

**Determinants and Consequences of Audit-Firm Profitability:
Evidence from Key Audit Matters**

Jeff Zeyun Chen

Neeley School of Business, Texas Christian University

zeyun.chen@tcu.edu

Anastasios Elemen

ESSEC Business School

elemes@essec.edu

Ole-Kristian Hope

Rotman School of Management, University of Toronto

okhope@rotman.utoronto.ca

Aaron S. Yoon

Kellogg School of Management, Northwestern University

aaron.yoon@kellogg.northwestern.edu

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Abstract

We use a novel dataset that links *audit-firm* and client-firm financial statement information from the U.K.'s largest audit firms to examine drivers of audit-firm profitability and its implications for audit outcomes conveyed by Key Audit Matter (KAM) disclosures. We first explore the determinants of audit-firm profitability and conclude that Big-4 and non-Big-4 audit firms have fundamentally different profitability structures. Big-4 firms earn higher profit margins than non-Big-4 firms. Furthermore, Big-4 profitability increases with client size and complexity, while non-Big-4 profitability is higher for smaller clients and clients with losses. Next, we examine the relation between audit-firm profitability and KAM reporting. We find that more profitable audit firms address more KAMs. However, audit-firm profitability is less likely to affect audit outcomes for loss-making clients (i.e., when auditors are exposed to more litigation risk). Our findings are robust to endogeneity controls, out-of-sample analyses, and alternative outcome measures.

Keywords: Auditing, Audit Firms, Audit-Firm Profitability, Key Audit Matters, Private Firms, Audit Quality, Audit Effort

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1. Introduction

In this study, we examine the determinants of audit-firm profitability and its implications for Key Audit Matter (KAM) reporting by using a unique dataset of U.K. audit firms that links *audit-firm* and client-firm financial statement information. Theoretical models in economics suggest that firm profitability is a key performance indicator that significantly affects product quality (Fazzari, Hubbard, and Petersen 1988; Beard 1990; Maksimovic and Titman 1991; Chevalier and Scharfstein 1996). These models have been backed by empirical evidence from a number of industries (Rose 1990; Dionne, Gagné, Gagnon, and Vanasse 1997; Noronha and Singal 2004; Matsa 2011; Phillips and Sertsios 2013; Kini, Shenoy, and Subramaniam 2017). Yet audit research has so far focused almost exclusively on Big-N membership and industry specialization as audit-firm determinants of audit effort and quality. There is virtually no empirical evidence on the drivers of audit firms' profitability as well as on its implications for audit effort and outcome.

Audit firms are private firms. Therefore, the lack of empirical evidence of the association between audit-firm factors and audit outcomes is likely because U.S. audit firms' financial statements are not publicly available. In Europe, however, *all* private firms that meet certain size criteria are subject to mandatory disclosure and audit of their financial statements. We take advantage of this institutional setting to extend research on audit-firm determinants of audit effort and audit outcomes beyond auditor size and industry specialization.

We begin by offering descriptive and exploratory analyses of the determinants of audit-firm profitability. We find that Big-4 firms earn higher profit margins than non-Big-4 firms. Furthermore, audit firms with higher leverage and cash holdings exhibit higher profitability. Perhaps most importantly, we show that Big-4 and non-Big-4 audit firms have fundamentally

different profitability structures. We find that Big-4 profitability increases with client complexity, but find that the opposite is true for non-Big-4 auditors. Finally, loss-client firms represent a source of increased profit margins for non-Big-4 auditors, which suggests that non-Big-4 auditors establish a niche in this segment of the audit market.

We next examine the extent to which audit-firm profitability affects KAM reporting.¹ In 2013, the U.K. became the first country to introduce expanded audit reports that mandate the disclosure of the risks of material misstatements. The audit report has been historically described as boilerplate and uninformative because the audit opinion takes form of a binary outcome (unqualified or qualified) and consists of largely standardized wording. For example, Lennox, Schmidt, and Thomson (2018) observe that most regulators and stock exchanges require companies to receive unqualified opinions. While KAM disclosures represent a direct outcome of the audit process similar to the auditor's opinion, they exhibit more detail and greater cross-sectional variation, thereby offering a more nuanced understanding of the areas that require special audit attention and, consequently, of the allocation of audit effort.² This means that KAM disclosures offer a powerful setting that allows for a more meaningful interpretation of the link between audit-firm profitability and audit effort.

We argue that more profitable audit firms are less likely to face constraints in the investment of human capital and information technology, are better able to attract and retain high quality human capital, and are more successful in supporting the audit process with state-of-the-art IT systems. Furthermore, partner-compensation policies incentivize partners to exert effort and minimize threats to auditor independence. For that reason, partner compensation is, at least in part,

¹ These analyses control for the determinants of audit-firm profitability identified in the previous step.

² Indeed, in our sample of U.K. premium listings we find that 84% of our observations have at least one identified KAM. In addition, during our sample period the number of KAMs has a mean (median) value of 2.8 (3) and a standard deviation of 1.8.

a function of audit-firm profitability at the national or even international (i.e., non-local) level (Trompeter 1994; Burrows and Black 1998; Carcello, Hermanson, and Huss 2000; Elemen, Blaylock, and Spence 2020). Partners in more profitable firms are therefore more likely to uphold independence and less likely to succumb to client pressure because they will receive a larger portion of their compensation from profit sharing at the firm level. In line with these arguments, we find strong evidence that more profitable audit firms issue more KAMs. This finding is robust to controlling for the lagged number of KAMs as well as a battery of client-firm and audit-firm determinants of audit effort and audit-firm profitability.

Next, we examine whether client-firm financial performance moderates the relation between audit-firm profitability and KAMs. Pratt and Stice (1994) argue that the auditor's assessment of litigation risk is a function of the client's financial condition. Consistent with this argument, Stice (1991) purports that clients' poor financial performance increases auditor exposure to litigation risk. On one hand, more profitable audit firms likely have "deeper pockets" and more wealth at risk. Therefore, auditors from more profitable firms may have greater incentives to exert effort for loss-making client firms to avoid litigation risk. On the other hand, auditors may have increased litigation concerns when client financial performance is poor. If so, audit outcomes and audit effort may be less sensitive to audit-firm profitability for loss-client firms. This scenario implies that, for risky clients, auditors may uphold a sufficiently high level of audit effort regardless of their (i.e., audit firm's) level of profitability. We find that the effect of profitability on KAMs is *weaker* in loss-making client firms. This finding is consistent with the notion that audit-firm profitability is less likely to affect audit outcomes in more risky clients.

Although our empirical analyses include a large number of control variables, in additional analyses we also control for both *client-firm and audit-firm fixed effects*, employ a changes specification, examine the relation between audit-firm profitability and alternative outcome

measures, as well as validate the robustness of our findings out-of-sample (i.e., on data for the rest of Europe). Our inferences remain unchanged, enhancing our confidence to conclude that audit-firm profitability is associated with reporting more KAMs.

In terms of economic significance, we find the largest effect when we include both audit-firm and client-firm fixed effects. In particular, our analyses suggest a difference of roughly 1.9 KAMs between the lowest audit-firm profitability decile (average profitability: 14.4%) and the highest audit-firm profitability decile (average profitability: 28.4%). This result demonstrates the economic importance of our findings.

Our paper makes several contributions. First, to our knowledge, we are the first to examine the determinants of overall audit-firm profitability. Our study relates to Hoang, Jamal, and Tan (2019) who examine determinants of audit-engagement profitability. A number of studies suggest that audit-firm overall profitability plays an important role - potentially greater than audit-engagement profitability - in partner-compensation policies and in incentivizing auditors to exert effort (e.g., Trompeter 1994); Hay, Baskerville, and Qiu 2007; Ernstberger, Koch, Schreiber, and Trompeter 2020). In that regard, our study complements Hoang et al. (2019) by offering additional insights into audit-firm and client-firm profitability drivers.

Second, our study is in line with research in economics, marketing, and management that suggests that firm profitability positively affects product/service quality (Rose 1990; Dionne et al. 1997; Noronha and Singal 2004; Matsa 2011; Phillips and Sertsios 2013; Kini et al. 2017). We link audit-firm and client-firm financial statement information to examine the implications of audit-firm profitability for audit effort and audit outcomes. We find an *incremental* effect of audit-firm profitability on audit outcomes, after controlling for Big-N membership and auditor industry specialization that have been extensively used in the literature to infer audit quality.

Third, we show that the positive relation between audit-firm profitability and KAMs weakens in client firms with poor financial performance. Our findings suggest that auditors are upholding a sufficiently high level of audit effort when auditing risky clients regardless of how profitable the audit firm is. In that regard, we offer insights into the interplay among audit-firm financial performance, client-firm financial performance, and audit outcomes. Our study also adds to the stream of research that highlights the importance of exposure to litigation risk in incentivizing auditors to exert effort (Dye 1993; DeFond and Zhang 2014).

Fourth, our article contributes to the growing stream of research on the implications of KAMs/CAMs for auditors, investors, and managers (e.g., Gutierrez, Minutti-Meza, Tatum, and Vulcheva 2018; Lennox et al. 2018; Reid, Carcello, Li, Neal, and Francis 2019; Bentley, Lambert, and Wang 2020). Whereas this line of research explores the consequences of KAM reporting, we examine the determinants of KAM reporting and, in particular, the relation between audit-firm profitability and the number of KAMs. Finally, we hope that our findings will be relevant to regulators and standard setters in the U.S. in light of the recent PCAOB Auditing Standard 3101 (AS 3101), which requires that auditors communicate Critical Audit Matters (CAMs) to their clients, as well as to U.K. regulators.^{3,4}

³ In June 2017 the PCAOB issued AS 3101, which mandates the disclosure of Critical Audit Matters as of June 30, 2019 for large accelerated filers and as of December 15, 2020 for all other companies. Lennox et al. (2018) observe that, while the standards and wording differ slightly, the intent and content of CAM disclosures are very similar to those of KAM disclosures.

⁴ Recently there have been a series of high-profile accounting scandals in the U.K. KPMG U.K. has decided to stop providing non-audit services to large publicly listed clients due to heavy regulatory pressure. We view our research findings as not only highlighting a positive relation between profitability and KAMs but also as highlighting that the Big-4 firms do not compromise audit quality when there is an increased audit risk to be informative to the U.K. regulators who are considering splitting the Big-4 firms.

2. Background, Literature Review, and Hypotheses Development

2.1 Background – Key Audit Matters

In the wake of the financial crisis, auditors were criticized for lack of due diligence in identifying key risks in their clients' financial statements (e.g., Jones (2011)). In response, standard-setters around the globe moved toward implementing enhanced auditor reporting standards that require auditors to describe these risks in the audit report. The U.K. Financial Reporting Council (FRC) introduced its new auditor reporting standards in 2013. Effective in 2013, ISA (UK) 700 requires that auditors disclose KAMs (i.e., describe the risks of material misstatement including the allocation of resources during the audit processes and the audit effort of the audit-engagement team), disclose the materiality threshold for the financial statements as a whole, and explain the scope of the audit. In January 2015, the International Auditing and Assurance Standards Board (IAASB) issued a new set of revised auditor reporting standards aimed at improving transparency in the auditor's report.⁵

To identify KAMs, auditors need to consider areas with higher assessed risks and significant auditor and management judgment, and the effects of significant events or transactions that occurred during the year. The new standard requires auditors to separately describe not only the matters of most significance to the audit procedure and why they are significant (*risk description*) but also how the matter was addressed in the conduct of the audit process (*auditor response*). In essence, the KAM section of the audit report highlights the risks of material misstatements as well as the auditor's *efforts* to mitigate those risks. KAM communications

⁵ ISA 700 (IAASB 2015a) provides the overarching framework for the enhanced reporting model and ISA 701 (IAASB 2015b) highlights KAMs as a central element of the enhanced reporting model. ISA 701 (IAASB 2015b) defines KAMs as those matters that, in the auditor's professional judgment, were of most significance in the audit of the financial statements of the current period. The FRC adopted the IAASB's definition in 2015 and stipulated that risks of material misstatement as determined under ISA (UK) 700 (Revised June 2013) are KAMs under that definition. To be consistent with the prior literature, we use the term *KAMs* throughout the paper.

therefore offer a unique opportunity for researchers to better understand the black box of the audit process and shed light on how auditors identify and respond to audit risks.

2.2 Literature Review

Recent research suggests that KAM/CAM disclosure is important. For instance, Reid et al. (2019) provide evidence that the adoption of the expanded audit report is associated with improvement in financial reporting quality, suggesting that the threat of disclosure from auditors can incentivize management to improve their firm's financial reporting quality. Bentley et al. (2020), on the other hand, shed light on potential unintended consequences. They find that such disclosures can incentivize managers to engage in more risk-increasing activities. In addition, Christensen, Glover, and Wolfe (2014) suggest that CAM disclosures change investors' investment decisions. In line with this argument, Zhou (2019) finds that the disclosure of KAMs in China increases firms' cost of capital and that the effect is stronger in firms with poor information environment. In contrast, Porumb, Karaibrahimoglu, Lobo, Hooghiemstra, and De Waard (2019) show that the expanded audit report in the U.K. improves lenders' ability to assess borrowers' risk, leading to less stringent loan-contracting terms. Finally, prior studies provide mixed and inconclusive evidence on the effects of KAM/CAM disclosures on auditors' litigation risk. For instance, Gimbar, Hansen, and Ozlanski (2016) argue that CAM disclosures increase auditor exposure to litigation risk, whereas Brasel, Doxey, Grenier, and Reffett (2016) provide evidence that, under certain conditions, CAM disclosures reduce auditor liability judgments.⁶ We add to this stream of literature by focusing on *antecedents* of KAM disclosures.

⁶ Brasel et al. (2016) find that when the auditors fail to detect an overstatement of inventory, they are less likely to be held liable when they disclose a related CAM. However, when auditors fail to detect an understatement of environmental restoration liability, their disclosure of a related CAM does not affect jurors' auditor liability judgments. Brasel et al. (2016) argue that this discrepancy between misstatement types is due to the environmental

Our study is also relevant to research that examines the association between audit-firm characteristics and audit quality. Audit firms, just like other companies, invest in human capital through hiring and training employees. They use compensation policies to incentivize their employees and devise internal audit programs to maintain consistency in the implementation of accounting and auditing standards across different engagements (Francis, Pinnuck, and Watanabe 2014).

Research has primarily focused on two audit-firm characteristics, Big-N membership and industry specialization, and finds that Big-N auditors or auditors specialized in a specific industry deliver higher audit quality (DeAngelo 1981; Becker, DeFond, Jiambalvo, and Subramanyam 1998; Francis, Reichelt, and Wang 2005; Francis and Wang 2008; Lennox and Pittman 2010; Reichelt and Wang 2010). DeFond and Zhang (2014) point out two potential limitations for this line of research. One is that the measures of Big-N membership and industry specialization fail to capture relatively subtle variations in audit quality because they are typically dichotomous. The other is that the measure of auditor industry specialization contains large measurement error.⁷ Furthermore, Francis (2011) argues that research on the relation between audit firms and audit quality is severely limited by the availability of data on audit-firm characteristics and recommends that researchers should attempt to analyze audit firms' organizational structure and operations.

Our study extends this research by moving beyond client-based measures of industry expertise and auditor size and by using instead *audit-firms' financial data* to more fully analyze the economic drivers that shape audit outcomes. We examine whether audit-firm profitability, a

restoration liability misstatement appearing more foreseeable than the inventory misstatement in the absence of a CAM, thereby reducing the impact of the CAM on auditor liability judgments.

⁷ Neal and Riley (2004) point out that auditor industry specialization suffers from a lack of consensus on its measurement. Specifically, prior research uses two approaches to measure industry specialization: (1) within-industry differentiation across competing audit firms, and (2) within-audit firm differentiation across industries. The choice between the two approaches has a significant impact on the research findings.

key performance indicator, affects the supply of audit effort revealed in KAM disclosures. Therefore, our findings can shed light on audit firm-level factors that influence the number of KAMs identified and addressed by engagement partners.

2.3 Hypotheses Development

Theoretical models in economics suggest that the financial condition of a firm can affect its ability and incentives to invest in initiatives that enhance product quality (Fazzari et al. 1988; Beard 1990; Maksimovic and Titman 1991; Chevalier and Scharfstein 1996). These models have been backed by empirical evidence from many industries. For example, Rose (1990), Dionne et al. (1997), and Noronha and Singal (2004) provide evidence of a positive link between airline profitability and airline safety. On a similar note, Phillips and Sertsios (2013) show that airline product quality - proxied by the rate of mishandled bags and the average percentage of on-time flights - deteriorates in airlines that experience financial distress. Using leverage as a proxy for financial distress, Matsa (2011) finds evidence consistent with highly levered supermarkets degrading their products' quality in order to preserve current cash flow for debt service. Finally, Kini et al. (2017) utilize data on food, drug, and medical-device recalls as well as on automobile recalls to examine product-recall events from 37 (93) different two-digit (three-digit) SIC code industries. Their findings suggest a positive association between leverage/distress likelihood and the probability of a subsequent product recall.

Evidence from the marketing literature further suggests that firms in financial distress often engage in cost-reduction activities that impair product quality and customer satisfaction (Anderson, Fornell, and Rust 1997; Malshe and Agarwal 2015). Malshe and Agarwal (2015) argue that the negative relation between financial distress and customer satisfaction is stronger in service firms because service firms are more likely to emphasize product customization. The pursuit of

customer satisfaction is more likely to take place at the cost of firm productivity in firms that emphasize product customization than in firms that offer standardized products. This is because the cost of increased customization increases at an increasing rate, whereas costs decline with increased standardization quality (Anderson et al. 1997). Therefore, improving productivity in service firms is more likely to require cutting expenses that are directly linked to service quality and client satisfaction such as expenses that relate to hiring and retaining high quality specialized personnel. In line with this argument, Graham, Kim, Li, and Qiu (2013) suggest that financial distress often leads firms to pay lower wages.

Firm financial performance can affect labor supply as well. Using a proprietary dataset that tracks all jobs posted by forty high-profile financial services firms during the financial crisis, Brown and Matsa (2016) examine job-applicant behavior as a function of their perception about the posting firm's profitability. The authors find that applicants are less likely to apply to distressed firms and that this relation is more pronounced for positions with high educational requirements. They further find that applicants' average quality declines with firms' financial distress. This finding suggests a link between firm financial performance and the ability to attract high quality human capital, an important production input and determinant of service quality.

As discussed, the literature on audit-firm characteristics and their associations with audit quality begins with the Big-N dichotomy. Subsequent research identifies industry specialization as a source of variation in audit quality among audit firms (Craswell, Francis, and Taylor 1995; Beasley and Petroni 2001; Balsam, Krishnan, and Yang 2003). However, due to data constraints, much remains unknown about audit firms' organizational structure and operations and whether these firm-level factors influence the supply of audit quality (Francis 2011).⁸ Our study attempts

⁸ Che, Hope, and Langli (2020) make use of detailed register data in Norway to examine *how* Big-4 firms provide higher audit quality than non-Big-4 firms. Such data are not available in most jurisdictions.

to open up this black box as we use U.K. audit firms' financial data to understand the role of audit-firm profitability, a key performance indicator, in shaping the supply of audit effort. We posit that financial performance at the audit-firm level will have a positive impact on the supply of audit effort, which we infer from auditors' KAM disclosures, for two reasons.

First, more profitable firms face fewer resource constraints. They can attract and retain high-quality employees and provide them with up-to-date technical support and training. Firm-level financial performance influences investments in firm-wide audit support systems and the use of information technology to control the audit process. Anecdotal evidence is consistent with the idea that profitability concerns play an important role in investment in human capital and information technology. For example, in 2019, KPMG U.K., under profitability concerns, stepped up its cost-cutting drive by asking hundreds of its employees working in IT and legal teams to hand in their work mobile phones.⁹ The audit-support system is essential for achieving high-quality audits because it is the primary technology application used by audit firms to control, facilitate, and support audit work (Manson, McCartney, and Sherer 2001; Banker, Chang, and Kao 2002; Dowling and Leech 2007). If more profitable audit firms are more competent and can afford to deploy a better audit-support system to achieve firm-wide compliance with the audit methodology, we expect their audit teams to identify and address more KAMs at the engagement level.

Second, audit firms design compensation policies to incentivize auditors to exert effort. They share the profits among their partners at a local (e.g., office) level or at a national/international level (Trompeter 1994; Hay et al. 2007). This is because (1) audit firms are

⁹ In 2019, KPMG U.K. reported a 14 percent drop in annual profits following a series of reputational setbacks over the past two years, even though its revenue increased 3% (see more details at <https://www.ft.com/content/a120f9ca-1bfe-11ea-97df-cc63de1d73f4>). In its internal memo, the audit firm indicated that “*To realize our growth ambition, we need to improve our profitability by building a leaner, more responsive cost base...*” It also planned to cut about 200 of its 670 administrative support staff (see more details at <https://www.theguardian.com/business/2019/sep/30/kpmg-uk-mobiles-cut-staff>).

organized as partnerships where partners are both principals and agents of the firm and thus have incentives to monitor each other (Huddart and Liang 2005) and (2) partners are required to remain independent of their clients.¹⁰ Research finds that profit sharing in a large profit pool at the national level is associated with higher audit quality because independence concerns arise in a small profit pool at the local level (Ernstberger et al. 2020). Nevertheless, Knechel, Niemi, and Zerni (2013) argue that partner profit sharing is likely to depend on the partner's client base as well as attributes of the audit firm such as overall profits.

In a more profitable audit firm, partners are less likely to compromise independence and succumb to client pressure because they will receive a larger portion of their compensation from profit sharing at the firm level. Client firms may negotiate with their auditors on the number of KAMs to report and want to minimize the attention on the risks of material misstatement. We expect that auditors facing lower profit pressure are more likely to uphold auditor independence and integrity and that their audit report more accurately reflects the effort they exert to identify and address KAMs. In contrast, poor-performing audit firms will increase their partners' vulnerability to client demands, unintentionally creating an independence threat.¹¹ Based on the above discussion, we state our first hypothesis in the alternative form as follows:

H1: The number of KAMs reported by auditors is positively associated with audit-firm profitability.

¹⁰ For instance, partners at PwC U.K. are remunerated solely out of the profits of PwC U.K. and its subsidiaries. Each partner's profit share comprises three interrelated profit-dependent components: (1) responsibility income – reflecting the partner's sustained contribution and responsibilities, (2) performance income – reflecting how a partner and their team(s) have performed, and (3) equity unit income – reflecting the overall profitability of the firm. (<https://www.pwc.co.uk/transparencyreport/assets/pdf/transparency-report-fy14.pdf>)

Performance income represented about 39% of each partner's profit share as of June 30, 2014.

¹¹ Audit-firm size also influences auditors' independence because of higher reputation capital and litigation risk (DeFond and Zhang 2014). Our focus is on audit-firm profitability, which affects auditors' independence through compensation incentives.

The null hypothesis is that engagement-specific audit effort is not affected by audit-firm profitability. While we do not expect this to be the case, the research question is not without tension. Many audit firms, especially the Big-4, are highly profitable. Partners may be insensitive to minor fluctuations of firm-level profitability or they only participate in profit sharing at the local level. Furthermore, other firm-level characteristics such as firm size and engagement-level characteristics (that we control for) such as fee dependence may subsume audit-firm profitability in driving the audit process. Finally, higher profitability may create economic bonding between auditors and clients, compromising auditor independence and reducing audit effort to identify and address KAMs. These tensions leave our research question as an empirical one.

A key factor that drives auditors to supply audit effort (quality) is their litigation concern (Dye 1993). Audit litigation can be serious enough to threaten the viability of even the largest and most profitable audit firms. Research finds compelling evidence that audit firms consider litigation risk in the planning stages of the audit and in the pricing of audit services (e.g., Brumfield, Elliott, and Jacobson 1983; Simunic 1980; Simunic and Stein 1996; Bronson, Ghosh, and Hogan 2017). Our second hypothesis examines whether the relation between KAM disclosures and audit-firm profitability varies with the auditor's litigation concern.

Stice (1991) develops and tests a model to predict litigation against auditors, which includes both client and auditor characteristics. He finds strong and consistent support for the client characteristics but little support for the auditor characteristics.¹² Our research question is motivated by Stice (1991)'s model and empirical results. Specifically, does audit-firm profitability (an

¹² In Stice (1991)'s model, auditor characteristics include Big-N membership, independence, and tenure. These characteristics are predicted to relate to litigation through their effects on the probability of audit failure.

important but underexplored auditor characteristic) still matter for audit effort if client characteristics are associated with higher litigation risk?

We focus on a client firm's financial condition to measure the auditor's litigation concern because Pratt and Stice (1994) find that a client's financial condition is the primary consideration in the auditor's assessment of litigation risk and recommendation for the audit plan and fees. Palmrose (1987) finds that even if client firms with significant losses do not declare bankruptcy, investors often file lawsuits against auditors. Stice (1991) argues that clients' poor financial condition increases the likelihood of a loss being incurred by investors, which in turn leads to attempts to recover the loss through litigation against auditors. In addition to higher probability of investor losses, studies find that poor financial condition can lead to more frequent audit failures that are particularly likely to trigger lawsuits (Kreutzfeldt and Wallace 1986; Kinney and McDaniel 1989).

The effect of client financial condition on the relation between KAM disclosures and audit-firm profitability is not clear *ex ante*. On one hand, more profitable audit firms are more likely to be targeted for lawsuits because of their "deeper pockets."¹³ Thus, auditors from more profitable firms have greater incentives to exert audit effort to avoid litigation risk for loss-making client firms. On the other hand, auditors from less profitable audit firms are in general less competent and more likely to succumb to management pressure, so they tend to have lower audit quality, on average. To protect themselves from excessive exposure to litigation risk, less profitable auditors may have stronger incentives to assign their most competent staff to risky audit engagements and maintain a high level of independence for risky client firms. In line with this argument, research

¹³ Dye (1993) defines the depth of auditor pocket as the amount of wealth an audit firm has. Auditors with deeper pockets have more wealth at risk in case of an audit failure. Prior research generally focuses on auditor size to infer the depth of auditor pocket. We argue that, controlling for the size effect, audit-firm performance (i.e., profitability) plays an incremental role in shaping audit-firm wealth.

suggests that client-firm riskiness is likely to affect audit partner allocation decisions (e.g., Lee, Nagy, and Zimmerman 2019). Thus, when auditing loss-making client firms, auditors from less profitable audit firms could be more sensitive to litigation risk and have greater incentives to exert audit effort. Based on the above competing arguments, we specify our cross-sectional hypothesis in the null form:

H2 (null): *The positive relation between the number of KAMs reported by auditors and audit-firm profitability is unrelated to client-firm financial condition.*

3. Determinants of Audit-Firm Profitability

We first seek to understand *what drives* audit-firm profitability. This test is exploratory in nature because we lack clear economic (audit) theory to guide our choice of the determinants of profitability at the audit-firm level. However, given the importance of this topic and the lack of prior research (due to the lack of such data in the U.S.), we consider this analysis an important contribution of our study.

For our determinants analyses, we rely on audit-firm and client-firm data from Amadeus. Amadeus provides data for a large number of European private and public companies and these data are compiled from several well-established national data providers. Financial data in Amadeus are retained for a rolling period of up to 10 years. When a new year of data is added, the oldest year is dropped. To overcome this restriction and create a longer time-series of data that is necessary for us to perform our determinant analyses, we merge the October 2015 version of Amadeus with the March 2019 version.

We specify our client-firm dataset by identifying all observable publicly listed and private firms in Amadeus that are incorporated in the U.K. and are classified as very large, large, or

medium-sized. We also rely on Amadeus for audit-firm data. Audit firms are private (i.e., not publicly listed). Therefore, they are required to comply with the Fourth EU Directive and its amendments that mandate the financial statement disclosure and audit of all private firms that meet certain size criteria. We limit our sample to those private firms that engage in accounting, bookkeeping, auditing, and tax consultancy activities (Peer group code: 6920). We subsequently manually match the company name field (i.e., the audit-firm name field) in the audit-firm sample with the auditor name field in the client-firm sample. This procedure results in a sample that spans from 2008 to 2017 and consists of 339 audit firm-year observations and 58 unique audit firms.¹⁴

We classify our explanatory variables into two groups: *audit-firm* characteristics and *cliente* characteristics. Audit-firm characteristics include size, capital structure, and cash holdings. Larger firms benefit from economies of scale and market power, so we expect them to be more profitable (Hall and Weiss 1967; Schmalensee 1989). We measure audit-firm size by the natural logarithm of total assets (*LnAssets AF*), the natural logarithm of the number of employees (*LnEmpl AF*), and Big-4 membership (*Big4*). Whether debt boosts or hurts firm performance is subject to debate. Empirical evidence shows that moderate debt-taking is associated with better performance, whereas excessive indebtedness leads to weaker performance (Campello 2006). Furthermore, evidence from the marketing literature suggests that higher leverage pressures managers to generate adequate cash flows and incentivizes them to adopt cost-reduction strategies such as cutting research and development expenses (Malshe and Agarwal 2015). These actions

¹⁴ Because (1) the sample period used for the KAM analyses is relatively short, (2) the KAM analyses are restricted to U.K.'s six largest accounting firms (see section 4 for more information on the KAM sample-selection procedures), and (3) Big-4 and non-Big-4 accounting firms have fundamentally different profitability structures and this necessitates that we perform our determinants analyses separately for the Big-4 and the non-Big-4, we do not restrict our determinants analyses to the sample period and the audit firms used in the main KAM analyses. To increase power and allow for sufficient variation in our variables of interest, in our determinants analyses we use all U.K. publicly listed and private firms covered by the Amadeus database with their audit firms' financial data available over a sufficiently long sample period that spans from 2008 to 2017.

result in lower customer satisfaction and negatively affect firm value and firm performance in the long run. We use *Leverage AF* to capture audit-firm reliance on debt financing. We define this variable as the ratio of audit-firm short-term and long-term debt to audit-firm lagged total assets. Finally, firms compete in product markets by investing in innovation using their cash holdings (e.g., Lyandres and Palazzo 2016). Given audit firms' strong commitment to emerging technologies, we expect their cash policies to be strategically motivated by investments in innovation, which in turn can influence firm growth and operating performance. Accordingly, we include cash holdings (*Cash AF*) as a potential contributing factor to profitability. We define this variable as the ratio of audit-firm cash holdings to audit-firm lagged total assets.

We also expect certain client-firm characteristics to be associated with audit-firm profitability. The literature provides compelling evidence that auditors charge higher fees for riskier clients and larger clients whose operations are more complex (Hay, Knechel, and Wong 2006). However, whether these clients improve or hurt audit-firm profitability is an open question, as it is not clear whether audit firms can fulfill their service in a cost-effective way. Our unit of observation is *audit firm-year*. Our client-firm determinants are therefore estimated at the audit firm-year level and represent mean values of the respective determinant.¹⁵ We include the proportion of public-client firms to the total number of client firms (*AvgPublic CF*), the proportion of client firms reporting a loss (negative net income) to the total number of client firms (*AvgLoss CF*), the average client size (*AvgLnAssets CF*), the average client leverage (*AvgLeverage CF*), the average client operating performance (*AvgROA CF*), and the average client-sales volatility

¹⁵ Because our analysis is at the audit firm-year level, we use the mean values of client firm variables in each year to capture the clientele effect on audit-firm profitability. Prior research adopts the same approach to controlling for the clientele effect in audit firm-level analyses. For example, to examine the deep pockets hypothesis, Lennox (1999) estimates the relation between the amount of litigation incurred by auditors and auditor size, controlling for the average client size.

(*AvgStdSales CF*). For these variables, we do not make directional predictions. We estimate the following model:

$$\begin{aligned}
 \text{EBIT Margin } AF_{j,t} = & \alpha_0 + \alpha_1 LnAssets AF_{j,t} + \alpha_2 LnEmpl AF_{j,t} + \alpha_3 Leverage AF_{j,t} + \alpha_4 Cash \\
 & AF_{j,t} + \alpha_5 Big4_{j,t} + \alpha_6 AvgPublic CF_{i,t} + \alpha_7 AvgLnAssets CF_{i,t} + \alpha_8 AvgLeverage CF_{i,t} + \\
 & \alpha_9 AvgLoss CF_{i,t} + \alpha_{10} AvgROA CF_{i,t} + \alpha_{11} AvgStdSales CF_{i,t} + \text{Year Fixed Effects} + \varepsilon_{i,t} \quad (1)
 \end{aligned}$$

where *EBIT Margin AF_{j,t}* is earnings before interest and taxes scaled by sales for audit firm *j* in year *t*. We present the audit-firm profitability determinants analyses in Table 1. In the first column of Table 1, we report the results for all 339 audit firm-year observations between 2008 and 2017. We find that audit-firm leverage and cash holdings are positively and significantly associated with profitability. Big-4 firms are significantly more profitable than non-Big-4 firms. Turning to clientele characteristics, we document weak evidence that auditing smaller and loss-making client firms is more profitable for audit firms. These are new findings in the literature.

Big-4 and non-Big-4 audit firms operate in different segments of the U.K. audit market and their business models (profit functions) are likely to differ. For instance, Francis and Stokes (1986) and Chaney, Jeter, and Shivakumar (2004) suggest that, relative to non-Big-4 firms, Big-4 firms are able to carry out audits more efficiently for large and complex client firms. Thus, we separately estimate the audit-firm profitability model for the Big-4 and non-Big-4 subsamples in the next two columns. We find that Big-4 firms' asset size (*LnAssets AF*) is positively related to their profitability, suggesting that economies of scale translate into a tangible benefit. We also find that Big-4 profitability increases with the number of public client firms (*AvgPublic CF*) and the size of client firms (*AvgLnAssets CF*).

In contrast, non-Big-4 profitability is positively associated with audit-firm leverage (*Leverage AF*) and cash holdings (*Cash AF*), suggesting that the profitability of small audit firms is sensitive to capital structure and cash policies. We find that small (*AvgLnAssets CF*) and loss-making (*AvgLoss CF*) client firms contribute significantly to non-Big-4 profitability, consistent with small audit firms optimizing their cost function and establishing a niche in this segment of the audit market.

Overall, the results reported in Table 1 reveal that, while both audit-firm characteristics and clientele characteristics are associated with profitability at the audit-firm level, Big-4 and non-Big-4 auditors target different audit-market segments and have different sources of profitability. Our analyses provide new empirical evidence that has previously not been possible due to lack of data on audit firms. In addition, these audit-firm and clientele characteristics may also influence the demand for and supply of audit quality, highlighting the importance of controlling them in our analysis of the relation between KAM communications and audit-firm profitability.

4. KAM Sample Selection and Descriptive Statistics

4.1 Sample Selection

In June 2013, the U.K. issued ISA 700 (Revised) that requires auditors to report KAMs. This requirement is mandatory for firms with a premium listing of stocks on the London Stock Exchange Main Market for fiscal year-ends in or after September 2013. Accordingly, our sample includes U.K. premium-listed firms with fiscal year ends between September 2013 and December 2017.

We use Audit Analytics Europe as our source for the KAM data and other auditor-related data. We identify U.K. premium-listed firms in Thomson Reuters and merge Audit Analytics Europe with Thomson Reuters and Compustat Global to create our client-firm dataset. As

discussed, we retrieve audit-firm data from Amadeus. We specify our audit-firm sample by identifying those U.K. private firms that engage in accounting, bookkeeping, auditing, and tax consultancy activities (peer group code: 6920). We subsequently manually match the company name field in Amadeus (i.e., the audit-firm name field) with the auditor name in Audit Analytics. We are able to identify six audit firms with premium-listed clients during our sample period: the Big-4 firms (Deloitte, Ernst & Young, KPMG, and PricewaterhouseCoopers) and two non-Big-4 firms (BDO and Grant Thornton). Therefore, our audit-firm sample includes the U.K.'s six largest audit firms.¹⁶

Table 2 presents the sample-selection procedures for our main sample to test H1 and H2. The initial sample contains 2,296 client firm-year observations. We drop client firms that are audited by two or more audit firms (169 firm-year observations), client firms that have missing data to calculate all variables of interest (505 firm-year observations), and client firms whose auditors have fewer than 20 clients in a given year (7 firm-year observations). Our final sample consists of a maximum of 1,615 client firm-year observations.¹⁷

4.2 Descriptive Statistics

Panel A of Table 3 presents descriptive statistics for our sample. On average, auditors report 2.83 KAMs per client firm.¹⁸ On average, audit firms report an EBIT margin (*EBIT Margin AF*) of 22.7%. Not surprisingly, most of the sample companies are Big-4 clients, as indicated by

¹⁶ Premium listing status is awarded to client firms that comply with the U.K.'s highest standards of regulation and corporate governance. Premium-listed firms are therefore large in size. It is, for that reason, not surprising that our audit-firm sample is restricted to the U.K.'s largest audit firms. In line with our findings, Lennox et al. (2018) report that, during their sample period, KAMs issued to premium-listed firms originated from the same six audit firms identified in the current study.

¹⁷ Because KAM disclosures became mandatory for fiscal year-ends in or after September 2013, in the specifications in which we control for the number of KAMs in year t-1 we restrict our analyses to the period September 2014 – December 2017. This results in a sample of 1,366 client firm-year observations.

¹⁸ Over our sample period, the total number of KAMs reported by all premium listed companies exhibits a steady increase.

the mean of *Big4* (92.5%). Because our sample companies are premium-listed, they are large and financially healthy. The mean of *AnalystFollowing CF* is 8.91 and the mean of *InstOwnership CF* is 62.7%. 6.3% of our sample firms change auditors over the sample period, as indicated by the mean of *AuditorSwitch CF*. Finally, only 1.2% of our sample firms have announced an accounting restatement in the previous two years, as indicated by the mean of *Problem CF*.

Panel B of Table 3 reports the correlations between *KAM* and audit-firm variables. We find that *KAM* and *EBIT Margin AF* are positively and significantly correlated, suggesting that auditors from more profitable audit firms report more KAMs. The bivariate result provides initial support for our hypothesis. Six other audit-firm characteristics are related to *KAM*. We find that audit firms with more total assets and more employees report more KAMs. Furthermore, the amount of cash holdings is positively related to *KAM*, whereas leverage is negatively related to *KAM*. In addition, Big-4 auditors and industry specialists report more KAMs. *EBIT Margin AF* is also positively related to *LnAssets AF* and *LnEmpl AF*.

Panel C reports the correlations between *KAM* and client-firm characteristics. We find that larger client firms and clients with more subsidiaries receive more KAMs. This is not surprising because larger firms and firms with a larger number of subsidiaries are inherently more complex in their structures and business operations. Furthermore, we find a positive association between *Leverage CF* and *KAM*, consistent with riskier firms receiving more KAMs. Both audit fees and non-audit fees are positively correlated with *KAM*, suggesting that potential economic bonding between auditor and client does not impair auditor independence. Finally, client firms with a higher proportion of sales to lagged total assets as well as client firms that have had a restatement in the past two years have more KAMs.

5. Research Design

To test H1, we use the following regression model:

$$\begin{aligned} KAM_{i,j,t} = & \alpha_0 + \alpha_1 EBIT\ Margin\ AF_{j,t} + \alpha_2 LnAssets\ AF_{j,t} + \alpha_3 LnEmpl\ AF_{j,t} + \alpha_4 Leverage\ AF_{j,t} \\ & + \alpha_5 Cash\ AF_{j,t} + \alpha_6 Big4_{j,t} + \alpha_7 LnAssets\ CF_{i,t} + \alpha_8 Leverage\ CF_{i,t} + \alpha_9 Loss\ CF_{i,t} + \\ & \alpha_{10} ROA\ CF_{i,t} + \alpha_{11} MTB\ CF_{i,t} + \alpha_{12} Problem\ CF_{i,t} + \alpha_{13} LnNumSubs\ CF_{i,t} + \\ & \alpha_{14} Inventory\ CF_{i,t} + \alpha_{15} Sales\ CF_{i,t} + \alpha_{16} StdSales\ CF_{i,t} + \alpha_{17} AnalystFollowing\ CF_{i,t} + \\ & \alpha_{18} InstOwnership\ CF_{i,t} + \alpha_{19} LnAuditFees\ CF_{i,t} + \alpha_{20} LnNonAuditFees\ CF_{i,t} + \\ & \alpha_{21} NonAuditFeesRatio\ CF_{i,t} + \alpha_{22} AuditorSwitch\ CF_{i,t} + \alpha_{23} IndustrySpecialist\ AF_{i,t} + \\ & Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t} \quad (2) \end{aligned}$$

where $KAM_{i,j,t}$ is the number of KAMs reported in the expanded auditor's report for firm i issued by audit firm j in year t . Our main variable of interest is $EBIT\ Margin\ AF_{j,t}$. A positive α_1 is consistent with the idea that auditors from more profitable audit firms exert more effort to identify and communicate KAMs.

The control variables can be broadly classified into two groups. The first group contains the audit-firm characteristics identified in our preceding determinants analyses. In particular, we include $LnAssets\ AF$, $LnEmpl\ AF$, $Leverage\ AF$, $Cash\ AF$, and $Big4$. In addition, we include a control for industry specialization ($IndustrySpecialist\ AF$) because prior research suggests that industry specialists are associated with more favorable audit outcomes and superior audit quality (Balsam et al. 2003; Krishnan 2003; Reichelt and Wang 2010). We define this variable as the ratio of all audit fees received by a given audit firm in a given industry-year to the sum of all audit fees paid to all audit firms in that industry-year. We identify industries using their two-digit SIC code.

Our second group of control variables contains client-firm characteristics. Following Lennox et al. (2018), we include client-firm size/complexity measured by the natural logarithm of total assets (*LnAssets CF*) and the natural logarithm of the number of subsidiaries (*LnNumSubs CF*), the market-to-book ratio (*MTB CF*), the number of analysts following (*AnalystFollowing CF*) to control for client firms' information environment, controls for performance using return on assets (*ROA CF*) and loss making (*Loss CF*), the level of sales as a proportion of lagged total assets (*Sales CF*), and inventory as a proportion of lagged total assets (*Inventory CF*) to capture components that require certain audit procedures and are often viewed as sources of increased audit risk. We also include a control for prior accounting problems (*Problem CF*). We define this variable as an indicator that takes the value of 1 if a client firm has restated its earnings in the past two years, and 0 otherwise. Further, we include the level of operating volatility (*StdSales CF*) and leverage (*Leverage CF*) to represent riskiness. In addition, institutional ownership (*InstOwnership*) may affect the demand for audit quality (effort), which in turn shapes KAM reporting.

To assess the potential economic bonding between the client firm and its auditor, we include total audit fees (*LnAuditFees CF*), total non-audit fees (*LnNonAuditFees CF*), the ratio of non-audit to audit fees (*NonAuditFeesRatio CF*), and whether the client changes its auditor in year t (*AuditorSwitch CF*). Finally, we include industry and year fixed effects. We define industries using their two-digit SIC code. In all models we use heteroskedasticity-robust standard errors.¹⁹

The number of KAMs reported by the auditor exhibits significant time-series correlation. In particular, during our sample period the correlation coefficient between the number of KAMs reported in year t and the number of KAMs reported in year $t-1$ is 0.72. This is not surprising given

¹⁹ *EBIT Margin AF* varies at the audit-firm level. Due to the small number of audit firms included in the main sample (6) we refrain from clustering at the audit-firm level (Petersen 2009). However, inferences are robust if we alternatively cluster at the audit-firm or client-firm level.

that some risk issues are likely persistent over time and/or may require more than a year to be resolved. For that reason, in all analyses we present a second specification in which we augment the list of control variables of equation (2) by additionally controlling for the lagged number of KAMs (*LagKAM*). To test our second hypothesis, we repeat our estimations of equation (2) by including the interaction term of *EBIT Margin AF* with *Loss CF*.

6. Results

6.1 Audit-Firm Profitability and KAMs

H1 predicts a positive relation between audit-firm profitability and the number of KAMs disclosed by auditors. We report the results of testing H1 in Table 4. In column 1, we estimate a baseline version of equation (2) in which we only include audit-firm controls. Consistent with H1 and the arguments from the economics literature, we find that the coefficient on *EBIT Margin AF* is significantly positive.

Besides *EBIT Margin AF*, several other audit-firm characteristics are related to KAM reporting. Big-4 auditors and industry-specialist auditors report more KAMs, consistent with these auditors being more competent and exerting more effort to address the most important audit risks. Audit firms with more employees and cash holdings have lower resource constraints in delivering audit effort. Accordingly, *LnEmpl AF* and *Cash AF* are both positively related to *KAM*.²⁰

²⁰ Although we find a positive correlation between *LnAssets AF* and *KAM* (Table 3, Panel B), the coefficient on *LnAssets AF* exhibits a negative sign in column 1. Due to the high correlations between *LnAssets AF* and *LnEmpl AF* and between *LnAssets AF* and *Big4* (Table 3, panel B), we may have over-controlled for audit-firm size in the regression model. In untabulated sensitivity analyses, we find that our conclusion is not affected after we drop *LnAssets AF* from equation (2). In fact, we continue to find a positive and highly significant coefficient on *EBIT Margin AF* regardless of which control we drop from equation (2). Furthermore, the coefficient on *EBIT Margin AF* is positive and highly significant when we regress *KAM* on *EBIT Margin AF* and control only for year and industry fixed effects (i.e., without including any other control variable).

In column 2, we estimate another baseline version of equation (2) with only client firm-level controls. We continue to find a significantly positive relation between *EBIT Margin AF* and *KAM*, consistent with audit firms with stronger financial performance exerting more audit effort to address audit risks. Similar to Lennox et al. (2018) we find that auditors report more KAMs for larger clients and clients with more subsidiaries because they operate in more complex business environments. Clients with higher leverage ratios, losses, and accounting restatements in the past are riskier from the auditor's perspective, so they are positively associated with *KAM*. Institutional investors are likely to prefer higher audit quality and more informative KAM disclosures. We find evidence that auditors report more KAMs for client firms with higher levels of institutional ownership. Finally, to the extent that audit fees reflect audit risk and/or effort (DeFond and Zhang 2014), it is not surprising that *KAM* is positively related to *LnAuditFees CF*. We do not find evidence in our sample pointing to economic bonding between auditors and client firms playing a significant role in KAM reporting, because the coefficients on *LnNonAuditFees CF*, *NonAuditFeesRatio CF* and *AuditorSwitch CF* are not reliably different from zero.

We report the results of estimating the full equation (2) in column 3. Again, *EBIT Margin AF* has a significantly positive relation to *KAM*, consistent with H1 ($\alpha_1 = 4.172, p < 0.001$). The results for the audit-firm and client-firm controls in column 3 are generally consistent with those separately reported in the previous two columns with the only exception that we no longer detect a significant relation between *Big4* and *KAM*.

In the last column, we add *LagKAM* as another control to equation (2). We observe a positive and highly significant coefficient on *LagKAM* (coefficient = 0.462, $p < 0.001$), suggesting

that key audit risk and/or audit effort is persistent over time. More importantly, the coefficient on *EBIT Margin AF* remains significantly positive ($\alpha_1 = 2.785, p < 0.001$).²¹

6.2 The Association Between Audit-Firm Profitability and KAMs Conditional on Client-Firm Losses

H2 examines the potential moderating effect of the client firm's financial condition. We report the results in Table 5. We continue to find a significantly positive coefficient on *EBIT Margin AF* ($\alpha_1 = 4.816, p < 0.001$), suggesting that for profitable (i.e., low risk) client firms, audit firms' financial performance is positively associated with the supply of audit effort to address the most critical audit risks. However, when client firms suffer losses and auditors are more concerned about litigation risk, audit-firm profitability is less relevant in shaping audit effort, as evidenced by the significantly negative coefficient on *EBIT Margin AF* \times *Loss CF* ($\alpha_2 = -4.824, p = 0.046$). In fact, for loss-making client firms, the relation between *EBIT Margin AF* and *KAM* is not statistically significant at conventional levels ($\alpha_1 + \alpha_2 = -0.008, p = 0.997$).²² These findings are robust to controlling for *LagKAM*, as indicated in column 2. Overall, our results suggest that when auditors have higher litigation concerns, audit-firm profitability has a negligible impact on the supply of audit effort. Auditors facing higher litigation risk are unlikely to adjust their audit effort even if they have profitability pressure at the audit-firm level.

²¹ To mitigate the potential effect of outliers in our measure of audit-firm profitability, in untabulated analyses we create ten deciles of audit-firm profitability and re-estimate equation (2) by replacing the original measure of audit-firm profitability with its decile-ranked transformation. We find that the coefficient on the decile-ranked transformation of *EBIT Margin AF* is significantly positive regardless of whether we control for *LagKAM* ($\alpha_1 = 0.048, p < 0.05$) or not ($\alpha_1 = 0.078, p < 0.001$). In terms of economic significance, our estimates suggest a maximum difference of 0.702 KAMs (0.078×9) between the lowest audit-firm profitability decile (average audit-firm profitability: 14.4%) and the highest audit-firm profitability decile (average audit-firm profitability: 28.4%).

²² Similarly, when we restrict our sample to loss-client firms only (246 – 274 client firm-year observations, depending on the specification) we find that *EBIT Margin AF* is insignificant. By contrast, *EBIT Margin AF* is positive and highly significant in the subsample of profitable client firms.

6.3 Further Controls for Endogeneity

6.3.1. Controlling for *Client-Firm* and *Audit-Firm Fixed Effects*

It is possible that our findings are affected by *unobservable, time-invariant* client- or audit-firm characteristics. For instance, reliance on incentive-based compensation may differ across audit firms (Bouwens, Bik, and Zou 2019). Consequently, we re-estimate equation (2) after controlling for both *client-firm and audit-firm fixed effects*. We present the results of these analyses in Table 6.²³ We continue to find a positive and significant coefficient on *EBIT Margin AF* regardless of whether we control for the lagged number of KAMs ($\alpha_1 = 6.062, p < 0.05$) or not ($\alpha_1 = 9.871, p < 0.01$).²⁴

6.3.2 Changes Specifications

Next, we employ a strict changes specification. This specification differences out unmeasured and unchanging causes of audit outcomes (measured by *KAM*) that may be associated with audit-firm profitability. Specifically, we regress changes in the number of KAMs (ΔKAM) on changes in audit-firm profitability ($\Delta EBIT Margin AF$), after controlling for changes in all control variables of equation (2). We tabulate the findings in Table 7. Consistent with H1, we find a positive and significant coefficient on $\Delta EBIT Margin AF$, regardless of whether we control for changes in the lagged number of KAMs ($\alpha_1 = 6.124, p < 0.1$) or not ($\alpha_1 = 5.578, p < 0.05$).²⁵

²³ *LnNumSubs CF* and *InstOwnership CF (Big4)* are time-invariant client-firm (audit-firm) controls and therefore drop out in these analyses.

²⁴ These findings are robust to replacing *EBIT Margin AF* with its decile-ranked transformation. The difference between the lowest and highest audit-firm profitability deciles amounts to 1.359 KAMs (1.863 KAMs) in the specification the controls (does not control) for the lagged number of KAMs.

²⁵ Because KAM reporting became mandatory for fiscal years ending in or after September 2013, we perform the changes specification of column 1 in a reduced sample that spans from September 2014 to December 2017. In column 2, we additionally control for the lagged change in KAM ($\Delta LagKAM$). We therefore further limit our sample to the period September 2015 – December 2017.

6.4 Supplemental Analyses

6.4.1 Examining the Relation Between Audit-Firm Profitability and Audit Outcomes Using Alternative Outcome Measures

In this section, we examine the association between audit-firm profitability and widely used measures of audit quality. To the extent that audit-firm profitability affects auditor competencies and auditor incentives to exert effort, we expect that more profitable audit firms would exhibit superior audit quality. To investigate this idea, we use an expanded U.K. sample that spans from 2008 to 2017 and includes all U.K. publicly listed and private firms that are subject to mandatory audit of their financial statements. We use two audit-quality proxies that have been extensively used in prior research (DeFond and Zhang 2014): the propensity to issue a qualified auditor opinion (*Qualified CF*) and the level of absolute discretionary accruals based on the model in Kothari, Leone, and Wasley (2005) (*/DACC/ CF*). We present these analyses in Table 8, panels A and B.²⁶

Panel A shows that client firms of more profitable audit firms are more likely to receive a qualified auditor opinion. Specifically, we find a positive and significant coefficient on *EBIT Margin AF*, regardless of whether we control for the lagged value of *Qualified CF* (column 2) or not (column 1).

Panel B presents the OLS regression results of examining the association between */DACC/ CF* and *EBIT Margin AF*. Consistent with clients firms of more profitable audit firms engaging in less earnings management, we find a negative and significant coefficient on *EBIT Margin AF*. When splitting the sample to client firm-years with income-decreasing (column 2) and income-

²⁶ We include private firms in these analyses because nearly all publicly listed firms receive an unqualified auditor opinion even when performing our analyses during the sample period of the expanded U.K. sample (10 years). Accordingly, to allow for sufficient variation in our variables of interest we perform the analyses of this section in an expanded U.K. sample that includes all U.K. public and private firms that are subject to mandatory audit and spans from 2008 to 2017.

increasing (column 3) discretionary accruals, we find a negative and significant coefficient on *EBIT Margin AF* only in the subsample of *income-increasing* discretionary accruals. The coefficient on *EBIT Margin AF* is negative but not statistically distinguishable from zero in the income-decreasing subsample. Taken together, the results of Table 8 provide evidence consistent with more profitable audit firms being associated with better audit quality.

6.4.2 Out-of-Sample Tests (External Validity)

It is conceivable that the positive relation between audit-firm profitability and KAMs is driven by factors that are unique to the U.K. setting. To address this possibility, we examine the external validity of our findings. Specifically, we exploit the mandatory adoption of ISA 701 in the rest of Europe in December 2016 and examine the association between audit-firm profitability and number of KAMs for a pooled sample of a maximum of 1,521 client-firm year observations from the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, and Sweden.²⁷ These analyses include client-year observations with fiscal year ending in December 2016 as well as client-year observations with fiscal year ending in 2017. Table 9 contains the results. Consistent with our findings in the U.K., we find a positive and significant coefficient on *EBIT Margin AF* (column 1). This finding is robust to controlling for the lagged number of KAMs, as column 2 suggests.²⁸

7. Conclusion

Theoretical and empirical evidence in economics and management suggests that there is a

²⁷ We require at least 10 client firm-year observations per country during the sample period (December 2016 - December 2017) to perform these analyses. Results are similar if we include those countries that have fewer than 10 client firm-year observations during our sample period.

²⁸ In the specification of column 2 in which we control for the lagged number of KAMs, we limit our analyses to all client firms with fiscal year ending in December 2017.

positive association between firm operating performance and product/service quality. Yet research in auditing lacks evidence on what drives audit-firm profitability and how audit-firm profitability affects audit outcomes. In this paper, we attempt to close this gap in the literature. We compile a novel dataset that links audit-firm and client-firm financial statement information from the U.K.'s largest audit firms. Our objectives are to examine determinants of audit-firm profitability and to explore its consequences for KAM reporting, a direct outcome of the audit process with increasing importance for managers, investors, regulators, auditors, and academics.

Our determinants analyses reveal that Big-4 and non-Big-4 audit firms have fundamentally different profitability structures. These analyses suggest that larger audit firms are more cost-effective and generate more profits in auditing larger and more complex clients when compared with smaller firms. Our analyses of the relation between audit-firm financial performance and KAM reporting provide strong evidence that more profitable audit firms issue more KAMs. However, this relation only holds for profitable client firms. We find no evidence that audit-firm profitability affects audit outcomes for loss-making client firms, that is, for those clients that subject auditors to higher levels of litigation risk. This finding suggests that auditors facing higher litigation risk are unlikely to adjust their audit effort even if they have profitability pressure at the audit-firm level.

Our study represents a first attempt at understanding the determinants of audit-firm profitability and its implications for audit effort and audit outcomes. Linking audit-firm and client-firm financial statement information introduces an opportunity for audit research to more closely focus on the interplay between audit-firm and client-firm characteristics and the ways through which they determine client outcomes. We encourage future research to explore how audit- and client-firm characteristics interact with each other to affect the whole spectrum of services offered by both large and smaller audit firms.

Appendix: Variable Definitions

Client-Firm Variables

<i> DACC CF</i>	The value of absolute discretionary accruals as in Kothari et al. (2005). In particular, we estimate the following model for each two-digit SIC code industry with at least 20 observations: $TACC CF_{i,t} = a_0 + a_1(1/Assets CF_{i,t-1}) + a_2\Delta Sales CF_{i,t} + a_3PPE CF_{i,t} + a_3ROA CF_{i,t} + \varepsilon_{i,t}$. We measure total accruals (<i>TACC CF</i>) as the change in non-cash current assets minus the change in current non-interest bearing liability, minus depreciation for firm i in year t, scaled by lagged total assets. This variable is calculated at the client firm-year level;
<i>AnalystFollowing CF</i>	The number of analysts following a client firm (source of data: TR EIKON). This variable is calculated at the client firm-year level;
<i>AuditorSwitch CF</i>	An indicator variable that takes the value 1 if a client firm switches auditor in a given year, and 0 otherwise (source of data: Audit Analytics Europe);
<i>AvgVariable CF</i>	The audit-firm year mean of the corresponding client-firm characteristic. This variable is calculated at the audit firm-year level;
<i>InstOwnership CF</i>	The proportion of shares held by institutional shareholders (source of data: TR EIKON). This variable is calculated at the client-firm level;
<i>Inventory CF</i>	The ratio of client-firm inventory to lagged total assets (source of data: Compustat Global). This variable is calculated at the client firm-year level;
<i>KAM</i>	The number of Key Audit Matters reported by the auditor (source of data: Audit Analytics Europe). This variable is calculated at the client firm-year level;
<i>LagKAM</i>	Variable <i>KAM</i> , lagged by one year;
<i>LagQualified CF</i>	Variable <i>Qualified CF</i> , lagged by one year;
<i>LagTACC CF</i>	Variable <i>TACC CF</i> , lagged by one year. We measure total accruals (<i>TACC CF</i>) as the change in non-cash current assets minus the change in current non-interest bearing liability, minus depreciation for client firm i in year t, scaled by lagged total assets;

<i>Leverage CF</i>	The ratio of client-firm short-term and long-term debt to lagged total assets (source of data: Compustat Global). This variable is calculated at the client firm-year level;
<i>LnAssets CF</i>	The natural logarithm of client-firm total assets (source of data: Compustat Global). This variable is calculated at the client firm-year level;
<i>LnAuditFees CF</i>	The natural logarithm of client-firm audit fees (source of data: Audit Analytics Europe). This variable is calculated at the client firm-year level;
<i>LnNonAuditFees CF</i>	The natural logarithm of client-firm non-audit fees (source of data: Audit Analytics Europe). This variable is calculated at the client firm-year level;
<i>LnNumSubs CF</i>	The natural logarithm of the number of subsidiaries of a given client firm (source of data: Amadeus). This variable is calculated at the client firm-year level;
<i>Loss CF</i>	An indicator variable that takes the value 1 if a client firm reports negative net income in a given year, and 0 otherwise (source of data: Compustat Global). This variable is calculated at the client firm-year level;
<i>MTB CF</i>	The ratio of client-firm market value of equity to book value of equity (source of data: Compustat Global). This variable is calculated at the client firm-year level;
<i>NonAuditFeesRatio CF</i>	The ratio of non-audit fees to audit fees (source of data: Audit Analytics Europe). This variable is calculated at the client firm-year level;
<i>Problem CF</i>	An indicator variable that takes the value 1 if a client firm restated its earnings over the previous two years, and 0 otherwise. (source of data: Thomson Reuters EIKON). This variable is calculated at the client firm-year level;
<i>Public CF</i>	An indicator variable that takes the value 1 if a client firm is publicly listed, and 0 otherwise (source of data: Amadeus). This variable is calculated at the client firm-year level;
<i>Qualified CF</i>	An indicator variable that takes the value 1 if a client firm receives a qualified auditor opinion, and 0 otherwise (source of data: FAME). This variable is calculated at the client firm-year level;

ROA CF The ratio of client firm net income to lagged total assets (source of data: Compustat Global). This variable is calculated at the client firm-year level;

Sales CF The ratio of client firm sales to lagged total assets (source of data: Compustat Global). This variable is calculated at the client firm-year level;

StdSales CF The standard deviation of *Sales CF*. This variable is calculated at the client firm-year level.

Audit-Firm Variables

Big4 An indicator variable that takes the value 1 if a client firm is audited by a Big-4 auditor, and 0 otherwise (source of data: Audit Analytics Europe);

Cash AF The ratio of audit-firm cash to lagged total assets (source of data: Amadeus). This variable is calculated at the audit firm-year level;

EBIT Margin AF The ratio of audit-firm operating profit to sales (source of data: Amadeus). This variable is calculated at the audit firm-year level;

IndustrySpecialist AF The ratio of the sum of all audit fees received by a given audit firm in a given industry to the sum of all audit fees received by all audit firms in the sample in that industry. We define industries by their two-digit SIC codes. This variable is calculated at the audit firm-two digit SIC code-year level;

Leverage AF The ratio of audit-firm short-term and long-term debt to lagged total assets (source of data: Amadeus). This variable is calculated at the audit firm-year level;

LnAssets AF The natural logarithm of audit-firm total assets (source of data: Amadeus). This variable is calculated at the audit firm-year level;

LnEmpl AF The natural logarithm of audit-firm number of employees (source of data: Amadeus). This variable is calculated at the audit firm-year level.

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Table 1: Audit-Firm and Client-Firm Characteristics Associated with Audit-Firm Profitability (Determinants Analyses)

Dependent variable = EBIT Margin AF

Variables	Expanded Full Sample		Expanded Big-4 Subsample		Expanded non-Big4 Subsample	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>LnAssets AF</i>	0.010	0.552	0.162*	0.065	0.023	0.366
<i>LnEmpl AF</i>	-0.003	0.875	0.004	0.699	-0.014	0.601
<i>Leverage AF</i>	0.075**	0.042	-0.055	0.261	0.080*	0.051
<i>Cash AF</i>	0.235***	0.001	-0.081	0.220	0.218**	0.019
<i>Big4</i>	0.116**	0.012				
<i>AvgPublic CF</i>	-0.070	0.656	4.444*	0.082	-0.059	0.707
<i>AvgLnAssets CF</i>	-0.073*	0.076	0.206*	0.061	-0.087**	0.049
<i>AvgLeverage CF</i>	-0.047	0.600	0.705	0.262	-0.070	0.459
<i>AvgLoss CF</i>	0.089*	0.068	-0.254	0.641	0.089*	0.075
<i>AvgROA CF</i>	0.218	0.390	-0.649	0.799	0.244	0.452
<i>AvgStdSales CF</i>	0.002	0.579	-0.005	0.158	0.002	0.834
Year FE	Yes		Yes		Yes	
# of audit firm-years	339		35		304	
Adj. R ²	0.168		0.635		0.173	

This table presents audit-firm and client-firm determinants of audit-firm profitability for the expanded full sample of all audit firms (column 1), Big-4 audit firms only (column 2) and non-Big4 audit firms only (column 3). These analyses cover the period 2008-2017 and include all observable client firms in Amadeus that are classified as very large, large or medium-sized. We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 2: Sample Selection for Hypotheses Testing

UK firms with stocks traded on the LSE Main Market with premium listing covered by Audit Analytics Europe and Compustat Global (2013-2017)	2,296
<i>Less:</i>	
Firms with more than one auditor	(169)
Firms whose auditors have less than 20 public client firms each year	(7)
Firms with missing data to calculate key variables in the regression analyses	(505)
Final sample	1,615

This table presents the sample selection procedures for the main sample (sample period: September 2013 - December 2017).

Table 3: Descriptive Statistics and Correlation Matrix

Panel A: Descriptive statistics

Variables	Mean	Std. Dev.	Q1	Median	Q3
Audit-firm characteristics					
<i>EBIT Margin AF</i>	0.227	0.044	0.200	0.239	0.255
<i>LnAssets AF</i>	20.920	0.481	20.830	21.100	21.160
<i>LnEmpl AF</i>	9.592	0.601	9.528	9.765	9.896
<i>Leverage AF</i>	0.186	0.156	0.058	0.128	0.283
<i>Cash AF</i>	0.092	0.063	0.036	0.073	0.139
<i>IndustrySpecialist AF</i>	0.140	0.144	0.049	0.112	0.172
<i>Big4</i>	0.925	0.263	1.000	1.000	1.000
Client-firm characteristics					
<i>KAM</i>	2.831	1.846	2.000	3.000	4.000
<i>LnAssets CF</i>	20.700	1.929	19.360	20.560	21.800
<i>Leverage CF</i>	0.168	0.148	0.019	0.143	0.286
<i>Loss CF</i>	0.170	0.375	0.000	0.000	0.000
<i>ROA CF</i>	0.047	0.082	0.016	0.056	0.104
<i>MTB CF</i>	3.128	4.270	0.949	1.874	3.610
<i>Problem CF</i>	0.012	0.108	0.000	0.000	0.000
<i>LnNumSubs CF</i>	3.661	1.769	2.833	3.912	4.828
<i>Inventory CF</i>	0.086	0.140	0.000	0.017	0.126
<i>Sales CF</i>	0.812	0.782	0.201	0.624	1.133
<i>StdSales CF</i>	0.083	0.112	0.025	0.052	0.097
<i>AnalystFollowing CF</i>	8.909	7.898	2.000	6.000	15.000
<i>InstOwnership CF</i>	0.627	0.223	0.493	0.675	0.791
<i>LnAuditFees CF</i>	12.750	1.115	12.080	12.930	13.860
<i>LnNonAuditFees CF</i>	11.030	3.950	10.540	11.920	13.120
<i>NonAuditFeesRatio CF</i>	0.609	0.844	0.143	0.336	0.700
<i>AuditorSwitch CF</i>	0.063	0.243	0.000	0.000	0.000

Panel B: Correlation between KAM and audit-firm characteristics

Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)
<i>KAM</i>	(a)						
<i>EBIT Margin AF</i>	(b)	0.19					
<i>LnAssets AF</i>	(c)	0.18	0.30				
<i>LnEmpl AF</i>	(d)	0.21	0.36	0.86			
<i>Leverage AF</i>	(e)	-0.17	-0.49	-0.22	-0.36		
<i>Cash AF</i>	(f)	0.06	0.41	-0.16	-0.12	-0.40	
<i>IndustrySpecialist AF</i>	(g)	0.24	0.18	0.19	0.21	-0.12	0.01
<i>Big4</i>	(h)	0.19	0.33	0.93	0.80	-0.33	-0.16 0.20

Panel C: Correlation between KAM and client-firm characteristics

Variables	(a)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	
<i>KAM</i>	(a)																
<i>LnAssets CF</i>	(i)	0.49															
<i>Leverage CF</i>	(j)	0.22	0.26														
<i>Loss CF</i>	(k)	-0.03	-0.17	-0.09													
<i>ROA CF</i>	(l)	0.01	0.08	0.04	-0.75												
<i>MTB CF</i>	(m)	0.07	-0.13	0.05	-0.05	0.10											
<i>Problem CF</i>	(n)	0.18	0.15	0.05	0.00	-0.02	0.05										
<i>LnNumSubs CF</i>	(o)	0.31	0.50	0.14	-0.15	0.11	-0.01	0.10									
<i>Inventory CF</i>	(p)	0.02	-0.10	-0.17	-0.07	0.11	0.10	-0.01	-0.06								
<i>Sales CF</i>	(q)	0.08	-0.24	-0.20	-0.08	0.15	0.39	0.03	-0.03	0.35							
<i>StdSales CF</i>	(r)	-0.07	-0.26	-0.10	0.08	-0.04	0.21	0.00	-0.13	0.06	0.39						
<i>AnalystFollowing CF</i>	(s)	0.50	0.73	0.20	-0.10	0.06	0.15	0.17	0.39	0.02	0.04	-0.16					
<i>InstOwnership CF</i>	(t)	0.21	0.07	0.17	-0.11	0.09	0.14	0.02	0.15	0.08	0.21	-0.03	0.21				
<i>LnAuditFees CF</i>	(u)	0.53	0.61	0.27	-0.08	-0.02	0.07	0.12	0.46	0.06	0.15	-0.13	0.67	0.35			
<i>LnNonAuditFees CF</i>	(v)	0.28	0.36	0.13	-0.03	-0.07	0.06	0.06	0.33	0.02	0.04	-0.02	0.40	0.14	0.49		
<i>NonAuditFeesRatio CF</i>	(w)	-0.05	-0.10	0.04	0.10	-0.11	0.07	-0.02	-0.06	-0.01	-0.01	0.08	-0.09	-0.02	-0.07	0.37	
<i>AuditorSwitch CF</i>	(x)	0.02	0.05	0.01	-0.06	0.06	0.01	0.02	0.02	0.01	0.03	0.02	0.06	0.00	0.04	-0.05	-0.01

Panel A presents descriptive statistics for the main sample. Panel B (panel C) presents Pearson correlations between *KAM* and audit-firm (client-firm) characteristics. Bold values indicate significance at the two-tailed 5% level or better. See the Appendix for variable definitions.

Table 4: KAM Disclosures and Audit-Firm Profitability*Dependent variable = KAM*

Variables	Column (1)		Column (2)		Column (3)		Column (4)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>EBIT Margin AF</i>	2.954**	0.021	4.738***	0.000	4.172***	0.000	2.785***	0.006
<i>LnAssets AF</i>	-0.926***	0.009			-0.720**	0.021	-1.191***	0.000
<i>LnEmpl AF</i>	0.435***	0.003			0.373***	0.003	0.242**	0.043
<i>Leverage AF</i>	0.202	0.685			0.404	0.339	0.591	0.147
<i>Cash AF</i>	1.922*	0.050			1.812**	0.036	1.764**	0.035
<i>IndustrySpecialist AF</i>	3.374***	0.000			0.635*	0.083	0.827**	0.018
<i>Big4</i>	1.330**	0.034			0.401	0.466	1.613***	0.002
<i>LnAssets CF</i>			0.301***	0.000	0.307***	0.000	0.171***	0.000
<i>Leverage CF</i>			0.599*	0.058	0.547*	0.082	0.357	0.200
<i>Loss CF</i>			0.327**	0.035	0.319**	0.040	0.043	0.763
<i>ROA CF</i>			0.195	0.797	0.251	0.737	-0.480	0.467
<i>MTB CF</i>			0.005	0.646	0.006	0.557	-0.002	0.803
<i>Problem CF</i>			1.101***	0.001	1.052***	0.003	0.824**	0.020
<i>LnNumSubs CF</i>			0.050*	0.066	0.053**	0.047	0.024	0.376
<i>Inventory CF</i>			0.494	0.244	0.494	0.238	-0.094	0.791
<i>Sales CF</i>			0.243***	0.001	0.240***	0.001	0.173**	0.012
<i>StdSales CF</i>			0.663	0.104	0.514	0.196	0.050	0.883
<i>AnalystFollowing CF</i>			0.005	0.533	0.003	0.737	-0.002	0.782
<i>InstOwnership CF</i>			0.629***	0.001	0.672***	0.000	0.324*	0.059
<i>LnAuditFees CF</i>			0.348***	0.000	0.349***	0.000	0.126**	0.040
<i>LnNonAuditFees CF</i>			0.004	0.753	0.002	0.839	0.000	0.983
<i>NonAuditFeesRatio CF</i>			-0.009	0.860	-0.003	0.948	0.070	0.111
<i>AuditorSwitch CF</i>			-0.086	0.539	-0.080	0.572	-0.121	0.383
<i>LagKAM</i>							0.462***	0.000
Industry FE	Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes	
# of client firm-years	1,615		1,615		1,615		1,366	
Adj. R ²	0.262		0.442		0.447		0.603	

This table presents the OLS regression results on estimating the relation between number of KAMs and audit-firm profitability. In the specification of column 1 (column 2) we control for audit-firm (client-firm) characteristics only. In column 3 we present the OLS regression results of estimating equation (2), which includes audit-firm and client-firm controls. In column 4 we limit our sample to the period September 2014 – December 2017 and re-estimate equation (2) by controlling for the lagged number of KAMs (*LagKAM*). We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 5: KAM Disclosures and Audit-Firm Profitability Conditional on Client-Firm Losses

Variables	Column (1)		Column (2)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>EBIT Margin AF</i>	4.816***	0.000	3.435***	0.001
<i>EBIT Margin AF</i> × <i>Loss CF</i>	-4.484**	0.046	-4.747***	0.028
<i>LnAssets AF</i>	-0.708**	0.023	-1.165***	0.000
<i>LnEmpl AF</i>	0.379***	0.002	0.246**	0.039
<i>Leverage AF</i>	0.356	0.404	0.534	0.194
<i>Cash AF</i>	1.778**	0.039	1.723**	0.040
<i>IndustrySpecialist AF</i>	0.660*	0.071	0.871**	0.013
<i>Big4</i>	0.377	0.495	1.569***	0.003
<i>LnAssets CF</i>	0.308***	0.000	0.171***	0.000
<i>Leverage CF</i>	0.547*	0.081	0.352	0.203
<i>Loss CF</i>	1.411**	0.014	1.103**	0.033
<i>ROA CF</i>	0.235	0.753	-0.499	0.450
<i>MTB CF</i>	0.007	0.534	-0.002	0.820
<i>Problem CF</i>	1.047***	0.002	0.812**	0.017
<i>LnNumSubs CF</i>	0.055**	0.042	0.026	0.326
<i>Inventory CF</i>	0.470	0.261	-0.106	0.767
<i>Sales CF</i>	0.247***	0.001	0.179***	0.010
<i>StdSales CF</i>	0.450	0.262	-0.025	0.943
<i>AnalystFollowing CF</i>	0.002	0.827	-0.003	0.688
<i>InstOwnership CF</i>	0.670***	0.000	0.323*	0.061
<i>LnAuditFees CF</i>	0.350***	0.000	0.127**	0.039
<i>LnNonAuditFees CF</i>	0.003	0.833	0.000	0.978
<i>NonAuditFeesRatio CF</i>	-0.000	0.998	0.074*	0.087
<i>AuditorSwitch CF</i>	-0.087	0.533	-0.128	0.348
<i>LagKAM</i>			0.461***	0.000
Industry FE	Yes		Yes	
Year FE	Yes		Yes	
# of client firm-years	1,615		1,366	
Adj. R ²	0.449		0.605	

Column 1 of this table presents the OLS regression results of estimating the relation between number of KAMs and audit-firm profitability conditional on client-firm loss-making. In column 2 we limit our sample to the period September 2014 – December 2017 and re-estimate the specification of column 1 by controlling for the lagged number of KAMs (*LagKAM*). We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 6: KAM Disclosures and Audit-Firm Profitability – Controlling for Audit-Firm and Client-Firm Fixed Effects

Dependent variable = KAM

Variables	Column (1)		Column (2)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>EBIT Margin AF</i>	9.871***	0.001	6.062**	0.049
<i>LnAssets AF</i>	0.857	0.382	-1.539	0.179
<i>LnEmpl AF</i>	0.014	0.911	0.076	0.540
<i>Leverage AF</i>	0.563	0.156	0.824**	0.041
<i>Cash AF</i>	2.624*	0.058	4.025***	0.007
<i>IndustrySpecialist AF</i>	0.748	0.175	1.630**	0.015
<i>LnAssets CF</i>	0.290	0.342	0.320	0.415
<i>Leverage CF</i>	-0.054	0.932	0.315	0.620
<i>Loss CF</i>	0.142	0.399	0.135	0.439
<i>ROA CF</i>	-1.183	0.249	-0.947	0.414
<i>MTB CF</i>	0.011	0.324	0.009	0.479
<i>Problem CF</i>	0.856**	0.034	0.350	0.204
<i>Inventory CF</i>	1.297	0.336	1.125	0.451
<i>Sales CF</i>	0.177	0.667	0.178	0.724
<i>StdSales CF</i>	0.176	0.742	0.290	0.665
<i>AnalystFollowing CF</i>	-0.048*	0.058	-0.045	0.114
<i>LnAuditFees CF</i>	0.620**	0.039	0.584	0.117
<i>LnNonAuditFees CF</i>	0.006	0.660	-0.002	0.891
<i>NonAuditFeesRatio CF</i>	0.041	0.358	0.048	0.337
<i>AuditorSwitch CF</i>	-0.122	0.373	-0.167	0.221
<i>LagKAM</i>			-0.015	0.709
Client Firm FE	Yes		Yes	
Audit Firm FE	Yes		Yes	
Year FE	Yes		Yes	
# of client firm-years	1,615		1,366	
Adj. R ²	0.663		0.711	

Column 1 of this table presents the OLS regression results of re-estimating equation (2) after controlling for client-firm and audit-firm fixed effects. In column 2 we limit our sample to the period September 2014 – December 2017 and re-estimate the specification of column 1 by controlling for the lagged number of KAMs (*LagKAM*). We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 7: Change in KAM Disclosures and Change in Audit-Firm Profitability*Dependent variable = ΔKAM*

Variables	Column (1)		Column (2)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>ΔEBIT Margin AF</i>	5.578**	0.025	6.124*	0.065
<i>ΔLnAssets AF</i>	-0.604	0.587	-1.934*	0.078
<i>ΔLnEmpl AF</i>	0.096	0.298	0.176*	0.064
<i>ΔLeverage AF</i>	0.653	0.109	0.921**	0.036
<i>ΔCash AF</i>	3.046**	0.049	3.852**	0.019
<i>ΔIndustrySpecialist AF</i>	-0.157	0.744	0.375	0.540
<i>ΔBig4</i>	0.153	0.691	0.080	0.863
<i>ΔLnAssets CF</i>	0.059	0.874	0.235	0.561
<i>ΔLeverage CF</i>	1.082	0.235	0.577	0.545
<i>ΔLoss CF</i>	0.082	0.431	0.043	0.700
<i>ΔROA CF</i>	-0.209	0.412	-0.267	0.334
<i>ΔMTB CF</i>	0.007	0.724	-0.001	0.951
<i>ΔProblem CF</i>	0.792**	0.013	0.485*	0.059
<i>ΔInventory CF</i>	0.058	0.965	0.027	0.986
<i>ΔSales CF</i>	-0.380	0.305	-0.432	0.281
<i>ΔStdSales CF</i>	0.277	0.647	0.801	0.260
<i>ΔAnalystFollowing CF</i>	-0.003	0.903	0.009	0.768
<i>ΔLnAuditFees CF</i>	0.570***	0.006	0.773***	0.001
<i>ΔLnNonAuditFees CF</i>	-0.014	0.305	-0.015	0.275
<i>ΔNonAuditFeesRatio CF</i>	0.052	0.192	0.021	0.638
<i>ΔAuditorSwitch CF</i>	-0.102	0.373	-0.112	0.359
<i>ΔLagKAM</i>			-0.251***	0.000
Industry FE	Yes		Yes	
Year FE	Yes		Yes	
# of client firm-years	1,187		944	
Adj. R ²	0.040		0.123	

Column 1 of this table presents the OLS regression results of changes in the number of KAMs reported by the auditor on changes in audit-firm profitability and changes in all client-firm and audit-firm control variables of equation (2) (sample period: September 2014 – December 2017). In column 2 we limit our sample to the period September 2015 – December 2017 and re-estimate the specification of column 1 by controlling for the lagged change in *KAM* (*ΔLagKAM*). We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 8: Audit Quality and Audit-Firm Profitability: Expanded U.K. SamplePanel A: Propensity to issue a qualified audit opinion (*Dependent variable = Qualified CF*)

Variables	Column (1)		Column (2)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>EBIT Margin AF</i>	2.049**	0.017	1.858**	0.023
<i>LnAssets AF</i>	-0.009	0.841	0.028	0.549
<i>LnEmpl AF</i>	0.010	0.774	-0.005	0.891
<i>Leverage AF</i>	-0.019	0.904	-0.156	0.392
<i>Cash AF</i>	0.135	0.663	0.215	0.437
<i>IndustrySpecialist AF</i>	0.036	0.888	0.005	0.984
<i>Big4</i>	-0.493***	0.000	-0.462***	0.000
<i>Public CF</i>	-1.241***	0.000	-1.026***	0.000
<i>LnAssets CF</i>	-0.133***	0.000	-0.110***	0.000
<i>Leverage CF</i>	0.109	0.110	0.108*	0.073
<i>Loss CF</i>	-0.021	0.705	0.005	0.941
<i>ROA CF</i>	-0.683***	0.004	-1.002***	0.001
<i>LnNumSubs CF</i>	0.029	0.338	0.026	0.298
<i>Inventory CF</i>	-0.006	0.969	-0.014	0.930
<i>Sales CF</i>	-0.184***	0.000	-0.082***	0.002
<i>StdSales CF</i>	0.103	0.138	0.109**	0.043
<i>LnAuditFees CF</i>	0.077**	0.024	0.073**	0.012
<i>LnNonAuditFees CF</i>	0.011	0.523	0.009	0.520
<i>NonAuditFeesRatio CF</i>	0.000	0.269	0.000	0.493
<i>AuditorSwitch CF</i>	0.121*	0.079	0.264***	0.001
<i>LagQualified CF</i>			3.051***	0.000
Industry FE	Yes		Yes	
Year FE	Yes		Yes	
# of client firm-years	99,694		99,694	
Adj. R ²	0.100		0.474	

Panel B: Discretionary accruals

Variables	Dep. variable = DACC CF		Dep. variable = DACC CF-		Dep. variable = DACC CF+	
	Coeff.	p value	Coeff.	p value	Coeff.	p value
<i>EBIT Margin AF</i>	-0.027**	0.046	-0.022	0.206	-0.036*	0.070
<i>LnAssets AF</i>	0.003***	0.000	0.004***	0.000	0.002*	0.090
<i>LnEmpl AF</i>	-0.001	0.273	-0.001	0.285	-0.000	0.820
<i>Leverage AF</i>	-0.008**	0.018	-0.011***	0.010	-0.003	0.472
<i>Cash AF</i>	0.017***	0.001	0.001	0.898	0.029***	0.000
<i>IndustrySpecialist AF</i>	-0.011*	0.085	-0.010	0.257	-0.008	0.367
<i>Big4</i>	0.005***	0.008	0.005*	0.072	0.006**	0.033
<i>Public CF</i>	-0.014***	0.000	-0.019***	0.000	-0.007***	0.005
<i>LnAssets CF</i>	-0.003***	0.000	-0.007***	0.000	0.001	0.321
<i>Leverage CF</i>	0.054***	0.000	-0.010***	0.000	0.102***	0.000
<i>Loss CF</i>	0.024***	0.000	0.028***	0.000	0.020***	0.000
<i>ROA CF</i>	0.247***	0.000	0.151***	0.000	0.356***	0.000
<i>LnNumSubs CF</i>	-0.006***	0.000	-0.005***	0.000	-0.006***	0.000
<i>Inventory CF</i>	0.003	0.402	-0.058***	0.000	0.037***	0.000
<i>Sales CF</i>	0.002***	0.000	-0.000	0.731	0.004***	0.000
<i>StdSales CF</i>	0.040***	0.000	0.035***	0.000	0.040***	0.000
<i>LnAuditFees CF</i>	0.003***	0.000	0.007***	0.000	-0.000	0.753
<i>LnNonAuditFees CF</i>	-0.003***	0.000	-0.002***	0.000	-0.003***	0.000
<i>NonAuditFeesRatio CF</i>	0.000	0.177	0.000	0.147	0.000	0.271
<i>AuditorSwitch CF</i>	0.016***	0.000	0.016***	0.000	0.015***	0.000
<i>LagTACC CF</i>	0.086***	0.000	0.186***	0.000	-0.047***	0.000
Industry FE	Yes		Yes		Yes	
Year FE	Yes		Yes		Yes	
# of client firm-years	85,314		43,996		41,318	
Adj. R ²	0.111		0.095		0.191	

This table presents analyses performed in the expanded U.K. sample. The expanded U.K. sample covers the period 2008-2017 and includes all U.K. publicly listed and private client firms that are classified in Amadeus as very large, large or medium-sized. Column 1 of panel A presents the logit regression results of estimating the relation between audit-firm profitability and the propensity to issue a qualified auditor opinion. Column 2 of panel A presents the logit regression results of re-estimating the specification of column 1 by additionally controlling for variable *LagQualified CF*. Panel B presents the OLS regression results of estimating the relation between audit-firm profitability and the level of absolute discretionary accruals for the full sample that includes both income-decreasing and income-

increasing accruals (column 1), for the subsample of (absolute) income-decreasing accruals only (column 2), and for the subsample of income-increasing accruals only (column 3). We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).

Table 9: European (Non-U.K.) Sample Results

Variables	Column (1)		Column (2)	
	Coeff.	<i>p</i> value	Coeff.	<i>p</i> value
<i>EBIT Margin AF</i>	2.176**	0.037	1.786*	0.087
<i>LnAssets AF</i>	-0.194*	0.080	0.249*	0.059
<i>LnEmpl AF</i>	0.067**	0.049	-0.270*	0.086
<i>Leverage AF</i>	1.716***	0.000	3.111***	0.006
<i>Cash AF</i>	0.312	0.468	-0.937	0.111
<i>IndustrySpecialist AF</i>	0.651	0.194	0.986	0.213
<i>Big4</i>	0.275	0.220	0.179	0.586
<i>LnAssets CF</i>	0.131***	0.000	0.047	0.502
<i>Leverage CF</i>	-0.419*	0.079	-0.525	0.252
<i>Loss CF</i>	0.112	0.306	0.403*	0.065
<i>ROA CF</i>	0.042	0.933	1.705**	0.035
<i>MTB CF</i>	0.020**	0.036	0.004	0.892
<i>Problem CF</i>	0.654*	0.060	-0.378	0.578
<i>LnNumSubs CF</i>	-0.021	0.670	0.027	0.544
<i>Inventory CF</i>	-0.043	0.884	0.657	0.157
<i>Sales CF</i>	0.002	0.974	-0.228*	0.089
<i>StdSales CF</i>	0.208	0.553	0.212	0.732
<i>AnalystFollowing CF</i>	-0.003	0.648	-0.019	0.395
<i>InstOwnership CF</i>	0.577**	0.022	0.449	0.108
<i>LnAuditFees CF</i>	0.206***	0.002	0.148*	0.095
<i>LnNonAuditFees CF</i>	0.009	0.360	0.073	0.319
<i>NonAuditFeesRatio CF</i>	0.035	0.423	0.034	0.719
<i>AuditorSwitch CF</i>	0.416*	0.051	0.649*	0.060
<i>LagKAM</i>			0.712***	0.000
Industry FE	Yes		Yes	
Year FE	Yes		Yes	
Country FE	Yes		Yes	
# of client firm-years	1,521		551	
Adj. R ²	0.389		0.500	

Column 1 of this table presents the OLS regression results of estimating the relation between number of KAMs and audit-firm profitability for the pooled sample of client firms that are incorporated in the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, and Sweden. These analyses are limited to the period following the mandatory adoption of ISA 701 in the rest of Europe and include all client-year observations with fiscal year end in December 2016 as well as client-year observations with fiscal year end in 2017. In column 2 we limit our sample to client firms with fiscal year end in December 2017 and re-estimate the specification of column 1 by controlling for the lagged number of KAMs. We measure audit-firm profitability using the ratio of audit-firm operating income to audit-firm sales (*EBIT Margin AF*). See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively (two-tailed).