows showed a decline in earnings smoothing post-IFRS. Results for timely loss recognition and value relevance were similar to the full sample.

We also repeated the analysis by focusing on the two dominant countries in our sample that are divergent in their mode of IFRS adoption at the country level. Specifically, we compared accounting quality metrics between South Africa and Egypt. In line with our main findings, the results show that the user group recorded a significant reduction in earnings smoothing relative to the adapt group. Similarly, the timely loss recognition shows that firms in the adapt category were less likely to recognize large losses on a timely basis. The results of the value relevance analysis are also consistent with those obtained for the full sample indicating that the adapt group had more value relevant information than the user group. Notably, South Africa and Egypt are reasonably comparable in terms of many economic and financial market indicators thus our inferences are associated with the financial reporting standards used at the country level.

4.5 Conclusion

We examine aspects of IFRS adoption and dimensions of accounting quality based on a sample of African companies. Consistent with studies on accounting quality, we apply three widely used proxies of accounting quality including the level of earnings management, timely loss recognition, and value relevance. Our sample consists of 3946

¹⁴ Robustness checks are not tabulated.

firm-year observations pooled from 6 countries over an eighteen-year period (2000-2017). In our empirical procedures, the observations are categorized into IFRS and non-IFRS where accounting quality between the two groups is compared. Further, based on Nobes and Zeff (2016), we classify observations using two broad forms of IFRS adoption: those that apply IFRS as issued by the IASB (users) and those that apply a national version of IFRS (adapters). This classification enables us to empirically examine the longstanding question of whether countries should adopt IFRS as is or adapt IFRS to national needs.

Generally, our empirical procedures and estimation follow those of Barth et al. (2008). We did not observe improvements in accounting quality post-IFRS adoption. Although our proxy for enforcement was not significant, other institutional components, including legal system and the level of corruption, were associated with accounting quality. Whether the country adopted the standard has become less important for accounting quality, but institutions remain a key driver of quality reporting, irrespective of the standards that are formally used.

With the widespread diffusion of IFRS around the globe, the focus has been on whether a jurisdiction adopted the standard. However, a number of jurisdictions, including Egypt in our study, did not adopt but rather adapted IFRS with local modifications. We observe two interesting findings that distinguish the adapters from the users. First, with respect to the various metrics for earnings management, it is the adapters that experienced a greater decline in accounting quality. On the other hand, the adapters exhibit relatively higher value relevance than the users, suggesting that accounting information based on the national version of IFRS may be more informative for capital market participants. Notably, while adapters benefit from increased value relevance, user group benefits from reduced earnings management and increased timely loss recognition. Given the capital market-oriented nature of the IFRS and the inefficient nature of most stock markets in many developing countries, our results call for a broader discussion of aspects of IFRS that are or are not suitable for these markets.

African countries tend to be at the periphery of standards-setting. For example, from 14 IASB board members, one represents Africa and comes from South Africa (IFRS Foundation, 2020a). African countries that adopted IFRS ‘as is’ rely on IASB to

develop standards and do not have to invest in the standard-setting function. Such reliance minimizes the need for local standard-setting for other companies. From our sample, all countries that have adopted IFRS ‘as is’ subsequently also adopted IFRS for SMEs without modifications. The tension between relying on the global or a local standard setting is also observed in developed countries. For example, EU countries are required to use IFRS as endorsed by the EU for the listed companies but have not adopted IFRS for SMEs for others and utilize local approaches. As IFRS for SMEs is only adopted ‘as is’ in developing countries, it would be fruitful to learn how such adoption occurs and the impact it has on reporting and local institutions.

We had difficulties locating data as some measures are not available for African countries. Future studies with access to companies can learn how IFRS is adopted and implemented. Also, there are other dimensions of accounting quality that we were unable to capture. Specifically, we acknowledge the importance of discretionary accruals as a proxy of earnings quality but couldn’t incorporate it into our study due to missing key variables, such as proposed dividend, in estimating a signed discretionary accruals model as applied in Houqe et al. (2012).

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Appendix A: Descriptions of variables

Variable	Measure	Data Source	Item code
<i>Test variables</i>			
ΔNI Change in net income	Change in annual earnings scaled by end of year total assets.	WorldScope ¹⁵	WC01751 WC02999
ΔCF Change in cash flows from operation	Change in operating cash flows scaled by end of year total assets.	WorldScope	WC04860 WC02999
ACC Accruals	Net income minus operating cash flows.	WorldScope	WC01751 WC04860
CFO Cash flows from operations	Annual net cash flow from operating activities divided by end of year total assets.	WorldScope	WC04860 WC02999
$SPOS$ Small positive net income	Indicator variable equal 1 if net income scaled by end of year total assets is between 0 and 0.01, and = 0 otherwise	WorldScope	WC01751 WC02999
$LNEG$ Large negative earnings	Indicator variable equal 1 if net income scaled by end of year total assets is less than -0.2, and = 0 otherwise.	WorldScope	WC01751 WC02999
$RETURNS$ Annual return	Stock price 3 months after year-end minus stock price 9 months prior to year-end)/stock price 9 months prior to year-end.	WorldScope	Multiple codes
NI/PS Net income per share	Net income per share divided by the price at the start of the year.	WorldScope	WC01751 WC05301
P Stock price	Stock price six months after the end of the fiscal year.	WorldScope	Multiple codes
$BVEP$ Book value of equity per share	Equity book value per share.	WorldScope	WC05476

¹⁵ Data was obtained from DataStream/WorldScope. Now these datasets are accessed through Eikon.

<i>NIPS</i> Net income per share	Annual net income divided by common share outstanding at the year-end.	WorldScope	WC01751 WC05301
Main independent variables			
<i>POST_IFRS</i>	Indicator variable = 1 if IFRS period and 0 if pre-IFRS.	IFRS Foundation	N/A
<i>ADAPTION</i>	Indicator variable = 1 if a national version of IFRS is used and 0 if IFRS as issued by the IASB is used.	IFRS Foundation	N/A
<i>ROL</i> Rule of law	This is an enforcement proxy which captures the degree to which agents trust the rules of society, as well as quality of contract enforcement, property rights, police, and the courts. The index ranges -2.5 to 2.5 in units of a standard normal distribution and has been adjusted by 2.5 to eliminate negative values. Yearly index for each country is used.	World Bank	
Firm-level control variables			
<i>GROWTH</i> Growth in annual sales	Percentage change in annual sales.	WorldScope	WC01001
<i>LEV</i> Leverage	End of year total liabilities divided by end of year equity book value.	WorldScope	WC03351 WC05491
<i>DISSUE</i> Change in total liabilities	Percentage change in total liabilities.	WorldScope	WC03351
<i>TURN</i> Turnover	Sales divided by end of year total assets.	WorldScope	WC01001 WC02999
<i>SIZE</i> Firm size	The natural logarithm of end-of-year market value of equity.	WorldScope	MV
Country-level control variables for institutional and economic development			
<i>CPI</i> Corruption perception index	This is a yearly score for each country on annual basis based on how the country's public sector is perceived to	Transparency International	N/A

	be corrupt by experts and business executives. The index ranges from 0 to 100 where countries with higher scores are perceived to be less corrupt and vice versa. Consistent with prior studies, we scaled it to a range of 0 to 10. Yearly scores for the period under study are used.		
<i>PMI</i> Protection of minority shareholders interest	Protection of minority shareholders' interest is a measure of a country's protection for minority shareholders interest and ranges from 1 to 7 where 1 implies no protection and 7 signifies protection and enforcement of minority shareholders interest. Yearly scores for the period under study are used.	World Economic Forum	N/A
<i>COM</i> Common law	This is an indicator variable where 1 is equal to countries that operate common law legal system and zero otherwise.	JuriGlobe	N/A
<i>TRADE</i>	The total of export and import divided by the GDP of a country. Yearly values for the period under study are used.	World Bank	N/A
<i>GDPPC</i>	Gross domestic product per capita for a country. Yearly values for the period under study are used.	World Bank	N/A

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Study 3: Use of experts in key audit matters

Use of experts in key audit matters

Abstract

The audit processes are opaque for the users of financial statements. This paper examines factors associated with auditors' use of experts in key audit matters (KAMs). Based on the signaling theory, auditor's industry specialization, number of KAMs, and audit fees are predicted to be associated with the use of experts in KAMs. Archival data from companies listed on the Oslo Stock Exchange and analyzed using panel data techniques. The results show that auditors seek expert assistance in audit areas typically associated with high risk and estimation uncertainty (impairment and valuation). Consistent with the predictions, auditor industry specialization, number of KAMs, and audit fees are significantly associated with a greater likelihood of using experts in key areas of the audit. Generally, these results suggest that due to the unobservable nature of audit processes and quality, industry specialist auditors, auditors confronted with more risks, and those charging higher fees employ experts as signals of greater diligence and commitment to high-quality audit. As there is a lack of archival data on auditors' use of experts, these findings provide insights relevant for regulators, practitioners, standard setters, and academics interested in audit processes. Theoretically, the study shows that signaling theory can be used to gain important insights into auditors' judgments and procedures in financial statement audit.

JEL classification: M40, M41, M42, M48

Keywords: Key audit matters; expert; industry specialization; audit fees

Use of experts in key audit matters

1. Introduction

Auditing is increasingly complex and has come under greater scrutiny by regulators. Auditors have to work with increasingly complex business models and information systems (Bauer, Estep, & Malsch, 2019) as well as operational and financial reporting complexities in areas that entail high estimation uncertainty (Griffith, 2020; Griffith, Hammersley, & Kadous, 2015; Smith-Lacroix, Durocher, & Gendron, 2012). Moreover, increased scrutiny of the audit profession and auditors' work by regulators and standard setters has resulted in new requirements for additional disclosures in the audit report. For example, standard setters have issued new standards aimed at increasing transparency as significant information gap exists between what auditors do and what users see in the audit report (Bédard et al., 2016).

International Standard on Auditing (ISA) 701: "Communicating Key Audit Matters in the Independent Auditor's Report" was adopted in December 2016 and focuses on increasing audit transparency. Key audit matters (KAMs) are issues that are of most significance in the audit of the financial statements and now have to be disclosed in the audit report (IAASB, 2015: ISA 701). Researchers have largely focused on the external impact of KAMs. Studies have directly examined the economic impact of KAM disclosures on investor behavior, market reaction, auditor liability, and clients management reactions (Bédard, Gonthier-Besacier, & Schatt, 2019; Gold & Heilmann, 2019; Gold, Heilmann, Pott, & Rematzki, 2020; Moroney, Phang, & Xiao, 2020; Reid, Carcello, Li, Neal, & Francis, 2019). The KAM requirement also provides an opportunity to gain insight into audit procedures utilized, including the use of experts. Hux (2017) called to examine questions related to auditors' use of experts as the lack of archival data limits research.

Prior studies on auditors' use of experts are mainly qualitative and have focused on different aspects, including firms' use of forensic experts in audit (Jenkins, Negangard, & Oler, 2018), use of experts in the audit of complex estimates (Griffith, 2018), views about the use of experts (Boritz, Kochetova, Robinson, & Wong, 2020) and the relationship between auditors and IT experts (Bauer et al., 2019). Some indicate

that auditors' use of experts might be constrained by audit cost as experts have high hourly rates (Boritz et al., 2020; Hux, 2017). Others contend that audit firms' incentives for audit quality override the associated cost of using experts (Jenkins et al., 2018). Auditor and engagement attributes such as auditor industry specialization and the magnitude of risk and complexity in financial statements have not been explored.

ISA 620: *Using the Work of an Auditor's Expert* provides guidance on auditors' use of experts as auditors are not expected to have expertise in fields other than accounting and auditing and need to employ experts to decrease the risk of material misstatements. Experts possess specialized knowledge in a wide range of fields and are utilized by the auditor as part of the audit process to obtain sufficient audit evidence (IAASB, 2009:ISA 620). The standard highlights valuation (e.g. complex financial instruments, land and buildings, plant and machinery, and environmental liabilities), actuarial computation of liabilities, interpretation, and analysis of contracts, laws, regulations, and complex tax compliance issues as areas that might require consultation with experts (IAASB, 2009:ISA 620 paragraph A1). Valuation and tax were identified in the literature as areas where auditors use experts (Barth, 2006; Griffith, 2020; Hux, 2017). Given that the most frequent KAMs that auditors reported are typically complex and relate to revenue recognition, valuation, impairment, tax, and litigation/provisions (Abdullatif & Al-Rahahleh, 2020; Pinto & Morais, 2019; Sierra-García, Gambetta, García-Benau, & Orta-Pérez, 2019; Vik & Walter, 2017), the KAMs setting presents an interesting context to examine the factors associated with auditors' use of experts in financial statement audit.

The study applies signaling theory to examine whether auditor industry specialization, magnitude of risk, and audit fees are associated with auditors' use of experts. Notably, given the information gap between auditors and users of the audit report, coupled with the unobservable nature of audit quality (Bédard et al., 2016; Bergner et al., 2020), use of experts in KAMs is theorized to signal the underlying diligence and quality associated with their work. In fact, because audit exhibits attributes of a credence good (Causholli & Knechel, 2012), auditors with incentives to protect their good reputation for high-quality audit or those who encounter more risky

and complex items charge high fees for the statutory audit could use experts as a signal of their commitment to high-quality audit.

This study is among the first to use archival data to identify factors that influence the use of experts in financial audits. Prior studies have mainly employed interview-based approaches to examine auditors' use of experts in individual areas such as fraud (Asare & Wright, 2017), valuation (Griffith, 2020), and information technology (IT) (Axelsen, Green, & Ridley, 2017). The empirical examination is based on hand-collected data (a total of 414 firm-year observations) from companies listed on the Oslo Stock Exchange during 2016 to 2018. The empirical results are based on panel data estimation techniques such as random-effects logistic regression. The results indicate that KAMs tend to focus on impairment, valuation, revenue recognition, provisions, and business acquisition issues. Auditors frequently involved experts in KAMs related to impairment, valuation, business acquisition, and taxation. The experts used are mostly experts within the audit firms. Auditors more frequently included an expert in taxation KAMs than they did in other areas, such as revenue recognition, despite the fact that more revenue recognition KAMs were identified. This can be attributed to revenue recognition being sufficiently covered by accounting standards and interpretations, but taxation is outside auditor's expertise. Auditors' use of experts in key areas of the audit is significantly associated with the auditors' industry specialization, number of KAMs, and audit fees.

The study provides novel insights into auditors' use of experts in financial statement audits. It shows that auditors mostly involve experts in areas identified by ISA 620. Given the unobservable nature of the audit process and audit quality (Bergner et al., 2020; DeAngelo, 1981), the results suggest that industry specialist firms, auditors encountering more items of risk, and firms charging high audit fees signal the quality of their work by utilizing experts in key areas of the audit as an additional layer of assurance. While studies have examined brand name and industry specialization as signals of audit quality (Habib et al., 2019), this study extends the literature by identifying use of experts as a possible mechanism through which auditors can signal audit quality. Theoretically, the study builds on the signaling theory by documenting that auditors use experts as signals to convey the underlying diligence and quality of

their work. Notably, this is the first study to examine auditors' use of experts from the theoretical perspective of signaling. Future studies could enhance our understanding by empirically investigating whether the use of experts is associated with audit quality.

Overall, the findings provide novel insights on KAM areas where experts are frequently utilized (impairment, valuation, business acquisition, and taxations) and the factors underlying their use. Hence, they provide investors, standard setters, regulators, practitioners as well as academics insights on the audit process especially concerning auditors' use of experts in the most significant matters of the audit. The rest of the paper proceeds as follows. Section 2 presents the background and research hypotheses. Section 3 presents the research design. Section 4 presents and discusses the results and Section 5 concludes.

2. Background and development of hypotheses

Recent audit reforms have focused on the nature, content, and communicative value of the audit report to enhance transparency and audit accountability to the public. Audit standard-setters scrutinized the content of the audit report in an attempt to enhance the informativeness of the report and reduce the information and expectation gaps (Church, Davis, & McCracken, 2008; Lawson et al., 2017; Vanstraelen, Schelleman, Meuwissen, & Hofmann, 2012). For instance, Lawson et al. (2017) noted that reform of the audit report received contemporaneous attention from three significant players in the audit field, namely: the US Public Company Accounting Oversight Board (PCAOB), the UK Financial Reporting Council (FRC), and the International Auditing and Assurance Board (IAASB). All of these bodies focused on enhancing the value of the audit report by proposing additional disclosures in areas related to the audit process and judgments made by the auditor in arriving at the audit opinion. Significant among these reforms is the requirement for auditors to disclose more client-specific audit information in the form of KAMs as prescribed in ISA 701 and effective for audits of financial statements for periods ending on or after December 15th, 2016. ISA 701 is currently used by several countries across the globe including countries in the European Union (EU) and the European Economic Area (EEA).

Similarly, the PCAOB version of KAMs: Critical Audit Matters (CAMs) are effective for audits of US listed companies for fiscal years ending on or after December 2020.

KAMs are ‘those matters that, in the auditor’s professional judgment, were of most significance in the audit of the financial statements of the current period’ (IAASB, 2015, p. paragraph 8) and are reported separately under a new section in the audit report titled: Key Audit Matters. KAMs were expected to address the information deficiency in the standardized audit report which users have criticized as too structured and boilerplate in content (Bédard et al., 2016; Coram, Mock, Turner, & Gray, 2011; Vanstraelen et al., 2012). They are expected to enhance transparency about the audit process as previously little information was provided about auditors' work and professional judgments. The increase in transparency around audit work was expected to enhance the quality of audit due to the effects of transparency and accountability on judgement (Rozelle & Baxter, 1981), external consultation (Siegel-Jacobs & Yates, 1996), and more careful decision-making (Ford & Weldon, 1981). For instance, auditors exercised better judgment when required to justify their rating of industrial bond issues compared to a no-justification scenario (Ashton, 1992).

Opponents of the expanded report, including audit firms and preparers of financial statements, did not want the expanded report and emphasized that auditors will be subject to more scrutiny and potentially, more litigation (Gold et al., 2020; Lawson et al., 2017). Although KAMs were not expected to affect the underlying work of auditors but rather the reporting of key issues encountered, the associated increase in disclosure can have implications for auditors’ work (Gutierrez, Minutti-Meza, Tatum, & Vulcheva, 2018; Reid et al., 2019). For example, disclosures about auditors’ judgments in key areas of the audit allow for greater scrutiny of the auditor (Gold et al., 2020). Notably, this perception of greater scrutiny has consequences for audit effort especially in the audit of items involving significant management judgments and high estimation uncertainties.

Prior studies have directly examined the consequences of KAMs by focusing on investor behavior and market reaction, auditor liability, and client’s management responses (Gold & Heilmann, 2019). Studies that focused on market reaction find that KAM disclosures were not associated with abnormal returns and abnormal trading

volumes (e.g. Bédard et al., 2019; Gutierrez et al., 2018; Lennox, Schmidt, & Thompson, 2018). KAMs were found to affect investors' evaluation of a company's economic prospects as well as their decision to invest (e.g. Christensen, Glover, & Wolfe, 2014; A. Köhler, Ratzinger-Sakel, & Theis, 2020). Likewise, others report evidence that KAMs' disclosure reduced users' and jurors' perceptions of auditors' negligence (e.g. Brasel, Doxey, Grenier, & Reffett, 2016; Gimbar, Hansen, & Ozlanski, 2015; Kachelmeier, Rimkus, Schmidt, & Valentine, 2019; Vinson, Robertson, & Cockrell, 2018). It was reported that the presence of KAMs resulted in a lower tendency of management to engage in aggressive financial reporting behavior (Gold et al., 2020). Investors' perception of auditors' credibility and audit value is also noted to be affected by the number of KAMs disclosed (Moroney et al., 2020). Moreover, KAMs also impacted audit fees through auditors' perceptions of increase in litigation risk (H. Li, Hay, & Lau, 2019) and audit quality through auditors' response to a perceived increase in scrutiny of their work (Gutierrez et al., 2018; H. Li et al., 2019; Reid et al., 2019). Overall, these studies show that KAMs have consequences for investors, management, and audit outcomes.

Conspicuously missing in the literature is an understanding of factors associated with auditors' resource deployment in KAMs. Specifically, questions about the factors underlying auditors' use of experts in KAM-areas are important since ISA 701 indicates that KAMs could entail those areas of the audit that required the deployment of experts, hence, an understanding of the factors associated with the use of experts in these significant areas of the audit is worth investigating.

2.1 Auditor industry specialization and use of experts

The core objective of signaling theory is to reduce information asymmetry between parties (e.g., management) with more information and those with less information (e.g., investors) (Akerlof, 1970; Spence, 1973, 1974, 2002). The theory is generally applied in the context of imperfect markets to understand the actions, behaviors or disclosures pursued by the parties with more information in resolving information asymmetry about unobservable quality underlying their service or products (Connelly et al., 2011). In this context, the parties with more information are often the

senders who employ signals aimed at giving the recipient more insight about their service or product. In the auditing literature, researchers have used the signaling theory to provide insights on companies' choice of auditors (Abbott & Parker, 2000; Bewley et al., 2008; Kang, 2014). Generally, these studies report that companies choose perceived high-quality auditors (Big N and industry specialist auditors) to communicate to users their commitment to high-quality financial information (Alon & Vidovic, 2015; Habib et al., 2019).

Although, these auditors (Big N and industry specialists) are associated with reputation for audit quality, the unobservable nature of the audit process and the binary audit opinion makes it difficult to discern how these firms deliver comparatively high-quality audit (Bergner et al., 2020). Given that KAMs are the most significant areas of the audit, they could represent such areas where auditors associated with strong reputation for high audit quality will seek to signal their willingness to provide high-quality audit by engaging experts in these areas. Thus, audit firms with a known reputation for high-quality audit have greater incentives to maintain and demonstrate the underlying quality of their work (Bergner et al., 2020). Similarly, given the information gap between auditors and users of the audit report (Bédard et al., 2016; Mock et al., 2012) as well as the unobservable nature of audit quality (Bergner et al., 2020; DeAngelo, 1981), these auditors might seek to communicate the underlying quality of their audit by deploying experts in key areas of the audit. For example, industry specialist firms are often more concerned with their reputation than non-industry specialist firms (Gramling & Stone, 2001; Velury, 2003), hence have greater incentives to use experts in areas that are susceptible to high risk and estimation uncertainty in order to maintain their reputation for high-quality audit. Furthermore, given that the use of experts in high-risk areas affects jurors' perception of auditors' negligence (J. O. Brown, Grenier, Pyzoha, Reffett, & Zielinski, 2020), it is plausible that industry specialist firms will be more willing to use experts in key areas of the audit as a signal of greater diligence and professionalism. Additionally, large accounting firms with industry expertise have in-house team of experts and thus may be more willing to engage them in audit due to the ease of accessibility (Hux, 2017). The first hypothesis is stated as follows:

H1: Ceteris paribus, industry specialist audit firms are more likely to use experts than non-industry specialist audit firms.

2.2 Number of KAMs and use of experts

Related to information gap as it pertains to a financial statement audit, the judgments, processes, and procedures used by the auditor are unobservable to users of the audit report (Bergner et al., 2020). That makes it difficult for users to ascertain whether the auditor acted reasonably in dealing with matters of high-risk arising from estimation uncertainty and significant management discretion. In a high-risk audit engagement, the likelihood of material misstatement can be high. Auditors would need to commit more audit resources and use experts to signal diligence. That is also the case since auditors' use of experts was shown to alleviate concerns about audit quality. J. O. Brown et al. (2020) show that jurors perceived auditors to be less negligent in instances where the auditor consulted an expert as part of the audit process. Their experiment focused on an alleged audit failure where they found that auditors who consulted valuation experts in assessing an aggressive management estimate were less likely to be judged as negligent.

Moreover, given the professional guidance on auditors' use of experts as contained in ISA 620, auditors might seek to signal their proactive application of the standard. For example, the standard notes areas such as valuation (e.g. complex financial instruments, land and buildings, plant and machinery, and environmental liabilities), actuarial computation of liabilities, interpretation, and analysis of contracts, laws, regulations, and complex tax compliance as typical audit issues where auditors could consult experts. Given that prior studies have reported that KAMs are typically complex and relate to revenue recognition, valuation, impairment, tax, and litigation/provisions (Abdullatif & Al-Rahahleh, 2020; Pinto & Morais, 2019; Sierra-García et al., 2019; Vik & Walter, 2017), they could represent areas where experts are used. Boritz et al. (2020) conducted an interview-based study, comprising of 40 practitioners in Canada, including auditors and experts. They found that 61% of auditors considered risk a major factor underlying their use of experts in financial statement audit. Consequently, in the presence of high-risk and complex financial statement items

the auditor is more likely to use an expert as signal of the diligence and thoroughness underlying the audit opinion. Specifically, since KAMs relate to those financial statement items that are associated with high-risk due to their complexity and the use of significant management discretion (Pinto & Morais, 2019; Sierra-García et al., 2019), a higher number of KAMs could imply a more risky and complex audit thus inducing a greater incentive to signal diligence and thoroughness. Hence, a higher volume of KAMs could be associated with a higher likelihood that an expert will be consulted.

H2: Ceteris paribus, auditors are more likely to utilize experts as the number of KAMs increases.

2.3 Audit fees and use of experts

In the presence of unobservable quality and information gap as is the case in auditing, firms will employ various signals to enable users appraise the quality underlying their work. Particularly, given the credence attributes of audit (Causholli & Knechel, 2012), and the abstract nature of audit quality (Bergner et al., 2020; DeAngelo, 1981), audit firms charging high fees could have greater incentives to signal the underlying quality of their work. Credence goods are goods/services in which sellers have information advantage over buyers due to the technical/professional nature of the service (Emons, 1997). For instance, credence attributes such as the auditees' inability to directly estimate the scope of audit work required as well as evaluate the quality of the audit work (Causholli & Knechel, 2012) create incentives for auditors to use signaling. Here, the auditee is unable to ascertain accurately whether the audit fees reflect the extent of work performed by the auditor. This creates a scenario where the auditor will seek to demonstrate a rational justification for the fees charged by doing more work. Thus, firms charging high audit fees will have stronger incentives to use various mechanisms including the deployment of experts in key areas of the audit as signals of the underlying thoroughness and quality of their work. Moreover, due to conflicting evidence on the relationship between audit fees and audit quality, the incentive to signal thoroughness could be stronger when audit fees are high. For instance, whilst higher audit fees (abnormal audit fees) are reported to be positively associated with audit quality (Blankley, Hurtt, & MacGregor, 2012; Eshleman & Guo,

2014), it has also been documented that it has negative consequences for audit quality through an impairment of auditor independence (Choi, Kim, & Zang, 2010; Krauß, Pronobis, & Zülch, 2015). These studies have used various proxies of audit quality including discretionary accruals and restatements. An implication of the conflicting results is that audit firms charging higher audit fees are more likely to signal the underlying diligence of their work. Such firms may seek to communicate that the audit fees charged do not impair their professional judgment and underlying quality of their work. Consequently, firms charging higher audit fees might have stronger incentives to signal their commitment to audit quality by including experts in the most significant areas of the audit. Furthermore, because audit fees' impact on audit quality is debatable as well as the unobservable nature of the audit procedures and resources used by the auditor, firms charging higher audit fees might be associated with a greater likelihood of using experts. Moreover, higher audit fees could enhance the firm's ability to bring in experts for financial statement audit since it is more expensive to engage experts in audit. Hence, it is postulated that audit fees will be positively associated with audit firm's use of experts, thus, the final hypothesis is stated as follows:

H3: Ceteris paribus, audit firms with higher audit fees are more likely to use an expert.

3. Research design

3.1 Research context

We obtained data for companies listed on the Oslo Stock Exchange in Norway. These companies are required to apply the International Financial Reporting Standards (IFRS) in the preparation of consolidated financial statements. The regulation of the audit market is under the remit of the Financial Supervisory Authority (Norwegian: Finanstilsynet) which provides licensing, supervision, and disciplinary measures for auditors in Norway (Sormunen et al., 2013). ISAs have been used for auditing since 2010 (Sormunen et al., 2013). Generally, the Norwegian audit environment is characterized as a low litigation risk setting (Hope & Langli, 2010) and is similar to other Nordic countries (Sormunen et al., 2013). Moreover, the audit and financial reporting framework is substantially similar to countries in the EU since Norway is part

of the EEA and implements the EU Directives on accounting and auditing (Eilifsen, 1998).

3.2 Data and sample selection

The sample included companies listed on the Oslo Stock Exchange consisting of both the Oslo BORS and Oslo AXESS¹⁶. The final sample used was constructed as follows. First, the sampling frame consists of 210 companies listed on the Oslo Stock Exchange as of 31st December 2018. Data for these companies is collected for the first three-years of KAM implementation starting from December 2016 to December 2018. The Communicating Key Audit Matters standard (ISA 701) became effective from the 2016 reporting year. Hence, the paper is based on data from the first three years of implementing ISA 701 requirements, 2016, 2017, and 2018. Companies that were listed or delisted during the study period are excluded from the sample. Next in the exclusion criteria are companies using a reporting framework other than IFRS (e.g. US-GAAP). Additionally, companies under regulatory sanctions or judicial management are excluded due to the distinctive additional risk associated with such firms. Finally, consistent with most studies on audit reporting (e.g. Gutierrez et al., 2018; Reid et al., 2019), we excluded companies in the financial sector. The sample selection procedure is summarized in Table 1. It contains a total of 138 companies yielding 414 company-year observations.

Table 1: Sample selection criteria

	Firms
Total number of firms listed on Oslo Stock Exchange	210
Exclude: firms in the financial sector	38
Reporting framework other than IFRS	5
Listed, delisted, and acquired ¹⁷ between 2016 and 2018	26
Others i.e. regulatory sanctions	3
Final Sample	138

¹⁶ Trading on both Oslo BORS and Oslo AXESS are fundamentally similar except for differences in market capitalization. Companies trading on Oslo BORS need a minimum market capitalization of NOK 300 million whilst those on Oslo AXESS must be meet a minimum market capitalization of NOK 8 million (Ausland, 2020).

¹⁷ This includes firms that were acquired or merged into one reporting entity and those that were acquired and taken private between 2016 and 2018.

The KAM-related data are manually collected from the annual reports. Data on the involvement of experts in KAMs are collected from the audit reports by carefully reading the auditor's procedures used to address identified KAMs and the audit fees are collected from the financial statements. Although there are two types of experts, internal and external experts, all the sampled firms used their internal experts. Audit reports that are in Norwegian (23 audit reports) were translated to English by native speakers of Norwegian with a master's degree in accounting.

All financial variables are obtained from Thomson Reuters Eikon Database. Consistent with prior studies which used Norwegian data, all monetary values are in the Norwegian Kroner (NOK) (e.g. Firth, 1997; Hope, Langli, & Thomas, 2012). For companies reporting in currencies other than the NOK, the amounts are translated using the annual exchange rate published by the Central Bank of Norway for the respective fiscal years (Zhang, Hay, & Holm, 2016). A total of 51 companies reported in other currencies consisting of the US Dollar (42), Euro (3), the British Pound Sterling (1), Danish Kroner (2), and Swedish Kroner (3).

3.3 Variables and measurements

The dependent variable is *EXPERT* coded as one for financial statements audits where an expert is included in a KAM and zero otherwise. This variable is obtained from the auditors' response to the identified KAMs where they described the specific actions/procedures used in addressing each KAM. For example, involvement of valuation experts in the evaluation of impairment estimates is listed as part of their audit procedures in addressing impairment KAMs.

The explanatory variables used to capture factors underlying auditors' use of experts in KAMs are number of KAMs (*#KAMs*), auditor industry specialization (*IND_SPEC*), and audit fees (*LN_AFee*). *#KAMs* are the number of key audit matters contained in each audit report and used to proxy for the level of risk and complexity inherent in the audit since KAMs are typically areas of high complexity and risk (IAASB, 2015: ISA 701; Reid et al., 2019).

The auditor industry specialization variable is an indicator variable where an audit firm is coded as an industry specialist (1) if the firm holds the largest market share in the auditee's industry and (0) otherwise. This approach is based on the definition by Gramling and Stone (2001) where the market share of an audit firm is measured as the total audit fees earned by the audit firm in a particular industry say X , deflated by the total audit fees generated by all audit firms in industry X . Mathematically, it is computed as follows:

$$MS_{xi} = \frac{\sum_{j=1}^J TAF_{xij}}{\sum_{i=1}^I \sum_{j=1}^J TAF_{xij}}$$

where MS is the market share of audit firm i in industry x , TAF is total audit fees earned by audit firm i from auditee j in industry x , J captures the total number of audit firm i auditees in industry x and I denotes the total number of audit firms in industry x . Several studies (e.g. Craswell et al., 1995; Mark L DeFond, Francis, & Wong, 2000; Eshleman & Guo, 2020) have applied similar metrics in the auditing literature. Although different metrics of industry specialization exist, the market share approach is widely used and consistent with the industrial organization literature measures of industry leadership (Audousset-Coulier, Jeny, & Jiang, 2016; Neal & Riley Jr, 2004).

The audit fees variable is the amount of fees charged by the audit firm for conducting the statutory audit and was collected manually from the published financial statements. Consistent with prior studies (e.g. H. Li et al., 2019; Reid et al., 2019), the natural logarithm of audit fees is used to avoid problems of scale.

Finally, several variables are included to control for the possible effects of auditor and client attributes on auditors' use of experts (Asare & Wright, 2017). As there are no archival studies examining auditors' use of experts, we rely on prior survey studies (e.g. Asare & Wright, 2017; Boritz et al., 2020) and other related studies on audit reporting (e.g. Gutierrez et al., 2018; Reid et al., 2019), to identify relevant auditor and client characteristics. Those include audit firm location ($AFLOC$) and non-audit fee ratio ($NAFR$). Choi, Kim, Qiu, and Zang (2012) show that audit firms located within the same locality as the auditee tend to provide higher quality audit, thus, the geographic proximity between the auditor and auditee might have implications for the auditors' use of in-house experts. Audit firms earning high non-audit fees from their auditees may be

more knowledgeable about accounting and regulatory issues of the auditee due to their greater involvement with the auditee, hence could impact the use of experts.

Client variables include: total assets (*SIZE*), profitability (*ROA*, *LOSS*), leverage (*LEVERAGE*), receivables and inventory (*INVREC*), number of subsidiaries (*NoS*), and the presence of a foreign subsidiary (*FS*). Clients with more assets, high leverage, more subsidiaries, and foreign presence may have greater use of experts in KAMs due to higher likelihood of complex issues such as fair value measurements and international taxation. Industry and year fixed effects are also included to control for the possible impact of industry attributes and time on auditors' use of experts. The industrial classifications are based on the four-digit Global Industrial Classification Sectors (GICS) codes. Detailed description of variables, measures, and sources are included in Appendix A.

3.4 Estimation techniques

The underlying hypotheses are empirically tested using panel data estimation techniques. Regarding the suitability of panel data estimation techniques, Nikolaev and Van Lent (2005) established that panel data estimation techniques are capable of mitigating the possible effects of endogeneity bias in accounting research. Given that different estimations techniques are available, various diagnostic¹⁸ and specification tests underlying each technique are first performed to identify the most suitable model. These tests show that the underlying logistic regression assumptions are met. For instance, the link test model specification was performed to ascertain whether the model is properly specified, notably, it tests the null hypothesis that the model is correctly specified. The results included in Table 4 under model specification diagnosis show that the linear predicted value (*_hat*) is significant while the linear predicted value squared (*_hatsq*) is insignificant *p*-value of 0.520. This implies that the logit model is suitable and does not suffer from specification errors such as the omission of relevant predictors. In the choice between pooled logistic regression and random effects logistic regression, the Likelihood Ratio test included in the main results in Table 4 are all significant

¹⁸ Tests for assumptions of normality, linearity, multicollinearity, Pagan Lagrangian multiplier test and Hausman Test, among several others, are performed.

suggesting that a random-effects logistic regression outperforms a pooled logistic regression model.

Empirically, the following logit regression model is used in estimating the factors associated with auditors' decision to use experts.

$$\begin{aligned} EXPERT(0,1)_{it} = & \beta_0 + \beta_1 IND_SPEC_{it} + \beta_2 \#KAMS_{it} + \beta_3 LN_AFee_{it} + \\ & \beta_4 SIZE_{it} + \beta_5 LEVERAGE_{it} + \beta_6 ROA_{it} + \beta_7 CFO_{it} + \beta_8 LOSS_{it} + \beta_9 FS_{it} + \beta_{10} NoS_{it} + \\ & \beta_{11} INVREC_{it} + \beta_{12} AFLOC_{it} + \beta_{13} NAFR_{it} + \beta_{14} Industry\ Dummy_i + \varepsilon_{jit} \end{aligned} \quad (1)$$

4. Results

4.1 Descriptive, univariate, and exploratory statistics

Panel A of Table 2 presents the descriptive statistics of the variables¹⁹ used in the multivariate regression models. First, regarding the use of experts, about 37% of the 414 observations represented instances where an expert was involved in the audit of a KAM area. Consistent with the observation by Hux (2017) that large accounting firms mostly use their in-house experts due to their large consulting departments, all the experts used in the sample are internal experts of the audit firms. On average, auditors identified around 2 KAMs and industry specialist firms audited about 30% of the total sample. The dominance of the Big 4 accounting firms in the audit of listed firms is noticeable given that 88% of the firms used a Big 4 auditor. In relation to audit fees, the average amount paid for statutory audit by the sampled firms is NOK 4,163,226.10 approximately USD 503,717.62²⁰. Even though most (93%) of the audit firms provided both audit and non-audit services to their auditees, the ratio of non-audit fees to total audit fees (*NAFR*) of approximately 29% is a significant decline from the 43.1% reported by Zhang et al. (2016) in 2010.

¹⁹ Consistent with prior studies, continuous variables (e.g. Total assets, Leverage, audit fees) are log transformed because of skewness. In examining for the skewness, a graphical inspection of each variable was first done using the gladder command in STATA which also enables the identification of the most suitable transformation option. In all cases, the log transformed option turned out to be the most suitable except for number of subsidiaries where the square root option was most suitable.

²⁰ This translation is based on the average of the annual exchange rates of 2016, 2017 and 2018 from the Central Bank of Norway.

A mean comparison of variables between the two groups (observations in which auditors used experts and those that they did not) shows significant differences. Specifically, the results in Panel B of Table 2 show that the observations with expert involvement are associated with significantly higher audit fees, more KAMs, and more industry specialist auditors (*IND_SPEC*) than the group without an expert. Additionally, significant differences exist between the two groups in terms of auditee size (*SIZE*), number of subsidiaries (*NoS*), presence of foreign subsidiaries (*FS*), leverage (*LEVERAGE*), cash flows from operations (*CFO*), inherent risk (*INVREC*), and profitability (*ROA* and *LOSS*). For instance, the category of auditees with KAMs, where experts were used, have higher leverage, better cash flows, more subsidiaries and include more loss-making entities. Auditees for which the auditor engaged experts have relatively higher inventory and receivables than those where an expert was not brought in.

Panel C of Table 2, contains a pairwise correlation matrix with variance inflation factor (VIF). Generally, most of the variables have weak to moderate positive and significant association with the dependent variable (*EXPERT*) implying that this set of variables could have predictive abilities for the dependent variable. Majority of the independent variables have weak to moderate significant positive associations among themselves. The correlation coefficients and the values of the VIF do not exceed the critical thresholds for multicollinearity problems. Specifically, the highest correlation coefficient of 0.704 between *NoS* and *SIZE* is below the threshold of 0.9 recommended by Hair et al. (1998). Similarly, the VIF values are all below the threshold of 5 recommended by Studenmund and Cassidy (1992) also suggesting that multicollinearity is not a problem.

Table 2: Descriptive and univariate statistics

Panel A: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Audit fees	414	4163226.10	8104081.90	33594.80	66000000.00
LAfee	414	14.28	1.32	10.42	18.01
EXPERT	414	0.37	0.49	0.00	1.00
IND_SPEC	414	0.30	0.46	0.00	1.00
#KAMs	414	1.83	1.02	0.00	5.00
#EXPERT	414	0.42	0.57	0.00	2.00
BIG4	414	0.88	0.32	0.00	1.00
SIZE	414	21.65	2.05	16.11	27.60

LEVERAGE	414	26.35	23.51	0.00	95.14
ROA	414	-5.95	26.49	-186.86	99.54
CFO	414	0.01	0.28	-1.93	1.40
LOSS	414	0.53	0.50	0.00	1.00
AFLOC	414	0.88	0.32	0.00	1.00
FS	414	0.84	0.37	0.00	1.00
JP	414	0.93	0.26	0.00	1.00
INVREC	414	0.21	0.18	0.00	0.76
NoS	414	4.05	2.47	0.00	14.56
NAFR	414	0.29	0.20	0.00	0.95

Panel B: T Test for differences between no-expert and expert groups

Variables	Expert=0 (n=259)	Expert=1 (n=155)	Mean Diff	St_Err	t-statistic	p_value
#KAMs	1.59	2.23	-0.64	0.10	-6.50	0.000
LAfee	13.95	14.85	-0.91	0.13	-7.15	0.000
IND_SPEC	0.26	0.38	-0.13	0.05	-2.70	0.007
SIZE	21.12	22.54	-1.42	0.20	-7.25	0.000
LEVERAGE	23.14	31.72	-8.59	2.35	-3.65	0.001
ROA	-9.13	-0.63	-8.50	2.66	-3.20	0.002
CFO	-0.03	0.07	-0.10	0.03	-3.40	0.001
LOSS	0.50	0.59	-0.09	0.05	-1.70	0.093
FS	0.85	0.83	0.01	0.04	0.35	0.722
NoS	3.61	4.79	-1.18	0.24	-4.85	0.000
INVREC	0.22	0.18	0.04	0.02	2.05	0.043
AFLOC	0.87	0.91	-0.04	0.03	-1.25	0.209
NAFR	0.28	0.30	-0.02	0.02	-1.00	0.330

Notes: Panel A of Table 2 provides the descriptive statistics of the variables used in the paper. Panel B contains the t-test (two-tailed) difference in means between the two categories of observations: the expert group and the no expert

Panel C: Pairwise correlations and variance inflation factor (VIF)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	VIF	1/VIF
(1) LAFee	1.000																2.72	0.368
(2) EXPERT	0.332*	1.000																
	(0.000)																	
(3) IND_SPEC	0.243*	0.133*	1.000														1.19	0.840
	(0.000)	(0.007)																
(4) #KAMs	0.444*	0.304*	-0.069	1.000													1.41	0.709
	(0.000)	(0.000)	(0.163)															
(5) #SPEC	0.419*	0.942*	0.176*		1.000													
	(0.000)	(0.000)	(0.000)															
(6) SIZE	0.686*	0.337*	0.215*	0.337*		1.000											3.73	0.268
	(0.000)	(0.000)	(0.000)	(0.000)														
(7) LEVERAGE	0.126*	0.177*	-0.036	0.044	0.410*		1.000										1.36	0.735
	(0.010)	(0.000)	(0.460)	(0.377)	(0.003)													
(8) ROA	0.275*	0.156*	0.038	0.132*	0.152*	0.420*	0.082	1.000									2.37	0.422
	(0.000)	(0.001)	(0.438)	(0.007)	(0.002)	(0.000)	(0.097)											
(9) CFO	0.281*	0.165*	-0.002	0.160*	0.158*	0.391*	0.067	0.664*	1.000								1.89	0.529
	(0.000)	(0.001)	(0.968)	(0.001)	(0.001)	(0.000)	(0.172)	(0.000)										
(10) LOSS	0.264*	0.083	0.108*	0.140*	0.103*	0.408*	-0.067	0.570*	0.394*	1.000							1.83	0.546
	(0.000)	(0.093)	(0.027)	(0.004)	(0.035)	(0.000)	(0.172)	(0.000)	(0.000)									
(11) FS	0.301*	-0.018	0.028	0.179*	0.005	0.171*	0.036	0.114*	0.108*	0.030	1.000						1.29	0.775
	(0.000)	(0.721)	(0.574)	(0.000)	(0.921)	(0.000)	(0.462)	(0.021)	(0.028)	(0.549)								
(12) NoS	0.582*	0.232*	0.160*	0.361*	0.332*	0.704*	0.295*	0.233*	0.208*	0.244*	0.290*	1.000					2.36	0.423
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(13) INVREC	0.091	-0.100*	0.031	0.053	-0.086	-0.128*	-0.283*	0.145*	0.031	0.268*	0.048	-0.093	1.000				1.36	0.735
	(0.064)	(0.043)	(0.535)	(0.281)	(0.082)	(0.009)	(0.000)	(0.003)	(0.523)	(0.000)	(0.333)	(0.058)						
(14) AFLOC	0.113*	0.062	0.123*	-0.010	0.079	0.171*	0.121*	0.066	0.006	0.070	-0.158*	0.069	0.046	1.000			1.12	0.893
	(0.021)	(0.209)	(0.012)	(0.839)	(0.110)	(0.000)	(0.014)	(0.183)	(0.907)	(0.156)	(0.001)	(0.162)	(0.350)					
(15) NAFR	-0.169*	0.048	0.086	-0.050	0.008	-0.024	0.116*	-0.054	-0.039	0.034	-0.010	-0.054	-0.095	0.095	1.000		1.35	0.741
	(0.001)	(0.329)	(0.080)	(0.315)	(0.866)	(0.633)	(0.018)	(0.270)	(0.424)	(0.489)	(0.841)	(0.271)	(0.053)	(0.052)				
(16) JP	0.081	0.017	0.077	0.065	0.034	0.100*	0.041	-0.040	-0.010	0.085	-0.120*	0.055	0.100*	0.108*	0.372*	1.000	1.28	0.781
	(0.100)	(0.734)	(0.116)	(0.188)	(0.490)	(0.041)	(0.401)	(0.415)	(0.834)	(0.084)	(0.015)	(0.263)	(0.043)	(0.029)	(0.000)			

*Correlation coefficients with a star * are statistically significant at 5% or lower.*

Table 3 presents a list of the different types of KAMs reported in the audit reports as well as the number of KAMs in which experts were used for each category of the identified KAMs. Generally, the classification was based on a content analysis of the KAMs section of the audit report where KAM issues as reported by the auditor are used. For example, impairment KAMs are grouped and tallied as impairment. Other classifications are based on Sierra-García et al. (2019) and include KAMs related to entity-level issues, such as IT systems and controls. Nine (9) different types of KAMs were identified: impairment (230 KAMs), valuation (170 KAMs), revenue recognition (116 KAMs), taxation (30 KAMs), business acquisition (60 KAMs), intangibles (11 KAMs), provisions (77 KAMs), entity-level risk matters (26 KAMs), and other accounting-related matters (37 KAMs). Majority of the KAMs approximating 30% are impairment KAMs, followed by valuation KAMs which constituted 22% of the total number of KAMs reported, and revenue recognition KAMs comprising 15% of the total. These three types of KAMs make up 67% of the total number of KAMs thereby are the dominant issues auditors identified as key audit matters.

Regarding the use of experts in KAMs, auditors included experts in a total of 199 KAMs representing 26% of the 757 KAMs identified. About 50% of these KAMs related to impairment and nearly 25% to valuation. Most of the experts used were valuation experts who provided expertise in the development and verification of models used in estimating accounting numbers for assessing impairment and valuation. For example, a content analysis²¹ of the KAMs section of the audit report revealed that valuation experts were mainly used in verifying the mathematical and methodological integrity of management's valuation models applied in impairment testing and valuation. As observed by Glover, Taylor, and Wu (2017), the evaluation of independent estimates and valuations models are areas that auditors rely on valuation experts. Similarly, these areas are consistent with the audit issues highlighted in ISA 620 as possible areas where auditors could consult experts.

²¹ As part of the data collection for the use of experts, I read and summarized the specific tasks valuation performed in the identified KAM-area.

With respect to the proportion of individual KAM types in which auditors used experts, more than half (60%) of the taxation related KAMs involved a tax expert. This is closely followed by impairment KAMs where 43% of the impairment KAMs entailed the use of a valuation expert. Business acquisition and valuation KAMs are the third and fourth most consulted areas where experts were brought in to review estimates prepared by management. KAMs on revenue recognition, provisions, and other accounting matters like IFRS 9 implementation issues are areas where auditors consulted experts the least. For example, out of the 116 revenue recognition KAMs, it is only in about 3% (4) of KAMs that auditors included experts indicating that auditors do not tend to rely on experts in these areas.

Table 3: Type of KAM, #KAMs, and experts' involvement

<i>Type of KAMs</i>	<i>#KAMs</i>	<i>KAM with expert</i>	<i>Category/ Total KAMs with expert</i>	<i>Type of experts</i>
Impairment	230(30.38%)	99 (43.04%)	49.75%	Valuation
Valuation	170(22.46%)	49 (28.82%)	24.62%	Valuation
Revenue	116(15.32%)	4 (3.45%)	2.01%	Other Expert
Provisions	77 (10.17%)	4 (5.19%)	2.01%	Tax & Other
Business Acquisition	60 (7.93%)	22 (36.67%)	11.06%	Valuation
Other-accounting KAMs	37 (4.89%)	2 (5.41%)	1.00%	Valuation & Other
Taxation	30 (3.96%)	18 (60.00%)	9.05%	Tax
Entity level risk KAMs	26 (3.43%)	1 (3.85%)	0.50%	Other
Intangibles	11 (1.45%)	0 (0.00%)	0.00%	
	757 (100%)	199(26.29%)	100%	

This table lists the different types of KAMs identified from the audit reports and other frequencies about the use of experts in the various types of KAMs. Column 1 reports the various types of KAMs with their corresponding number and percentages reported in Column 2. The number and percentage of each category of KAMs in which experts were used is contained in Column 3. Column 4 presents the proportion of the total number of KAMs with experts' involvement according to the various categories of KAMs and Column 5 gives information on the type of expert that was used in each category of KAMs. On the type of KAMs, other-accounting KAMs relate to KAMs on accounting areas other than those listed above, examples include IFRS 9 implementation issues and Sale and Leaseback transactions. The other experts included in the type of experts' column refers to experts such as lawyers, project implementation consultants, etc. For example, an audit firm used the expertise of their in-house legal counsel to evaluate a company's exposure to potential claims from license commitments.

5. Empirical results

Table 4 contains random effects logistic regression results of the factors associated with auditors' use of experts. The underlying regression models appear well fitted with statistically significant Wald χ^2 at 1% level for all models. In Table 4, model 1 includes the auditor industry specialization variable as the only test variable and all

control variables as specified in equation 1 above. The results show that industry specialist firms are significantly associated with the use of experts in key areas of the audit. This result holds in the full model (model 4) where all test variables are included thereby providing support for the first hypothesis. Specifically, compared to non-industry specialists' firms, industry specialists' auditors were more likely to consult experts in key areas of the audit. This likelihood is statistically significant at 10%.

Similarly, consistent with the prediction in hypothesis 2, the results in both models 2 and 4 indicate that in the presence of more items of risk and complexity, auditors were more likely to consult experts. Here, the likelihood that the magnitude of risk and complexity is associated with auditors' consultation with experts is significant at 1% with a marginal effect coefficient of 0.021. Thus, as the magnitude of risk increases, the probability that an expert would be consulted increases by 2%. This is robust with the inclusion of the relative effects of the identified control variables as well as industry and year-fixed effects.

Hypothesis 3 predicts that higher audit fees are associated with a greater likelihood that auditors use experts in key areas of the audit. Consistent with this, the results in models 3 and 4 show a significant positive association between audit fees and use of experts at 1% and 10% respectively. As inferences are based on the full model (Model 4), the results suggest that audit firms charging higher audit fees were more likely at the 10% significance level to include an expert in critical areas of the audit. The relative effect of this association is shown by the marginal effect coefficient of 0.050 implying that a unit increase in audit fees is associated with an increase in 5% likelihood that an auditor consulted experts in key areas of the audit.

Regarding the control variables, majority of them are positive but it is only SIZE that is statistically significant at 10% implying that audit firms are more likely to use experts in the audit of large clients measured by total assets. On the other hand, the decision to use experts in a KAM area is less probable (at 10% significance level) for auditees with a foreign subsidiary relative to those without a foreign subsidiary. Equally, audit firms are less likely (at 10% significance level) to use experts in the audit of KAM-areas for clients with high inventory and receivables (INVREC).

Table 4: Factors associated with auditors' decision to use expert

	(1) EXPERT	(2) EXPERT	(3) EXPERT	(4) EXPERT
IND_ SPEC	.078* (.045)			.077* (.044)
#KAMs		.106*** (.021)		.104*** (.022)
LAfee			.087*** (.030)	.050* (.030)
NAFR	.029 (.101)	.049 (.093)	.152 (.107)	.090 (.101)
AFLOC	-.015 (.099)	.027 (.100)	-.016 (.101)	.006 (.097)
SIZE	.074*** (.021)	.072*** (.018)	.042 (.024)	.048* (.023)
LEVERAGE	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)
ROA	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)
CFO	.074 (.093)	.010 (.082)	.072 (.092)	.022 (.082)
LOSS	-.054 (.046)	-.048 (.042)	-.061 (.047)	-.048 (.043)
FS	-.135 (.083)	-.137* (.081)	-.178** (.084)	-.163* (.082)
NoS	.001 (.016)	-.015 (.015)	-.003 (.016)	-.019 (.016)
INVREC	-.113 (.148)	-.206 (.140)	-.176 (.150)	-.270* (.146)
INDUSTRY fixed effects	Yes	Yes	Yes	Yes
Reference year: 2016				
2017	-.174 (.459)	-.022 (.525)	-.172 (.454)	-.090 (.527)
2018	-1.012** (.487)	-.857 (.571)	-.997** (.483)	-.790 (.563)
Constant	-22.257*** (6.996)	-29.739*** (9.057)	-28.26*** (7.369)	-31.45*** (9.21)
Observations	414	414	414	414
Number of companies	138	138	138	138
Wald chi2	27.73**	29.91***	29.39***	33.81***
Likelihood Ratio test	117.15***	121.47***	106.63***	113.97***
Model specification diagnostic test				
DV: Expert	Coef	Std Err	Z Statistic	p_Value
_hat	1.037	0.141	7.340	0.000
_hatsq	0.042	0.082	0.520	0.605
_cons	-0.032	0.140	-0.230	0.819

This table lists random-effects logistic regression results for the factors associated with the audit firm's decision to involve an expert in the audit of a KAM-area. The reported coefficients are the marginal effects of the logistic regression. Please, see Appendix A for a full description of variables.

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

5.1 Additional analysis

Two additional analysis are performed. In the first analysis, the dummy dependent variable, use of experts is replaced with the actual number of experts used in order to ascertain the intensity of experts' involvement in KAMs. The results reported in Table 5 indicate that the number of experts is still positively associated with industry specialization, number of KAMs, and audit fees; industry specialization is however not statistically significant.

Table 5: Additional analysis using the actual number of experts used in KAMs

	(1) #EXPERT	(2) #EXPERT	(3) #EXPERT	(4) #EXPERT
IND_ SPEC	.167 (.150)			.173 (.148)
NKAMs		.289*** (.063)		.249*** (.063)
LAfee			.339*** (.100)	.261*** (.101)
NAFR	.110 (.360)	.129 (.398)	.512 (.448)	.361 (.481)
AFLOC	.005 (.386)	.121 (.382)	-.016 (.357)	.064 (.366)
SIZE	.217*** (.066)	.189*** (.069)	.073 (.082)	.062 (.080)
LEVERAGE	.003 (.004)	.004 (.005)	.005 (.004)	.006 (.004)
ROA	.006 (.005)	.007 (.005)	.008* (.005)	.008* (.005)
CFO	.446 (.31)	.336 (.342)	.344 (.294)	.291 (.317)
LOSS	-.247 (.163)	-.249 (.16)	-.209 (.164)	-.214 (.161)
FS	-.329 (.269)	-.334 (.254)	-.505** (.256)	-.480* (.258)
NoS	.024 (.041)	.001 (.041)	.008 (.041)	-.013 (.041)
INVREC	-.066 (.622)	-.240 (.643)	-.483 (.629)	-.607 (.649)
INDUSTRY fixed effects	Yes	Yes	Yes	Yes
Reference year: 2016				
2017	-.037 (.076)	-.024 (.078)	-.039 (.076)	-.030 (.078)
2018	-.171* (.100)	-.079 (.097)	-.162 (.099)	-.076 (.095)
Constant	-5.433*** (1.431)	-5.381*** (1.427)	-7.010*** (1.355)	-6.195*** (1.379)
/lnalpha	-.565 (1.375)	-.698 (1.571)	-.790 (1.573)	-.966 (1.934)
Observations	414	414	414	414
Number of companies	138	138	138	138
Wald chi2	120.19***	119.78***	130.41***	123.15***

This table lists random effects Poisson regression results for the factors associated with the number of specialists used in the audit of a KAM-area. Please, see Appendix A for a full description of variables.

Standard errors are in parentheses

In the second analysis, the linear probability model (LPM) is used to estimate the likelihood of an auditor using experts in key areas of the audit. Arguably, given that the dependent variable is a dummy, the logit model as estimated in the main analysis is most suitable (Aldrich & Nelson, 1984; Stone & Rasp, 1991; Williams, 2016). Notwithstanding the above, Caudill (1988) demonstrates that the LPM is superior to logit models when dummy independent variables have similar values with the dependent variable. In such instances, coefficients for the categorical variables cannot be estimated. Although none of the categorical predictors suffer from this problem, the LPM estimates are used as a robustness check to ensure that inferences based on the logit model are consistent. The results in Table 6 are consistent with the main findings as all the three predictor variables are significantly and positively associated with auditors' use of experts. The reported coefficients are largely similar to those from marginal effects in the logit model.

Table 6: LPM results on use of experts

	(1) EXPERT	(2) EXPERT	(3) EXPERT	(4) EXPERT
#KAMs	.112*** (.022)			.108*** (.022)
IND_SPEC		.091* (.050)		.096** (.049)
LAfee			.093*** (.033)	.057* (.033)
NAFR	.035 (.108)	.033 (.111)	.148 (.115)	.075 (.113)
AFLOC	-.002 (.108)	-.035 (.111)	-.042 (.108)	-.024 (.107)
SIZE	.071*** (.023)	.077*** (.024)	.047* (.026)	.046* (.025)
LEVERAGE	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)
ROA	.000 (.001)	.000 (.001)	.001 (.001)	.001 (.001)
CFO	.002 (.088)	.035 (.090)	.035 (.090)	.014 (.087)
LOSS	-.031 (.048)	-.039 (.050)	-.040 (.050)	-.028 (.048)
FS	-.135 (.091)	-.126 (.093)	-.174* (.093)	-.164* (.091)
NoS	-.011	-.001	-.008	-.017

	(.017)	(.018)	(.018)	(.017)
INVREC	-.124	-.078	-.155	-.204
	(.160)	(.164)	(.165)	(.162)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Reference year: 2016				
2017	-.006	-.014	-.013	-.010
	(.033)	(.034)	(.034)	(.033)
2018.	-.049	-.074**	-.072**	-.051
	(.033)	(.034)	(.034)	(.033)
Constant	-1.168**	-1.130**	-1.744***	-1.392***
	(.466)	(.481)	(.505)	(.503)
Observations	414	414	414	414
Number of companies	138	138	138	138
Wald chi2	65.35***	39.50***	45.65***	74.52***
R Squared	0.18	0.14	0.17	0.21

Standard errors are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

6. Discussion

The results provide empirical support for the theoretical predictions underlying the study. Specifically, the arguments based on the signaling theory are supported indicating that auditors could be using the KAM setting to differentiate and highlight the underlying thoroughness of their work by employing experts as signals. The theory shows that in the presence of information gap and unobservable quality as is the case in auditing (Bédard et al., 2016), audit firms with certain attributes including industry specialization and those charging high audit fees use their deployment of specialized knowledge from experts as signals of their greater commitment to deliver comparatively high-quality audit. Similarly, auditors might be signaling to users of the audit report that in the presence of a higher magnitude of risk, they go an extra length to consult experts in an effort to reduce overall audit risk.

The auditor industry specialization results also imply that such firms could be deploying various strategies, including the use of experts in critical areas of the audit to demonstrate their industry leadership and resource capability (e.g. in-house experts such as valuers, tax experts, etc.). This is particularly the case since users of audit reports do not readily see the differences in audit quality between brand-name auditors and other types of auditors. It shows that industry specialist firms are more willing to bring in experts.

The results on magnitude of risk and use of experts also provide insights into how auditors vary their audit procedures to account for the underlying risk inherent in financial statements. Specifically, given that experts were mostly consulted in areas identified in ISA 620 as circumstances that could require the auditor to use specialized knowledge, the use of experts in such areas could be signals of compliance to users and regulators. This could be related to the assertion by Griffith (2020) that auditors do not use experts for gaining insights but rather as part of an institutional mechanism to provide comfort for the auditor. Again, given that KAMs are those areas of the audit that *'kept the auditor awake'* (Harris, 2017), the inclusion of experts in such areas might be for signaling that the uncertainty and complexity around critical issues in the audit have been professionally and competently resolved. Particularly, given that J. O. Brown et al. (2020) reported that auditors who consulted experts in high-risk areas were found to be less negligent, these results suggest that auditors use experts for signaling purposes.

Given the credence nature of audit service (Causholli & Knechel, 2012) and the unobservable nature of audit quality (Bergner et al., 2020), the results are indicative that audit firms charging high fees for statutory audit might be deploying experts in key areas of the audit to signal the depth and underlying quality of their work. Thus, it supports the assertion that firms charging high audit fees have stronger incentives to demonstrate the underlying quality of their work. In relation to the audit pricing literature (e.g. Hay et al., 2006; Simunic, 1980), the positive relationship between audit fees and the use of experts support the argument that audit fee is a determinant of audit effort (Hope et al., 2012).

7. Conclusion

This study examines auditors' use of experts within the context of financial statement audit by focusing on those issues identified as most important in the audit. The audit process, particularly audit procedures and judgments underlying the auditors' work, are generally unobservable (Bergner et al., 2020), thus creating an information gap between auditors and users of the audit report (Bédard et al., 2016). Regulators and standard setters have therefore focused on increasing the transparency around audit. For

instance, regulators have recently adopted requirements (ISA 701) for auditors to disclose the significant matters of the audit where they exercised the greatest effort and judgment. This requirement presents an opportunity to gain insights into auditors' professional judgment. Thus, the increased transparency associated with ISA 701 provides a unique opportunity to gain insights into the audit procedures including the use of experts by auditors in the most significant areas of the audit.

Theoretically framed hypotheses based on the signaling theory are empirically tested. Specifically, auditor and engagement attributes including auditor industry specialization, the magnitude of risk, and audit fees are hypothesized to be associated with auditors' use of experts in key areas of the audit. The inferences are based on hand-collected data comprising 414 firm-year observations from companies listed on the Oslo Stock Exchange. Panel data estimation is used in examining the factors underlying auditors' use of experts in KAMs.

First, the results show that dominant areas identified as KAMs include impairment, valuation, revenue recognition, provisions, and business acquisition. During the audit process, auditors brought in experts to review impairment, valuations, taxation, and business acquisitions issues. Consultation with experts in these areas of the audit is in line with the provisions of ISA 620. Consistent with the hypothesis, the empirical results show that the desire to signal greater diligence and thoroughness is higher for industry specialist auditors, auditors encountering a higher magnitude of risk, and those charging higher audit fees. Specifically, industry specialist auditors, those encountering a higher number of risky items, and those charging higher audit fees were more likely to include experts in the audit of critical areas identified in the audit.

These results provide unique insights into the audit process particularly in relation to auditors' choice of audit procedures in the most significant areas of the audit. Notably, it offers a rare opportunity for stakeholders including users of audit reports, regulators, and academics to understand the auditors' choice of procedures particularly the use of experts in key areas of the audit that are highly susceptible to material misstatement due to risk. Additionally, as the study shows areas where auditors use experts, it could assist standard setters in gauging compliance with ISA 620 as well as in revisions to the standard. Moreover, given that the auditors' work, particularly the

judgments underlying the binary opinion (qualified or unqualified), are unobservable (Bergner et al., 2020; Mock et al., 2012), this could assist stakeholders to appreciate the depth of work associated with the audit opinion. For instance, auditors' involvement of experts in the most significant and risky areas of the audit demonstrates their commitment to providing greater assurance. Secondly, the insights on the underlying factors associated with auditors' use of experts provide a new perspective on the mechanisms used by auditors to signal the underlying quality of their work. For example, while companies signal the underlying quality of their financial reporting, by engaging brand-name auditors such as the Big N and industry specialist firms (Habib et al., 2019), these results suggest that due to the unobservable nature of the audit process and audit quality (Bergner et al., 2020), auditors might be using the KAM setting to signal the underlying quality of their work. This may be done by highlighting the use of experts in key areas of the audit that are susceptible to material misstatement. Furthermore, these results provide an interesting and a practical insight on how auditors apply risk-based auditing standards in their use of audit resources and specialized knowledge in areas assessed to be highly risky and complex (Johnstone, Gramling, & Rittenberg, 2013). Theoretically, as the study empirically tests hypothesis based on the signaling theory, it adds to the nascent literature using signaling theory in auditing. Notably, it provides insights on how auditors' use of professional judgment can be understood from the perspective of signaling. Overall, the lack of archival data on the use of experts has resulted in limited insights on the factors underlying auditors' use of experts, hence, these findings extend current knowledge on auditors' use of experts. Future studies can take advantage of this new data on auditors' use of experts to examine questions relating to the impact of experts' use on audit quality.

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Appendix A: Variables description

Variables	Description	Data Source
Dependent variables		
<i>EXPERT</i>	Indicator variable = 1 if the audit firm involved a specialist in a KAM related item and 0 otherwise.	Audit report
Test variables		
<i>NKAMS</i>	The number of KAMs identified by the auditor for an auditee.	Audit report
<i>IND_SPEC</i>	This is an indicator variable coded 1 if the auditor holds the largest market share in the auditee's industry and 0 otherwise.	
<i>LN_AFee</i>	The natural logarithm of statutory audit fees.	Annual report
Control Variables		
<i>SIZE</i>	The natural logarithm of total assets at the end of year.	Eikon
<i>ROA</i>	Net income divided by total assets.	Eikon
<i>LOSS</i>	Indicator variable = 1 if the firm has a net income less than 0, 0 otherwise.	Eikon
<i>LEVERAGE</i>	Total debt divided by total assets at the end of year.	Eikon
<i>AFLOC</i>	Indicator variable =1 if the audit firm signing the audit report is in Norway and 0 otherwise.	Audit report
<i>CFO</i>	Cash flows from operations divided by total assets at the year-end.	Eikon
<i>INVREC</i>	Total Inventory and receivables divided by total assets at the year-end.	Eikon
<i>NAFR</i>	Total non-audit fees divided by the total of audit and non-audit fees in a year.	Annual report
<i>NoS</i>	Square root of the number of subsidiaries.	Annual report
<i>FS</i>	Indicator variable = 1 if the company has a foreign subsidiary and 0 otherwise.	Annual report
<i>Industry Dummy</i>	Industry fixed effects based on GICS industry classification codes.	Eikon