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Essays on Internal Control and External Auditing in the Context of Financial Reporting Quality

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Julkaisun nimike
Esseitä sisäisestä valvonnasta ja tilintarkastuksesta taloudellisen raportoinnin laadun kontekstissa

Tiivistelmä
Tämä väitöskirja käsittelee yrityksen sisäisen valvonnan ja tilintarkastuksen roolia taloudellisen raportoinnin laadun kontekstissa. Yritysten julkaiseman taloudellisen informaation oikeellisuus ja luotettavuus on tärkeää sidosryhmien päätöksenteolle ja siten talouden toimivuudelle. Väitöskirjan kaksi ensimmäistä esseetä keskittyvät sisäisen valvonnan tehokkuuden aihepiiriin, kun taas kahden jälkimmäisen esseen tarkastelukohteena on tilintarkastuksen laatu. Tutkimusaineisto koostuu kolmessa ensimmäisessä esseessä yhdysvaltalaisista listatuista yhtiöistä ja neljännessä esseessä suomalaisista listatuista yhtiöistä.

Ensimmäisen esseen tutkimustuloksena havaitaan, että heikko taloudellisen raportoinnin laatu on todennäköisempää sisäisen valvonnan heikkouksista raportoivissa yrityksissä vielä kahtena vuotena viimeisimmän heikkouksista tiedottavan raportin jälkeen. Toinen essee jatkaa sisäisen valvonnan aihepiirissä ja sen tulokset osoittavat, että operatiivinen tuloksenjärjestely on yleisempää yrityksissä, joilla on heikkouksia sisäisessä valvonnassa. Kolmannen esseen tutkimustulokset antavat viitteitä heikommasta tilintarkastuksen laadusta silloin, kun tilintarkastusyhteisö tarjoaa myös verotukseen liittyviä palveluita samalle asiakkaalle. Neljäs essee tarkastelee tilintarkastajan erikoistumista listattujen yhtiöiden tarkastamiseen ja tuloksena havaitaan, että tällaisella erikoistumisella on positiivinen vaikutus listatun asiakasyrityksen taloudellisen raportoinnin laatuun.

Kokonaisuutena tämän väitöskirjan tutkimustulokset tuovat uutta tietoa sekä sisäisen valvonnan heikkouksista juontuvien ongelmien laajuudesta että tilintarkastuksen laadusta riippumattomuuden vaarantumisen ja tilintarkastajan erikoistumisen näkökulmista.

Asiasanat
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Abstract

This thesis examines the role of internal control and external auditing in the context of financial reporting quality. The truthfulness and reliability of companies' financial reporting is essential for the decision-making of stakeholders and hence for economic functionality. The first two essays of the dissertation focus on internal control over financial reporting, while the last two essays study audit quality. Three essay uses data on US listed companies, and the fourth essay uses data on Finnish listed companies.

The findings of the first essay indicate that companies disclosing internal control weaknesses have greater likelihood of low financial reporting quality still two years after the last disclosure. The second essay continues in the field of internal controls and finds that companies with internal control weaknesses are manipulating real operational activities to manage earnings. The findings of the third essay imply lower audit quality, when the incumbent audit firm provides also tax services to the client. The fourth essay examines auditors' specialization in auditing publicly listed companies, and the results suggest that this type of specialization has a positive impact on the financial reporting quality of public clients.

All in all, the findings of this thesis provide new evidence both on the pervasive nature of internal control weaknesses, and on external audit quality from the perspective of auditor independence and auditor specialization.

Keywords

financial reporting quality, internal control, non-audit services, auditor specialization

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Vaasa, April 2015

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Sisällys

This dissertation thesis consists of an introductory chapter and the following four essays:

Myllymäki, Emma-Riikka (2014). The persistence in the association between Section 404 material weaknesses and financial reporting quality. *Auditing: A Journal of Practice & Theory* 33:1, 93–116.[1]

Järvinen, Tuukka & Emma-Riikka Myllymäki (2014). Real earnings management before and after reporting SOX 404 material weaknesses.

Chong, H. Gin, Erkki K. Laitinen & Emma-Riikka Myllymäki (2014). Incumbent audit firm-provided tax services and clients with low financial reporting quality. *Universitat Autònoma de Barcelona Working paper series* No. 14/4. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2539018

Ittonen, Kim, Karla M. Johnstone & Emma-Riikka Myllymäki (2014). Audit partner public-client specialisation and client abnormal accruals. *European Accounting Review*, Forthcoming, DOI: 10.1080/09638180.2014.906315.[2]

[1] Printed with kind permission of American Accounting Association.
[2] Printed with kind permission of Taylor & Francis.

1 INTRODUCTION

Due to the recent financial crisis and the widely publicized accounting scandals at the beginning of the century (e.g., Enron, Parmalat, WorldCom), there has been a growing demand to enhance the transparency of companies' operations and the integrity of financial reporting. Shareholders, creditors, and other company stakeholders base their decisions on publicly disclosed financial information, and hence, the truthfulness and reliability of that information is essential for economic functionality. This doctoral dissertation focuses on two corporate governance mechanisms for financial reporting quality: *internal control over financial reporting* and *external auditing*. In response to the aforementioned scandals, a high-profile change to the legislation was made in 2002 in the USA with the passing the Sarbanes-Oxley Act (SOX), which aims at improving companies' governance, internal controls, and external audit quality.[3] Consequently, corporate governance codes and audit regulation have been developed worldwide by further defining and including new requirements especially for publicly listed companies, audit firms, and auditors.[4] Thus, internal controls and external auditing have been at the center of the discussion among academics, practitioners, and regulators. As a whole, the purpose of the four essays that comprise this dissertation is to provide new evidence on the role of internal controls and external auditing in the context of financial reporting quality.

The first essay uses data on internal control reports mandated by Section 404 of the SOX, which requires the management of listed companies to annually assess and report on the effectiveness of internal control over financial reporting, and to disclose any material weaknesses. The study examines whether Section 404 material weakness (MW404) disclosures are predictive of future financial reporting quality, and concentrates on the fiscal years following the last MW404 disclosure, i.e., the post-MW404 period. The findings suggest that in the first two years after the last MW404 disclosure, internal controls are still not as effective at preventing or detecting misstatements in a timely manner as they are in companies without a history of MW404s. The findings further imply that the reason for the misstate-

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[3] Along with the SOX, Public Company Accounting Oversight Board (PCAOB) was established. PCAOB is responsible for regulating the auditing profession and monitoring public accounting firms and the compliance with SOX.

[4] For example, the new Statutory Audit Directive of the EU was enacted in 2006, and amended again in 2014. The main new issues in the 2006 directive were related to strengthening the oversight of auditors and auditor independence. The new requirements in the 2014 directive further aim at improving auditor independence, audit oversight and audit report informativeness, for example.

ment incidences in the post-MW404 period is the unacknowledged pervasiveness of control problems.

The second essay examines the association between MW404s and manipulation of real operational activities to manage earnings (e.g., inventory overproduction). The empirical findings indicate that real earnings management is greater in companies with existing material weaknesses, and in companies disclosing previous year's material weaknesses. It appears that the poor commitment by management to provide effective internal control systems and high quality financial information relates to a tendency to use real earnings management methods and also impairs management's real operational decisions. Moreover, the public disclosure of material weaknesses might induce management to strive to mitigate the expected negative reactions of stakeholders to the disclosure by engaging in real earnings management. Overall, this study provides further insights into pervasive control problems that may exist in companies with material weaknesses by documenting how operational activities fall under the sphere of influence of internal control effectiveness.

The third essay investigates audit quality in the context of tax services provided by incumbent audit firms. Although having the same audit firm to provide both auditing and non-auditing services could improve audit quality due to possible knowledge spillover, the greater economic dependence may jeopardize auditor independence leading to lower audit quality. The SOX legislation prohibits most non-audit services being provided by incumbent audit firms, but allows tax services. The empirical findings of the third essay suggest that there is a greater likelihood of low financial reporting quality remaining unacknowledged when tax-related fees are higher, which supports the economic dependence view. However, the findings also imply that the mere act of providing both audit and tax services does not in itself have an impact on audit quality, but rather it is the magnitude of the tax-related fees that counts.

The fourth essay focuses on individual auditor specialization in auditing public clients. Especially nowadays with increasingly complex client companies and greater demand for high quality auditing by regulators and stakeholders, auditors need to possess specialized in-depth knowledge of their clients to build expertise in a domain and perform high quality audits. Using Finnish data on listed companies, the fourth essay examines the association between an audit partner's public-client specialization and the client company's abnormal accruals, which is used as a proxy for audit/financial reporting quality. The identity of the individual auditor in charge is publicly available in Finland because, unlike in the USA or the UK for example, the responsible auditors are required to personally sign the audit re-

port. The findings suggest that greater public-client specialization is associated with higher audit/financial reporting quality. Moreover, it appears that this association is attributable to partners with a moderate level of public-client specialization, while the higher number of public-clients may reflect busyness, mitigating the benefits related to the public-client specialization.

Collectively, the findings of this dissertation contribute to the literature on internal control and external auditing in the context of financial reporting quality. The inferences from the first two essays underline the pervasive nature of internal control weaknesses and the role of management in developing effective internal control systems. The last two essays focus on audit quality, and discuss how auditor judgments can be disrupted by the economic dependence of the audit firm, but benefit from individual auditor specialization.

The remainder of the introductory chapter is structured as follows. Section 2 briefly describes the theoretical background of financial reporting quality in order to illustrate the role of internal controls and external auditing. Section 3 presents the concept and relevant prior research on internal control over financial reporting, and introduces the research questions in the first two essays. Section 4 describes the perspective on audit quality used in this dissertation, and discusses the relevant background of the provision of non-audit services by incumbent audit firms, and of auditor specialization. Section 5 summarizes the four essays.

2 FINANCIAL REPORTING

2.1 Demand for financial reporting

The role of financial reporting is most commonly explained by agency theory. In an agency relationship, a principal engages an agent to work on the principal's behalf through a contract. The fundamental problem in the principal-agent relationship stems from self-interest, where both parties attempt to maximize their own utility, but their interests are not necessarily aligned. Information asymmetry between the two parties creates an opportunity for the agent to gain private benefits. Therefore, the principal faces the risk that the agent will try to maximize his/her private benefits at the expense of the principal. The agent's behavior is unobservable to the principal, who faces the risk that the agent is not doing what he/she is supposed to do (moral hazard), and/or cannot verify the skills and abilities of the agent (adverse selection). (E.g., Jensen and Meckling 1976; Eisenhardt 1989.)

The agency relationship between shareholders (principals) and management (agents) is considered to predominantly create the demand for financial reporting especially in large companies (such as public (listed) companies) where, in principle, ownership and control are separated. Financial reporting alleviates agency problems by aligning the interests of management with those of the shareholders (bonding), and by monitoring. The bonding role can be observed from incentive contracts, which are usually based on the financial statement numbers. The monitoring role suggests that financial statements are used to monitor managerial actions (performance and contract terms). In addition to the shareholder-manager relationship, financial reporting also reduces information asymmetry between blockholders and minority shareholders, or creditors and shareholders, for instance.[5] Moreover, publicly disclosed financial statements provide information for the decision-making by a number of different stakeholders, including shareholders and creditors, but also potential shareholders, suppliers, and employees,

[5] Small and medium-sized companies, which are usually private (i.e., unlisted) companies, are mostly run by owner-managers. Thus, the problem of information asymmetry in private companies centers on the relationship of manager-owners and creditors, for instance. Ball and Shivakumar (2005), however, argue that private companies are likely to distribute information via unofficial channels, and thus, information asymmetry is not as profound as in listed companies. They suggest that the demand and supply of financial reporting in private companies can rather be explained by tax, dividend, and compensation payment policies than information asymmetry issues.

etc. (Fama 1980; Fama and Jensen 1983; Watts and Zimmermann 1983; Bushman and Smith 2001.)

2.2 Financial reporting quality

In order for financial reporting to serve its bonding and/or monitoring purpose of reducing agency problems, the disclosed information needs to be truthful and reliable. The conceptual frameworks for financial reporting produced by both the Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB) state that relevance and faithful representation (complete, neutral and free from error) are the important qualitative characteristics of financial information (FASB 2010; IASB 2010). Quality levels however vary across companies. Previous literature has extensively investigated the determinants and consequences of financial reporting quality (or earnings quality), using various proxies to capture different dimensions of quality (see Dechow et al. 2010 for a review).[6]

Although financial reporting quality can have many slightly different dimensions, this dissertation focuses more on the aspect of faithful representation, and not, for example, on perceived quality by investors. Bias and erroneous information can occur both intentionally and unintentionally. The financial reporting process involves decision-making, and discretion is used in accounting choices (e.g., Watts and Zimmerman 1983). Due to its decision-making authority, management has both opportunities and incentives (bonuses and reputation building, for example) to manipulate accounting numbers to reach earnings targets (e.g., Watts and Zimmerman 1983). However, not all the deterioration in financial reporting quality stems from intentional malpractice, unintentional errors may also contribute. Nonetheless, in these cases too, the accountability of management is important since it is responsible for establishing a properly functioning accounting system.

The measures of financial reporting quality used in the essays of this dissertation are introduced briefly here.

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[6] Dechow et al. (2010) discuss the different proxies for earnings quality examined in previous studies by categorizing them to earnings properties (earnings persistence, abnormal accruals, earnings smoothness, asymmetric timeliness and timely loss recognition, and target beating), investor responsiveness to earnings (the research on earnings response coefficient as a proxy for perceived earnings quality), and external indicators of earnings misstatements (for example, restatements and internal control weaknesses).

- In the USA the generally accepted accounting principles (GAAP) requires companies to restate previous financial statement(s), if it includes (either intentional or unintentional) material misstatement (e.g., DeFond and Jiambalvo 1991). Restatements explicitly indicate problems in the accounting system (violations of accounting principles), and hence, are used as a proxy for financial reporting quality (e.g., DeFond and Francis 2005).

- A vast number of previous studies have focused on the magnitude of abnormal accruals as a proxy for earnings quality. The basic idea is to distinguish abnormal accruals from the normal by modeling the expected accruals. The magnitude of abnormal accruals is considered to capture the problems in the accounting measurement system, and distortions that stem from discretion used in accrual choices or earnings management. Previous literature uses several different models to estimate abnormal accruals (e.g., Jones 1991; Dechow et al. 1995; DeFond and Park 2001; Dechow and Dichev 2002; McNichols 2002; Kothari et al. 2005; Ball and Shivakumar 2006).

- Real earnings management is not related to accounting issues per se, but refers to the manipulation of real operational activities such as inventory overproduction or reduction of discretionary expenses. These actions are departures from normal operating practices conducted to achieve financial targets, but which might have a negative effect on long-term company value (Roychowdhury 2006). Prior research has stated that real earnings management is extensively employed, because it is not easily detected or constrained by outsiders (e.g., Graham et al. 2005; Cohen et al. 2008). The most commonly examined real earnings management methods are inventory overproduction (proxied by abnormal levels of production costs), reduction of discretionary expenses (proxied by abnormal levels of discretionary expenses), and sales manipulation (proxied by abnormal levels of cash flows from operations).

Because of the risk of misstatements, users of financial statement information need assurance of the integrity of the accounting system and financial reporting. *Internal control over financial reporting* aims to prevent and/or detect errors or malpractice that could result in a misstatement in a financial statement (PCAOB 2007). However, if not properly established, maintained and developed, internal control may not serve its purpose. Consequently, the existence of internal control weaknesses can also be considered an indicator of low financial reporting quality, while effective internal control should manifest in high quality financial information. Internal control over financial reporting is further elaborated upon in section 3.

The task of *external auditing* is to provide reasonable assurance to the users of financial information that a client company's financial statements are fairly stated and free of material misstatement (e.g., Watts and Zimmerman 1986; Eilifsen and Messier 2000). However, the quality of an audit is not just about meeting legal and professional requirements, but it is rather a continuum that ranges between low and high quality (e.g., Francis 2004; Francis 2011). Audit quality as it relates to the provision of non-audit services by incumbent audit firm and auditor specialization is discussed in more detail in section 4.

3 INTERNAL CONTROL OVER FINANCIAL REPORTING

According to the Committee of Sponsoring Organizations of the Treadway Commission's (COSO) framework from 1992, the three objectives of internal control are 1) the effectiveness and efficiency of operations, 2) reliability of financial reporting, and 3) compliance with applicable laws and regulations. Naturally, an internal control process involves the risk that the objectives are not achieved (Kinney 2000). This dissertation concentrates on the risk of not achieving the second objective, and examines the effectiveness of internal control over financial reporting.

> *"Internal control over financial reporting is a process designed… to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes"* (PCAOB 2007).

Management is responsible for establishing and maintaining adequate internal controls, and ought to adopt an internal control framework to assist with both establishing internal controls and with evaluating the effectiveness of the control system (SOX 2002; SEC 2003a).[7] Because the management is accountable for the quality of financial information, internal controls can be considered a tool for management to alleviate the risk of not achieving the objective of reliable financial reporting due to errors or malpractice by the personnel, for instance. However, management itself has the incentives and opportunities to neglect its responsibility to establish a properly functioning internal control system. In accordance with the definition of internal control over financial reporting, ineffective internal controls may not be able to prevent or detect misstatements in financial information (e.g., DeFond and Jiambalvo 1991; Eilifsen and Messier 2000; PCAOB 2007; Doyle et al. 2007a; Ashbaugh-Skaife et al. 2008).

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[7] The most widely known internal control framework is the COSO (1992) framework, which comprises five components of internal controls: control environment sets the foundation for the entire internal control system, 'the tone at the top', and involves management's philosophy, human resources, policies and practices, among others; risk assessment involves the identification and assessment of the relevant risks in achieving objectives; control activities involves policies and practices to ensure that the risks are mitigated or eliminated and objectives are achieved; information and communication relates to the identification and communication of relevant information throughout the organization; monitoring involves the follow-up of the internal controls. COSO-ERM is a refined integrated framework that focuses on enterprise risk management. In addition to the components of the traditional COSO framework, the COSO-ERM framework includes also three other components to help with risk management: objective setting, event identification, risk response.

3.1 Section 404 of the Sarbanes-Oxley Act

Section 404 of the SOX focuses on improving companies' internal controls, and requires the management of companies under the authority of the Securities and Exchange Commission (SEC) to provide annual reports containing an internal control report. The internal control report must include a statement about management's responsibility for establishing and maintaining adequate internal control over financial reporting, and the management's assessment of the effectiveness of the internal controls. Any material weaknesses must be disclosed. A material weakness is defined as a significant deficiency, or combination of significant deficiencies, that results in more than a remote likelihood that a material misstatement of the interim or annual financial statements will not be prevented or detected (PCAOB 2007). Section 404 also requires that the company's external auditor attests to and reports on the assessment made by the management. In order to be able to render an opinion on the effectiveness of the client's internal controls, the auditor must plan and perform a comprehensive evaluation of them (PCAOB 2007).[8]

Section 404 became effective for the fiscal years ending after November 15, 2004 for accelerated filers (market capitalization of at least 75 million dollars). The SOX also includes Section 302, which became effective for fiscal years ending after August 29, 2002, and requires management to assess the effectiveness of disclosure controls and procedures on a quarterly basis. The quarterly certification should indicate that the management has evaluated the effectiveness of internal controls, as well as any significant changes in internal controls. The provisions of Section 302 are, however, somewhat less stringent than those of Section 404, as Ashbaugh-Skaife et al. (2007) note *"…under the provisions of Section 302, the review of internal control is subject to less scrutiny by both management and the auditor and the disclosure rules are less specific than subsequently exist under Section 404."*

Although there are some prior studies suggesting that Section 404 has achieved its objective of improving the quality of companies' financial reporting (e.g., Nagy 2010), it has also attracted considerable criticism, especially due to the high costs it has brought to companies and their auditors. Audit fees have risen substantially with the adoption of Section 404, since the scope of financial statement audits has widened, and auditor responsibility, and litigation risk due to investor expecta-

[8] External auditors follow the standards by the PCAOB in their internal control assessment, while management follows the guidance issued by the SEC (Schneider et al. 2009).

tions have increased (e.g., Raghunandan and Rama 2006; Krishnan et al. 2008; Hoag and Hollingsworth 2011). In 2007, Auditing Standard No. 2 was replaced by Auditing Standard No. 5 (AS5), which attempts to increase the efficiency of internal control evaluation. In particular, AS5 includes guidance on the "top-down risk-based" approach to internal control testing, which means that audit firms should focus on areas that include the most risk and they should scale audits based on the client company size and complexity (PCAOB 2007). Moreover, since 2007 smaller public companies have also started to report on their internal control effectiveness, but because of the concerns of high costs compared to benefits, external auditors' internal control reporting is not required (SEC 2010).[9]

3.2 Determinants and consequences of internal control weaknesses

The public internal control disclosures have enabled researchers to use large datasets to examine different aspects of internal control effectiveness. Companies disclosing internal control weaknesses are found to be smaller, riskier, more complex, and poorly performing in comparison to companies that have reported effective internal controls (e.g., Ge and McVay 2005; Ashbaugh-Skaife et al. 2007; Doyle et al. 2007b). That is, weaknesses appear to occur in companies that may have difficulties in investing in internal controls due to limited resources, for example. Moreover, companies with weak boards, audit committees, and financial management are more likely to have internal control weaknesses (Krishnan and Visvanathan 2007; Zhang et al. 2007; Hoitash et al. 2009; Li et al. 2010). Strong governance has the expertise and the will to invest in internal controls. The previous research also suggests that companies are more likely to remediate their internal control deficiencies if they have stronger governance and better financial performance (e.g., Goh 2009; Li et al. 2010; Johnstone et al. 2011). Bedard et al. (2012), however, point out that the likelihood of such remediation depends on the type of weakness, that is, some weaknesses are remediated more quickly.

Several studies have examined the consequences of having/disclosing weaknesses. As the aim of internal controls over financial reporting is to secure the reliability of financial information, prior literature has examined the association between the effectiveness of internal controls and financial reporting quality (Doyle et al.

[9] The first essay of this dissertation uses data on companies with auditor internal control reports, and the second and the third essay uses data that comprises both auditors' internal control reports and management-only internal control reports.

2007a; Chan et al. 2008; Ashbaugh-Skaife et al. 2008; Bedard et al. 2012). In general, the findings of these studies suggest that internal control weaknesses cause deterioration in financial reporting quality. Doyle et al. (2007a) find that the association is primarily driven by weaknesses in less auditable entity-level controls, while the association is not especially evident with account-specific internal control weaknesses. Chan et al. (2008) provide marginally significant evidence that companies with material weaknesses have greater discretionary accruals. Ashbaugh-Skaife et al. (2008) report that accruals quality is better in companies remediating weaknesses compared to companies continuing to disclose internal control weaknesses, and Bedard et al. (2012) suggest that the significant impact of the material weakness remediation on abnormal accruals depends on the type of the weakness.

According to the agency theory view on internal controls, a company's public disclosures should matter to users of financial statement information. Prior research has examined the impact of internal control disclosures on equity markets, and found that these disclosures do affect investors' risk assessment, stock returns, and companies' cost of equity (Beneish et al. 2009; Ashbaugh-Skaife et al. 2009; Lopez et al. 2009; Rezee et al. 2012). Previous studies investigating debt holders' reactions to internal control reports have documented that internal control weaknesses affect loan officers' risk assessment (Schneider and Church 2008) and cost of debt (Kim et al. 2011). In addition to the research investigating equity and debt market reactions, Su et al. (2014) found that customer demand decreases after internal control weaknesses are disclosed.

Considering the negative consequences of internal control weaknesses on financial reporting quality, and equity and debt markets, the impact of internal control effectiveness on auditors' risk assessment and audit fees has been discussed in prior studies. When designing the audit process, auditors need to carefully evaluate risks involved to that specific audit engagement in order to plan the required audit effort, and to reduce overall risk to an acceptable level (e.g., O'Keefe et al. 1994; Johnstone and Bedard 2001).[10] Thus, high levels of perceived risk increase

[10] The risks that auditors need to consider can be categorized into a client's business risk, an auditor's business risk, and an audit risk (e.g., Johnstone 2000). The client company business risk is the risk that the client's economic condition will deteriorate in the short or long term; the auditor business risk is the risk that the audit firm will suffer a loss resulting from the engagement (either through a lack of engagement profitability, loss of reputation, or via future litigation); the audit risk is the likelihood of undetected material misstatements in a client's financial statements. Furthermore, audit risk comprises inherent risk (the risk of material misstatements), control risk (the risk that material misstatements will not be prevented or detected

audit effort (and possibly induce a fee premium due to heightened litigation risk), and results in higher audit fees (Simunic 1980; Simunic and Stein 1996). Raghunandan and Rama (2006), Hoitash et al. (2008) and Hogan and Wilkins (2008), for example, found strong evidence on the positive association between internal control weaknesses and audit fees.

3.3 Pervasiveness of internal control weaknesses

Since management is responsible for establishing and maintaining adequate internal controls, it could be argued that the effectiveness or ineffectiveness of an internal control system stems from (and reflects) the competence and overall attitude of management toward internal controls and financial reporting quality (i.e., 'the tone at the top'). Consequently, problems in the control environment could be expected to be pervasively reflected, for example, in internal control assessments and in the credibility of those assessments, and in the operational decisions by the management.

Rice and Weber (2012) show that some existing material weaknesses remain unacknowledged (undiscovered and undisclosed). They suggest that whether material weaknesses are actually acknowledged depends on the incentives for detection and disclosure. Moreover, Bedard and Graham (2011) point out that judging whether the internal control weakness should be designated material is difficult, because of the ambiguity in the definition of materiality. Thus, there are challenges for reliable assessment of internal control effectiveness. The pervasiveness of internal control weaknesses and the challenges in evaluating internal controls are discussed in the first essay, which examines whether the low financial reporting quality of companies disclosing Section 404 material weaknesses persists into the period after the last material weakness disclosure. In particular, the essay investigates whether companies will continue to have a higher likelihood of misstatement in financial information in the post-MW404 period compared to companies without a history of disclosed material weaknesses.

Recent research on internal controls suggests that, in addition to the direct link to accounting quality, material weaknesses may have spillover effects to operations too (Cheng et al. 2013; Bauer et al. 2014; Feng et al. 2015). Considering the governance problems in companies with internal control weaknesses (e.g., Zhang et

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by internal controls), and detection risk (the risk that auditor fails to detect material misstatements) (e.g., Eilifsen and Messier 2000).

al. 2007; Hoitash et al. 2009; Skaife et al. 2013) and the importance of the 'tone at the top' in developing internal control process, material weaknesses could be expected to reflect such a business environment, which is permissive to manipulation of real activities to manage earnings. Therefore, not only do internal control weaknesses increase the probability of accounting misstatements, but they also might be associated with real earnings management. The second essay investigates whether the *existence* of material weaknesses in internal controls manifests in real earnings management behavior and whether the subsequent year's *disclosure* of the weaknesses induces company management to employ real earnings management methods.

4 AUDIT QUALITY

The stakeholders of the financial reporting process have different expectations of external auditing, and thus, there is no unanimous agreement on the definition of audit quality (Watkins et al. 2004; Francis 2011; Knechel et al. 2013). Similar to many prior studies, this dissertation adopts the perspective of the users of financial statements, and explores audit quality in the context of client companies' financial reporting quality. Audit outcome, and hence, audit quality itself is unobservable (Knechel et al. 2013). Consequently, the observable audit outputs, audited financial statements and audit reports, have been utilized in prior archival research to examine quality and to test hypotheses (e.g., Francis 2011). The underlying assumption in the fourth essay is that better quality audits should be manifested in better quality financial reporting (for example, smaller abnormal accruals). The third essay takes another approach to audit quality in the context of financial reporting quality. That is, when solely examining client companies with low financial reporting quality, high quality auditing should lead to a greater likelihood of acknowledging existing problems/bias/errors, for example, discovering misstatements or material weaknesses.

Before the audit report and financial statement are issued, the preceding audit process involves a number of phases, which all require judgment and decision-making: risk assessment, internal control evaluation, analytical procedures, obtaining and assessing audit evidence, testing, and reviewing (Knechel et al. 2013). The quality of the audit process is dependent on the quality of judgments during each phase. Risk assessment, for example, is vital to the entire audit process, affecting internal control evaluation, the nature and extent of the audit procedures, and testing. However, the judgments are affected by the various circumstances that auditors face (e.g., an audit firm's economic dependence on a client) and by the auditors' individual characteristics (e.g., auditor domain-specific knowledge) (Knechel et al. 2013). The circumstances and personal characteristics influence the probability that an auditor will both discover a breach in a client's accounting system (implying expertise and audit effort) and disclose that breach (implying objectivity and independence), which is the most commonly used definition of audit quality (DeAngelo 1981). The following sections discuss audit quality in the context of non-audit services provided by an incumbent audit firm, and auditor specialization in building expertise.

4.1 Non-audit services and audit quality

Over the last few decades, audit firms have expanded their businesses to include consultancy services, such as those addressing taxation, mergers and acquisitions, and risk management. Audit quality research has investigated two conflicting hypotheses on the association between non-audit services provided by incumbent audit firms and audit quality.

1. The knowledge spillover view holds that information acquired in consulting flows to the audit partner, improving audit quality.

2. The economic dependence view holds that non-audit fees increase an auditor's economic dependence on the clients, thereby impairing audit quality.

Overall, the previous studies investigating the association between non-audit fees and audit quality have provided mixed results (Schneider et al. 2006). The findings of Frankel et al. (2002), Kanagaretnam et al. (2011), and Rice and Weber (2012) suggest that non-audit fees jeopardize auditor independence and result in a lower audit quality. However, DeFond et al. (2002), Ashbaugh et al. (2003), Chung and Kallapur (2003), and Reynolds et al. (2004) do not find a statistically significant association between non-audit fees and audit quality. Prior research has also investigated whether investors perceive the quality-enhancing or quality-deteriorating effects of incumbent audit firm-provided non-audit services. Studies examining earnings response coefficients (e.g., Krishnan et al. 2005), market valuation of earnings surprise (Francis and Ke 2006), and cost of equity capital (Khurana and Raman 2006) suggest that investors do perceive non-audit fees to be a threat to auditor independence. However, Gosh et al. (2009) do not find a significant association between non-audit fees and perceived auditor independence.

Particularly after the accounting scandal of Enron and its audit firm Arthur Andersen, investors and regulators became concerned over the magnitude of the fees paid to incumbent audit firms for their non-audit services. Consequently, the SOX (2002) prohibits audit firms from offering audit and certain non-audit services to the same client on a concurrent basis. Because of the potential benefits from knowledge spillover, the SOX permits the provision of tax services. There are, however, certain specific requirements for incumbent audit firms providing tax services, such as an audit committee's pre-approval of the tax services, a separate disclosure of the amount of non-audit fees paid by type of the service (audit-related fees, tax fees, other fees) and limitations to the scope of the consulting (SEC 2003b; PCAOB 2005).

Since the restrictions on the non-audit services provided by incumbent audit firms were established, the research has focused on examining tax services. The findings of these prior studies indicate that tax services are associated with a reduced likelihood of restatements (Kinney et al. 2004), and of tax-related restatements (Seetharaman et al. 2011), with a greater likelihood of a going concern opinion prior to bankruptcy filing (Robinson 2008), with reduced discretionary accruals (Choi and Lee 2009), a reduced likelihood of loss avoidance (Krishnan and Visvanathan 2011), improved estimates for tax reserves (Gleason and Mills 2011), the value-relevance of earnings (Krishnan et al. 2013), and a reduced likelihood of non-tax internal control weaknesses (Harris and Zhou 2013). In summary, these studies support the knowledge spillover hypothesis. Moreover, Huang et al. (2007) found mostly insignificant associations between tax fees and proxies for financial reporting quality (some weak evidence of lower abnormal accruals and insignificant association with meeting or beating earnings benchmarks). However, a few prior studies have found indications suggesting that tax fees may negatively affect audit quality. Using an experiment, Favere-Marchesi (2006) found that the joint provision of audit and tax services led to significantly lower fraud-risk assessments. Paterson and Valencia (2011) found that the recurring tax services provided by audit firm create knowledge spillover, but nonrecurring tax services seem to have a detrimental impact on auditor independence.

The issue of tax-related fees and financial reporting quality is examined in the third essay. The study specifically focuses on a sample of companies that all have poor financial reporting quality (misstatements in financial information), and investigates whether tax services being provided by incumbent audit firms enhance or impair the likelihood that the client company acknowledges the low financial reporting quality.

4.2 Individual auditor specialization and audit quality

Knechel et al. (2013) refer to an audit as a knowledge-based professional service. Thus, audit performance is affected by the quality of judgments, and hence, the expertise of individual auditors. Expertise is determined by a person's innate abilities (problem-solving abilities) and knowledge (e.g., Bonner and Lewis 1990; Libby 1995). Although education and training develop knowledge, experience and extensive practice are required to acquire expertise in auditing (e.g., Bonner and Lewis 1990; Bédard and Chi 1993; Libby 1995).

An expert can be characterized as an individual with specialized knowledge of the domain (Bédard and Chi 1993). That is, in order to gain expertise, a person must

acquire specialized knowledge in addition to more general knowledge (e.g., Bonner and Lewis 1990; Bedard and Biggs 1991; Bedard and Chi 1993). Specialization acquired by auditing similar types of client companies can foster domain-specific knowledge and in-depth expertise, and result in high quality auditing (e.g., Bonner and Lewis 1990; Libby 1995; Bedard and Chi 1993; Bedard and Biggs 1991; Zerni 2012). Prior studies examining auditors' domain-specific knowledge have primarily examined the specialization in auditing specific industries. The findings of these studies generally indicate higher audit fees charged (Craswell et al. 1995; Zerni 2012) and higher quality auditing (Owhoso et al. 2002; Hammersley 2006; Chin and Chi 2009; Reichelt and Wang 2010; Chi and Chin 2011; Gul et al. 2009; Lim and Tan 2008; Lim and Tan 2010) by industry-specialist auditors.

The majority of the previous archival auditing research has investigated audit quality at the firm-level (e.g., Simunic 1980; Becker et al. 1998; Francis and Krishnan 1999; Balsam et al. 2003). The underlying assumption in these studies is that quality relates to the audit firm's brand name and that knowledge can be distributed across audit offices (e.g., Becker et al. 1998; Francis and Krishnan 1999; Balsam et al. 2003). However, as audit performance depends on the expertise of individual auditors (e.g., Bonner and Lewis 1990), more recent archival research has studied audit quality at the office-level (e.g., Ferguson et al. 2003; Francis et al. 2005; Reichelt and Wang 2010) and at the individual partner-level (e.g., Chin and Chi 2009; Chi and Chin 2011; Zerni 2012). Accordingly, recent research suggests that audit partners' characteristics affects audit quality (Carey and Simnett 2006; Gul et al. 2009; Chin and Chi 2009; Chi and Chin 2011; Zerni 2012; Knechel et al. 2015). In terms of industry specialization, the findings of Chin and Chi (2009), for example, indicate that an individual audit partner's industry specialization is associated with higher quality financial reporting of client companies, but the audit-firm level industry specialization does not of itself lead to better quality auditing.

Zerni (2012) points out that audit firms organize their business lines, not only based on industry sectors, but also according to criteria like client size and ownership structure. However, there is a lack of research on other dimensions of specialization in determining domain-specific knowledge. An exception is the study by Zerni (2012) that finds that both auditor industry specialization and specialization in auditing public companies are associated with higher audit fees. Extending the research on auditor specialization, the fourth essay examines the association between an individual audit partner's public-client specialization and audit/financial reporting quality.

5 SUMMARY OF THE ESSAYS

5.1 The persistence in the association between Section 404 material weaknesses and financial reporting quality

The first essay investigates whether MW404 disclosures are predictive of future financial reporting quality. In particular, the paper examines whether the low financial reporting quality of MW404 companies persists into the post-MW404 period. Given that changing organizational policies takes time (Kotter 1995) it is intuitively appealing to assume that this kind of persistence occurs. Because material weaknesses in internal controls carry a threat that material misstatements are not detected in a timely manner, the current study relies on the view that an incidence of a misstatement indicates a failure in a company's internal controls (e.g., Eilifsen and Messier 2000; Leone 2007; Rice and Weber 2012). If companies in the post-MW404 period have not yet reached as high level of internal control effectiveness as companies without a history of MW404s, the likelihood of incidences of misstatement would be higher in the post-MW404 period too.

The empirical findings indicate that there is a greater likelihood of undiscovered material misstatements in financial information among MW404 companies and companies in the post-MW404 period compared to companies without a history of MW404s (referred to as EIC companies, i.e., companies with effective internal controls). On average, the greater likelihood of misstatements is estimated to persist for two years. That is, in the two years immediately following the last MW404 disclosure, internal control over financial reporting is still not as effective at preventing or detecting misstatements in a timely manner as it is in EIC companies. The magnitude of the effect, however, decreases non-linearly (i.e., first rapidly then slowly).

When exploring the possible explanations for the empirical findings, the additional descriptive analysis provides some evidence that companies with undiscovered misstatements in the post-MW404 period have previously disclosed more entity-level internal control problems (multiple account-specific MW404s, and entity-level MW404s related to accounting personnel training and competence, year-end adjustment, and untimely or inadequate account reconciliations) compared to those companies without undiscovered misstatements. More interestingly, the exploration reveals that the majority of the misstatements in the post-MW404 period are unrelated to the previously disclosed account-specific MWs. It appears that many companies with misstatements in the post-MW404 period have even

more pervasive internal control problems than reported in the last MW404 disclosure.

Overall, the findings of this study indicate that in the post-MW404 period, there is a greater likelihood of existing control problems remaining unacknowledged. It might be that management's assertion of the effectiveness of internal controls is too easily accepted by some auditors. Moreover, due to insufficient expertise and/or lack of resources, some auditors might concentrate their effort on the previously discovered MW problem and not adequately examine other aspects of financial reporting. These inferences bring additional insights to the problem of undiscovered and undisclosed control weaknesses, suggesting the need to develop auditors' competence in evaluating the effectiveness of internal control over financial reporting.

5.2 Real earnings management before and after reporting SOX 404 material weaknesses

The second essay investigates whether the existence of Section 404 material weaknesses manifests in real earnings management behavior and/or whether the disclosure of material weaknesses induces company management to employ real earnings management. Firstly, it is examined whether real earnings management is employed in company years with ineffective internal controls based on a subsequent SOX 404 internal control report – that is, material weaknesses exist, but have not yet been disclosed. Because of management responsibility for establishing and maintaining adequate internal controls (SOX 2002), weaknesses in internal controls implicitly create doubts about management's competence and its attitude toward financial reporting and/or in extreme cases, even its integrity. Material weaknesses particularly reflect pervasive problems in the control environment (e.g., Zhang et al. 2007; Hoitash et al. 2009), and thus these weaknesses might stem from the 'tone at the top'. More recent studies on internal control effectiveness suggest that weaknesses in internal control over financial reporting have spillover effects to operations (Cheng et al. 2013; Bauer et al. 2014). The existence of material weaknesses could hence be expected to reflect such a business environment, which is permissive to real earnings management. Moreover, given that material weaknesses per se frequently reduce the quality of internal information (Feng et al. 2015), it is possible that management is making (unintentionally) poor operational decisions based on this information, which manifest in greater real earnings management.

The essay goes on to examine whether companies disclosing material weaknesses relating to the prior period have higher levels of real earnings management. Higher levels of real earnings management could be expected in companies that have recently attracted bad publicity due to material weakness disclosures. Prior research has shown that the disclosures of internal control deficiencies are perceived negatively in debt and equity markets (e.g., Ashbaugh-Skaife et al. 2009; Kim et al. 2011), and lead to a decline in customer demand (Su et al. 2014). The negative consequences anticipated from material weakness disclosure (e.g., negative investor reactions, increased cost of debt, or impact on personal reputation) mean management could be expected to strive to mitigate these concerns and therefore have an incentive for earnings management by manipulating real operational activities, which is not something easily detected or constrained by outsiders.

The sample used in this study comprises fiscal year observations of US listed companies from 2004 to 2012. The real earnings management methods investigated are inventory overproduction (proxied by abnormal levels of production costs), reduction of discretionary expenses (proxied by abnormal levels of discretionary expenses), and sales manipulation (proxied by abnormal levels of cash flow from operations) (Roychowdhury 2006). The main analyses are additionally conducted using a propensity-score matched sample.

The empirical findings indicate that companies with material weaknesses in their internal controls have higher levels of real activities manipulation (particularly inventory overproduction but also the reduction of discretionary expenses) compared to companies with effective internal controls. This implies that the weak commitment by management to provide effective internal control systems and high quality financial information relates to a tendency to use real earnings management methods and also impairs management's real operational decisions. Furthermore, the empirical results indicate that companies employ real earnings management (overproduction and reduction of discretionary expenses) after disclosing a previous year's material weaknesses. It appears that the public disclosure of material weaknesses induces management to strive to manage the expected negative reactions of stakeholders to the disclosure by engaging in real earnings management, which is not easily detected or constrained by outsiders. Overall, this study suggests that material weaknesses in internal controls signal an environment where management is more inclined to employ real earnings management.

5.3 Incumbent audit firm-provided tax services and clients with low financial reporting quality

The third essay investigates whether tax services provided by incumbent audit firms enhance or impair the likelihood of acknowledging client companies' low financial reporting quality. As discussed in Section 4.1, SOX (2002) prohibits audit firms from providing most non-audit services to their audit clients, but permits tax services due to the potential benefits from knowledge spillover. This study approaches the issue of incumbent audit firm-provided tax services by using a sample of companies with poor financial reporting quality, that is, companies with misstatements. The misstatements are determined from the restated periods indicated by restatement data. First, the essay investigates whether tax fees are associated with restatement lags, in other words, those misstatements in financial information that remain undiscovered in a particular fiscal year. That is, the companies with a restatement lag are compared to those companies with misstatements more quickly restated. Second, the essay investigates whether tax fees are associated with the likelihood of Section 404 internal control weakness disclosures among companies with misstatements. Based on the view that an incidence of a misstatement indicates underlying internal control weaknesses (e.g., Eilifsen and Messier 2000; Rice and Weber 2012), material weakness disclosures would suggest greater scrutiny by auditors. The research setting featured a sample of similar companies in terms of poor accounting quality, allows examining the auditors' professional skepticism in particular. Enhanced knowledge of the client acquired via the provision of tax services could make restatements more timely and material weakness disclosures more likely for companies with poor accounting quality. However, economic dependence may disrupt an auditor's professional skepticism, resulting in restatement lags and unacknowledged control problems.

The inferences of the findings in prior studies investigating the association between tax services being provided by an incumbent audit firm and financial reporting quality largely support the knowledge spillover view. For example, Kinney et al. (2004) suggest that tax fees reduce the likelihood of restatements, implying there are benefits from knowledge spillover. Seetharaman et al. (2011), however, report an insignificant association between tax fees and restated periods, but a significant negative association with tax-related restatements. These studies examine whether or not restatements/misstatements occur. Harris and Zhou (2013) suggest that tax consulting leads to a reduced likelihood of non-tax-related internal control weaknesses but does not have an effect on tax-related weaknesses. Lower likelihood of internal control weakness disclosures could, however, also indicate a reluctance to disclose weaknesses. Rice and Weber (2012) exam-

ine a sample of companies with existing internal control weaknesses and conclude that larger non-audit fees makes it less likely that material weaknesses are disclosed, supporting the economic dependence view. The current study extends the findings of these prior studies and investigates the role of tax services being provided by audit firm among companies with poor financial quality, using a sample of fiscal-year observations of US companies from 2005–2012.

The empirical findings indicate that higher tax-related fees are associated with a reduced likelihood of SOX 404 internal control weakness disclosures for companies with misstatements, implying that underlying control problems are unacknowledged. However, the findings suggest that just providing both audit and tax services does not itself have an impact on audit quality, but rather it is the magnitude of the tax-related fees in particular that counts. The results also provide modest evidence suggesting that lower levels of tax-related fees are associated with a lower likelihood of restatement lags, that is, misstatements are restated in a more timely manner. Overall, the findings of this study provide some evidence suggesting that, among companies with poor accounting quality, greater economic bond with the clients might impair auditors' professional skepticism. In other words, auditors' scrutiny of their client is weaker when the magnitude of fees generated from tax services provided to that client is higher.

5.4 Audit partner public-client specialization and client abnormal accruals

The fourth essay examines whether the extent an audit partner specializes in public-clients is associated with abnormal accruals, a proxy for client companies' audit quality/financial reporting quality. Prior research has provided extensive evidence of the effects of audit firm or local audit office-level characteristics on both audit quality (e.g., Reynolds and Francis 2001; Balsam et al. 2003; Krishnan 2005; Reichelt and Wang 2010) and audit fees (e.g., Craswell et al. 1995; Ferguson et al. 2003). However, the empirical evidence on how individual audit partner specialization affects client financial reporting outcomes is limited due to the wide-spread absence of audit partner signature on audit reports, which would enable the identification of individual partners with specific client engagements.

Prior research has mainly investigated auditors' specialization in different industries, and audit partner industry specialization has been found to be positively associated with audit quality (Chin and Chi 2009; Chi and Chin 2011). Specialization in public companies is another means to gain domain-specific knowledge (Zerni 2012). Auditing public-clients requires specialist knowledge of the relevant

financial reporting and auditing requirements. Zerni (2012) finds that both industry specialization and specialization in public companies are associated with higher audit fees. However, prior research has not investigated whether public-client specialization is associated with actual audit outcomes that are indicative of higher quality. In addition to the enhanced expertise achieved through public-client specialization, the willingness to resist client pressure is likely to increase with the number of public clients in the partner's portfolio as the partner's dependence on any one client diminishes, which should help to ensure audit quality (Johnstone et al. 2001).

This study uses a sample of 420 company-year observations from the NASDAQ OMX Exchange in Finland. The identities of audit partners assigned to public-client engagements are linked with client financial statement data. The findings reveal a negative association between greater public-client specialization and absolute abnormal working capital accruals. Moreover, the findings indicate that the negative association between public-client specialization and abnormal accruals only occurs for partners with three to six public clients; a moderate level of public-client specialization appears optimal, and the busyness that goes with having a high level of such specialization appears to mitigate the knowledge and independence benefits associated with this type of specialization. Finally, the results reveal that companies audited by partners with a higher level of public-client specialization have significantly smaller income-decreasing abnormal accruals. In the setting with high-tax and high-alignment between financial reporting and tax accounting, auditors with a greater public-client specialization might be more likely to recognize the negative reputational implications of their clients' aggressive tax minimization strategies and discourage income-decreasing earnings management. Overall, this study suggests that audit partner public-client specialization is associated with improved audit quality, reveals the extent of public-client specialization that appears to be optimal, and the nature of earnings management that is mitigated by partner public-client specialization.

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The Persistence in the Association between Section 404 Material Weaknesses and Financial Reporting Quality,

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REAL EARNINGS MANAGEMENT BEFORE AND AFTER REPORTING SOX 404 MATERIAL WEAKNESSES♦

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ABSTRACT

The purpose of this study is to investigate whether the *existence* of SOX section 404 material weaknesses manifests in real earnings management behavior and/or whether the *disclosure* of material weaknesses induces company management to employ real earnings management. First, the empirical findings indicate that companies with material weaknesses in their internal controls engage in more manipulation of real activities (particularly inventory overproduction, but also reduction of discretionary expenses) compared to companies with effective internal controls. This implies that the weak commitment by management to provide effective internal control system and high quality financial information relates to a tendency to use real earnings management methods and also impairs management's real operational decisions. Second, the empirical results indicate that companies employ real earnings management (overproduction and reduction of discretionary expenses) after disclosing previous year's material weaknesses. It appears that the public disclosure of material weaknesses induces management to strive to mitigate the expected negative reactions of stakeholders to the disclosure by engaging in real earnings management, which is not easily detected or constrained by outsiders. Overall, this study suggests that material weaknesses in internal controls signal an environment where management is more inclined to employ real earnings management.

Keywords: internal control, material weakness; real earnings management

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1 Introduction

The past two decades have seen a series of well-publicized failures of corporate governance, some being related to accounting scandals, some to the financial crisis. Such failures make it essential for both the financial markets and accounting research to improve the understanding of internal control effectiveness; of the pervasiveness of control issues; and of how they relate to earnings management behavior.[1] Utilizing internal control reports mandated by Section 404 of the Sarbanes-Oxley Act (SOX) of 2002, this study investigates whether the *existence* of material weaknesses in internal controls manifests in real earnings management behavior, and whether the subsequent *disclosure* of weaknesses induces management to employ real earnings management methods.[2] Real earnings management refers to the manipulation of real operational activities to achieve certain financial goals, which do not necessarily enhance long-term company value but are instead likely to decrease future cash flows (e.g., Roychowdhury 2006). Real earnings management, as opposed to accrual-based earnings management, is not related to accounting issues *per se*. Consequently, real earnings management can be fully executed within the generally accepted accounting principles (GAAP), and (after the proper disclosure of these transactions in the financial statements) does not necessarily fall within the purview of auditors or regulators (Cohen et al. 2008; Kim et al. 2010). Considering the wide-ranging use of real activities manipulation to manage earnings instead of or in addition to accounting manipulation (e.g., Graham et al. 2005; Cohen et al. 2008) and the pervasive problems in the control environment and governance in companies with internal control weaknesses (e.g., Zhang et al. 2007; Hoitash et al. 2009; Skaife et al. 2013), it is interesting to examine whether real earnings management is greater in companies with material internal control weaknesses.[3]

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[1] Related to internal controls in general, it is stated in a report of global survey on risk management and internal control that *"Strong risk management and internal control systems are crucial to strengthening the governance of organizations, and therefore the global financial infrastructure, and helping to prevent future crises."* (PAIB 2011)

[2] Section 404 requires Securities and Exchange Commission (SEC) registrants' managers to assess and report on the effectiveness of internal control over financial reporting, and to disclose the existence of any material weaknesses. Moreover, companies' auditors must also evaluate and report on the effectiveness of internal controls. Section 404 became effective for fiscal years ending after November 15, 2004 for the largest companies (market capitalization of at least 75 million dollars). Since 2007, SEC has required also smaller public companies to report on internal control effectiveness, but do not require external auditors internal control reporting. Thus, the data used in this study comprises both auditors' internal control reports and management-only internal control reports.

[3] Although Chan et al. (2008), for example, have found some evidence of accrual-based earnings management in companies with material weaknesses, the current study takes a broader per-

First, we examine whether real earnings management is employed in company years with ineffective internal controls based on subsequent SOX 404 internal control report. That is, material weaknesses exists, but have not yet been disclosed. We particularly scrutinize situations where material weaknesses were disclosed for the first time, so as to explore the impact of the existence of weaknesses without the possibly confounding effect arising from previous material weakness disclosures. Internal control systems are designed and implemented by the management (COSO 1992; SOX 2002), and consequently, weaknesses in internal controls implicitly create doubts about management's competence and its attitude toward financial reporting and/or in extreme cases, even its integrity. Material weaknesses particularly reflect pervasive problems in the control environment, and thus these weaknesses might stem from the 'tone at the top'. As prior research suggests, low quality governance characteristics are associated with the presence of material weaknesses (e.g., Zhang et al. 2007; Hoitash et al. 2009). Recent studies also suggest that weaknesses in internal control over financial reporting have spillover effects to operations (Cheng et al. 2013; Bauer et al. 2014). The existence of material weaknesses could hence be expected to reflect such a business environment, which is permissive to real earnings management. Moreover, given that material weaknesses *per se* frequently give rise to lower quality *internal* information (Feng et al. 2015), it is possible that management is (unintentionally) making poor operational decisions based on this information, which manifest in greater real earnings management.

Second, we examine whether companies disclosing previous year's material weaknesses have higher levels of real earnings management. Higher levels of real earnings management could be expected in companies that have recently attracted bad publicity due to material weakness disclosures. Prior research has shown that disclosures of internal control deficiencies are perceived negatively in debt and equity markets (e.g., Ashbaugh-Skaife et al. 2009; Kim et al. 2011). Moreover, Su et al. (2014) report a decline in customer demand following the disclosure of internal control weaknesses. Because of the negative consequences anticipated from the disclosure of material weakness (e.g., negative investor reactions, increased cost of debt, or impact on personal reputation), management could be expected to strive to mitigate these effects and therefore have an incentive for earnings management executed by the manipulation of real operational activities, which is not easily detected or constrained by outsiders. Therefore, inducing a short-term in-

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spective on the influence of material weaknesses by examining whether also operational activities fall under the sphere of influence of internal control effectiveness, not only accounting issues.

crease in earnings by real earnings management in an attempt to mitigate the negative reactions to material weakness disclosures might be perceived to outweigh the risk posed by real earnings management being detected.

Using a sample of fiscal year observations of US listed companies from 2004 to 2012, we examine whether real earnings management is greater in companies 1) having material weaknesses for the first time (existence), 2) disclosing material weaknesses for the first time and subsequently disclosing a clean 404 report (disclosure), and 3) disclosing material weaknesses for the first time and continuing to have material weaknesses based on a subsequent internal control report[4]. Our control group consists of companies without a history of material weakness disclosures (i.e., companies that have always had effective internal controls based on 404 reports). The main analyses are also conducted using a propensity-score matched sample. The real earnings management methods investigated are inventory overproduction (proxied by abnormal levels of production costs), reduction of discretionary expenses (proxied by abnormal levels of discretionary expenses), and sales manipulation (proxied by abnormal levels of cash flows from operations) (Roychowdhury 2006). For each method, we use three measures: the basic real earnings management measures introduced by Roychowdhury (2006) and two other measures where the basic measures have been adjusted by performance.[5]

The empirical findings of this study suggest that the existence of material weaknesses and the disclosure of those weaknesses are related to more extensive real earnings management than in companies that have always had effective internal controls. First, companies with existing material weaknesses appear to be using overproduction as a real earnings management method. This implies that, although the association may stem from the behavior of an opportunistic management, the poor 'tone at the top' may also flow through to inventory-related operational decisions via low quality internal information that results from material weaknesses (see Feng et al. 2015). The existence of material weaknesses is also related to the reduction of discretionary expenses, but the significance of that relationship appears to be somewhat smaller. Moreover, we find only modest evi-

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[4] The third group captures both effects: the existence of material weaknesses and the disclosure of material weaknesses. Therefore, the indicator variable for this group is merely used to provide supplemental information.

[5] The first performance-adjusted measures are calculated by adding lagged return on assets to the estimation models of real earnings management measures. The second performance-adjusted measures are calculated by subtracting the mean values of real earnings management measures of matched control companies based on year, industry, and return on assets (e.g., Kim and Park 2014).

dence on the association between the existence of material weaknesses and sales manipulation.

Second, companies disclosing material weaknesses and subsequently disclosing a clean internal control report also use inventory overproduction and reduction of discretionary expenses as real earnings management methods. In particular, cutting discretionary expenses seems likely to be the most feasible real earnings management method after disclosure. The results do not, however, indicate that material weakness disclosure is associated with sales manipulation. This insignificance might be related to the reduction in customer demand following the disclosure of an internal control weakness (Su et al. 2014). Thus, sales manipulation is not a workable real earnings management method for companies with material weaknesses. Finally, companies disclosing material weaknesses and subsequently continuing to disclose material weaknesses employ inventory overproduction to manage earnings, but there is also some evidence on reduction of discretionary expenses among these companies.

To provide additional evidence on the incentives for real earnings management among material weakness companies, we examine whether the associations between material weakness/material weakness disclosure companies and real earnings management differ based on previous-year performance. These findings primarily indicate that when the sample consists of previously poorly performing companies, the *existence* (but not the disclosure) of material weaknesses is associated with inventory overproduction and reduction of discretionary expenses. That is, although the motivation is similar (previous poor performance), the management of a material weakness company employs real earnings management methods. When the sample consists of previously better performing companies (i.e., the sample companies do not have a clear performance-related incentive to manage earnings), the companies *disclosing* material weaknesses are utilizing overproduction and reduction of discretionary expenses, suggesting that the negative publicity of material weakness disclosures induces management to manipulate real operational activities to manage earnings. There is also, however, some modest evidence of sales manipulation among poor performing companies that disclose material weaknesses, and among better performing companies with existing material weaknesses.

This study contributes to the research on internal control over financial reporting and the research on earnings management. First, while previous studies have found evidence for a relationship between internal control deficiencies and earnings management through accrual-manipulation/accrual quality (e.g., Chan et al. 2008; Doyle et al. 2007a; Ashbaugh-Skaife et al. 2008), the current study investi-

gates another possible method, namely real earnings management. In particular, the findings on the impact of material weaknesses on real earnings management behavior imply the pervasiveness of control issues in companies with material weaknesses. That might reflect a direct tendency to use real earnings management methods or decisions made based on biased internal accounting information (nevertheless caused by management's failure to establish an adequate control system). These findings therefore offer insights into the issue of the pervasive nature of control problems and spillover effects to operations that have been discussed in prior studies (e.g., Skaife et al. 2013; Cheng et al. 2013; Feng et al. 2015; Bauer et al. 2014; Myllymäki 2014).

Second, this study extends the literature on the effects of internal control disclosures (e.g., Ashbaugh-Skaife et al. 2009; Beneish et al. 2009; Kim et al. 2011; Rezee et al. 2012; Clinton et al. 2014; Su et al. 2014) and provides new information about greater real earnings management in companies after a material weakness disclosure, suggesting that incentives for real earnings management exist due to the expected negative effects of such disclosures. Third, this study contributes to the real earnings management literature (e.g., Roychowdhury 2006; Cohen et al. 2008; Cohen and Zarowin 2010; Gunny 2010; Badertscher 2011; Chi et al. 2011; Zang 2012; Kim and Park 2014) by indicating that material weaknesses in internal controls signal an environment where management is more susceptible to real earnings management behavior, which may subsequently incur costs for stockholders by decreasing company value in the longer term. Overall, our study provides further insights on pervasive governance problems that may exist in companies with material weaknesses by documenting how operational activities fall under the sphere of influence of internal control effectiveness.

The remainder of the paper is organized as follows. Section two discusses the relevant prior studies, and reasoning behind the hypotheses. Section three describes the data and methodology. The empirical findings are reported in section four. Section five concludes the paper.

2 Background and development of the hypotheses

Healy and Wahlen (1999) define earnings management in the following way:

> *"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying eco-*

> *nomic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."*

According to the survey results of Graham et al. (2005), managers consider meeting or exceeding financial objectives to be very important, although the ways in which they do so might have a negative effect on the company's future value. The primary incentives for managers to meet short-term objectives are stock prices and career and reputation concerns (Graham et al. 2005). Prior research on earnings management has primarily concentrated on investigating accrual-based earnings management, which relates to the discretion that management employs in applying an accounting method (Zang 2012). In addition to accrual-based earnings management, more recent research has considered whether management might apply earnings management through operational decisions, that is, real activities manipulation (e.g., Graham 2005; Roychowdhury 2006; Badertscher 2011; Zang 2012).

Real activities manipulation relates to departures from normal operating practices (Roychowdhury 2006). According to Roychowdhury (2006), these departures do not necessarily enhance the long-term company value, although they enable the company to meet certain financial reporting targets. That is, the stakeholders are misled into believing that normal business operations led to the achievement of the goals. However, the manipulation of current earnings might have a negative effect on cash flows in the future periods (Roychowdhury 2006). Real earnings management methods available to managers are, for example, acceleration of sales through aggressive price discounts or more lenient credit terms, overproduction, and cutting discretionary expenditure (Roychowdhury 2006). These actions increase earnings in the current period, but most likely result reducing cash flows in the longer term. The recent research on real activities manipulation is primarily motivated by the survey results in Graham et al. (2005), which suggest that the bulk of earnings management results from manipulating real operating activities. Supporting the survey results in Graham et al. (2005), the findings of Roychowdhury (2006), Cohen et al. (2008), and Zang (2012) suggest that managers do engage in real activities manipulation. For example, investigating earnings management in the pre- and post-SOX environment, Cohen et al. (2008) find that the level of real earnings management activities increased significantly after the passage of SOX in 2002, whereas accrual-based earnings management declined. The use of real earnings management is related to the assumption that manipulating real operating activities is harder for company outsiders to detect or constrain (see the discussion in, for example, Graham et al. 2005; Roychowdhury 2006; Cohen et al. 2008).

2.1 The effect of existence: real earnings management before disclosure of material weakness

SOX section 404 requires management to report annually on its assessment of the effectiveness of internal controls over financial reporting, and to disclose any material weaknesses.[6,7] The internal controls over financial reporting aim to provide a reasonable assurance that financial information is reliable (PCAOB 2007). Accordingly, prior research has indicated that an effective internal control system is associated with higher quality earnings (Doyle et al. 2007a; Chan et al. 2008; Ashbaugh-Skaife et al. 2008).[8] Chan et al. (2008) concentrate on the association between internal control weaknesses and accrual-based earnings management (proxied by discretionary accruals), and document some evidence of accrual-based earnings management among companies reporting material weaknesses.

Although internal controls over financial reporting are not specifically designed to constrain real activities manipulation, in as far as internal control effectiveness reflects management's attitude toward financial reporting quality, by implication, it could be linked with real earnings management behavior. The effectiveness of internal controls is an outcome of management decision making, since management is responsible for designing, implementing, monitoring, and improving internal control systems (SOX 2002). Thus, weaknesses in internal controls result from a lack of commitment to establish or maintain appropriate internal controls. Such weaknesses then implicitly cast doubt on the management's competence, and/or attitude toward financial reporting and internal control systems. In the extreme cases, material weaknesses may reflect an absence of integrity among the management. Prior research has demonstrated that effective internal control systems are associated with different governance characteristics: audit committee characteristics (e.g., Zhang et al. 2007; Hoitash et al. 2009), CFO characteristics (Li et al. 2010), and board strength (e.g., Hoitash et al. 2009). Thus, companies with internal control weaknesses are exposed to greater governance risk.

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[6] Material weakness is defined as *"a significant deficiency, or combination of significant deficiencies, that results in more than a remote likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected"* (PCAOB 2007).

[7] SOX contains also Section 302, which relates to quarterly reporting and requires management to assess the effectiveness of disclosure controls and procedures. The quarterly certification should indicate that the management has evaluated the effectiveness of internal controls as well as any significant changes in internal controls.

[8] Ineffective internal controls have the potential to allow both unintentional errors in accounting information and intentional earnings management (Doyle et al. 2007a; Ashbaugh-Skaife et al. 2008).

If material weaknesses signal an environment that promotes actions and policies supporting management's self-interest (see the discussion in Skaife et al. 2013), management of material weakness companies might intentionally apply real earnings management to boost earnings and to gain private benefits. Recent literature suggests that, in addition to the direct link to accounting quality, material weaknesses have spillover effects on operations as well (Cheng et al. 2013; Bauer et al. 2014). Moreover, if internal control weaknesses *per se* reduce the quality of *internal* information (Feng et al. 2015), it is possible that management is unintentionally making poor operational decisions based on inaccurate information, which manifest in real earnings management. Feng et al. (2015), for example, find that inventory-related weaknesses are associated with poor inventory management.

Based on the discussion above, we propose the following hypothesis:

H1: Companies with first-time internal control material weaknesses have higher levels of real earnings management than companies that have always had effective internal controls.

In line with the hypothesis above, we concentrate on *first-time* material weaknesses, because we wish to capture the effect of the *existence* of internal control material weaknesses in particular. That is, we use the company years before the actual disclosure of 404 material weaknesses, in order to investigate whether real earnings management decisions are related to the existence of material weaknesses rather than the disclosure of those weaknesses.

2.2 The effect of disclosure: real earnings management after disclosure of material weakness

Company stakeholders may perceive material weaknesses in internal control over financial reporting to be an indicator of unreliable financial reporting, and therefore as increasing information risk. Previous studies generally suggest that equity markets react negatively to disclosures of internal control deficiencies (Schneider et al. 2009). For example, Ashbaugh-Skaife et al. (2009) document adverse reactions to the disclosures of internal control deficiencies, and although Beneish et al. (2009) suggested that investors react negatively only to section 302 disclosure reports (see footnote 7), Rezee et al. (2012) found negative stock market reactions to section 404 disclosures. Moreover, previous research has found evidence of the high cost of debt for companies with internal control deficiencies (e.g., Kim et al. 2011), and less financial analysts' coverage after internal control weaknesses had been disclosed (Clinton et al. 2014). Experimental studies have also found, for

example, that adverse internal control opinions have an impact on loan officers' assessments of risk (Schneider and Church 2008), analysts' risk assessments (Shelton and Whittington 2008), and investors' decision making (Lopez et al. 2009). Finally, Su et al. (2014) illustrate a decline in customer demand after the disclosure of internal control weakness. In summary, managers probably expect negative reactions from various stakeholders and negative economic consequences to arise from material weakness disclosures. Considering that corporate executives pay a great deal of attention to stock prices, and their personal and company reputation (Graham et al. 2005), managers of companies disclosing material weaknesses could be expected to have an incentive for upward earnings management to mitigate the negative consequences involved (e.g., lowered stock-based compensation, career concerns, increased risk of being the target of a hostile takeover).

The management of companies with recent disclosures of material weaknesses might expect to attract the rigorous attention of auditors and regulators, making accruals-based earnings management seem risky. Real earnings management does not violate GAAP and therefore is not something that external auditors, for example, would necessarily constrain or could even detect.[9] Moreover, the opaque nature of real earnings management is likely to mislead investors (Kothari et al. 2012). Therefore, managers might consider enhancing financial performance by real earnings management in cases when the companies have received bad publicity from material weakness disclosure outweighs the risk of that real earnings management being detected. Based on the above indications of management incentives to manipulate earnings, this study examines whether companies disclosing material weaknesses have higher levels of real earnings management compared to companies without a history of material weaknesses. Accordingly, we propose the following hypothesis:

H2: Companies disclosing previous year internal control material weaknesses for the first time have higher levels of real earnings management than companies that have always had effective internal controls.

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[9] Kim and Park (2014) do suggest that auditors drop clients with aggressive real activities manipulation. Thus, in order to avoid excessive risk, auditors appear to be concerned about real earnings management. Whether auditors would actually constrain real earnings management is, however, another issue. Chi et al. (2011) find that companies that have higher quality external auditors employ real earnings management, since these auditors are constraining accrual earnings management.

3 Data and methodology

3.1 Sample description

The data used in this study consist of company-year observations of listed companies located in the U.S., covering the years 2004–2012. The data on internal control over financial reporting and external auditors are obtained from the Audit Analytics database, whereas the financial statement data are obtained from the Thomson Financial database.

The initial sample of internal control opinions from Audit Analytics consists of 54,798 company-year observations (11,491 companies). Then, in order to examine the hypotheses, we identify the following groups:

- MWEXIST to test Hypothesis 1: company-year observations of existing material weaknesses for the first time based on subsequent Section 404 internal control reports.

- $\text{MWDISCL}_{\text{CLEAN}}$ to test Hypothesis 2: company-year observations of first-time material weakness disclosures, where companies subsequently disclosed a clean report. Because our second hypothesis relates to the impact of the disclosure in particular, we exclude those $\text{MWDISCL}_{\text{CLEAN}}$ observations where the previous year's material weaknesses were disclosed only in the restated internal control report.

- $\text{MWDISCL}_{\text{REPEATED}}$ to provide supplemental information: company-year observations of first-time material weakness disclosures, where companies continue to have material weaknesses.

- EIC: effective internal controls—observations of companies that have always disclosed a clean internal control report. Because the dataset consists of both auditors' internal control reports (starting from 2004) and management-only internal control reports (mostly starting from 2007), we use two criteria to construct the EIC group: 1) observations of companies that have disclosed a clean internal control report each year 2004–2012, and 2) observations of companies that have disclosed a clean internal control report each year 2007–2012 and no internal control reports before 2007. The second criterion is applied to capture smaller companies that began to disclose internal control reports only after 2007 in the control sample. Moreover, we exclude company-year observations with disclosed weaknesses based on section 302 requirements (see footnote 7).

After identifying these groups, the sample consists of 23,409 company-year observations: 4,267 observations in the MWEXIST group; 1,081 observations in the $MWDISCL_{CLEAN}$ group; 1,858 observations in the $MWDISCL_{REPEATED}$ group; and 16,203 observations in the EIC group.

The initial sample from Thomson Financial consists of financial data for 9,669 companies, and after excluding banks, insurance companies, and other financial companies (SIC codes 6XXX), and the observations with missing values on variables required to estimate real earnings management, the sample consists of 20,498 company-year observations (3,340 companies).[10]

After combining the Thomson Financial data with the Audit Analytics' data, and after excluding the observations with missing values on control variables, the final sample consists of 5,439 company-year observations: 532 observations in the MWEXIST group; 259 observations in the $MWDISCL_{CLEAN}$ group; 194 observations in the $MWDISCL_{REPEATED}$ group; and 4,454 observations in the EIC group. The number of sample observations by year, and by group, is presented in Table 1.

Table 1. Sample by year and by group

Year	MWEXIST	MWDISCL CLEAN	MWDISCL REPEATED	EIC	Total
2004	93	0	0	379	472
2005	85	47	37	378	547
2006	57	60	29	365	511
2007	95	35	9	517	656
2008	73	51	44	553	721
2009	36	28	36	556	656
2010	29	19	12	567	627
2011	31	6	17	579	633
2012	33	13	10	560	616
Total	532	259	194	4,454	5,439

Notes: See Appendix 1 for variable definitions.

[10] This sample is used to estimate the models of production costs, discretionary expenditure, and operating cash flows, and further, to determine measures for real earnings management (see the model specification section for details).

3.2 Propensity-score-matched sample

Companies with material weaknesses usually possess certain company characteristics (e.g., poor financial performance, complexity, and small size) (e.g., Ge and McVay 2005; Ashbaugh-Skaife et al. 2007; Doyle et al. 2007b) that could themselves incentivize earnings management. Therefore, we conduct analyses using a propensity-score-matched sample as well. This approach aims to match each material weakness company to a control company that is similar along observable dimensions other than the treatment effect. It is suggested that the advantage of this approach is its ability to better control for determinants of material weakness companies because it disregards functional form for confounding effects that inherently exist in cross-sectional regression analyses (Skaife et al. 2013). We match companies belonging to the MWEXIST, $MWDISCL_{CLEAN}$, and $MWDISCL_{REPEATED}$ groups with EIC companies based on the predicted probabilities derived from the following probit regression:

$$MW = \alpha + \beta_1 LOGMC + \beta_2 LOGAGE + \beta_3 FOREIGN + \beta_4 SQRTSEGMENTS + \beta_5 RESTRUCTURE + \beta_6 ACQUISITION + \beta_7 INV + \beta_8 LOSS + \beta_9 ROA + \beta_{10} LEV_{t-1} + \beta_{11} GC + \beta_{12} ZSCORE + \beta_{13} HIGHGROWTH + \beta_{14} BIG4 + \beta_{15} AUDITORCHANGE + \beta_{16} LITIGATION + \beta_{17} ICREPORTM + \textit{annual fixed effects} + \textit{industry fixed effects} + \varepsilon, \quad (1)$$

where *MW* is assigned a value of one if it is either MWEXIST, $MWDISCL_{CLEAN}$, or $MWDISCL_{REPEATED}$, and zero if it is an EIC observation. Model (1) includes independent variables of measures for company size (*LOGMC*), age (*LOGAGE*), complexity (*FOREIGN*, *SQRTSEGMENTS*, *RESTRUCTURE*, *ACQUISITION*, *INV*), financial performance (*LOSS*, *ROA*), debt (*LEVt-1*), bankruptcy risk (*GC*, *ZSCORE*), extreme growth (*HIGHGROWTH*), auditor (*BIG4*, *AUDITORCHANGE*), litigation risk (*LITIGATION*), management-only internal control reports (*ICREPORTM*). Moreover, Model (1) includes year and industry (two-digit SIC codes) dummy variables. See Appendix 1 for the variable definitions.

Before the propensity-score matching, the sample consisted of 4,971 observations (after excluding observations with missing data on the independent variables). The estimation results of the probit regression are presented in column (1) of Appendix 2. The propensity-score-matched sample used in the analyses comprises 1,432 company-year observations.[11] The same propensity-score-matching proce-

[11] After the propensity score matching procedure, the sample size at the first stage is 1,710 observations. However, to tighten matching criteria even further, we include to the matched sample only those observations with maximum of ten percent difference in propensity scores between

dure was applied for the reduced sample where observations with missing values for the performance-matched real earnings management variables (see the model specification section for details) are dropped. After the matching, the propensity-score-matched sample for the analyses with performance-matched real earnings management variables comprises 748 observations.

3.3 Model specifications

Following Roychowdhury (2006), we investigate the following real earnings management methods: increasing earnings by reducing the cost of goods sold by overproducing inventory (proxied by the abnormal level of production costs); reducing discretionary expenditure (proxied by the abnormal level of discretionary expenditures); and sales manipulation (proxied by the abnormal level of cash flow from operations). Overproduction of inventories is considered real earnings management when producing an excessive volume of units is intended to reduce fixed costs per unit by spreading fixed overhead costs over a larger number of units (Cohen et al. 2008). Thus, overproduction can reduce sales costs in a current period and therefore increase earnings, if greater inventory holding costs or marginal cost per unit are not offsetting realized cost savings (Gunny 2010). However, in subsequent periods high inventory holding costs caused by excess of inventories are negatively affecting cash flows. The normal level of production costs is measured using the following model:

$$\frac{PROD_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 \frac{\Delta S_{t-1}}{TA_{t-1}} + \varepsilon, \quad (2)$$

where $PROD$[12] is the sum of the cost of goods sold in year t and the change in inventory from $t-1$ to t, S is net sales, and TA is total assets.

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treatment observation and control observation (84 percent of the 1,432 observations have a maximum of one percent difference in propensity scores). In the propensity score matched sample, the mean (median) difference in propensity scores is 0.0030 (0.0001). Moreover, a re-run of Model (1) using the propensity score matched sample shows that the global hypothesis that all of the explanatory variables are zero cannot be rejected, suggesting that the matching was successful (chi-square 18.29, Prob > Chi-Square 1.000). These results are presented in column (2) of Appendix 2.

[12] Following Roychowdhury (2006), we use production costs instead of cost of goods sold because of two reasons: Using cost of goods sold may also measure simultaneously accrual manipulation via inventory account, and it could be distorted by company's FIFO/LIFO choice.

Reducing discretionary expenditure refers to managers trying to decrease expenses such as advertising expense, research and development, and selling, general, and administrative (SG&A) expenses to achieve various income objectives for the current period (Cohen et al. 2008). While the reduction of those costs can boost current period earnings, the action is likely to have a negative effect on cash flow in the future and is therefore not an optimal long-term operational decision. For instance, delaying the start of a new project or shutting down a research site can weaken a company's competitive advantage in the markets (Graham et al. 2005). The normal level of discretionary expenditure is measured using the following model:

$$\frac{DISX_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_{t-1}}{TA_{t-1}} + \varepsilon, \quad (3)$$

where *DISX* is the discretionary expenditure (i.e., the sum of R&D expenditure, advertising, and SG&A expenditure[13]) in year *t*.

Sales manipulation may be carried out using various techniques enabling managers to increase sales during the current year in an effort to increase reported earnings. Offering customers abnormal discounts or lenient credit terms can increase sales volume temporarily and pull sales from the next fiscal year into the current year, but is also likely to result in reduced cash flows overall and sacrifice future earnings (Cohen et al. 2008; Gunny 2010). Furthermore, re-establishing former prices and payment terms can adversely affect demand if customers defer purchases in anticipation of more favorable terms reappearing (Roychowdhury 2006; Gunny 2010). The normal level of cash flow from operations is measured using the following model:

$$\frac{OCF_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \varepsilon, \quad (4)$$

where *OCF* is cash flow from operations in year *t*.

[13] If advertising or R&D are missing, they are set to zero (see Roychowdhury 2006).

Models (2), (3), and (4) are estimated for industry-years with at least 15 observations, and the industry categorization is based on two-digit SIC industry groups. The estimated residuals from Model (2) represent the abnormal level of production costs (*AB_PROD*). Higher residuals indicate greater inventory overproduction, which reduces the cost of goods sold and increases earnings. The estimated residuals from Model (3) represent the abnormal level of discretionary expenditure (*AB_DISX*), with lower values indicating greater real earnings management to increase earnings. The estimated residuals from Model (4) represent the abnormal level of operating cash flows (*AB_OCF*), with lower values indicating greater real earnings management to increase earnings. Observations with extreme values are winsorized at the top and bottom one percent.

Following Kothari et al. (2005), who demonstrate an improvement in abnormal accruals estimations after taking performance into account, recent studies (e.g., Cohen et al. 2014; Kim and Park 2014) suggest that real earnings management estimations also include potential performance-related misspecification. Therefore, we construct two additional real earnings management variables adjusted by performance (return on assets). First, we estimate the above Models (2)-(4) after including the previous year's return on assets (ROA_{t-1}) in the models. The real earnings management variables from these estimations are labeled *AB_PROD_LAGROAadded*, *AB_DISX_LAGROAadded*, and *AB_OCF_LAGROAadded*. Second, we follow Kim and Park (2014) in employing the performance-matching procedure. We subtract the mean values of real earnings management measures of matched control companies based on the following criteria: fiscal year, two-digit SIC code and ROA between +/- 50 percent. The sample observation is dropped if there is no match between the ROA ranges. These real earnings management variables are labeled *AB_PROD_ROAmatched*, *AB_DISX_ROAmatched*, and *AB_OCF_ROAmatched*.

To test Hypotheses 1 and 2, we estimate the following OLS regression model:

$$RM = \alpha + \beta_1 MWEXIST + \beta_2 MWDISCL_{CLEAN} + \beta_3 MWDISCL_{REPEATED} + \beta_4 LOGMC + \beta_5 LEV_{t-1} + \beta_6 PB_{t-1} + \beta_7 \Delta INCOME_{t-1} + \beta_8 ROA_{t-1} + \beta_9 BIG4 + \beta_{10} DACC + annual\ fixed\ effects + industry\ fixed\ effects + \varepsilon, \quad (5)$$

where *RM* is either *AB_PROD*, *AB_DISX*, or *AB_OCF* (or their corresponding performance-adjusted measures). Congruent with groups described in the sample description section, the variables of interest are the following: *MWEXIST* is a dummy variable set to one, if the company year includes first-time material weaknesses in internal controls over financial reporting according to the 404 report, and zero otherwise; $MWDISCL_{CLEAN}$ is a dummy variable assigned a value

of one if the previous company year included first-time material weaknesses in internal controls, and the subsequent report was a clean report, and zero otherwise; $MWDISCL_{REPEATED}$ is a dummy variable equal to one, if the previous company year included first-time material weaknesses in internal controls according to the 404 report, and the subsequent report still indicated material weaknesses, and zero otherwise; EIC group of companies without a history of 404 material weaknesses serves as the control group.

Model (5) includes control variables for various company characteristics expected to influence real earnings management. The following six control variables were adapted from Chi et al. (2011). We control for company size by including the natural logarithm of market capitalization (*LOGMC*) in the model. To control for the effect of indebtedness on real earnings management, we include the prior fiscal year's leverage (*LEV*) in the model. We add the previous year's price-to-book ratio (*PB*) into the model in order to control for growth opportunities. We control for firm performance by adding the previous year's change in net income before extraordinary items ($\Delta INCOME$) and return on assets (*ROA*) to the model. To control for the effect of the size of the audit firm on its client companies' real earnings management, we include an indicator variable for the four largest audit firms (*BIG4*).

Moreover, as Zang (2012) suggest that accrual-based earnings management is associated with real activities manipulation, we add discretionary accruals (*DACC*) to the model as a control variable.[14] Year and industry (according to the two-digit SIC industry groups) fixed effects control for temporal variation and industry differences in the real earnings management. The variables are defined in Appendix 1.[15]

3.4 Descriptive statistics

Panel A of Table 2 displays the descriptive statistics of the variables used in the empirical analyses. The means of the real earnings management variables (*LAGROAadded*, and *ROAmatched* in parentheses, respectively) are: *AB_PROD* -

[14] There may not be direct causal relationship between these variables, as Zang (2012) suggests that these two earnings management methods are sequential decisions, i.e. real earnings management (executed during the fiscal year) preceding accrual-based earnings management (executed after the fiscal-year end to "fine-tune the manipulation"). However, we include discretionary accruals to the model to control for accounting earnings management behavior.

[15] The continuous control variables are winsorized at the top and bottom one percent to mitigate outliers.

0.013 (-0.007, -0.026), *AB_DISX* -0.007 (0.032, 0.005), and *AB_OCF* 0.033 (0.007, 0.013). The median values of the real earnings management variables (*LAGROAadded*, and *ROAmatched* in parentheses, respectively) are: *AB_PROD* -0.009 (-0.001, -0.023), *AB_DISX* -0.067 (-0.032, -0.015), and *AB_OCF* 0.048 (0.021, 0.018). According to Cohen et al. (2014): *"… in random samples where firms are selected without regard to any hypothesis or prediction about managerial incentives to manage real activities, the expected value of each REM measure is zero."* Against this backdrop, our inferences from the analyses are based on those models where the real earnings management measure contains less bias (i.e., the mean and median are closer to zero). Our distributional statistics regarding the means (and medians) of real earnings management measures indicate that *LAGROAadded* variables are the most well-specified measures for abnormal production costs and abnormal operating cash flows[16], while *ROAmatched* is the most well-specified measure for abnormal discretionary expenses.

Market capitalization ranges from 2.486 million to 113 billion dollars, with an average (median) value of 6,136 (819) million dollars. The mean (median) LEV_{t-1} is 0.196 (0.180), PB_{t-1} is 3.479 (2.265), $\Delta INCOME_{t-1}$ is 0.017 (0.010), and ROA_{t-1} is 0.010 (0.050). In addition, 76 percent of the company years are audited by one of the four largest audit firms. The mean (median) *DACC* is -0.069 (0.002).

Panel B of Table 2 displays the Pearson correlation coefficients across the independent variables. Overall, correlations between the variables are modest and the highest correlation (0.629) occurs between the indicator variable for a Big 4 audit firm (*BIG4*) and market capitalization (*LOGMC*). Untabulated variance inflation factors do not indicate problems with multicollinearity.

[16] The median of the performance-matched measure of abnormal operating cash flows is slightly closer to zero com-pared to *LAGROAadded* measure. However, since the difference in mean values between these two measures is somewhat larger, with the mean of *LAGROAadded* being closer to zero, the inferences from the analyses are primarily based on results where *AB_OCF_LAGROAadded* is the dependent variable.

Table 2. Descriptive statistics

Panel A: Distributional statistics

Variable	Mean	Std.	Min	25%tile	Median	75%tile	Max	N
AB_PROD	-0.013	0.228	-0.936	-0.120	-0.009	0.094	0.910	5,439
AB_PROD LAGROAadded	-0.007	0.224	-0.919	-0.107	-0.001	0.095	0.845	5,439
AB_PROD ROAmatched	-0.026	0.229	-1.151	-0.134	-0.023	0.079	1.330	3,839
AB_DISX	-0.007	0.646	-1.771	-0.196	-0.067	0.045	5.378	5,439
AB_DISX LAGROAadded	0.032	0.561	-1.473	-0.136	-0.032	0.078	4.893	5,439
AB_DISX ROAmatched	0.005	0.404	-6.352	-0.100	-0.015	0.084	5.708	3,839
AB_OCF	0.033	0.246	-1.830	-0.027	0.048	0.139	1.006	5,439
AB_OCF LAGROAadded	0.007	0.206	-1.523	-0.037	0.021	0.087	0.954	5,439
AB_OCF ROAmatched	0.013	0.173	-1.396	-0.037	0.018	0.073	2.661	3,839
MWEXIST	0.098	0.297	0.000	0.000	0.000	0.000	1.000	5,439
$MWDISCL_{CLEAN}$	0.048	0.213	0.000	0.000	0.000	0.000	1.000	5,439
$MWDISCL_{REPEATED}$	0.036	0.185	0.000	0.000	0.000	0.000	1.000	5,439
EIC	0.819	0.385	0.000	1.000	1.000	1.000	1.000	5,439
Market cap (millions)	6136.140	16616.390	2.486	161.788	819.321	3456.080	113240.000	5,439
LEV_{t-1}	0.196	0.169	0.000	0.028	0.180	0.307	0.649	5,439
PB_{t-1}	3.479	4.458	0.350	1.415	2.265	3.759	34.282	5,439
$\Delta INCOME_{t-1}$	0.017	0.155	-0.554	-0.020	0.010	0.042	0.745	5,439
ROA_{t-1}	0.010	0.181	-0.902	-0.004	0.050	0.093	0.335	5,439
BIG4	0.758	0.428	0.000	1.000	1.000	1.000	1.000	5,439
DACC	-0.069	3.244	-17.264	-0.210	0.002	0.290	13.966	5,439

Panel B: Pearson's correlation coefficients among independent variables (N=5,439)

	2	3	4	5	6	7	8	9	10
MWEXIST (1)	**-0.074**	**-0.063**	**-0.206**	-0.022	**0.033**	**0.038**	**-0.123**	**-0.139**	-0.001
$MWDISCL_{CLEAN}$(2)		**-0.043**	**-0.122**	-0.016	0.016	**-0.054**	**-0.094**	**-0.083**	0.018
$MWDISCL_{REPEATED}$(3)			**-0.179**	-0.007	**0.053**	-0.022	**-0.124**	**-0.155**	**0.030**
LOGMC (4)				**0.174**	**0.033**	0.000	**0.388**	**0.629**	-0.007
LEV_{t-1} (5)					**0.108**	**-0.042**	-0.022	**0.168**	**0.032**
PB_{t-1} (6)						0.021	**-0.221**	**-0.074**	**0.032**
$\Delta INCOME_{t-1}$ (7)							**0.354**	0.010	0.004
ROA_{t-1} (8)								**0.261**	-0.009
BIG4 (9)									-0.012
DACC (10)									

Notes: See Appendix 1 for variable definitions. Bold text in the Pearson correlation matrix indicates significance at the 0.05 level.

In Table 3, we present the mean differences of the real earnings management measures between MW companies and EIC companies. The statistical significances are based on t-tests. In general, these univariate tests imply that MWEXIST companies, $MWDISCL_{CLEAN}$ companies, and $MWDISCL_{REPEATED}$ companies, have higher levels of real earnings management than EIC companies. Specifically, across different real earnings management measures, abnormal production costs appear to be consistently higher in MW companies than in EIC companies. Abnormal operating cash flows are significantly smaller in MW companies, except when using the performance-matched measure. Performance-matched abnormal discretionary expenses are significantly smaller for companies with existing material weaknesses. Companies disclosing material weaknesses and subsequently disclosing a clean report have also significantly smaller discretionary expenses, but only when using the measure estimated from the models with lagged ROA added. However, we make our inferences based on the multivariate analyses reported in the following section.

Table 3. Univariate results

	MWEXIST		$MWDISCL_{CLEAN}$		$MWDISCL_{REPEATED}$		Control group: EIC	
	Mean	n	Mean	n	Mean	n	Mean	n
AB_PROD	**0.031 *****	532	**0.038 *****	259	**0.067 *****	194	-0.025	4,454
AB_PROD LAGROAadded	**0.032 *****	532	**0.043 *****	259	**0.072 *****	194	-0.018	4,454
AB_PROD ROAmatched	**0.004 ****	271	**0.026 ****	136	-0.004	81	-0.031	3,351
AB_DISX	-0.027	532	-0.013	259	0.044	194	-0.007	4,454
AB_DISX LAGROAadded	0.013	532	**-0.021 ****	259	0.021	194	0.038	4,454
AB_DISX ROAmatched	**-0.038 ***	271	-0.044	136	-0.037	81	0.011	3,351
AB_OCF	**-0.031 *****	532	**-0.025 *****	259	**-0.027 *****	194	0.047	4,454
AB_OCF LAGROAadded	**-0.052 *****	532	**-0.032 *****	259	**-0.013 ***	194	0.018	4,454
AB_OCF ROAmatched	-0.002	271	0.000	136	0.022	81	0.015	3,351

Notes: See Appendix 1 for variable definitions. Statistical significance are based on t-tests.

4 Results

We estimate Model (5) to test whether *MWEXIST*, $MWDISCL_{CLEAN}$, and/or $MWDISCL_{REPEATED}$ are associated with real activities manipulation. The OLS regression results (the statistical significances calculated by clustering the standard errors within companies) are reported in Table 4: regressions of abnormal production costs, abnormal discretionary expenditure, and abnormal operating cash flows in Panel A, Panel B, and Panel C of Table 4, respectively. In each panel, columns (1)-(3) report the results when using the total sample, while columns (4)-(6) report the results when using the propensity-score-matched sample.

4.1 Abnormal production costs

The results in Panel A of Table 4 indicate that the coefficient on *MWEXIST* is positive and significant at the 0.05 level when the dependent variable is either *AB_PROD* or *AB_PROD_LAGROAadded*. The findings are similar for the propensity-score-matched sample. When using the performance-matched measure of abnormal production costs (*AB_PROD_ROAmatched*), *MWEXIST* is insignificant. However, as explained in the descriptive statistics section, our distributional statistics suggest that the most well-specified measure for abnormal production costs is that calculated by adding the lagged ROA (*AB_PROD_LAGROAadded*) to the estimation models [Model (2)]. It should also be noted that using the propensity-score-matched sample should control for differences in performance, among oth-

ers. We therefore infer that the existence of material weaknesses is associated with inventory overproduction.

In the analyses on the total sample, the coefficients on $MWDISCL_{CLEAN}$ indicate a significant and positive association with *AB_PROD* (at the 0.10 level) and *AB_PROD_LAGROAadded* (at the 0.05 level). These associations are similar when using the propensity-score-matched sample (a positive association with *AB_PROD* significant at the 0.05 level and with *AB_PROD_LAGROAadded* significant at the 0.01 level). Following the rationale outlined above, we infer that companies disclosing material weaknesses have greater inventory overproduction, although the performance-matched measure is not significantly associated with $MWDISCL_{CLEAN}$.

When using the total sample (propensity-score-matched sample) $MWDISCL_{REPEATED}$ is positive and significant at the 0.01 level (at the 0.05 level) when the dependent variable is *AB_PROD*, and positive and significant at the 0.01 level when the dependent variable is *AB_PROD_LAGROAadded*. Thus, we infer that companies disclosing material weaknesses and maintaining material weaknesses (as confirmed by a subsequent internal control report) have significantly more inventory overproduction compared to companies with effective internal controls.[17] Again, the association is insignificant when using the performance-matched measure as a dependent variable [columns (3) and (6)].

[17] In column (2) where the dependent variable is *AB_PROD_LAGROAadded*, the coefficients on *MWEXIST*, $MWDISCL_{CLEAN}$, and $MWDISCL_{REPEATED}$ indicate 3, 3.7, and 7.1 percentage points higher abnormal production costs compared to the control group, respectively.

Table 4. Multivariate results

Panel A: Abnormal production costs

		(1)			(2)			(3)			(4)			(5)			(6)		
		Total sample			Total sample			Total sample			Matched sample			Matched sample			Matched sample		
Dependent variable		AB_PROD			AB_PROD LAGROAadded			AB_PROD ROAmatched			AB_PROD			AB_PROD LAGROAadded			AB_PROD ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t		Est.	t		Est.	t		Est.	t	
MWEXIST	+	0.032	2.26	**	0.030	2.14	**	0.010	0.52		0.038	2.01	**	0.038	2.08	**	-0.007	-0.33	
$MWDISCL_{CLEAN}$	+	0.036	1.95	*	0.037	2.11	**	0.039	1.48		0.057	2.45	**	0.059	2.72	***	0.045	1.56	
$MWDISCL_{REPEATED}$	+	0.066	3.15	***	0.071	3.38	***	0.008	0.29		0.057	2.25	**	0.069	2.65	***	-0.007	-0.19	
LOGMC	-	-0.009	-2.42	**	-0.006	-1.77	*	-0.007	-1.52		-0.016	-2.89	***	-0.013	-2.36	**	-0.010	-1.65	*
LEV_{t-1}	+	0.199	5.22	***	0.196	5.27	***	0.113	2.27	**	0.224	4.18	***	0.194	3.75	***	0.142	2.11	**
PB_{t-1}	-	-0.010	-6.34	***	-0.011	-7.05	***	-0.011	-4.88	***	-0.006	-2.34	**	-0.007	-2.64	***	-0.017	-4.03	***
$\Delta INCOME_{t-1}$	-	-0.000	-2.06	**	-0.000	-2.08	**	-0.000	-0.54		0.026	0.57		0.074	1.49		-0.046	-0.59	
ROA_{t-1}	-	-0.125	-3.73	***	-0.101	-3.03	***	-0.094	-1.30		-0.045	-0.73		-0.041	-0.65		0.214	1.50	
BIG4	-	-0.005	-0.28		-0.007	-0.39		-0.024	-0.94		0.017	0.76		0.018	0.80		0.036	1.16	
DACC	?	0.000	0.00		0.000	0.14		0.002	1.39		0.002	0.73		0.003	0.99		-0.001	-0.13	
Intercept		0.069	1.37		0.092	2.01	**	0.135	1.85	*	0.093	0.99		0.101	1.22		-0.053	-0.36	
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.08			0.09			0.06			0.05			0.05			0.06		
N		5,439			5,439			3,839			1,432			1,432			748		

4.2 Abnormal discretionary expenses

The results in Panel B of Table 4 indicate that *MWEXIST* is negative and significant at the 0.01 level when the dependent variable is *AB_DISX*, and negative and marginally significant (at the 0.10 level) when the dependent variable is *AB_DISX_ROAmatched*. We draw our inferences from the model with a performance-matched measure as a dependent variable, since the distributional statistics in Panel A Table 2 suggest that *ROAmatched* variable is the most well-specified measure for abnormal discretionary expenses. Moreover, in the propensity score matched sample, *MWEXIST* is marginally significantly associated with *AB_DISX* (at the 0.10 level). We therefore conclude that the existence of material weaknesses has a modest association with the reduction of discretionary expenses.

In the total sample, $MWDISCL_{CLEAN}$ is marginally significantly (at the 0.10 level) associated with the performance-matched measure of abnormal discretionary expenses (*AB_DISX_ROAmatched*). When using the propensity-score-matched sample, $MWDISCL_{CLEAN}$ is significant at the 0.01 level when the dependent variable is *AB_DISX* or *AB_DISX_LAGROAadded*, and significant at the 0.05 level when the dependent variable is *AB_DISX_ROAmatched*. In sum, we find evidence that companies disclosing material weaknesses are cutting discretionary expenses to manage earnings.

$MWDISCL_{REPEATED}$ is marginally significant in the total sample when the performance-matched measure of abnormal discretionary expenses (*AB_DISX_ROAmatched*) is the dependent variable. Moreover, when using the propensity-score-matched sample, $MWDISCL_{REPEATED}$ is significant at the 0.05 level, but only if the dependent variable is *AB_DISX_ROAmatched*. Accordingly, these results offer evidence that companies disclosing material weaknesses and continuing to have material weaknesses are managing earnings by reducing discretionary expenses, albeit that evidence is somewhat modest.[18]

[18] In column (3) where the dependent variable is *AB_DISX_ROAmatched*, the coefficients on *MWEXIST*, $MWDISCL_{CLEAN}$, and $MWDISCL_{REPEATED}$ indicate 5.5, 7.1, and 7.9 percentage points lower abnormal discretionary expenses compared to the control group, respectively.

Panel B: Abnormal discretionary expenses

Dependent variable		(1) Total sample AB_DISX			(2) Total sample AB_DISX LAGROAadded			(3) Total sample AB_DISX ROAmatched			(4) Matched sample AB_DISX			(5) Matched sample AB_DISX LAGROAadded			(6) Matched sample AB_DISX ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t		Est.	t		Est.	t		Est.	t	
MWEXIST	-	-0.082	-2.81	***	-0.043	-1.60		-0.055	-1.84	*	-0.072	-1.92	*	-0.044	-1.26		-0.011	-0.41	
$MWDISCL_{CLEAN}$	-	-0.042	-1.13		-0.050	-1.55		-0.071	-1.82	*	-0.108	-3.04	***	-0.101	-3.05	***	-0.102	-1.99	**
$MWDISCL_{REPEATED}$	-	-0.030	-0.58		-0.033	-0.70		-0.079	-1.85	*	-0.050	-0.80		-0.067	-1.19		-0.100	-2.26	**
LOGMC	+	-0.020	-2.43	**	-0.013	-1.95	*	-0.024	-2.06	**	-0.006	-0.49		-0.010	-0.86		0.000	-0.03	
LEV_{t-1}	-	-0.257	-4.14	***	-0.258	-4.75	***	-0.152	-2.29	**	-0.193	-1.74	*	-0.224	-2.21	**	-0.192	-2.19	**
PB_{t-1}	+	0.022	5.30	***	0.018	5.48	***	0.019	3.84	***	0.014	2.56	**	0.014	3.05	***	0.020	3.04	***
$\Delta INCOME_{t-1}$	+	0.002	0.02		0.091	1.04		-0.220	-1.46		0.124	0.86		0.150	1.14		-0.077	-0.50	
ROA_{t-1}	+	-0.307	-2.76	***	0.065	0.67		0.164	0.70		-0.443	-2.97	***	0.030	0.24		-0.298	-1.34	
BIG4	+	0.007	0.19		-0.005	-0.17		0.060	1.47		0.022	0.48		0.018	0.42		-0.076	-2.08	**
DACC	?	-0.021	-4.53	***	-0.022	-5.10	***	-0.002	-0.69		-0.023	-2.25	**	-0.023	-2.34	**	0.007	0.89	
Intercept		-0.275	-2.76	***	-0.102	-1.08		-0.113	-0.69		-0.394	-2.52	**	-0.141	-0.98		0.003	0.02	
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.15			0.16			0,04			0.14			0.13			0.03		
N		5,439			5,439			3,839			1,432			1,432			748		

4.3 Abnormal operating cash flows

The results in Panel C of Table 4 do not show any consistent evidence of an association between abnormal operating cash flows and material weaknesses. That is, *MWEXIST* is negative and significant at the 0.05 level (at the 0.10 level) when using the total sample (the propensity-score-matched sample) and the dependent variable is *AB_OCF_LAGROAadded* (which is the most well-specified measure of abnormal operating cash flows based on distributional statistics). Thus, we conclude that there is some evidence of sales manipulation when companies have material weaknesses. However, it appears that companies disclosing material weaknesses are not employing sales manipulation to manage earnings. When the dependent variable is *AB_OCF_ROAmatched*, $MWDISCL_{REPEATED}$ is positive and marginally significant in columns (3 and (6), but the statistical power of these models is almost non-existent.[19]

[19] In column (2) where the dependent variable is *AB_OCF_LAGROAadded*, the coefficient on *MWEXIST* indicate 2.8 percentage points lower abnormal operating cash flows compared to the control group.

Panel C: Abnormal operating cash flows

Dependent variable	Exp. sign	(1) Total sample AB_OCF Est.	t		(2) Total sample AB_OCF LAGROAadded Est.	t		(3) Total sample AB_OCF ROAmatched Est.	t		(4) Matched sample AB_OCF Est.	t		(5) Matched sample AB_OCF LAGROAadded Est.	t		(6) Matched sample AB_OCF ROAmatched Est.	t	
MWEXIST	-	-0.020	-1.63		-0.028	-2.56	**	-0.001	-0.09		-0.015	-1.01		-0.024	-1.83	*	-0.008	-0.57	
$MWDISCL_{CLEAN}$	-	-0.024	-1.53		-0.023	-1.63		0.000	0.00		-0.004	-0.24		-0.003	-0.23		0.013	0.51	
$MWDISCL_{REPEATED}$	-	0.009	0.52		0.021	1.21		0.031	1.83	*	0.001	0.05		0.011	0.57		0.030	1.69	*
LOGMC	+	0.011	4.41	***	0.008	4.16	***	0.011	3.11	***	0.007	1.59		0.008	1.86	*	0.008	1.28	
LEV_{t-1}	-	0.044	1.91	*	0.045	2.32	**	-0.003	-0.11		0.062	1.62		0.053	1.60		0.004	0.11	
PB_{t-1}	+	-0.002	-1.47		0.000	-0.20		-0.001	-0.95		-0.002	-0.98		0.000	-0.16		0.001	0.42	
$\Delta INCOME_{t-1}$	+	-0.063	-1.85	*	-0.104	-3.08	***	0.049	0.85		-0.113	-2.41	**	-0.116	-2.18	**	0.087	1.24	
ROA_{t-1}	+	0.494	12.38	***	0.263	7.16	***	0.087	1.32		0.493	8.51	***	0.210	3.59	***	-0.024	-0.21	
BIG4	+	-0.001	-0.07		0.008	0.83		-0.006	-0.46		0.000	0.01		-0.002	-0.12		0.008	0.39	
DACC	?	0.005	3.42	***	0.006	3.82	***	0.003	1.69	*	0.004	1.07		0.004	1.19		-0.003	-0.69	
Intercept		0.114	2.69	***	0.008	0.27		-0.037	-0.56		0.074	1.07		0.007	0.12		-0.110	-0.70	
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.24			0.17			0.01			0.23			0.11			-0.00		
N		5,439			5,439			3,839			1,432			1,432			748		

Notes: See Appendix 1 for the variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, results for the year and industry fixed effects are not reported.

4.4 Additional tests

In the main analyses, we attempted to alleviate the concern that the performance of material weakness companies is systematically lower than that in the EIC control companies by 1) using a propensity-score-matched sample, and 2) employing performance-adjusted measures of real earnings management. Moreover, in order to scrutinize the *incentives* for real earnings management, we investigate whether the association between MW and real earnings management differs based on previous performance.

We construct two sub-samples based on performance in the *previous* fiscal year: 1) poor performing companies with a negative change in net income ($DINCOME_{t-1}<0$), or a negative return on assets ($ROA_{t-1}< 0$), and 2) better performing companies with both a positive change in net income ($DINCOME_{t-1}>0$), and a positive return on assets ($ROA_{t-1}>0$). Moreover, we include in those sub-samples only those observations that show an increase in net income in the current fiscal year ($DINCOME_t>0$). We rerun the analyses using those sub-samples. The results reported in Table 5 indicate that when the sample consists of previously poorly performing companies, the existence of material weaknesses (*MWEXIST*) is associated with higher levels of abnormal production costs (Panel A columns 1–3) and lower levels of abnormal discretionary expenses (Panel B columns 1–2).[20] This suggests that, although the incentive is similar (being previous poor performance), the management of a material weakness company is the one employing these real earnings management methods.

When the sample consists of previously better performing companies, companies disclosing material weaknesses ($MWDISCL_{CLEAN}$) have higher levels of abnormal production costs (Panel A columns 4–6) and lower levels of discretionary expenses (Panel B columns 4–6) than companies that have never reported 404 material weaknesses. That is, when investigating a sample of companies that have all previously showed good financial performance (i.e., the sample companies do not have a clear performance-related incentive to manage earnings), the disclosure of material weaknesses ($MWDISCL_{CLEAN}$) is significantly associated with real earnings management, suggesting that the negative publicity associated with the disclosure of material weakness induces management to employ these real earnings management methods.

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[20] The association with the performance-matched measure is insignificant (column 3), but it should be noted that the model fit is weak.

The results of the abnormal operating cash flows are somewhat inconsistent (Panel C of Table 5). In the sample of previously poor performing companies, $MWDISCL_{CLEAN}$ is marginally negatively associated with abnormal operating cash flows, but not when the dependent variable is the performance-adjusted measure. Moreover, in the sample of better performing companies, the coefficient on *MWEXIST* is marginally significant when the dependent variable is *AB_OCF_LAGROAadded*.

Table 5. Additional tests for sub-samples based on previous performance and current year increase in net income

Panel A: Abnormal production costs

Dependent variable		(1) Poor perform AB_PROD			(2) Poor perform AB_PROD LAGROAadded			(3) Poor perform AB_PROD ROAmatched			(4) Better perform AB_PROD			(5) Better perform AB_PROD LAGROAadded			(6) Better perform AB_PROD ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t		Est.	t		Est.	t		Est.	t	
MWEXIST	+	0.083	3.25	***	0.084	3.32	***	0.067	1.87	*	0.003	0.12		0.006	0.23		-0.011	-0.36	
$MWDISCL_{CLEAN}$	+	0.019	0.65		0.029	1.04		0.031	0.81		0.063	1.96	*	0.063	2.06	**	0.068	1.79	*
$MWDISCL_{REPEATED}$	+	0.054	1.57		0.061	1.68	*	0.057	1.45		0.014	0.24		0.031	0.53		-0.019	-0.32	
LOGMC	-	-0.008	-1.60		-0.003	-0.63		-0.007	-1.12		-0.010	-1.68	*	-0.007	-1.15		-0.013	-2.16	**
LEV_{t-1}	+	0.196	4.40	***	0.210	4.67	***	0.119	2.21	**	0.144	2.08	**	0.122	1.85	*	0.114	1.60	
PB_{t-1}	-	-0.007	-3.86	***	-0.008	-4.50	***	-0.008	-3.16	***	-0.013	-4.36	***	-0.013	-4.62	***	-0.011	-3.88	***
$\Delta INCOME_{t-1}$	-	0.004	0.09		0.007	0.15		0.138	1.80		-0.096	-1.07		-0.078	-0.90		-0.047	-0.50	
ROA_{t-1}	-	-0.038	-0.84		-0.041	-0.86		-0.007	-0.07		-1.017	-5.00	***	-0.944	-4.75	***	-0.375	-1.82	*
BIG4	-	-0.010	-0.39		-0.019	-0.77		-0.023	-0.77		-0.025	-0.69		-0.027	-0.78		-0.037	-0.97	
DACC	?	-0.002	-1.02		-0.002	-0.79		-0.002	-0.46		0.001	0.45		0.000	-0.20		0.003	1.26	
Intercept		-0.018	-0.21		-0.002	-0.03		0.140	1.10		0.184	2.92	***	0.202	3.36	***	0.133	2.01	**
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.06			0.07			0.05			0.18			0.18			0.08		
N		1,561			1,561			1,036			1,638			1,638			1,626		

Panel B: Abnormal discretionary expenses

Dependent variable	Exp. sign	(1) Poor perform AB_DISX Est.	t		(2) Poor perform AB_DISX LAGROAadded Est.	t		(3) Poor perform AB_DISX ROAmatched Est.	t		(4) Better perform AB_DISX Est.	t		(5) Better perform AB_DISX LAGROAadded Est.	t		(6) Better perform AB_DISX ROAmatched Est.	t	
MWEXIST	-	-0.230	-4.53	***	-0.187	-4.11	***	-0.044	-1.16		-0.002	-0.04		0.024	0.54		0.009	0.24	
$MWDISCL_{CLEAN}$	-	0.010	0.13		-0.051	-0.74		-0.094	-1.00		-0.109	-2.04	**	-0.094	-1.94	*	-0.084	-2.12	**
$MWDISCL_{REPEATED}$	-	-0.085	-1.22		-0.089	-1.41		-0.093	-1.44		-0.064	-1.05		-0.047	-0.86		-0.127	-1.23	
LOGMC	+	-0.008	-0.57		-0.007	-0.63		-0.016	-0.97		-0.026	-2.25	**	-0.013	-1.30		-0.027	-2.44	**
LEV_{t-1}	-	-0.378	-3.90	***	-0.393	-4.72	***	-0.215	-2.27	**	-0.109	-0.85		-0.159	-1.51		-0.045	-0.38	
PB_{t-1}	+	0.014	3.09	***	0.011	3.10	***	0.017	2.41	**	0.023	4.60	***	0.019	4.28	***	0.018	4.12	***
$\Delta INCOME_{t-1}$	+	0.022	0.14		0.102	0.76		-0.048	-0.25		0.056	0.30		0.168	1.10		-0.220	-1.11	
ROA_{t-1}	+	-0.412	-2.86	***	0.021	0.18		0.065	0.22		0.739	1.18		1.006	1.82	*	0.434	0.75	
BIG4	+	0.006	0.11		0.020	0.38		0.056	1.25		0.026	0.50		0.034	0.74		0.047	0.95	
DACC	?	-0.018	-1.85	*	-0.018	-2.07	**	-0.006	-0.84		-0.037	-2.83	***	-0.036	-3.09	***	-0.005	-0.82	
Intercept		-0.391	-2.95	***	-0.194	-1.49		-0.272	-1.95	*	-0.322	-1.64		-0.237	-1.27		0.039	0.19	
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.17			0.18			0.01			0.13			0.16			0.04		
N		1,561			1,561			1,036			1,638			1,638			1,626		

Panel C: Abnormal operating cash flows

Dependent variable	Exp. sign	(1) Poor perform AB_OCF Est.	t		(2) Poor perform AB_OCF LAGROAadded Est.	t		(3) Poor perform AB_OCF ROAmatched Est.	t		(4) Better perform AB_OCF Est.	t		(5) Better perform AB_OCF LAGROAadded Est.	t		(6) Better perform AB_OCF ROAmatched Est.	t	
MWEXIST	-	0.024	1.04		0.024	1.21		-0.031	-1.30		-0.011	-0.49		-0.029	-1.70	*	-0.008	-0.36	
$MWDISCL_{CLEAN}$	-	-0.057	-1.76	*	-0.055	-1.86	*	0.003	0.06		0.009	0.42		0.005	0.42		0.015	0.76	
$MWDISCL_{REPEATED}$	-	0.018	0.60		0.031	1.22		0.023	0.77		0.005	0.16		0.016	0.68		0.043	1.22	
LOGMC	+	0.004	0.70		0.003	0.78		0.003	0.42		0.013	3.39	***	0.006	1.95	*	0.016	4.46	***
LEV_{t-1}	-	0.114	2.67	***	0.116	3.21	***	0.063	1.41		-0.045	-1.00		-0.023	-0.66		-0.051	-1.25	
PB_{t-1}	+	-0.002	-1.18		-0.001	-0.73		-0.002	-1.07		0.000	-0.25		0.001	0.66		-0.001	-0.38	
$\Delta INCOME_{t-1}$	+	-0.115	-2.10	**	-0.140	-2.72	***	-0.135	-1.86	*	0.041	0.51		0.020	0.32		0.045	0.58	
ROA_{t-1}	+	0.516	8.84	***	0.258	5.27	***	0.157	1.88	*	0.598	3.53	***	0.426	3.46	***	0.193	1.31	
BIG4	+	-0.003	-0.13		-0.004	-0.24		0.000	0.02		-0.011	-0.57		0.002	0.12		-0.006	-0.30	
DACC	?	0.006	1.77	*	0.007	2.34	**	0.005	1.24		0.009	2.03	**	0.007	1.95	*	0.006	1.55	
Intercept		0.278	5.08	***	0.150	3.46	***	0.160	1.73	*	0.077	1.05		0.001	0.03		-0.103	-1.17	
Annual fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes			Yes			Yes			Yes		
Adj. R^2		0.26			0.18			0.00			0.15			0.15			0.02		
N		1,561			1,561			1,036			1,638			1,638			1,626		

Notes: See Appendix 1 for the variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, results for the year and industry fixed effects are not reported.

4.5 Robustness checks

As of 2007, Auditing Standard No. 2 was replaced by Auditing Standard No. 5 (AS5), which recognizes scalability in evaluating controls, and requires a top-down risk-based approach to controls testing. Although including indicator variables for fiscal years should capture the yearly effects on the material weakness disclosures, we perform the propensity-score matching by replacing the year dummy variables in Model (1) with an indicator variable for the company years after 2006. The regression results of estimating Model (5) using the alternative propensity-score-matched sample are presented in Table 6. The inferences from these results are essentially similar to those from the main analyses, although some significance levels vary. For example, $MWDISCL_{CLEAN}$ is significantly associated with each measure of abnormal production costs (Panel A of Table 6). Moreover, *MWEXIST* and abnormal discretionary expenses is insignificant when the dependent variable is the basic measure, but significant at the 0.05 level when the dependent variable is the performance-matched measure (Panel B of Table 6).

Real earnings management through overproduction is applicable to manufacturing companies, which is why we also estimate the model of abnormal production costs for manufacturing companies (two-digit SIC codes between 20 and 39) (Cohen et al. 2008). The inferences from the results presented in Table 7 are similar to those from the main analysis (Panel A of Table 4).

Because our first hypothesis relates to the existence but not the disclosure of material weaknesses and our second hypothesis relates specifically to the disclosure, we exclude those *MWEXIST* observations that disclosed 302 weaknesses[21] in the first and/or the second quarter from the sample. The inferences from these (untabulated) results are essentially similar to those from the main analyses.

[21] No distinction is made between material weaknesses and significant deficiencies.

Table 6. Propensity-score-matched sample with AS5 controlled

Panel A: Abnormal production costs

Dependent variable		(1) AB_PROD			(2) AB_PROD LAGROAadded			(3) AB_PROD ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t	
MWEXIST	+	0.030	1.69	*	0.034	1.97	**	0.031	1.41	
$MWDISCL_{CLEAN}$	+	0.051	2.30	**	0.056	2.66	***	0.070	2.37	**
$MWDISCL_{REPEATED}$	+	0.041	1.69	*	0.056	2.19	**	0.033	0.93	
LOGMC	-	-0.012	-2.27	**	-0.009	-1.66	*	-0.001	-0.10	
LEV_{t-1}	+	0.186	3.78	***	0.176	3.68	***	0.079	1.11	
PB_{t-1}	-	-0.004	-1.79	*	-0.006	-2.27	**	-0.013	-1.87	*
$\Delta INCOME_{t-1}$	-	-0.002	-0.05		0.036	0.81		0.006	0.07	
ROA_{t-1}	-	-0.049	-0.91		-0.056	-1.02		-0.184	-1.08	
BIG4	-	0.014	0.63		0.011	0.51		0.002	0.08	
DACC	?	0.000	0.15		0.002	0.58		-0.001	-0.29	
Intercept		0.000	-0.01		0.021	0.28		0.128	0.75	
Annual fixed effects?		Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes		
Adj. R^2		0.04			0.03			0.05		
N		1,468			1,468			792		

Panel B: Abnormal discretionary expenses

Dependent variable		(1) AB_DISX			(2) AB_DISX LAGROAadded			(3) AB_DISX ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t	
MWEXIST	-	-0.024	-0.68		-0.009	-0.26		-0.054	-1.99	**
$MWDISCL_{CLEAN}$	-	-0.052	-1.73	*	-0.054	-1.89	*	-0.113	-2.30	**
$MWDISCL_{REPEATED}$	-	0.005	0.09		-0.020	-0.37		-0.126	-2.55	**
LOGMC	+	-0.004	-0.34		-0.006	-0.60		0.017	1.36	
LEV_{t-1}	-	-0.241	-2.40	**	-0.304	-3.53	***	-0.281	-3.16	***
PB_{t-1}	+	0.012	2.64	***	0.012	2.81	***	0.015	2.07	**
$\Delta INCOME_{t-1}$	+	0.182	1.27		0.266	1.98	**	-0.049	-0.34	
ROA_{t-1}	+	-0.551	-3.95	***	-0.080	-0.58		-0.003	-0.01	
BIG4	+	-0.040	-0.86		-0.023	-0.54		-0.020	-0.55	
DACC	?	-0.020	-2.29	**	-0.022	-2.64	***	0.003	0.48	
Intercept		-0.278	-1.84	*	-0.034	-0.23		-0.112	-0.67	
Annual fixed effects?		Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes		
Adj. R^2		0.11			0.10			0.07		
N		1,468			1,468			792		

Panel C: Abnormal operating cash flows

Dependent variable		(1) AB_OCF			(2) AB_OCF LAGROAadded			(3) AB_OCF ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t	
MWEXIST	-	-0.025	-1.62		-0.028	-2.11	**	-0.009	-0.60	
$MWDISCL_{CLEAN}$	-	-0.020	-1.28		-0.014	-1.01		-0.002	-0.08	
$MWDISCL_{REPEATED}$	-	-0.004	-0.20		0.008	0.38		0.025	1.20	
LOGMC	+	0.008	1.75	*	0.009	2.03	**	-0.006	-0.90	
LEV_{t-1}	-	0.116	3.09	***	0.112	3.22	***	0.114	2.42	**
PB_{t-1}	+	-0.002	-0.76		0.000	-0.04		-0.002	-0.58	
$\Delta INCOME_{t-1}$	+	-0.090	-1.70	*	-0.145	-2.62	***	0.068	0.74	
ROA_{t-1}	+	0.502	7.99	***	0.218	3.60	***	0.094	0.57	
BIG4	+	0.010	0.54		0.010	0.61		0.019	0.93	
DACC	?	0.007	2.12	**	0.007	2.37	**	0.005	1.40	
Intercept		0.074	1.04		-0.017	-0.34		-0.151	-1.20	
Annual fixed effects?		Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes		
Adj. R^2		0.22			0.11			0.01		
N		1,468			1,468			792		

Notes: See Appendix 1 for the variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, results for the year and industry fixed effects are not reported.

Table 7. Abnormal production costs – manufacturing companies SIC 20XX-39XX

		(1)			(2)			(3)		
Dependent variable		AB_PROD			AB_PROD LAGROAadded			AB_PROD ROAmatched		
	Exp. sign	Est.	t		Est.	t		Est.	t	
MWEXIST	+	0.049	3.41	***	0.048	3.33	***	0.022	1.19	
$MWDISCL_{CLEAN}$	+	0.051	2.74	***	0.052	2.83	***	0.024	1.10	
$MWDISCL_{REPEATED}$	+	0.070	3.44	***	0.081	3.94	***	0.007	0.25	
LOGMC	-	-0.008	-2.07	**	-0.007	-1.67	*	-0.008	-1.70	*
LEV_{t-1}	+	0.243	6.37	***	0.244	6.47	***	0.209	4.58	***
PB_{t-1}	-	-0.012	-6.51	***	-0.012	-6.58	***	-0.014	-5.59	***
$\Delta INCOME_{t-1}$	-	0.000	-2.13	**	0.000	-1.83	*	0.000	-0.64	
ROA_{t-1}	-	-0.130	-3.60	***	-0.125	-3.44	***	-0.075	-1.01	
BIG4	-	-0.003	-0.12		-0.004	-0.22		-0.024	-0.97	
DACC	?	0.001	1.09		0.002	1.41		0.002	1.45	
Intercept		0.019	0.45		0.018	0.41		0.055	1.09	
Annual fixed effects?		Yes			Yes			Yes		
Industry fixed effects?		Yes			Yes			Yes		
Adj. R^2		0.12			0.12			0.11		
N		3,742			3,742			2,631		

Notes: See Appendix 1 for the variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, results for the year and industry fixed effects are not reported.

5 Conclusions

This study examines the association between SOX 404 material weaknesses and earnings management by manipulating real operational activities. Our empirical findings suggest that both the existence and the disclosure of SOX 404 material weaknesses are related to real earnings management. For companies with existing material weaknesses, the results consistently indicate overproduction being used as a method of real earnings management. Although the association may stem from the behavior of an opportunistic management, the poor 'tone at the top' may also flow through to inventory-related operational decisions via low quality internal information caused by material weaknesses (see Feng et al. 2015). Furthermore, the findings show some evidence that the existence of material weaknesses is associated with the reduction of discretionary expenses.

Companies disclosing material weaknesses are using inventory overproduction and reduction of discretionary expenses as real earnings management methods. Cutting discretionary expenses in particular is probably the most feasible real

earnings management method after disclosure. We do not find evidence of sales manipulation among companies disclosing material weaknesses, which might be due to reduced customer demand after the disclosure of internal control weaknesses (Su et al. 2014), making sales manipulation as a dysfunctional real earnings management method for material weakness companies.

The additional analyses reveal that among previously poor performing companies, the *existence* of material weaknesses in particular is associated with real earnings management, implying that the management of a company with material weaknesses employs real earnings management methods. However, when the sample consists of previously better performing companies, it is mainly the companies *disclosing* material weaknesses that appear to be employing real earnings management methods, suggesting that the incentive stems from the negative publicity flowing from material weakness disclosures.

Our results offer several avenues for future research. First, while we interpret our results as indicating that material weakness companies do engage in real earnings management, whether intentionally or unintentionally, future research could strive to investigate the question of intentionality further. Second, as our data set is inadequate to address the underlying reason for the variance in these real earnings management methods, we surmise that one possible reason is the desirability of a specific method in a certain situation and a fear of real earnings management being detected by outsiders determining the preferred order of the application of real earnings management methods.

In summary, the findings of this study suggest that, after controlling for various company characteristics, material weaknesses reflect pervasive control problems and the 'tone at the top', enabling real earnings management behavior. Material weaknesses hence identify a setting where there is a greater risk of the value of stockholders' investments in the company being reduced in the long run via real activities manipulation. The findings of this study extend the research on internal control over financial reporting and the research on real earnings management by providing new information on situations that can provide fertile ground for real earnings management, and on what might prompt it.

We acknowledge as a limitation of the study that some material weaknesses might not be detected and disclosed (see e.g., Rice and Weber 2012). However, this concern is not likely to distort the statistical significance of our findings if the underlying reasons for undetected weaknesses are random. In addition, there is a risk that the models used in this study to capture real earnings management might measure it erroneously, and thus bias our results. This is, however, the same risk faced by prior real earnings management studies (e.g., Roychowdhury 2006; Co-

hen et al. 2008; Zang 2012). Finally, we acknowledge that the common problem of endogeneity cannot be completely ruled out, although we do address this issue by employing a propensity-score-matching technique and using the matched sample in our main analyses.

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Appendices

Appendix 1. Variable definitions

Variable	Definition
AB_PROD	The estimated residuals from the following industry-year regression $\frac{PROD_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 \frac{\Delta S_{t-1}}{TA_{t-1}} + \varepsilon.$
AB_DISX	The estimated residuals from the following industry-year regression $\frac{DISX_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_{t-1}}{TA_{t-1}} + \varepsilon.$
AB_OCF	The estimated residuals from the following industry-year regression $\frac{OCF_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \varepsilon.$
PROD	The sum of the cost of goods sold in year t and the change in inventory from t-1 to t.
DISX	The discretionary expenditure that are the sum of R&D expenditure, advertising, and selling, general, and administrative (SG&A) expenditure.
OCF	Cash flow from operations.
TA	Total assets.
S	Net sales.
AB_PROD LAGROAadded	The estimated residuals from the following industry-year regression $\frac{PROD_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 \frac{\Delta S_{t-1}}{TA_{t-1}} + \beta_5 ROA_{t-1} +$
AB_DISX LAGROAadded	The estimated residuals from the following industry-year regression $\frac{DISX_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_{t-1}}{TA_{t-1}} + \beta_3 ROA_{t-1} + \varepsilon.$
AB_OCF LAGROAadded	The estimated residuals from the following industry-year regression $\frac{OCF_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{S_t}{TA_{t-1}} + \beta_3 \frac{\Delta S_t}{TA_{t-1}} + \beta_4 ROA_{t-1} + \varepsilon.$
AB_PROD ROAmatched	AB_PROD minus average AB_PROD of matched control companies based on fiscal-year, two-digit SIC code and return on assets between +/- 50 percent.
AB_DISX ROAmatched	AB_DISX minus average AB_DISX of matched control companies based on fiscal-year, two-digit SIC code and return on assets between +/- 50 percent.
AB_OCF ROAmatched	AB_OCF minus average AB_OCF of matched control companies based on fiscal-year, two-digit SIC code and return on assets between +/- 50 percent.
MWEXIST	A dummy variable with a value of one if the company-year includes first time material weaknesses in internal controls according to the subsequent 404 report, and zero otherwise.
$MWDISCL_{CLEAN}$	A dummy variable with a value of one if the previous company-year included first time material weaknesses, but the current company-year does not include weaknesses based on subsequent 404 report, and zero otherwise.

$MWDISCL_{REPEATED}$	A dummy variable with a value of one if the previous company-year included first time material weaknesses and the current company-year again includes weaknesses based on subsequent 404 report, and zero otherwise.
LOGMC	The natural logarithm of market capitalization.
LEV_{t-1}	Beginning of the year total debt divided by total assets.
PB_{t-1}	Lagged price-to-book ratio.
$\Delta INCOME_{t-1}$	Lagged change in a company's annual net income before extraordinary items, scaled by the beginning of the year total assets.
ROA_{t-1}	Lagged ROA calculated as net income before extraordinary items, scaled by the beginning of the year total assets.
BIG4	A dummy variable with a value of one if the auditor is one of the four largest audit firms, and zero otherwise.
DACC	Discretionary accruals estimated using the modified Jones (1991) model with ROA_{t-1} included to the model.
YEAR	Dummy variables for the fiscal years 2004–2012.
INDUSTRY	Dummy variables for two-digit SIC industry groups.

Variables used in the propensity score matching [Model (1)] if not defined above:

MW	A dummy variable with a value of one if *MWEXIST*=1, $MWDISCL_{CLEAN}$=1, or $MWDISCL_{REPEATED}$=1, and zero otherwise.
LOGAGE	A natural logarithm of the number of years since the company was founded.
FOREIGN	A dummy variable with a value of one if a company reported geographic segment(s) other than the US, and zero otherwise.
SQRTSEGMENTS	The square root of the number of business segments reported by the company.
RESTRUCTURE	A dummy variable with a value of one if a company reported restructuring expenses / charges, and zero otherwise.
ACQUISITION	A dummy variable with a value of one if an exemption to the assessment of internal controls indicates acquisition(s) during the past year, and zero otherwise.
INV	Total inventory divided by total assets.
LOSS	A dummy variable with a value of one if the net income before extraordinary items is negative in year *t* or *t-1*, and zero otherwise.
GC	A dummy variable with a value of one if a company received a going concern opinion, and zero otherwise.
ZSCORE	Altman's Z-score: 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before interests and taxes / total assets) + 0.6*(market capitalization/total liabilities) + 1*(sales/total assets).
HIGHGROWTH	A dummy variable with a value of one if a company's sales growth from previous fiscal year falls into the top quartile in the sample, and zero otherwise.
AUDITORCHANGE	A dummy variable with a value of one if the signing audit firm changed from previous year, and zero otherwise.
LITIGATION	A dummy variable with a value of one if the company operates in a litigious industry (SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370-7374), and zero otherwise.
ICREPORTM	A dummy variable with a value of one if the internal control report is management-only report (no auditor's internal control report), and zero otherwise.

Appendix 2. Probit regression results on estimating Model (1)

Dependent variable	(1) MW			(2) MW	
	Estimate	Z		Estimate	Z
LOGMC	-0.218	-10.68	***	0.015	0.48
LOGAGE	-0.147	-4.78	***	0.013	0.31
FOREIGN	-0.120	-1.97	**	0.039	0.47
SQRTSEGMENTS	0.276	5.03	***	0.031	0.39
RESTRUCTURE	0.057	0.92		-0.033	-0.37
ACQUISITION	-0.057	-0.68		-0.003	-0.02
INV	0.197	0.83		-0.289	-0.91
LOSS	0.175	2.82	***	0.021	0.24
ROA	-0.185	-1.62		-0.016	-0.10
LEV_{t-1}	0.428	2.85	***	-0.076	-0.37
GC	0.526	3.94	***	-0.055	-0.28
ZSCORE	-0.000	-0.87		0.003	0.87
HIGHGROWTH	0.130	2.08	**	-0.115	-1.37
BIG4	-0.154	-2.09	**	0.013	0.13
AUDITORCHANGE	0.431	5.02	***	0.081	0.70
LITIGATION	0.225	2.83	***	0.011	0.10
ICREPORTM	-0.096	-1.03		0.071	0.54
Intercept	0.318	1.22		0.001	0.00
Annual fixed effects?	Yes			Yes	
Industry fixed effects?	Yes			Yes	
N	4,971			1,432	
Likelihood ratio	Chi-Square 1,073.98 Prob > ChiSq 0.0000			Chi-Square, 18.29 Prob > ChiSq 1.0000	
Log likelihood	-1744.89			-983.44	

Notes: See Appendix 1 for the variable definitions. Statistical significance based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. For brevity, results for the year and industry fixed effects are not reported.

INCUMBENT AUDIT FIRM-PROVIDED TAX SERVICES AND CLIENTS WITH LOW FINANCIAL REPORTING QUALITY♦

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ABSTRACT

This study investigates whether tax services being provided by incumbent audit firms enhances or impairs the likelihood of acknowledging client companies' low financial reporting quality. In particular, we examine the association between tax-related fees and the likelihood of timely restatements, and internal control weakness disclosures among a sample of US companies that all have misstatements in their financial information. The empirical findings indicate that companies paying higher tax-related fees are less likely to disclose SOX 404 internal control weaknesses, implying that underlying control problems are unacknowledged when incumbent audit firm-provided tax-related fees are higher. However, the findings suggest that merely providing both audit and tax-related services does not have an impact on audit quality per se, but rather it is the magnitude of the tax-related fees in particular that counts. We also find some evidence suggesting that companies paying higher tax-related fees have a greater likelihood of restatement lags, whereas companies paying smaller tax-related fees to their audit firm restate financial statements in a more timely manner. Overall, the findings suggest that audit scrutiny of client companies with low quality financial reporting is weaker when the magnitude of tax-related fees is higher.

Keywords: tax fees, financial reporting quality, internal control weakness

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1 Introduction

This study investigates whether tax services provided by incumbent audit firms enhance or impair the likelihood of acknowledging client companies' low financial reporting quality. Since the audit scandal involving Arthur Andersen, investors and regulators have expressed their concerns over the magnitude of non-audit services provided by incumbent audit firms, because they are perceived as a threat to auditors' independence, in that non-audit services might increase auditors' economic dependence on their clients, leading to lower audit quality. In the USA, the Sarbanes Oxley Act (SOX) (2002) prohibits audit firms from providing most non-audit services to their audit clients, but permits tax services due to the potential benefits from knowledge spillover to audit quality. After all, audit quality consists of both the likelihood that the auditor discovers a breach (implying expertise and audit effort) and the likelihood that the auditor discloses the breach (implying objectivity and independence) (DeAngelo 1981).

The bulk of prior studies have investigated the association between non-audit fees and audit/financial reporting quality, and reported somewhat mixed results (see Schneider et al. 2006 for a review). After the restrictions on the provision of most non-audit services by incumbent audit firms (SOX 2002), prior research has particularly focused on the influence of tax services in order to examine whether the expected benefits from knowledge spillover outweigh the problems of economic dependence (e.g., Seetharaman et al. 2011; Krishnan and Visvanathan 2011; Paterson and Valencia 2011). In this study, we approach the issue of incumbent audit firm-provided tax services using a sample of companies that all have poor financial reporting quality, that is, they are companies with misstatements that were eventually restated. The misstatements are determined from the restated periods indicated by restatement data. First, we investigate whether tax fees are associated with those misstatements in financial information that remain undiscovered in a fiscal year in question, to which we refer to as restatement lag. We therefore compare companies with restatement lag to those companies with misstatements restated more quickly. Secondly, we investigate whether tax fees are associated with the likelihood of Section 404 internal control weakness disclosures. Based on the view that an occurrence of a misstatement indicates existing internal control weaknesses (e.g., Eilifsen and Messier 2000; Rice and Weber 2012), disclosing material weakness would suggest that the company acknowledges the control weaknesses. The research setting featuring a sample of similar companies in terms of poor accounting quality allows examining the auditors' professional

skepticism in particular.[1] Thus, the underlying assumption is that high quality auditing should lead to the discovery of any material misstatements and internal control weaknesses, and auditors should require management to acknowledge them. Enhanced knowledge about the client via tax-services could make restatements more timely and material weakness disclosures more likely for companies with poor accounting quality. However, economic dependence may reduce an auditor's professional skepticism, resulting in restatement lags and unacknowledged control problems.

The inferences of the findings in prior studies that investigate the association between incumbent audit firm-provided tax services and financial reporting quality mostly support the knowledge spillover view. For example, Kinney et al. (2004) suggest that tax-related fees reduce the likelihood of restatements, implying there are benefits from knowledge spillover. Seetharaman et al. (2011), however, report insignificant association between tax-related fees and restated periods, but significant negative association with tax-related restatements. These studies examine whether or not restatements/misstatements occur. Harris and Zhou (2013) suggest that tax services lead to reduced likelihood of non-tax internal control weaknesses but do not have an effect on tax-related weaknesses. A lower likelihood of restatements and/or internal control weaknesses could, however, also signify a reluctance to acknowledge and disclose them. Rice and Weber (2012) examine a sample of companies with existing internal control weaknesses and find that non-audit fees makes it less likely that material weaknesses are disclosed, supporting the economic dependence view. We extend the findings of the prior studies on tax services and investigate the role of audit firm-provided tax services among companies with poor financial reporting quality.

This study uses a sample of fiscal-year observations of US companies from 2005–2012. Only the company-years involving misstatements are included in the sample used in the analyses. That analysis investigates the probability of a restatement lag (an indicator variable for company-years where restatement is disclosed after the filing date of internal control opinion) and the probability of internal control material weakness disclosure (an indicator variable for internal control reports disclosing material weaknesses). Our independent variables of interest are

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[1] Nelson (2009) defines professional skepticism as *"indicated by auditor judgments and decisions that reflect a heightened assessment of the risk that an assertion is incorrect, conditional on the information available to the auditor."* He elaborates that *"In many circumstances the assertion in question will be a client's assertion that the financial statements are free of material misstatement, but the definition could apply to other assertions as well (e.g., attesting to the effectiveness of a client's internal controls)."*

(1) an indicator variable with a value of one if the tax fees paid to the incumbent auditor are greater than zero, and zero otherwise *(DTAXFEES)*, (2) the tax fees paid to the incumbent auditor divided by the square root of total assets *(TAXFEES)*, (3) the ratio of tax fees divided by total fees paid to the incumbent auditor *(TAXFEES_TF)*, and (4) the ratio of tax fees divided by audit fees paid to the incumbent auditor *(TAXFEES_AF)*.

The empirical findings of this study suggest that in all different model specifications, the indicator variable for tax services is insignificant. This implies that tax services provided by incumbent audit firms do not have either a quality-enhancing or quality-impairing impact. However, the results indicate that the continuous variables measuring the magnitude of tax-related fees (*TAXFEES*, *TAXFEES_TF*, and *TAXFEES_AF*) have negative effects on the likelihood of a material weakness disclosure, although the significance levels vary across different model specifications. That is, we find evidence implying that the higher (proportional) magnitude of tax fees results in unacknowledged control problems. In most model specifications, tax-related fees are not associated with the likelihood of restatement lags. However, when we further examine the impact of tax-related fees using a sample of only those companies that have paid tax-related fees to their auditors (i.e., observations of zero tax fees are excluded), the results indicate that tax fees divided by total fees and tax fees divided by audit fees are (mostly marginally) significantly associated with higher likelihood of restatement lags and lower likelihood of material weakness disclosures. These findings support the inference that it is the magnitude of the fees in particular that reduce the likelihood of acknowledging client companies' financial reporting problems. In summary, this study contributes to the literature investigating non-audit fees charged by incumbent audit firms by suggesting that, among companies with poor accounting quality, a stronger economic bond with the client resulting from higher levels of tax-related fees may jeopardize the auditor's independence and impair auditor's professional skepticism.

The remainder of the paper is organized as follows. The next section summarizes the literature on the relation between non-audit services and financial reporting quality, and develops the hypotheses. Section three describes the data and the methodology. Results are reported in Section four, and are followed by conclusions.

2 Background and hypotheses development

Over the past 30 years, audit firms have expanded their business areas to consultancy services, such as taxation, mergers and acquisitions, and risk management. Research on audit quality has investigated the possible benefits and disadvantages of an audit firm providing both audit and non-audit services to the same client concurrently. There are two conflicting hypotheses on the association between non-audit services being provided by an incumbent auditor and audit quality. The knowledge spillover view suggests that information acquired in the course of consulting flows to the audit partner, improving the quality of the audit (and vice versa) (e.g., Simunic 1984). However, these services are economically important to the audit firms. High non-audit fees increase an auditor's economic dependence on the client, thereby possibly impairing audit quality (e.g., Simunic 1984).[2]

Prior studies have reported mixed results on the association between non-audit fees and audit/financial reporting quality (see Schneider et al. 2006 for a review). While the findings of Frankel et al. (2002), Ferguson et al. (2004), and Kanagaretnam et al. (2011) imply that non-audit fees impair auditor independence, DeFond et al. (2002), Ashbaugh et al. (2003), Chung and Kallapur (2003), Raghunandan et al. (2003), and Reynolds et al. (2004) do not find a statistically significant association between non-audit fees and audit/financial reporting quality.

The findings of an experiment by Joe and Vandervelde (2007) indicate that although knowledge spillover improves audit risk assessment, auditors seem to be less skeptical in identifying specific factors indicative of fraud when they provide both audit and non-audit services. Rice and Weber (2012) examine a sample of companies with existing internal control weaknesses and find that non-audit fees make it less likely that material weaknesses are disclosed. Their findings therefore support the economic dependence view. Prior research has also investigated market perceptions of non-audit services being provided by incumbent audit firms (e.g., Krishnan et al. 2005; Francis and Ke 2006; Khurana and Raman 2006), and the findings generally suggest that investors perceive the provision of non-audit services impairs auditor independence.

In 2002, the US Congress passed the Sarbanes-Oxley Act (SOX), which brought greater regulation to audit firms, among other things. In order to enhance audit

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[2] As defined by DeAngelo (1981), audit quality consists of both the likelihood that the auditor discovers a breach and the likelihood that the auditor discloses the breach.

quality by securing auditor independence, SOX provisions and Securities and Exchange Commission (SEC) rules prohibit audit firms from offering audit and certain non-audit services to the same client concurrently. Because of the potential benefits from knowledge spillover, providing tax services is permitted, but is hedged with specific requirements. For example, an audit committee must approve in advance all audit firm-provided tax services, tax-related fees paid to the audit firm must be reported separately, and there are limitations to the scope of the tax consulting (SEC 2003; PCAOB 2005).

There are some prior studies examining the effects of tax services on the clients' financial reporting quality. The underlying assumption in most of these studies is that better quality auditing ought to manifest in better quality financial reporting by the client company. Kinney et al. (2004) find a negative association between restatements of financial statements and tax fees. They interpret this result as suggesting that there are benefits from tax consulting that flow to the audit quality. Seetharaman et al. (2011) examine the association between restated periods and tax-related fees, but do not find statistically significant results. However, they report a significant negative relation when the restatements relate to tax issues. Choi and Lee (2009) find that tax services being provided by an incumbent audit firm results in lower client discretionary accruals. Huang et al. (2007) find mostly insignificant associations between tax fees and proxies for financial reporting quality (some weak evidence of lower abnormal accruals, but insignificant association with meeting or beating earnings benchmarks). Krishnan and Visvanathan (2011) suggest that tax services have a negative impact on loss avoidance. Gleason and Mills (2011) find improvement in estimates for tax reserves when the audit firm also provides tax services. Harris and Zhou (2013) suggest that tax services lead to lower likelihood of non-tax internal control weak-nesses but do not have an effect on tax-related weaknesses. In addition to the studies examining the client company's financial reporting quality, Robinson (2008) finds a positive association between tax fees and the likelihood that the auditor issues a going concern opinion prior to bankruptcy filing. In summary, these studies support the view of knowledge spillover or find insignificant associations. However, a few prior studies have found indications suggesting that tax fees may have a negative effect on audit quality. Using an experiment, Favere-Marchesi (2006) find that the joint provision of audit and tax services lead to significantly lower fraud-risk assessments. Paterson and Valencia (2011) find that recurring audit firm-provided tax services create knowledge spillover, but nonrecurring tax services seem to have a detrimental impact on auditor independence.

In this study, we approach the issue of tax services being provided by an incumbent audit firm via a sample of companies with poor financial reporting quality,

that is, companies with misstatements. The misstatements are determined from restatement data, and the focus is on the restated periods. Rather than examining the years of restatement announcements, it is more appropriate to concentrate on the restated periods including misstatement in order to determine the company-years with poor accounting quality. First, we investigate whether tax-related fees are associated with those misstatements in financial information that remain undiscovered in a fiscal year in question, to which we refer as restatement lag. Second, we investigate whether tax-related fees are associated with the likelihood of internal control weakness disclosures among companies with misstatements. SOX Section 404 requires the management of listed companies to disclose their assessment on the effectiveness of internal control over financial reporting.[3] The underlying assumption is that an occurrence of a misstatement indicates internal control weaknesses (e.g., Eilifsen and Messier 2000; Leone 2007; Rice and Weber 2012). Therefore, utilizing a sample of companies with misstatements (eventually restated), we examine whether tax fees has an impact on whether or not a company disclosed the existing material weaknesses.

A research setting utilizing a sample of companies that all have low financial reporting quality allows the examination of auditors' professional skepticism in the context of the joint provision of tax services and audit services. Given the cost (a threat to auditor independence) and benefit (knowledge spillover) associated with tax services, it is not obvious how tax services affect audit quality. The enhanced knowledge of clients acquired via the provision of tax services could make restatements more timely and material weakness disclosures more likely in companies with poor accounting quality. However, economic dependence might disrupt an auditor's professional skepticism, resulting in restatement lags and unacknowledged control problems. Thus, we state the following two hypotheses without directional expectations:

H1: There is a significant association between restatement lag and incumbent audit firm-provided tax services among companies with poor financial reporting quality.

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[3] This section became effective for accelerated filers in 2004. In addition to the management assessment, Section 404 requires the company's external auditor to attest the assessment. Since 2007 smaller listed companies have also been reporting their assessment of internal control effectiveness annually, but auditor's internal control disclosure is not required. Thus, our sample includes company-year observations with both auditor internal control reports and management-only internal control reports.

H2: There is a significant association between disclosure of internal control weaknesses and incumbent audit firm-provided tax services among companies with poor financial reporting quality.

3 Data and methodology

3.1 Sample and model specification

The data used in this study consist of company-year observations of US listed companies from 2005–2012. We start the sample selection by gathering from Audit Analytics all the companies located in the US that have issued the SOX Section 404 mandated internal control reports. Then we obtain restatement data and audit fee data (also from Audit Analytics), and combine those with the internal control data. Finally, we extract the financial data from the Thomson Financial database.

The samples used in the analyses consist of companies with poor financial reporting quality based on occurrences of misstatements (eventually restated). Specifically, we examine the restatement disclosure data, focusing on the restated periods, that is, the periods including misstatements. The restatement data include the period beginning and ending dates for which the company is restating. The restatement can affect an entire fiscal year, multiple fiscal years, or only a part of the fiscal year.

In order to investigate the first hypothesis, we estimate the following logit model[4]:

$$REST\_LAG = \alpha + \beta_1 taxservices + \beta_2 AUDITFEES + \beta_3 AUDITRELATED + \beta_4 OTHERFEES + \beta_5 BIG4 + \beta_6 GC + \beta_7 ACHANGE + \beta_8 LOGTA + \beta_9 LOGNBS + \beta_{10} FOREIGN + \beta_{11} RESTRUCT + \beta_{12} ACQ + \beta_{13} LOSS + \beta_{14} LEV + \beta_{15} PRIORICW + annual\ fixed\ effects + industry\ fixed\ effects + \varepsilon \quad (1)$$

[4] Because we are estimating conditional probability, we use logistic analysis, where normal distributions of variables are not required.

The dependent variable in Model (1) is *REST_LAG*, which is a dummy variable equal to one if the restatement announcement took place after the filing date of internal control report, and zero otherwise. If more than one restatement announcement affects the same fiscal-year, *REST_LAG* is coded as one only if each announcement date takes place after the filing date of the internal control report. The rationale in the analyses using Model (1) is to compare company-years where misstatements were restated in a more timely manner to those company-years where misstatements were restated only at the later periods (restatement lag). We assume that better audit quality would manifest in a reduced likelihood of restatement lags.

In order to investigate the second hypothesis, we estimate the following logit model:

$$MW404 = \alpha + \beta_1 taxservices + \beta_2 AUDITFEES + \beta_3 AUDITRELATED + \beta_4 OTHERFEES + \beta_5 BIG4 + \beta_6 GC + \beta_7 ACHANGE + \beta_8 LOGTA + \beta_9 LOGNBS + \beta_{10} FOREIGN + \beta_{11} RESTRUCT + \beta_{12} ACQ + \beta_{13} LOSS + \beta_{14} LEV + \beta_{15} PRIORICW + \textit{annual fixed effects} + \textit{industry fixed effects} + \varepsilon \quad (2)$$

The dependent variable in Model (2) is *MW404*, which is a dummy variable equal to one if a company disclosed an internal control report indicating material weaknesses, and zero otherwise. Since the sample used in the analyses consists of company-years with misstatements, material weakness disclosures could be expected to indicate that control problems have been acknowledged. The data on section 404 material weaknesses consists of both auditor internal control reports and management-only reports (see also footnote 3). The assumption is that, in case of high quality auditing, auditors would require management to acknowledge existing material weaknesses also when they do not issue their own internal control report. Additionally, we use the variable *MW404FIRST*, which is set to one if a company discloses internal control material weaknesses for the first time, and zero otherwise.

Both Model (1) and Model (2) include the same explanatory variables. *Taxservices* represents the four alternative variables for tax-related fees, which are examined separately in the analyses: *DTAXFEES* is set as one, if tax-related fees are greater than zero, and zero otherwise; *TAXFEES* measures the magnitude of tax fees, and is calculated by dividing tax-related fees paid to the incumbent auditor by the square root of total assets (see Kinney et al. 2004); *TAXFEES_TF* is the

ratio of tax-related fees paid to the incumbent auditor divided by total fees[5]; *TAXFEES_AF* is the ratio of tax-related fees paid to the incumbent auditor divided by audit fees.

The control variables are adapted from prior studies investigating the likelihood of restated financial statements (Seetharaman et al. 2011) and the non-disclosure of existing material weaknesses (Rice and Weber 2012). *AUDITFEES* controls for the effect of audit effort, and is calculated as audit fees scaled by the square root of total assets (see e.g., Kinney et al. 2004; Rice and Weber et al. 2012). Similarly, audit related fees (*AUDITRELATED*) and all other auditor fees (*OTHERFEES*) are scaled by the square root of total assets. To control for the effect of audit firm size, an indicator variable for the Big 4 audit firms *(BIG4*) is included in the model (see e.g., Seetharaman et al. 2011). Indicator variables for going concern opinion (*GC*) and for change of the signatory audit firm from previous year (*ACHANGE*) are also included in the model. Company size is controlled by including the natural logarithm of total assets (*LOGTA*) in the model (e.g., Seetharaman et al. 2011). Complex companies might have more difficulties to establish and maintain higher quality accounting system. To control for the effect of company complexity, we include the natural logarithm of the number of business segments (*LOGNBS*) in the model (e.g., Seetharaman et al. 2011). Moreover, we include indicator variables for companies reporting geographic segment(s) other than the USA (*FOREIGN*), restructuring expenses/charges (*RESTRUCT*) and exemptions to the internal control assessment due to acquisition (*ACQ*).[6] Poorly performing companies may have more incentive to manage earnings, and/or have less resource to maintain high quality accounting systems. Thus, we add to the model an indicator variable for companies reporting negative income in either previous or current company year (*LOSS*) to control for financial performance. Highly leveraged companies might try to avoid violating debt covenants by managing earnings (e.g., Seetharaman et al. 2011), but those companies might also be subject to closer monitoring leading to more conservative reporting (e.g., Seetharaman et al. 2011). Thus, we include leverage (*LEV*) calculated as total debt divided by total assets in the model.[7] Finally, we control for the disclosure of the previous year's internal control effectiveness (*PRIORICW*). *PRIORICW* is set to one if a company identified internal control weaknesses in the previous year based on either Section 404 disclosure or Section 302 quarterly disclosure. SOX

[5] Total fees is the sum of audit fees, audit related fees, tax-related fees, and other fees.
[6] This information is based on Audit Analytics data where it is indicated if exemptions to the assessment of internal controls over financial reporting were identified.
[7] Observations with *LEV*>1 are excluded to mitigate outliers.

Section 302 relates to quarterly reporting and requires management to assess the effectiveness of disclosure controls and procedures. Finally, year and industry (according to the 17 industry classifications by Fama and French) fixed effects control for temporal variation and industry differences. All the variables used in the analyses are defined in Table 1.

Table 1. Variable definitions

Variable	Definition
REST_LAG	A dummy variable with a value of one if the restatement announcement took place after the filing date of internal control opinion, and zero otherwise.
MW404	A dummy variable with a value of one if a company disclosed weaknesses in internal controls over financial reporting based on Section 404, and zero otherwise.
MW404FIRST	A dummy variable with a value of one if a company disclosed weaknesses in internal controls over financial reporting based on Section 404 for the first time, and zero otherwise.
DTAXFEES	A dummy variable with a value of one if a company paid tax related fees to the auditor, zero otherwise.
TAXFEES	Tax related fees paid to the incumbent auditor scaled by the square root of total assets.
TAXFEES_TF	Tax related fees paid to the incumbent auditor scaled by total fees.
TAXFEES_AF	Tax related fees paid to the incumbent auditor scaled by audit fees.
AFEES	Audit fees scaled by the square root of total assets.
AUDITRELATED	Audit related fees scaled by the square root of total assets.
OTHERFEES	Other fees scaled by the square root of total assets.
BIG4	A dummy variable with a value of one if the auditor is one of the four largest audit firms, and zero otherwise.
GC	A dummy variable with a value of one if a company received a going concern opinion, and zero otherwise.
ACHANGE	A dummy variable with a value of one if the signing audit firm changed from the previous fiscal year, and zero otherwise.
LOGTA	The natural logarithm of total assets
LOGNBS	The natural logarithm of the number of business segments reported by the company.
FOREIGN	A dummy variable with a value of one if a company reported geographic segment(s) other than the US, and zero otherwise.
RESTRUCT	A dummy variable with a value of one if a company reported restructuring expenses / charges, and zero otherwise.
ACQ	A dummy variables with a value of one if an exemption to the assessment of internal controls indicates acquisition(s) during the past year, and zero otherwise.
LOSS	A dummy variable with a value of one if the net income before extraordinary items is negative in year t or t-1, and zero otherwise.
LEV	Total debt divided by total assets
PRIORICW	A dummy variable with a value of one if the company disclosed either Section 404 material weaknesses or Section 302 weaknesses in the previous year, and zero otherwise.
YEAR	A dummy variable for the fiscal years 2005–2012
INDUSTRY	A dummy variable for Fama and French 17 industry classifications

The analyses are conducted using 1) total sample of restated company-years and 2) sample of company-years where only the first restated years are included. The number of observations in the samples is as follows[8]:

1) Total samples of restated company-years

   - Model (1) used to examine the probability of a restatement lag: 2,749 observations (1,343 unique companies)

   - Model (2) used to examine the probability of a material weakness disclosure: 2,584 observations (1,312 unique companies). If a restated internal control report was issued and the material weaknesses were stated only in the restated report, the observation is excluded from the sample.

     - Additionally, we examine the probability of a first time material weakness disclosure: 2,262 observations (1,174 unique companies). If an internal control report indicating material weaknesses is issued repeatedly (i.e., other than a first time material weakness report), the observation is excluded from the sample.

2) Sample of restated company-years: only first restated years are included. A restatement may affect multiple fiscal years. We also conduct the analyses using a sample where continuous misstatement years have been excluded and examine only the first restated fiscal years.

   - Model (1) used to examine the probability of a restatement lag: 1,374 observations (1,096 unique companies)

   - Model (2) used to examine the probability of a material weakness disclosure: 1,297 observations (1,051 unique companies)

     - Additional investigation of first time material weaknesses: 1,131 observations (941 unique companies)

[8] Exclusions from the sample are primarily related to missing values on variables needed in the analyses, but also to some extreme cases or possible data errors in financial dates (which are used to determine years including misstatements) and inconsistencies in auditor names between datasets.

3.2 Descriptive statistics

The descriptive statistics of the variables used in the empirical analyses are presented in Panel A of Table 2. The mean of the dependent variable *REST_LAG* indicates that 63 percent of the sample observations are restatement lag observations. Moreover, 21 percent of the sample observations include 404 material weaknesses and 10 percent first time material weaknesses. The dummy variable for tax fees (*DTAXFEES*) indicates that 70 percent of the company-year observations include incumbent auditor-provided tax services. The means (medians) of tax fees scaled by the square root of total assets (*TAXFEES*) is 0.165 (0.045), the ratio of tax fees to total fees (*TAXFEES_TF*) is 0.074 (0.039), and the ratio of tax fees to audit fees (*TAXFEES_AF*) is 0.105 (0.044). The means (medians) of audit fees divided by the square root of total assets (*AFEES*) is 1.596 (1.263), audit related fees divided by the square root of total assets (*AUDITRELATED*) is 0.124 (0.027), and other fees divided by the square root of total assets (*OTHERFEES*) is 0.028 (0.000). Seventy-three percent of the company-years are audited by one of the Big 4 audit firms, seven percent of the sample observations have a going concern opinion, and approximately eight percent have changed their signatory auditor from the previous year.

The average value of total assets is 9,730 million dollars with a median value of 735 million dollars. The average number of business segments is 2.625. Approximately 46 percent of the observations have foreign operations, 24 percent have reported restructuring expenses/charges, and 10 percent indicate an exception to the assessment of internal controls due to acquisition. In about 49 percent of the company-years, the companies report a loss in either the current or previous year. The mean (median) leverage is 0.247 (0.197). On average, 23 percent of the sample observations have disclosed internal control weaknesses based on section 404 disclosure, or section 302 disclosure in the previous year.

Panel B of Table 2 displays the Pearson correlation coefficients among the selected variables. The two highest correlations among the independent variables occur between *BIG4* and *LOGTA* (0.563), and *TAXFEES* and *AUDITRELATED* (0.462). The variance inflation factors (untabulated) do not indicate problems with multicollinearity.

Table 2. Descriptive statistics

Panel A: Distributional statistics

Variable	Mean	Std.	Min	25%tile	Median	75%tile	Max	N
REST_LAG	0.628	0.483	0.000	0.000	1.000	1.000	1.000	2,749
MW404	0.214	0.410	0.000	0.000	0.000	0.000	1.000	2,584
MW404FIRST	0.103	0.303	0.000	0.000	0.000	0.000	1.000	2,262
DTAXFEES	0.696	0.460	0.000	0.000	1.000	1.000	1.000	2,749
TAXFEES	0.165	0.384	0.000	0.000	0.045	0.192	8.818	2,749
TAXFEES_TF	0.074	0.094	0.000	0.000	0.039	0.115	0.553	2,749
TAXFEES_AF	0.105	0.164	0.000	0.000	0.044	0.142	1.693	2,749
AFEES	1.596	1.379	0.029	0.717	1.263	2.052	24.417	2,749
AUDITRELATED	0.124	0.358	0.000	0.000	0.027	0.118	7.727	2,749
OTHERFEES	0.028	0.239	0.000	0.000	0.000	0.002	7.115	2,749
BIG4	0.730	0.444	0.000	0.000	1.000	1.000	1.000	2,749
GC	0.069	0.253	0.000	0.000	0.000	0.000	1.000	2,749
ACHANGE	0.084	0.277	0.000	0.000	0.000	0.000	1.000	2,749
Total assets (millions)	9729.710	96053.390	0.003	182.666	735.445	2728.510	3222422.000	2,749
Segments	2.625	1.809	1.000	1.000	2.000	4.000	10.000	2,749
FOREIGN	0.458	0.498	0.000	0.000	0.000	1.000	1.000	2,749
RESTRUCT	0.242	0.428	0.000	0.000	0.000	0.000	1.000	2,749
ACQ	0.101	0.302	0.000	0.000	0.000	0.000	1.000	2,749
LOSS	0.492	0.500	0.000	0.000	0.000	1.000	1.000	2,749
LEV	0.247	0.230	0.000	0.040	0.197	0.384	0.996	2,749
PRIORICW	0.225	0.418	0.000	0.000	0.000	0.000	1.000	2,749

Panel B: Pearson's correlations coefficients

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DTAXFEES (1)	**0.284**	**0.525**	**0.425**	**0.081**	**0.054**	0.028	**0.222**	**-0.155**	**-0.171**	**0.262**	**0.158**	**0.194**	**0.098**	0.034	**-0.101**	0.000	**-0.096**
TAXFEES (2)		**0.627**	**0.709**	**0.299**	**0.462**	**0.287**	**0.141**	**-0.055**	**-0.068**	**0.105**	**0.120**	**0.174**	**0.141**	0.025	0.004	-0.013	**-0.044**
TAXFEES_TF (3)			**0.943**	-0.018	**0.055**	0.023	**0.121**	**-0.089**	**-0.086**	**0.136**	**0.093**	**0.097**	**0.089**	0.014	**-0.076**	-0.002	**-0.113**
TAXFEES_AF (4)				-0.014	**0.235**	**0.163**	**0.096**	**-0.078**	**-0.071**	**0.123**	**0.091**	**0.079**	**0.078**	0.012	**-0.056**	0.000	**-0.101**
AFEES (5)					**0.171**	**0.068**	**0.184**	0.016	**-0.051**	**-0.067**	**0.123**	**0.378**	**0.271**	**0.079**	**0.145**	**-0.088**	**0.214**
AUDITRELATED (6)						**0.415**	**0.044**	-0.016	-0.017	**0.056**	**0.074**	**0.076**	**0.064**	**0.055**	0.027	0.035	-0.010
OTHERFEES (7)							**0.056**	-0.027	-0.027	**0.114**	**0.049**	**0.070**	**0.041**	0.018	-0.005	-0.004	0.015
BIG4 (8)								**-0.321**	**-0.272**	**0.563**	**0.251**	**0.257**	**0.218**	**0.115**	**-0.204**	**0.082**	**-0.191**
GC (9)									**0.183**	**-0.458**	**-0.166**	**-0.157**	**-0.063**	**-0.091**	**0.256**	**0.063**	**0.194**
ACHANGE (10)										**-0.253**	**-0.104**	**-0.104**	**-0.069**	**-0.054**	**0.131**	0.002	**0.139**
LOGTA (11)											**0.370**	**0.166**	**0.122**	**0.122**	**-0.344**	**0.175**	**-0.230**
LOGNBS (12)												**0.181**	**0.128**	**0.107**	**-0.148**	**0.077**	**-0.054**
FOREIGN(13)													**0.341**	**0.121**	**-0.068**	**-0.146**	-0.025
RESTRUCT (14)														**0.066**	**0.072**	-0.020	-0.013
ACQ (15)															**-0.090**	0.005	**-0.054**
LOSS (16)																**0.085**	**0.166**
LEV (17)																	-0.006
PRIORICW (18)																	

Notes: See Table 1 for variable definitions. Bold text in the Pearson correlations matrix indicates significance at the 0.05 level.

3.3 Univariate tests

Panel A of Table 3 reports the univariate results when the sample is partitioned into two groups based on the restatement lag variable (*REST_LAG*). The mean differences examined are *DTAXFEES*, *TAXFEES*, *TAXFEES_TF*, and *TAXFEES_AF*. The statistical significances are based on t-tests for continuous variables and a chi-square test for dummy variables. The descriptive test results for the total sample indicate that companies with restatement lags are more likely to have tax fees (*DTAXFEES* has a marginally significant difference at the 0.10 level), and have higher proportions of tax fees to total fees (*TAXFEES_TF*) and tax fees to audit fees (*TAXFEES_AF*) (significant at the 0.01 level) compared to companies with misstatements discovered before filing the internal control report. Moreover, the results of a sample that includes only the first restated years indicate that companies with restatement lags have higher tax-related fees (*TAXFEES*, *TAXFEES_TF*, and *TAXFEES_AF*).

Panel B of Table 3 reports the univariate results when the sample is partitioned into two groups based on the material weakness disclosure variable (*MW404*). These descriptive results indicate that companies disclosing material weaknesses have significantly lower tax-related fees compared to those that do not acknowledge their control problems. In the total sample, the differences are significant with the variables *DTAXFEES*, *TAXFEES_TF*, and *TAXFEES_AF*. In the sample that includes only the first restated years, all the variables of tax-related fees are significantly different between companies that disclose weaknesses and those that do not disclose them.

Table 3. Univariate results

Panel A: Restatement lags

	Total sample of restated company-years			Sample of restated company-years: only first restated year included		
	REST_LAG=1 n=1,727	REST_LAG=0 n=1,022		REST_LAG=1 n=908	REST_LAG=0 n=466	
DTAXFEES	0.708	0.674	*	0.666	0.663	
TAXFEES	0.170	0.156		0.161	0.126	**
TAXFEES_TF	0.080	0.066	***	0.074	0.062	**
TAXFEES_AF	0.114	0.090	***	0.107	0.082	***

Panel B: Section 404 material weaknesses

	Total sample of restated company-years			Sample of restated company-years: only first restated year included		
	MW404=1 n=554	MW404=0 n=2,030		MW404=1 n=281	MW404=0 n=1,016	
DTAXFEES	0.610	0.724	***	0.577	0.696	***
TAXFEES	0.153	0.172		0.111	0.164	***
TAXFEES_TF	0.054	0.080	***	0.047	0.078	***
TAXFEES_AF	0.075	0.114	***	0.064	0.110	***

Notes: See Table 1 for the variable definitions. The statistical significances are based on t-tests for continuous variables and chi-square test for dummy variables.

4 Results

We estimate Model (1) to test whether tax services are associated with the likelihood of a restatement lag, and Model (2) to test whether tax services are associated with the likelihood of a material weakness disclosure. The logistic regression results are reported in Table 4. Panel A of Table 4 reports the results for the dummy variable of tax services (*DTAXFEES*). These results indicate that in each model specification (*REST_LAG*, *MW404*, *MW404FIRST*), the indicator variable for tax-related fees is insignificant, suggesting that tax services being provided by incumbent audit firms is not associated with audit quality.

Panel B of Table 4 reports the results for the continuous variable *TAXFEES*, which represents the magnitude of tax-related fees. Columns (1) and (4) indicate that tax-related fees are not associated with restatement lags. However, *TAXFEES* is marginally significantly associated with lower likelihood of material weakness disclosures in the sample that includes only the first restated years [column (5)]. Moreover, higher tax-related fees are negatively associated with the likelihood of first time material weakness disclosures [columns (3) and (6)].

Panel C of Table 4 reports the results for the variable tax-related fees to total fees (*TAXFEES_TF*). These results show that *TAXFEES_TF* is not significantly associated with the likelihood of restatement lags [columns (1) and (4)]. However, the results indicate that the proportion of tax-related fees of total fees is significantly and negatively associated (at the 0.05 level) with the likelihood of material weakness disclosures (columns (2), (3), (5), and (6)].

Panel D of Table 4 shows the results for the ratio of tax-related fees to audit fees. *TAXFEES_AF* is significantly (at the 0.05 level) and positively associated with the likelihood of restatement lags, but only in the total sample of misstatements [column (1)]. The results in columns (3) and (6) suggest that the likelihood of first time material weakness disclosures is lower when tax-related fees are higher.

Table 4. Multivariate results

Panel A: The indicator variable for tax-related fees>0 (*DTAXFEES*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
DTAXFEES	-0.063	0.44		-0.066	0.25		-0.226	1.75		-0.203	2.04		-0.103	0.30		-0.209	0.80	
AUDITFEES	-0.196	20.52	***	0.417	51.52	***	0.466	40.27	***	-0.264	17.73	***	0.339	17.68	***	0.247	6.48	***
AUDITRELATED	0.150	1.39		-0.122	0.57		-0.009	0.00		0.455	5.32	**	-0.213	0.76		-0.226	0.26	
OTHERFEES	-0.196	0.75		0.032	0.03		-0.037	0.02		-0.130	0.20		-0.018	0.00		-1.500	1.41	
BIG4	0.452	11.69	***	-0.845	27.07	***	-0.841	13.96	***	0.922	26.40	***	-0.976	17.96	***	-1.023	9.42	***
GC	-0.159	0.72		0.601	6.61	**	0.381	1.21		0.113	0.21		0.225	0.52		0.193	0.19	
ACHANGE	-0.518	9.85	***	0.886	22.67	***	1.083	20.65	***	-0.548	7.37	***	1.044	16.00	***	1.092	12.10	***
LOGTA	-0.014	0.24		-0.083	4.35	**	-0.121	4.92	**	-0.044	1.14		-0.059	1.01		-0.049	0.37	
LOGNBS	0.095	2.13		-0.103	1.22		-0.036	0.09		0.133	1.67		0.122	0.76		0.126	0.47	
FOREIGN	0.188	3.17	*	-0.348	5.32	**	-0.384	3.92	**	0.244	2.21		-0.501	4.95	**	-0.221	0.62	
RESTRUCT	0.038	0.11		-0.099	0.39		-0.107	0.28		-0.268	2.66		-0.064	0.08		-0.025	0.01	
ACQ	0.146	0.99		0.028	0.02		0.223	0.89		0.098	0.21		0.207	0.52		0.339	1.03	
LOSS	-0.214	4.93	**	0.434	10.13	***	0.484	7.39	***	-0.519	13.46	***	0.846	18.04	***	0.852	9.64	***
LEV	0.221	1.26		-0.009	0.00		-0.114	0.10		0.205	0.50		-0.493	1.71		-0.468	0.88	
PRIORICW	-0.908	68.89	***	1.113	77.44	***	-1.963	31.30	***	-0.409	5.70	**	1.576	68.99	***	-1.247	7.42	***
Intercept	0.088	0.17		-0.854	8.28	***	-1.326	11.19	***	0.528	2.85	*	-1.180	8.09	***	-1.790	9.85	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio Chi-Square	353.5	<.0001		612.1	<.0001		257.2	<.0001		185.4	<.0001		373.4	<.0001		119.7	<.0001	
R^2		0.12			0.21			0.11			0.13			0.25			0.10	
N		2,749			2,584			2,262			1,374			1,297			1,131	

Panel B: The magnitude of tax-related fees (*TAXFEES*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES	0.132	1.16		-0.205	1.46		-0.394	3.16	*	0.389	2.22		-0.880	3.74	*	-1.970	6.15	**
AUDITFEES	-0.206	20.89	***	0.431	49.89	***	0.494	42.78	***	-0.292	18.91	***	0.376	17.79	***	0.318	8.12	***
AUDITRELATED	0.090	0.37		-0.031	0.03		0.192	0.98		0.355	2.85		-0.153	0.31		-0.204	0.21	
OTHERFEES	-0.214	0.77		0.077	0.16		0.114	0.26		-0.098	0.12		-0.032	0.01		-1.603	1.51	
BIG4	0.447	11.41	***	-0.845	27.05	***	-0.857	14.60	***	0.904	25.52	***	-0.953	17.09	***	-0.980	8.67	***
GC	-0.158	0.70		0.605	6.69	***	0.386	1.24		0.113	0.21		0.231	0.55		0.239	0.30	
ACHANGE	-0.506	9.52	***	0.893	23.13	***	1.102	21.05	***	-0.507	6.46	**	1.035	15.89	***	1.098	12.15	***
LOGTA	-0.017	0.38		-0.082	4.16	**	-0.120	4.78	**	-0.053	1.68		-0.057	0.93		-0.051	0.39	
LOGNBS	0.091	1.98		-0.102	1.21		-0.033	0.07		0.125	1.48		0.128	0.84		0.148	0.64	
FOREIGN	0.181	2.97	*	-0.357	5.64	**	-0.407	4.45	**	0.225	1.87		-0.506	5.08	**	-0.229	0.66	
RESTRUCT	0.036	0.10		-0.101	0.40		-0.110	0.30		-0.274	2.75	*	-0.056	0.06		0.035	0.01	
ACQ	0.156	1.12		0.013	0.00		0.196	0.70		0.122	0.32		0.198	0.47		0.350	1.08	
LOSS	-0.213	4.89	**	0.437	10.27	***	0.496	7.75	***	-0.504	12.78	***	0.827	17.06	***	0.763	7.86	***
LEV	0.223	1.28		-0.007	0.00		-0.094	0.07		0.197	0.46		-0.478	1.60		-0.425	0.72	
PRIORICW	-0.898	67.49	***	1.104	75.72	***	-2.010	31.49	***	-0.384	4.98	**	1.552	65.75	***	-1.305	7.70	***
Intercept	0.072	0.12		-0.896	9.34	***	-1.456	13.81	***	0.459	2.20		-1.207	8.41	***	-1.798	10.07	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio Chi-Square	354.1	<.0001		613.5	<.0001		259.1	<.0001		185.9	<.0001		378.4	<.0001		128.5	<.0001	
R^2		0.12			0.21			0.11			0.13			0.25			0.11	
N		2,749			2,584			2,262			1,374			1,297			1,131	

Panel C: The ratio of tax-related fees to total fees (*TAXFEES_TF*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES_TF	0.700	2.40		-1.364	4.31	**	-2.350	5.28	**	0.592	0.71		-2.356	5.25	**	-3.981	5.47	**
AUDITFEES	-0.194	20.12	***	0.412	50.44	***	0.458	40.30	***	-0.268	17.74	***	0.333	17.00	***	0.238	5.85	**
AUDITRELATED	0.135	1.13		-0.099	0.40		0.047	0.06		0.428	4.73	**	-0.216	0.73		-0.256	0.30	
OTHERFEES	-0.186	0.66		0.029	0.02		-0.044	0.02		-0.102	0.12		-0.040	0.02		-1.651	1.62	
BIG4	0.443	11.21	***	-0.839	26.33	***	-0.839	13.82	***	0.911	26.03	***	-0.968	17.67	***	-1.000	9.07	***
GC	-0.156	0.68		0.592	6.45	**	0.380	1.22		0.120	0.24		0.211	0.46		0.217	0.25	
ACHANGE	-0.499	9.22	***	0.875	22.14	***	1.082	20.48	***	-0.503	6.37	**	1.013	15.22	***	1.071	11.69	***
LOGTA	-0.017	0.38		-0.081	4.10	**	-0.119	4.70	**	-0.052	1.60		-0.056	0.93		-0.044	0.29	
LOGNBS	0.089	1.90		-0.098	1.13		-0.033	0.07		0.126	1.51		0.125	0.80		0.137	0.54	
FOREIGN	0.177	2.81	*	-0.357	5.65	**	-0.396	4.24	**	0.223	1.83		-0.511	5.18	**	-0.222	0.62	
RESTRUCT	0.031	0.08		-0.092	0.34		-0.095	0.22		-0.268	2.64		-0.062	0.08		-0.003	0.00	
ACQ	0.153	1.09		0.014	0.00		0.202	0.75		0.117	0.30		0.195	0.46		0.329	0.97	
LOSS	-0.211	4.79	**	0.427	9.84	***	0.467	6.91	***	-0.510	13.08	***	0.821	16.83	***	0.785	8.23	***
LEV	0.222	1.28		-0.008	0.00		-0.106	0.09		0.193	0.44		-0.461	1.50		-0.442	0.80	
PRIORICW	-0.898	67.50	***	1.104	75.99	***	-1.981	31.54	***	-0.397	5.33	***	1.563	68.01	***	-1.259	7.50	***
Intercept	0.021	0.01		-0.800	7.53	***	-1.295	11.08	***	0.419	1.84		-1.080	6.70	***	-1.668	9.01	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio																		
Chi-Square	355.2	<.0001		616.1	<.0001		261.6	<.0001		184.0	<.0001		378.2	<.0001		126.1	<.0001	
R^2		0.12			0.21			0.11			0.13			0.25			0.11	
N		2,749			2,584			2,262			1,374			1,297			1,131	

Panel D: The ratio of tax-related fees to audit fees (*TAXFEES_AF*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES_AF	0.570	4.56	**	-0.644	2.54		-1.330	4.59	**	0.594	2.08		-0.992	1.90		-2.286	3.49	*
AUDITFEES	-0.192	19.69	***	0.412	50.62	***	0.458	40.27	***	-0.266	17.49	***	0.332	17.22	***	0.234	5.81	**
AUDITRELATED	0.087	0.46		-0.063	0.15		0.114	0.36		0.384	3.73	*	-0.171	0.43		-0.211	0.21	
OTHERFEES	-0.210	0.74		0.050	0.07		0.041	0.02		-0.102	0.12		-0.021	0.01		-1.593	1.53	
BIG4	0.444	11.21	***	-0.844	26.80	***	-0.846	14.10	***	0.909	25.86	***	-0.970	17.83	***	-1.007	9.18	***
GC	-0.155	0.67		0.594	6.47	**	0.379	1.21		0.120	0.24		0.217	0.49		0.210	0.24	
ACHANGE	-0.498	9.23	***	0.881	22.46	***	1.088	20.65	***	-0.502	6.36	***	1.033	15.76	***	1.082	11.86	***
LOGTA	-0.018	0.41		-0.082	4.18	**	-0.118	4.68	**	-0.052	1.62		-0.058	0.99		-0.046	0.31	
LOGNBS	0.088	1.85		-0.100	1.17		-0.034	0.08		0.125	1.47		0.124	0.78		0.135	0.53	
FOREIGN	0.177	2.83	*	-0.358	5.66	**	-0.401	4.35	**	0.222	1.83		-0.511	5.21	**	-0.229	0.66	
RESTRUCT	0.029	0.07		-0.094	0.35		-0.102	0.26		-0.270	2.67		-0.063	0.08		-0.012	0.00	
ACQ	0.157	1.14		0.015	0.01		0.201	0.74		0.121	0.32		0.197	0.47		0.332	0.99	
LOSS	-0.212	4.82	**	0.432	10.04	***	0.478	7.23	***	-0.508	12.95	***	0.830	17.29	***	0.799	8.55	***
LEV	0.226	1.32		-0.012	0.00		-0.103	0.08		0.190	0.43		-0.476	1.60		-0.440	0.80	
PRIORICW	-0.898	67.62	***	1.108	76.72	***	-1.980	31.50	***	-0.392	5.19	**	1.563	68.04	***	-1.256	7.50	***
Intercept	0.016	0.01		-0.827	8.09	***	-1.339	11.89	***	0.405	1.72		-1.135	7.60	***	-1.710	9.59	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio																		
Chi-Square	357.1	<.0001		614.5	<.0001		260.6	<.0001		185.2	<.0001		375.6	<.0001		124.3	<.0001	
R^2		0.12			0.21			0.11			0.13			0.25			0.10	
N		2,749			2,584			2,262			1,374			1,297			1,131	

Notes: See Table 1 for variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, the results for the industry and year fixed effects are not reported.

Additionally, we estimate Model (1) and Model (2) for only those companies that have paid tax-related fees to their audit firm. That is, we exclude from the sample those observations where tax-related fees are zero. The results are reported in Table 5. These results indicate that the magnitude of tax-related fees is associated with a greater likelihood of restatement lags: *TAXFEES* is significant at the 0.05 level [column (4) of Panel A]; *TAXFEES_TF* is significant at the 0.10 level [columns (1) and (4) of Panel B]; *TAXFEES_AF* is significant at the 0.05 level [columns (1) and (4) of Panel C]. Moreover, the magnitude of tax-related fees is associated with a lower likelihood of material weakness disclosures: *TAXFEES* is significant at the 0.10 level [columns (3), (5), (6) of Panel A]; *TAXFEES_TF* is significant at the 0.10 level [columns (2), (3), (6) of Panel B] and significant at the 0.05 level [column (5) of Panel B]; *TAXFEES_AF* is significant at the 0.10 level [column (3)].

In summary, the current research does uncover some evidence suggesting that companies paying higher tax-related fees to their audit firm are more likely to have a restatement lag on a misstated financial statement. The results show more consistently across different model specifications that tax-related fees are associated with a lower likelihood of material weakness disclosures. Especially the higher proportion of tax fees over total fees or audit fees appears to have a significant influence on the material weakness disclosures. However, providing tax-related services does not in itself affect the likelihood of restatement lags or material weakness disclosures. Rather it is the magnitude of the fees that counts.

The results of the control variables indicate that *AUDITFEES* is significantly and negatively (positively) associated with the likelihood of restatement lag (material weakness disclosure) in nearly every model specification, which suggests that greater audit effort leads to a greater probability that misstatements are restated and control problems acknowledged (e.g., Blankley et al. 2012). Surprisingly, the dummy variable for Big 4 audit firms is positive (negative) in restatement lag (material weakness disclosure) estimations. Auditor change from the previous year is negatively (positively) associated with restatement lag (material weakness disclosure). The indicator variable *LOSS* is negatively (positively) associated with restatement lags (material weakness disclosures). Moreover, restatement lag (material weakness disclosure) is less likely (more likely) if control problems have been acknowledged in the previous year (*PRIORICW*). Other control variables have greater variations in their significance levels in different model specifications.

Table 5. Additional tests: Only observations with tax-related fees>0 (*DTAXFEES*=1)

Panel A: The magnitude of tax-related fees (*TAXFEES*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES	0.195	1.91		-0.234	1.97		-0.372	2.83	*	0.671	4.17	**	-1.007	3.19	*	-1.957	3.62	*
AUDITFEES	-0.226	17.41	***	0.455	40.85	***	0.521	30.96	***	-0.318	13.66	***	0.405	16.87	***	0.364	4.26	**
AUDITRELATED	0.159	0.95		-0.054	0.09		0.212	0.70		0.353	2.12		0.012	0.00		-0.065	0.03	
OTHERFEES	-0.455	3.82	*	0.337	1.93		0.273	1.10		-0.951	1.08		0.766	0.40		0.581	0.14	
BIG4	0.551	9.39	***	-1.213	31.61	***	-1.248	19.35	***	1.081	19.80	***	-1.442	20.37	***	-1.777	16.99	***
GC	-0.606	4.10	**	0.634	3.36	*	0.381	0.46		-0.469	1.58		0.540	1.33		0.538	0.54	
ACHANGE	-0.438	3.14	*	0.483	2.76	*	0.587	2.32		-0.315	0.97		0.242	0.26		0.315	0.31	
LOGTA	-0.056	2.36		-0.049	0.94		-0.062	0.73		-0.088	2.46		0.002	0.00		0.035	0.10	
LOGNBS	0.163	3.99	**	-0.078	0.48		-0.132	0.70		0.069	0.26		0.352	3.51	*	0.351	1.77	
FOREIGN	0.086	0.42		-0.408	4.77	**	-0.575	5.08	**	0.102	0.22		-0.817	6.74	***	-0.501	1.28	
RESTRUCT	0.127	0.90		-0.113	0.36		-0.042	0.03		-0.153	0.52		-0.145	0.26		-0.199	0.25	
ACQ	0.272	2.49		-0.185	0.56		-0.028	0.01		0.488	3.43	*	0.105	0.08		0.392	0.76	
LOSS	-0.259	4.54	**	0.523	8.99	***	0.566	6.11	**	-0.571	10.46	***	0.976	12.78	***	0.988	7.39	***
LEV	0.181	0.50		0.144	0.18		-0.044	0.01		0.209	0.30		-0.279	0.28		-0.274	0.17	
PRIORICW	-1.079	61.37	***	1.129	52.57	***	-2.202	19.24	***	-0.599	7.20	***	1.598	36.29	***	-1.417	4.47	**
Intercept	0.239	0.75		-1.102	8.36	***	0.194	0.48		0.524	1.76		-1.493	7.37	***	-2.479	9.55	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio Chi-Square	293.5	<.0001		388.2	<.0001		175.0	<.0001		169.4	<.0001		246.0	<.0001		100.8	<.0001	
R^2		0.14			0.19			0.10			0.17			0.25			0.12	
N		1,912			1,807			1,612			914			869			773	

Panel B: The ratio of tax-related fees to total fees (*TAXFEES_TF*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES_TF	1.051	3.51	*	-1.483	3.67	*	-2.070	2.95	*	1.530	2.97	*	-3.182	5.21	**	-4.623	3.69	*
AUDITFEES	-0.199	15.19	***	0.422	39.83	***	0.463	26.78	***	-0.258	10.83	***	0.325	13.76	***	0.208	2.66	
AUDITRELATED	0.228	2.87	*	-0.140	0.66		0.040	0.03		0.454	4.29	**	-0.100	0.24		-0.115	0.11	
OTHERFEES	-0.396	3.50	*	0.262	1.23		0.177	0.39		-0.940	1.04		0.707	0.34		0.617	0.16	
BIG4	0.549	9.28	***	-1.213	31.10	***	-1.235	18.70	***	1.090	20.33	***	-1.460	21.22	***	-1.767	17.32	***
GC	-0.612	4.17	**	0.632	3.38	*	0.382	0.47		-0.464	1.55		0.530	1.28		0.539	0.56	
ACHANGE	-0.443	3.20	*	0.475	2.62		0.591	2.36		-0.319	1.00		0.220	0.20		0.268	0.23	
LOGTA	-0.054	2.14		-0.052	1.08		-0.070	0.93		-0.083	2.22		-0.006	0.01		0.030	0.08	
LOGNBS	0.161	3.94	**	-0.079	0.49		-0.130	0.69		0.071	0.28		0.339	3.28	*	0.336	1.63	
FOREIGN	0.087	0.43		-0.419	5.05	**	-0.570	5.13	**	0.101	0.22		-0.831	7.00	***	-0.488	1.29	
RESTRUCT	0.121	0.81		-0.097	0.26		-0.015	0.00		-0.138	0.43		-0.160	0.32		-0.264	0.42	
ACQ	0.265	2.41		-0.179	0.53		-0.005	0.00		0.476	3.29	*	0.112	0.10		0.371	0.70	
LOSS	-0.256	4.40	**	0.512	8.65	***	0.542	5.63	**	-0.576	10.65	***	0.958	12.26	***	1.003	7.55	***
LEV	0.178	0.48		0.152	0.20		-0.031	0.00		0.185	0.23		-0.244	0.22		-0.255	0.15	
PRIORICW	-1.081	61.83	***	1.131	52.99	***	-2.161	18.75	***	-0.615	7.62	***	1.616	38.25	***	-1.356	4.07	**
Intercept	0.099	0.12		-0.905	5.53	**	-1.486	7.55	***	0.361	0.80		-1.148	4.10	**	-2.100	7.19	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio Chi-Square	295.1	<.0001		389.9	<.0001		175.6	<.0001		167.0	<.0001		246.3	<.0001		99.8	<.0001	
R^2		0.14			0.19			0.10			0.17			0.25			0.12	
N		1,912			1,807			1,612			914			869			773	

Panel C: The ratio of tax-related fees to audit fees (*TAXFEES_AF*)

	Total sample of restated company-years									Sample of restated company-years: only first restated year included								
	(1)			(2)			(3)			(4)			(5)			(6)		
Dependent variable	REST_LAG			MW404			MW404FIRST			REST_LAG			MW404			MW404FIRST		
	Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald		Est.	Wald	
TAXFEES_AF	0.755	5.71	**	-0.646	1.99		-1.211	2.99	*	1.059	4.44	**	-1.168	1.81		-2.238	2.11	
AUDITFEES	-0.195	14.61	***	0.423	39.92	***	0.463	26.69	***	-0.253	10.52	***	0.328	14.13	***	0.210	2.81	*
AUDITRELATED	0.160	1.29		-0.095	0.29		0.130	0.29		0.372	2.73	*	-0.005	0.00		-0.031	0.01	
OTHERFEES	-0.453	4.53	**	0.302	1.53		0.264	1.03		-0.994	1.16		0.848	0.49		0.794	0.27	
BIG4	0.549	9.24	***	-1.216	31.59	***	-1.235	18.76	***	1.086	20.14	***	-1.445	21.10	***	-1.750	17.30	***
GC	-0.608	4.13	**	0.627	3.32	*	0.375	0.45		-0.464	1.57		0.518	1.23		0.497	0.48	
ACHANGE	-0.444	3.22	*	0.473	2.61		0.588	2.34		-0.326	1.04		0.230	0.23		0.275	0.24	
LOGTA	-0.054	2.14		-0.051	1.05		-0.067	0.86		-0.083	2.20		-0.005	0.00		0.036	0.10	
LOGNBS	0.160	3.87	**	-0.079	0.49		-0.131	0.70		0.069	0.26		0.341	3.31	*	0.322	1.50	
FOREIGN	0.088	0.45		-0.412	4.89	**	-0.574	5.18	**	0.101	0.22		-0.805	6.60	**	-0.472	1.21	
RESTRUCT	0.118	0.78		-0.101	0.29		-0.020	0.01		-0.141	0.45		-0.163	0.33		-0.291	0.52	
ACQ	0.270	2.47		-0.176	0.51		-0.012	0.00		0.482	3.38	*	0.103	0.08		0.352	0.63	
LOSS	-0.257	4.44	**	0.518	8.82	***	0.549	5.77	**	-0.577	10.65	***	0.981	12.91	***	1.030	8.00	***
LEV	0.186	0.53		0.138	0.17		-0.044	0.01		0.189	0.24		-0.293	0.31		-0.297	0.20	
PRIORICW	-1.082	62.18	***	1.137	53.65	***	-2.159	18.83	***	-0.609	7.48	***	1.620	38.76	***	-1.349	4.11	**
Intercept	0.099	0.12		-0.980	6.58	**	-1.559	8.52	***	0.374	0.88		-1.355	6.18	**	-2.312	8.96	***
Annual fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Industry fixed effects?	Yes			Yes			Yes			Yes			Yes			Yes		
Likelihood ratio Chi-Square	297.1	<.0001		388.5	<.0001		175.5	<.0001		168.5	<.0001		243.1	<.0001		97.8	<.0001	
R^2		0.14			0.19			0.10			0.17			0.24			0.12	
N		1,912			1,807			1,612			914			869			773	

Notes: See Table 1 for variable definitions. Statistical significances based on two-tailed tests at the 1 percent, 5 percent, and 10 percent levels are denoted by ***, **, and *, respectively. Statistical significances are calculated by clustering the standard errors within companies (Petersen 2009). For brevity, the results for the industry and year fixed effects are not reported.

5 Conclusions

Although SOX (2002) prohibits the provision of most non-audit services by incumbent audit firms, tax services remain allowed because of the potential benefits from knowledge spillover. We have empirically examined whether tax-related fees paid to the incumbent auditor are associated with the likelihood of 1) restatement lag of misstated financial statement and 2) material weakness disclosure of misstatement companies. Collectively, our findings suggest that providing tax-related services does not in itself have a significantly positive or negative impact on audit quality. However, the empirical findings of this study provide some evidence that higher levels of tax-related fees are associated with restatement lags, and stronger evidence on the association between higher tax-related fees and unacknowledged internal control problems. That is, the findings of the current study indicate that, among companies with misstatements in financial statements, the misstatements and control problems are more likely to remain undiscovered during the fiscal year in question when the tax-related fees paid to the audit firm are higher. These findings have implications for regulators and company stakeholders as well as for the audit profession.

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Audit Partner Public-Client Specialisation and Client Abnormal Accruals

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ABSTRACT We examine the association of Big 4 audit partners' public-client specialisation with client companies' audit quality. Using a sample of NASDAQ OMX companies in Finland, we identify the audit partner assigned to each public-client engagement. We expect that partners with greater public-client specialisation provide higher quality auditing, since they have likely developed deep domain-specific knowledge and a keen sense of the litigation and reputational risks posed by public clients. In addition, the willingness to resist client pressure likely increases with the number of public clients in the partner's portfolio because dependence on any one client diminishes, which should help to ensure audit quality. The results show that public-client specialisation is negatively associated with abnormal accruals, and this result is attributable to audit partners with three to six public clients. The results of supplemental tests imply that public-client specialisation is more important when general auditing experience is lower. Further, the results reveal that in our setting of high-tax and high alignment between financial reporting and tax reporting, greater public-client specialisation is particularly associated with smaller income-decreasing abnormal accruals, suggesting that auditors with greater public-client specialisation likely recognise the downside reputational implications and achieve audit quality by discouraging tax avoidance.

1. Introduction

The purpose of this paper is to examine how the extent of audit partners' specialisation in public clients is associated with abnormal accruals, a proxy for client companies' audit quality.[1] Prior research has provided extensive evidence of the effects of *audit firm* or *local audit office-level* characteristics on both audit quality (Balsam, Krishnan, & Yang, 2003; Krishnan, 2005; Reichelt & Wang, 2010; Reynolds & Francis, 2001) and audit fees (Craswell, Francis, & Taylor, 1995; Ferguson, Francis, & Stokes, 2003). However, the empirical evidence on how *individual audit partner* specialisation affects client financial reporting outcomes is limited due to the widespread lack of audit partner signature on audit reports, which enables identification of individual partners with specific client engagements. Chin and Chi (2009) and Chi and Chin (2011) examine the

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[1]Abnormal accruals reflect the quality, or lack thereof, of reported earnings. Reported earnings are the output of the financial reporting and the audit process, and thus represent a signal of actual audit quality since the audit process affects the client's audited financial statements (Becker et al., 1998; Francis, 2011).

effects of audit partner industry expertise and audit quality, whereas Zerni (2012) focuses on audit partner specialisation and audit fees. The current study extends this prior literature by examining how the extent of audit partners' public-client specialisation is associated with abnormal accruals.

Recent literature suggests that it may be more informative to focus on office (Ferguson et al., 2003; Francis, Reichelt, & Wang, 2005; Francis, Stokes, & Anderson, 1999; Reichelt & Wang, 2010; Reynolds & Francis, 2001) and audit partner level characteristics (Chi & Chin, 2011; Chin & Chi, 2009; Zerni, 2012) than on overall audit firm-level analyses. More specifically, auditor expertise is tied to the deep knowledge of individual professionals and at least partly this knowledge cannot be captured and distributed by the firm to other offices (Ferguson et al., 2003) or even to other partners (Chi & Chin, 2011; Zerni, 2012). Because signing partners plan and implement the audit and ultimately determine the type of audit report to be issued to the client (Ferguson et al., 2003), it is logical to assume that the characteristics of these individuals have a substantial effect on the quality of the audit engagement (Chin & Chi, 2009). In addition, signing the public audit report increases the risk of personal reputation loss in case of an audit failure, and hence might work as an incentive for performing high-quality auditing (Chi & Chin, 2011).

Prior research suggests that domain-specific knowledge is an important determinant of expertise, and this kind of knowledge can be acquired through the repetition of similar tasks, i.e. specialisation (Bonner & Walker, 1994; Solomon, Shields, & Whittington, 1999; Thibodeau, 2003; Zerni, 2012). Prior research has mainly investigated auditors' specialisation in different industries, and audit partner industry specialisation is positively associated with audit quality (Chi & Chin, 2011; Chin & Chi, 2009). Specialisation in public companies is another means to gain domain-specific knowledge (Zerni, 2012). Auditing public clients requires specialised knowledge concerning financial reporting (international financial reporting standards (IFRS)) and auditing requirements. In addition to the enhanced expertise achieved through public-client specialisation, the willingness to resist client pressure is likely to increase with the number of public clients in the partner's portfolio as the partner's dependence on any one client diminishes, which should help to ensure audit quality (Johnstone, Sutton, & Warfield, 2001). Zerni (2012) finds that both industry specialisation and specialisation in public companies are associated with higher audit fees. His findings suggest that auditors with greater public-client specialisation put more effort into performing the audit and/or that they are valued by financial statement users and corporate insiders – implying higher *perceived* audit quality. However, prior research has not investigated whether public-client specialisation is associated with actual audit outcomes that are indicative of higher quality. Building on Chin and Chi (2009), Zerni (2012) and Chi and Chin (2011), we examine the relationship between the extent of individual Big 4 audit partner's public-client specialisation and the absolute value of client abnormal working capital accruals (WCA), a proxy for *actual* audit quality. Specifically, we predict lower absolute abnormal accruals for clients having partners with greater public-client specialisation compared to those with lesser public-client specialisation.

To conduct our analyses, we use a sample of 420 company-year observations from the NASDAQ OMX Exchange in Finland. We track the identities of audit partners assigned to public-client engagements,[2] and link the partner's identity with client financial statement data. Thus, we are able to examine the association between the extent of audit partners' public-client specialisation and abnormal accruals. Our primary analyses show a significant negative association between greater public-client specialisation and absolute abnormal WCA.

[2]Audit partner signatures have been available in EU member states since the implementation of the Directive on Statutory Audit (Council of the European Union, 2006 (2006/43/EC)). However, Finland has a long tradition of publishing audit partner signatures in the annual reports.

We also explore the extent of public-client specialisation that may be optimal versus potentially dysfunctional. On one hand, audit quality is likely to improve with the number of public-clients in the partner's portfolio as both the partner's expertise and independence is likely to be increased. In contrast, and analogous to studies on busy directors (Beasley, 1996; Core, Holthausen, & Larcker, 1999; Fich & Shivdasani, 2006), it is possible that having too many public clients at some point may lead to overcommitted audit partners, which could threaten audit quality. To investigate these possibilities, we analyse the linearity of the association between public-client specialisation and abnormal accruals. We find that the negative association between public-client specialisation and abnormal accruals only occurs for partners with three to six public clients; this association is not evident for partners with seven or more public clients. Thus, a moderate level of public-client specialisation appears optimal, and the busyness that goes with having a high level of public-client specialisation appears to mitigate the knowledge and independence benefits associated with this type of specialisation.

In supplemental analyses, we examine whether public-client specialisation reduces the potentially negative association between shorter audit experience and audit quality. We re-estimate our primary hypothesis testing model and include an interaction term of public-client specialisation and experience. The results show a significant and positive interaction of public-client specialisation and experience, implying that public-client specialisation compensates for potential lower audit quality of less experienced auditors. We also split the sample into higher versus lower experience groups, and find that public-specialisation is significantly and negatively associated with abnormal accruals in the below-median experience sub-sample, but insignificant in the above-median experience sub-sample. Therefore, public-client specialisation appears to be most important for less experienced partners.

Finally, we investigate the association between public-client specialisation and abnormal accruals separately for income-increasing and income-decreasing sub-samples. Income-*increasing* accruals are usually considered as the primary signal of earnings management, but some prior research (Collins & Hribar, 2000; Peasnell, Pope, & Young, 2005) show that incentives and opportunities for income-*decreasing* accruals exist, for example when managers desire to mitigate the magnitude of a positive earnings surprise. In addition, Shackelford and Shevlin (2001) illustrate that managers also may seek to decrease earnings in order to minimise taxation, especially in high-tax countries. Further, Van Tendeloo and Vanstraelen (2008) show that Big 4 auditors constrain earnings management in countries with a high alignment between financial reporting and tax accounting because the probability that an audit failure is detected is larger when tax authorities have higher interest. Tax-driven choices of accounting policies in unconsolidated financial statements might 'flow through' to consolidated financial statements because of administrative convenience or because tax authorities expect such conformity (Gee, Haller, & Nobes, 2010). With respect to the tax authorities' expectations, it is important to note that in Finland the taxes of listed companies and their subsidiaries are administered and audited by a special unit for taxation of consolidated corporations. To conclude, in our setting with high-tax and high alignment between financial reporting and tax accounting, the tax authorities are likely to monitor aggressive tax minimisation strategies of consolidated corporations and thus the group auditors with greater public-client specialisation likely recognise the downside reputational implications of client misreporting and achieve audit quality by discouraging aggressive tax avoidance. The results reveal that companies audited by partners with greater public-client specialisation have significantly smaller income-decreasing abnormal accruals. Thus, in addition to providing the insight that audit partner public-client specialisation is associated with improved audit quality, this study further contributes to the literature by revealing the extent of public-client specialisation that appears to be optimal, and the nature of earnings management that is mitigated by partner public-client specialisation.

The remainder of this paper proceeds as follows. The next section develops our hypothesis. The following sections present research methods and describe results. The final section first presents limitations of the analyses and then discusses conclusions.

2. Background and Hypothesis Development

2.1. Literature on Audit Quality

Until recently, research on audit quality has mainly focused on examining audit firm characteristics and their impact on audit engagements (Balsam et al., 2003; Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Francis & Krishnan, 1999). Considering portfolios at the audit-firm level, DeAngelo (1981) shows that the diversified client portfolios of large audit firms are less dependent on the outcome of any individual client relationship, which should be associated with higher audit quality. Studies on industry specialisation at the national level indicate that clients audited by industry-specialist audit firms have higher earnings quality than clients audited by non-specialists (Balsam et al., 2003; Krishnan, 2003).

More recent research demonstrates the importance of local office-level audit firm characteristics in determining both audit quality (usually proxied by measures of conservative financial reporting or abnormal accruals) and audit fees (Francis, Richard, & Vanstraelen, 2005; Francis & Yu, 2009; Krishnan, 2005; Reichelt & Wang, 2010; Reynolds & Francis, 2001). This office-level perspective suggests that expertise and knowledge within the audit office are difficult to capture and distribute by the firm to other offices (Ferguson et al., 2003; Johnstone, Li, & Luo, in press).

We extend this prior research by examining individual audit partner characteristics at the audit partner portfolio level, as suggested by DeFond and Francis (2005). Auditor expertise is tied to the deep knowledge of individual professionals and it is difficult to distribute this knowledge to other partners (Chi & Chin, 2011; Zerni, 2012). Because signing partners plan and implement the audit and ultimately determine the type of audit report to be issued to the client (Ferguson et al., 2003), it is logical to assume that these engagement partners have a substantial effect on audit quality (Chin & Chi, 2009). In addition, signing the public audit report leads to an increase in the risk of personal reputation loss in case of an audit failure (Chi & Chin, 2011) or attention from taxing authorities (Van Tendeloo & Vanstraelen, 2008). Following the European Union's (EU's) 8th directive (2006/43/EC) requiring the disclosure of engagement partner identity and a Public Company Accounting Oversight Board (PCAOB, 2009) release on requiring individual partner signatures, Zerni (2012) notes that these initiatives also demonstrate that the quality of public-client audits rests to a large extent on the input of individual auditors exercising their own professional judgement.

2.2. Public-Client Specialisation

Underlying audit task knowledge develops early, including both explicit and tacit knowledge, and is an important determinant of audit task performance (Libby & Luft, 1993). As the auditor specialises in certain domains, domain-specific expertise grows (Bonner & Walker, 1994; Solomon et al., 1999; Thibodeau, 2003; Zerni, 2012). More specialised individuals have generally acquired their expertise through relevant experience, education and training, and consequently they are expected to have the ability to outperform less specialised individuals in their domain (Bedard, 1989; Bedard & Chi, 1993). Over time, the auditor establishes personal and professional contacts in the business community, which enables networking across individuals through repeated interactions (Borgatti & Cross, 2003). These interactions yield enhancements in the acquisition of domain-specific knowledge.

As the auditor gains further experience, the likelihood increases that the auditor will work on engagements within a given domain. Ultimately, over time and with experience, the auditor develops an understanding of commonalities and shared risks/opportunities among clients in a given domain, which constitutes individual auditor-level domain-specific knowledge. This type of domain-specific auditing knowledge is associated with superior performance (Jamal & Tan, 2001; Libby & Tan, 1994; Ramsay, 1994). In terms of resolving difficult financial reporting issues, Johnstone, Bedard, and Biggs (2002) show that auditors with greater specialised knowledge about how to resolve a complex financial reporting issue generate a greater number and monetary range of alternatives for evaluation as they prepare to negotiate with an aggressive client. Brown and Johnstone (2009) find that auditors with higher levels of negotiation experience are better able to negotiate a relatively more conservative financial reporting outcome, even when the client initially prefers an aggressive financial reporting outcome. Specialised auditors possess characteristics that enable them to achieve higher quality auditing and financial reporting outcomes. Taken together, this line of research suggests that specialisation is a critical determinant of developing expertise in a particular subject matter.[3]

Prior research has mainly investigated auditors' specialisation in different industries (Balsam et al., 2003; Chi & Chin, 2011; Chin & Chi, 2009; Ferguson et al., 2003; Francis et al., 2005; Krishnan, 2003, 2005; Reichelt and Wang, 2010). Examining industry specialisation at the audit partner level, Chin and Chi (2009) find that differences in restatement likelihood due to industry expertise are mainly attributable to the partner-level experts rather than firm-level experts. In addition, Chi and Chin (2011) report that individual audit partner industry expertise, together with audit firm industry specialisation, increase audit quality.

Another means to differentiate audit service is through specialisation in public versus private companies. It is logical to assume that the auditor's specialised knowledge of auditing public clients increases with the number of public clients audited. Auditing large, complex, high-profile clients is likely to require a great deal of auditor expertise (Zerni, 2012). Public clients require specialised knowledge concerning financial reporting and the associated auditing requirements mandated by government and trading exchanges. It is reasonable that public-client specialists possess the required domain-specific knowledge, which results in a higher level of expertise and higher audit quality. Moreover, auditing listed clients requires an in-depth understanding of the litigation risks that such clients represent to individual audit partners and their audit firms as a whole. Public-client specialists bear the litigation and reputational risks related to auditing listed companies, which receive a great deal of media and regulatory attention (Zerni, 2012). Thus, partners with high levels of public-client specialisation are likely high-profile leaders of their respective offices and audit firms, and, in addition, have valuable reputational capital at stake, which should encourage them to ensure that their clients present the highest quality financial statements. Further, the willingness to resist client pressure is likely

[3]We recognise that experience, knowledge, and specialisation are distinct, but related concepts, both conceptually and empirically. Experience involves 'the learning of action-outcome connections . . . learning occurs through outcome feedback' (Einhorn & Hogarth, 1981, p. 78). 'Of great importance to the issue of learning from experience is the role of awareness of the task factors that can influence outcomes' (Einhorn & Hogarth, 1981, p. 79.) Knowledge 'is generally rich in content and complex in form. It includes appearance, function, relation to other objects, and any other property of the object that can be deduced from our general knowledge of the world' (Tversky, 1977, p. 329). Libby and Luft (1993) help explain how repeated experiences affect knowledge development, noting that ' . . . the content and the organization of knowledge can be changed by decision makers' learning opportunities' (p. 428). Expertise develops through repeated experiences and the associated development of knowledge (Bedard & Chi, 1993; Nelson, Libby, & Bonner, 1995). And according to Craswell et al. (1995), 'specialized industry knowledge is thus a component of auditor expertise in addition to the general knowledge base required for all audits' (p. 301). Industry specialisation is associated with product differentiation and fee premia (Craswell et al., 1995).

to increase with the number of public clients in the partner's portfolio as the partner's dependence on any one client diminishes, which should help to ensure audit quality (Johnstone et al., 2001). Therefore, public-client specialisation may positively affect audit quality because it assists in enhancing auditor independence.

Zerni (2012) finds that both industry specialisation and specialisation in public companies are associated with higher audit fees, suggestive of higher *perceived* audit quality. Chin and Chi (2009) and Chi and Chin (2011) document the association between industry specialisation and *actual* audit quality. Prior research has not, however, examined whether the public-client specialisation actually results in higher quality audit outcomes, i.e. higher quality financial reporting of client companies. We extend Zerni (2012) by investigating whether public-client specialisation is associated with a financial reporting measure that proxies for *actual* audit quality, abnormal WCA.

Based on this discussion, our expectation is that auditors with a greater extent of specialisation in auditing public clients will be associated with higher quality audits:

> H1: Audit partner public-client specialisation is negatively associated with the absolute value of client abnormal WCA.

A factor that may potentially mitigate the impact of specialisation on audit quality is audit partner over-commitment. For example, while we hypothesise that public-client specialisation will enhance audit quality, having too many public clients may at some point lead to overcommitted audit partners who do not have time to focus on all clients. Of course, it is difficult to predict how many is 'too many' public clients. Prior research on busy board members shows that companies with busy directors have weaker performance and corporate governance (Beasley, 1996; Core et al., 1999; Fich & Shivdasani, 2006). Based on this discussion, we propose the following research question:

Research Question 1: Is there a point at which the audit quality benefits associated with public-client specialisation are mitigated due to over-commitment?

3. Method

3.1. Data

Our sample includes publicly listed companies of the NASDAQ OMX Helsinki exchange in Finland covering fiscal years 2006–2010.[4] The NASDAQ OMX exchange provides an expedient environment for studying public-client specialisation because audit partners are required to personally sign the audit reports on behalf of the audit firm, and thus, can be identified for each client company. This is in contrast with, for example, the USA, where only the name of the audit firm is public information.

Table 1 describes the sample selection. First, to construct our research variable we search all NASDAQ OMX Helsinki listed companies during years 2005–2010, yielding 793 engagements. We remove observations for companies traded in First North Finland, companies for which auditor information is unavailable, and companies with a foreign auditor. This yields 779 engagements for which we are able to identify the signing auditor (the engagement partner) after locating and reviewing the audit opinions included in the annual reports. In constructing the final sample, we exclude banks, insurance companies, and other financial companies (Standard Industrial Classification (SIC) codes 6000–6900) due to their unique regulations. To avoid

[4]As of 1 January 2005 all listed companies are required to follow the IFRS.

Table 1. Sample selection

Fiscal year ended	2005	2006	2007	2008	2009	2010	Total
Companies (listed on NASDAQ OMX Helsinki)	136	136	135	131	129	126	793
Less companies traded in First North Finland	0	1	2	2	2	2	9
=	136	135	133	129	127	124	784
Less companies with auditor information not available	2	0	0	0	1	0	3
=	134	135	133	129	126	124	781
Less companies with a foreign auditor	0	0	0	1	1	0	2
= Companies with identified audit partner	134	135	133	128	125	124	779
Less observations with fiscal year length six months	1	2	0	0	0	0	3
=	133	133	133	128	125	124	776
Less financial companies (SIC Codes 6XXX)	13	13	13	13	14	13	79
=	120	120	120	115	111	111	697
Less companies with non-Big4 audit firm	8	9	8	8	6	4	43
=	112	111	112	107	105	107	654
Less companies with two audit firms (joint audits)	2	2	2	0	0	0	6
=	110	109	110	107	105	107	648
Less observations with missing data	52	36	28	20	16	18	170
=	58	73	82	87	89	89	478
Less observations from fiscal year 2005	58	0	0	0	0	0	58
Final sample of companies used in the analyses	0	73	82	87	89	89	420

potential audit quality differences based on audit firm size, we exclude clients of non-Big 4 audit firms. In addition, we exclude the few rare observations with joint audits, where engagement partners from two audit firms have signed the audit report, again to avoid potential audit quality differences across audit firms. After removing the observations with missing data on our dependent and independent variables, the sample includes 478 observations. Since our public-client specialisation variables are determined based on the number of public clients in the *previous* fiscal year,[5] the first year included in the sample is the year 2006. Our final sample includes 420 company-year observations. The financial statement data are obtained from the Thomson Financial Worldscope database.

3.2. Model Specifications

Our empirical tests focus on the association between public-client specialisation and abnormal WCA, which is a proxy for actual audit quality. The abnormal part of WCA is defined as the difference between actual WCA and expected WCA. WCA are calculated as the change in current assets (less the change in cash and cash equivalents) minus the change in current liabilities (less the change in short-term debt and current portion of long-term debt). In determining the expected part of WCA, we use the DeFond and Park (2001) model:

$$\text{Expected WCA} = \text{Sales}\, x\left(\frac{\text{WCA}_{t-1}}{\text{Sales}_{t-1}}\right). \quad (1)$$

Following prior audit studies using non-US data (Carey & Simnett, 2006; Francis et al., 2009; Francis & Wang, 2008; Maijoor & Vanstraelen, 2006; Zerni, Haapamäki, Järvinen, & Niemi,

[5]We employ the previous year's number of public clients in order to capture the public-client specialisation at the beginning of a company-year.

Table 2. Variable definitions

Variable	Definition
|ABWCA|	Absolute value of the abnormal WCA calculated as actual WCA minus expected WCA based on the model by DeFond and Park (2001).
PUBS	The number of public clients for which the engagement partner signs the audit report in the previous year. In cases for which two partners sign the audit report, the number of public clients is measured for the partner with greater specialisation.
PUBS $\geq$ 3	One if the number of public clients in previous year is greater than or equal to three, zero otherwise.
3 $<$ PUBS $<$ 6	One if the number of public clients in previous year is greater than or equal to three but less than six, zero otherwise.
PUBS $\geq$ 6	One if the number of public clients in previous year is greater than or equal to six, zero otherwise.
LOGEXP	The natural logarithm of the number of years since the partner's Certified Public Accountant (CPA) examination. In cases for which two partners sign the audit report, experience is measured for the partner with greater experience.
INDSPEC	One if the audit partner audited at least two clients belonging to a particular industry in year *t*, zero otherwise.
LOGASSETS	The natural logarithm of total assets.
GROWTH	The percentage change in sales from previous year.
PB	Price-to-book ratio.
LEVERAGE	Total debt divided by total assets.
INV	Total inventory divided by total assets.
LOSS	One if net income is negative, and zero otherwise.
OCF	Operating cash flow divided by total assets.
AC	One if the company has an audit committee, and zero otherwise.
LAGWCA	Lagged working capital accruals scaled by lagged total assets.
STDSALES	The standard deviation of sales over the years $t-3$ to t
AUDITFIRM	Audit firm fixed effects (Deloitte, EY, KPMG, and PWC).
YEAR	Year fixed effects (2006–2010).
INDUSTRY	Two-digit SIC industry classifications.

2012), we employ the DeFond and Park (2001) model because the Jones (1991) model and its modifications may underperform when the industry samples are small (Francis et al., 2009; Peek, Meuwissen, Moers, & Vanstraelen, 2013; Zerni et al., 2012).

To examine whether audit partner public-client specialisation is associated with audit quality, we estimate the following fixed effects panel regression:

$$\begin{aligned} |\text{ABWCA}| = {} & a + \text{public-client specialisation} + \beta_1 \text{LOGEXP} + \beta_2 \text{INDSPEC} \\ & + \beta_3 \text{LOGASSETS} + \beta_4 \text{GROWTH} + \beta_5 \text{PB} + \beta_6 \text{LEVERAGE} \\ & + \beta_7 \text{INV} + \beta_8 \text{LOSS} + \beta_9 \text{OCF} + \beta_{10} \text{AC} + \beta_{11} \text{LAGWCA} \\ & + \beta_{12} \text{STDSALES} + \text{fixed effects} + \varepsilon, \end{aligned} \tag{2}$$

where ABWCA is the abnormal working capital accruals (ABWCA) calculated as actual WCA minus expected WCA, scaled by lagged total assets. The absolute values of ABWCA are used to capture both income-increasing and income-decreasing ABWCA. Larger values of |ABWCA| suggest lower actual audit quality. Observations with extreme values are dropped, that is, if the absolute value of ABWCA scaled by lagged total assets is above one. See variable definitions in Table 2.

Turning to the independent variables of interest, we use the previous year's number of public clients in order to measure public-client specialisation at the beginning of a company-year.[6] Public-client specialisation in Model (2) is measured in multiple ways. PUBS is a continuous variable measured by the number of the audit partner's public clients in the previous year. In addition to the continuous variable, we construct dummy variables for public-client specialisation. The appendix provides descriptive information about the number of public clients audited by partners in our sample. We observe that the average number of public clients per audit partner is 1.92, and, furthermore, that only 20% of partners audit three or more public clients. Consequently, we regard as specialists the minority of the engagement partners with three or more public clients. PUBS ≥ 3 is a dichotomous variable that equals one if the auditor had at least three public clients in the previous year, and zero otherwise. Moreover, we consider different levels of public-client specialisation and employ the following dichotomous variables:

- auditors with three to five clients ($3 \leq$PUBS < 6) and
- auditors with six or more clients (PUBS ≥ 6) (the top 5% of all auditors auditing listed companies audit six or more public clients (Appendix)).

Auditors with two or fewer public clients (PUBS ≤ 2), are used as the base. We assume that the highest level of specialisation is represented in the 5% of auditors who have six or more clients, followed by the group of about 15% of the audit partners with three to five clients.

Finally, in the fourth specification, we create dummy variables for the following levels of specialisation: PUBS ≥ 7, PUBS $= 6$, PUBS $= 5$, PUBS $= 4$, PUBS $= 3$, and PUBS $= 2$. These are compared to the base group PUBS ≤ 1. These variables enable us to test whether there exists a point at which the audit quality benefits associated with public-client specialisation are mitigated due to over-commitment.

Based on prior audit quality literature, we include numerous control variables in Model (2). Kaplan, O'Donnell, and Arel (2008), for example, find that high audit experience reduces the tendency to rely on information from management. To control for the audit partner's general audit experience, we use the natural logarithm of the number of years since the partner's CPA examination (LOGEXP) and expect this variable to be negatively associated with |ABWCA|.[7] Prior research suggests that industry specialisation is associated with higher quality auditing and financial reporting outcomes (Balsam et al., 2003; Chi & Chin, 2011; Ittonen, Vähämaa, & Vähämaa, 2013; Krishnan, 2005; Zerni, 2012). Adapting Zerni (2012), an audit partner is an industry specialist if the partner audited at least two public clients

[6]The audit report must be signed by at least one auditor. In 16% of the 420 observations, the audit report is signed by two engagement partners from the same audit firm. We use the value for the partner with greater specialisation when measuring public-client specialisation, and we use the value for the partner with greater experience when measuring partner experience. As a sensitivity test, however, we use the average of the partners' public-client specialisation and inferences from these tests are essentially the same as those from the main analyses, although the significances are weaker. Based on interest from one reviewer, we also conducted analyses using the lowest number. We find that the significant results for our test variable become mainly insignificant using this specification. This makes sense because it seems most logical that the partner with greater public-client specialisation should be most important from a leadership perspective for the engagement; it also seems implausible that the effect of the partner with less public-client specialisation/experience would outweigh the effect of the partner with greater public-client specialisation.

[7]We use the database provided by the Central Chamber of Commerce to identify the number of years of professional experience for each auditor. We acknowledge that it would be desirable to control for number of years auditing public clients, however, this information is not available.

belonging to industry k in fiscal year t.[8] We set a dichotomous variable equal to one if the partner is an industry specialist, and zero otherwise (INDSPEC). We anticipate a negative association between INDSPEC and |ABWCA|.

We measure client size using the natural logarithm of total assets, LOGASSETS, and expect that this variable will be negatively associated with |ABWCA| because large companies tend to have more stable operations (Zerni et al., 2012). We include growth in sales from the prior year (GROWTH) and price-to-book (PB) ratio in the model to capture the effect of growth on accruals behaviour, and expect these variables to be positively associated with |ABWCA| because growth companies have more incentives to try to meet their earnings benchmarks (Zerni et al., 2012). LEVERAGE equals total debt to total assets. We do not make a prediction on this control since there is evidence of a positive association with |ABWCA| (Francis & Wang, 2008), as well as a negative association (Zerni et al., 2012). INV equals inventory to total assets and is used to control for company complexity. Following previous studies (Ashbaugh-Skaife, Collins, Kinney, & LaFond, 2008; Ittonen et al., 2013), we expect that INV is positively associated with |ABWCA|, because in companies with larger proportions of inventory managerial discretion and estimates have a greater impact on reported earnings. We control for company performance by including LOSS and OCF in the model. LOSS is a dichotomous variable measuring whether the company has negative net income, and OCF is operating cash flow to total assets. We expect that LOSS (OCF) will be positively (negatively) associated with |ABWCA|, because poor financial performance may induce to manipulate earnings (Francis & Wang, 2008). AC is a dichotomous variable measuring the existence of an audit committee.[9] We expect that this variable will be negatively associated with |ABWCA| because the existence of an audit committee is likely to improve corporate governance and reduce aggressive earnings management (Klein, 2002). We also include one year lagged working capital accruals (LAGWCA) to control for the reversal of accruals, and following (Zerni et al., 2012) we expect a negative association with |ABWCA|). In addition, we include the standard deviation of sales over the years $t-3$ to $t0$ to control for the effect of operating variability on abnormal accruals (STDSALES), anticipating a positive association between this variable and |ABWCA| because larger variations in operations may provide greater opportunities for earnings management (Hribar & Nichols, 2007; Zerni et al., 2012).

We include audit firm fixed effects in Model (2) to control for audit firm-level effects on audit quality. We also include year fixed effects to control for temporal variation in audit quality and industry fixed effects to control for industry differences.

3.3. Descriptive Statistics

Table 3 Panel A presents the descriptive statistics. The mean (median) absolute ABWCA, |ABWCA|, equals 0.103 (0.066). In terms of individual audit partner characteristics, we find that the company-year observations in our sample have on average (median) a partner with 3.607 (3.000) publicly traded clients, while the mean (median) partner experience (EXPERIENCE) is 19 (20) years, and about 13% of the companies are audited by industry specialist auditors. The mean (median) total assets is 1785 (202) million euros. Mean (median) GROWTH is

[8]The industry classifications are based on two-digit SIC codes. Zerni (2012) defines industry specialists as those with five clients in the same industry. Our sample is characterised by smaller industry groups and we observe that only about 13% of the engagement partners are classified as industry specialists. Our sample includes only 15 company-year observations audited by engagement partners that have more than two public clients in the same industry.

[9]'The Finnish Corporate Governance Code' recommends that the public companies establish an audit committee. Non-compliance with the recommendation must be identified and explained in the annual report.

5.3 (5.2) per cent, and mean (median) PB ratio is 2.262 (1.776). Mean (median) LEVERAGE is 0.246 (0.249), and mean (median) INV is 0.144 (0.133). About 25% of companies have a current-year LOSS. The mean (median) operating cash flow to total assets (OCF) is 0.075 (0.081). About 49% of companies have an audit committee (AC). Finally, mean (median) WCA in the previous fiscal year (LAGWCA) is −0.005 (0.001), and mean (median) standard deviation of sales over the years $t-3$ to $t0$ (STDSALES) is 0.186 (0.132).

Table 3 Panel B displays Pearson correlation coefficients among selected variables used in the multivariate analyses. The number of public clients (PUBS), and experience (LOGEXP) are negatively correlated with |ABWCA|. The highest correlation among the independent variables is between LOGASSETS and AC (0.523). The variance inflation factors (VIF) do not indicate problems with multicollinearity among these variables.[10]

In Table 3 Panel C, we report descriptive statistics based on the number of public clients in the previous year. Table 3 Panel C shows that mean |ABWCA| is generally decreasing as the number of public clients audited increases. Audit partner experience is increasing as the number of public clients audited increases. Finally, industry specialisation is highest for audit partners auditing five public clients.

4. Results

4.1. Univariate Results

Table 4 reports the univariate results when the sample is partitioned into three groups based on the extent of public-client specialisation. The results in Panel A show that companies with audit partners that have three to five public clients have significantly lower |ABWCA| ($p = 0.040$), LAGWCA ($p = 0.016$), and STDSALES ($p = 0.003$), whereas LOGASSETS ($p = 0.016$) and the probability of having an audit committee ($p = 0.015$) are higher as compared to companies with audit partners that have two or fewer public clients. In terms of audit partner characteristics, partners that have three to five public clients have significantly more overall experience (LOGEXP) ($p \leq 0.001$) and industry specialisation (INDSPEC) ($p = 0.001$) than auditors that have two or fewer public clients. Panel B shows that companies with audit partners that have six or more public clients have significantly lower |ABWCA| ($p = 0.016$) and marginally lower LEVERAGE ($p = 0.086$), but higher LOGASSETS ($p = 0.001$) and a higher probability of having an audit committee ($p \leq 0.001$) compared to companies audited by auditors with two or fewer public clients. Panel B also reports that audit partners with six or more public clients have more overall experience (LOGEXP) ($p \leq 0.001$) and are more likely to be industry specialists (INDSPEC) ($p = 0.011$) than auditors with two or fewer public clients. Finally, Panel C indicates that companies with audit partners that have six or more public clients are more likely to have audit committees (AC) ($p \leq 0.001$) and higher LAGWCA ($p = 0.004$) than partners with three to five clients.

4.2. Multivariate Results

Table 5 Panel A reports results of estimating Model (2) for the total sample. Statistical significances are calculated by clustering the standard errors within companies (Petersen, 2009). The results using the number of public clients (PUBS) are reported in column (1), the dichotomous variable PUBS ≥ 3 in column (2), dichotomous variables $3 \leq$ PUBS < 6 and PUBS ≥ 6 in

[10]For example, in one of our main estimations, column (1) of Table 5 Panel A, the highest VIF among these variables is 3.833.

Table 3. Overall descriptive statistics, correlations, and descriptive statistics by public-client specialisation ($N = 420$)

Variable	Mean	Std.	Min	25% tile	Median	75% tile	Max	Skew.	Kurt.
Panel A: Distributional statistics									
|ABWCA|	0.103	0.120	0.000	0.029	0.066	0.130	0.990	2.859	14.541
PUBS	3.607	2.627	0.000	2.000	3.000	5.000	12.000	1.153	4.459
PUBS ≥ 3	0.564	0.496	0.000	0.000	1.000	1.000	1.000	−0.259	1.067
Audit partner experience in years	19.298	5.226	6.000	15.500	20.000	23.000	29.000	−1.047	3.605
INDSPEC	0.133	0.340	0.000	0.000	0.000	0.000	1.000	2.157	5.654
Total assets (m EUR)	1784.897	4697.450	9.422	63.230	202.035	1403.199	37,619.000	0.402	2.254
GROWTH	0.053	0.255	−1.000	−0.060	0.052	0.167	1.296	0.867	8.363
PB	2.262	1.681	0.170	1.108	1.776	2.904	15.050	2.149	11.510
LEVERAGE	0.246	0.155	0.000	0.123	0.249	0.355	0.705	0.211	2.458
INV	0.144	0.127	0.000	0.029	0.133	0.216	0.714	1.205	5.298
LOSS	0.248	0.432	0.000	0.000	0.000	0.000	1.000	1.169	2.368
OCF	0.075	0.107	−0.514	0.031	0.081	0.137	0.337	−1.477	8.578
AC	0.488	0.500	0.000	0.000	0.000	1.000	1.000	0.048	1.00
LAGWCA	−0.005	0.100	−0.430	−0.049	0.001	0.042	0.660	0.180	9.456
STDSALES	0.186	0.196	0.004	0.078	0.132	0.223	1.715	3.797	23.428

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Panel B: Pearson's correlation coefficients														
|ABWCA| (1)	**−0.115**	**−0.127**	**−0.127**	0.012	**−0.192**	0.040	−0.071	**−0.170**	0.017	**0.200**	**−0.245**	0.001	−0.031	**0.285**
PUBS (2)		**0.734**	**0.373**	**0.120**	**0.109**	0.003	−0.013	−0.055	0.034	−0.030	0.040	**0.273**	0.016	0.018
PUBS ≥ 3 (3)			**0.359**	**0.161**	**0.162**	0.033	0.024	−0.088	0.014	−0.052	0.055	**0.243**	−0.076	**−0.102**
LOGEXP (4)				−0.069	**0.273**	−0.012	−0.082	−0.041	−0.024	**−0.100**	0.071	**0.169**	0.062	**−0.103**
INDSPEC (5)					−0.027	−0.008	−0.030	0.001	−0.075	0.083	−0.072	0.037	0.004	−0.010
LOGASSETS (6)						−0.006	−0.082	**0.105**	**0.100**	**−0.269**	**0.187**	**0.523**	**0.099**	**−0.259**
GROWTH (7)							**0.106**	**−0.112**	−0.011	**−0.261**	**0.139**	0.054	−0.014	0.090
PB (8)								**−0.312**	−0.064	**−0.152**	**0.175**	−0.052	−0.081	−0.070
LEV (9)									0.082	**0.154**	**−0.176**	−0.041	0.020	−0.040
INV (10)										**−0.103**	**−0.117**	0.030	**0.126**	0.026
LOSS (11)											**−0.457**	−0.008	−0.092	**0.130**
OCF (12)												−0.024	**0.133**	**−0.199**
AC (13)													−0.030	−0.046
LAGWCA (14)														0.026
STDSALES (15)														

Panel C: Descriptive statistics by number of audit partner public clients

	Number of audit partner public clients in the previous year							
Mean	0	1	2	3	4	5	6	≥7
|ABWCA|	0.149	0.113	0.118	0.090	0.109	0.073	0.074	0.097
Audit partner experience in years	12.480	18.684	17.733	20.780	20.306	20.357	19.137	23.400
INDSPEC	0.160	0.000	0.089	0.119	0.225	0.286	0.137	0.200
N	25	57	101	59	49	28	51	50

Notes: Variables as defined in Table 2. Bold text in Panel B indicates significance at 0.05 level.

Table 4. Univariate results

Variable	PUBS ≤ 2	3 ≤ PUBS < 6	Difference *t*-stat. or X^2 and *p*-value	
Panel A: Comparisons between low and moderate levels of public-client specialisation				
|ABWCA|	0.121	0.093	2.07	0.040
LOGEXP	2.788	2.997	−6.18	<.001
INDSPEC	0.071	0.191	10.49	0.001
LOGASSETS	19.191	19.705	−2.42	0.016
GROWTH	0.043	0.060	−0.62	0.534
PB	2.217	2.335	−0.59	0.556
LEVERAGE	0.261	0.236	1.35	0.179
INV	0.142	0.140	0.16	0.874
LOSS	0.273	0.243	0.38	0.538
OCF	0.069	0.077	−0.64	0.525
AC	0.350	0.485	5.94	0.015
LAGWCA	0.004	−0.025	2.43	0.016
STDSALES	0.209	0.155	3.02	0.003
N	183	136		
	PUBS ≤ 2	PUBS ≥ 6	Difference *t*-stat. or X^2 and *p*-value	
Panel B: Comparisons between low and high levels of public-client specialisation				
|ABWCA|	0.121	0.085	2.43	0.016
LOGEXP	2.788	3.039	−7.54	<.001
INDSPEC	0.071	0.168	6.52	0.011
LOGASSETS	19.191	19.948	−3.24	0.001
GROWTH	0.043	0.060	−0.48	0.630
PB	2.217	2.245	−0.15	0.883
LEVERAGE	0.261	0.230	1.72	0.086
INV	0.142	0.153	−0.72	0.471
LOSS	0.273	0.208	1.48	0.224
OCF	0.069	0.085	−1.41	0.158
AC	0.350	0.743	40.19	<.001
LAGWCA	0.004	0.006	−0.20	0.838
STDSALES	0.209	0.186	0.75	0.456
N	183	101		
	3 ≤ PUBS < 6	PUBS ≥ 6	Difference *t*-stat. or X^2 and *p*-value	
Panel C: Comparisons between moderate and high levels of public-client specialisation				
|ABWCA|	0.093	0.085	−0.62	0.539
LOGEXP	2.997	3.039	1.56	0.119
INDSPEC	0.191	0.168	0.20	0.652
LOGASSETS	19.705	19.948	1.01	0.313
GROWTH	0.060	0.060	−0.02	0.982
PB	2.335	2.245	−0.43	0.665
LEVERAGE	0.236	0.230	−0.31	0.758
INV	0.140	0.153	0.94	0.347
LOSS	0.243	0.208	0.40	0.529
OCF	0.077	0.085	0.70	0.485
AC	0.485	0.743	15.92	< .001
LAGWCA	−0.025	0.006	2.88	0.004
STDSALES	0.155	0.186	1.12	0.264
N	136	101		

Notes: The significances are based on the *t*-test for continuous variables and the chi-square test for dichotomous variables. All variables are defined in Table 2.

Table 5. Primary hypothesis testing models

Panel A: Total sample (N = 420)

Dependent variable	Exp. sign	(1) |ABWCA| Coef. (*t*-value)	(2) |ABWCA| Coef. (*t*-value)	(3) |ABWCA| Coef. (*t*-value)	(4) |ABWCA| Coef. (*t*-value)
PUBS	−	−0.005 (−1.47)*			
PUBS ≥ 3	−		−0.040 (−1.83)**		
PUBS:					
PUBS ≥ 6	−			−0.024 (−0.97)	
3 ≤ PUBS < 6	−			−0.050 (−2.21)**	
PUBS ≥ 7	−				−0.031 (−0.94)
PUBS = 6	−				−0.037 (−1.32)*
PUBS = 5	−				−0.077 (−2.66)***
PUBS = 4	−				−0.041 (−1.39)*
PUBS = 3	−				−0.076 (−2.61)***
PUBS = 2	−				−0.022 (−1.11)
LOGEXP	−	−0.030 (−1.34)*	−0.026 (−1.19)	−0.025 (−1.16)	−0.020 (−0.96)
INDSPEC	−	−0.010 (−0.41)	−0.004 (−0.15)	−0.005 (−0.18)	−0.006 (−0.25)
LOGASSETS	−	−0.015 (−2.55)***	−0.014 (−2.56)***	−0.014 (−2.53)***	−0.014 (−2.65)***
GROWTH	+	0.032 (0.73)	0.033 (0.77)	0.035 (0.82)	0.037 (0.82)
PB	+	−0.008 (−1.95)	−0.008 (−1.96)	−0.008 (−1.94)	−0.008 (−2.04)
LEVERAGE	?	−0.112 (−1.90)*	−0.118 (−2.02)**	−0.113 (−1.97)*	−0.110 (−1.92)*
INV	+	−0.236 (−1.94)	−0.244 (−2.04)	−0.260 (−2.11)	−0.267 (−2.19)
LOSS	+	0.015 (0.70)	0.013 (0.63)	0.012 (0.60)	0.013 (0.64)
OCF	−	−0.129 (−1.94)**	−0.137 (−2.08)**	−0.139 (−2.10)**	−0.139 (−2.10)**
AC	−	0.021 (0.93)	0.020 (0.92)	0.018 (0.83)	0.019 (0.88)
LAGWCA	−	0.021 (0.15)	0.007 (0.05)	−0.001 (−0.01)	0.008 (0.05)
STDSALES	+	0.129 (2.73)***	0.122 (2.66)***	0.123 (2.70)***	0.125 (2.73)***
Audit firm fixed effects?		Yes	Yes	Yes	Yes
Year fixed effects?		Yes	Yes	Yes	Yes
Industry fixed effects?		Yes	Yes	Yes	Yes
Intercept		0.510 (3.34)***	0.501 (3.46)***	0.494 (3.44)***	0.505 (3.53)***
Adjusted R^2		0.28	0.29	0.30	0.30

(*Continued*)

Table 5. Continued

Panel B: Sample of income-increasing ABWCA(N = 223)

Dependent variable	Exp. sign	(1) |ABWCA| Coef. (*t*-value)	(2) |ABWCA| Coef. (*t*-value)	(3) |ABWCA| Coef. (*t*-value)	(4) |ABWCA| Coef. (*t*-value)
PUBS	−	0.000			
		(0.08)			
PUBS ≥ 3	−		−0.025		
			(−1.29)		
PUBS:					
PUBS ≥ 6	−			−0.007	
				(−0.32)	
3 ≤ PUBS < 6	−			−0.037	
				(−1.84)**	
PUBS ≥ 7	−				−0.009
					(−0.25)
PUBS = 6	−				−0.011
					(−0.38)
PUBS = 5	−				−0.036
					(−1.34)*
PUBS = 4	−				−0.024
					(−0.80)
PUBS = 3	−				−0.055
					(−1.78)**
PUBS = 2	−				−0.006
					(−0.25)
LOGEXP	−	−0.005	0.004	0.006	0.006
		(−0.25)	(0.23)	(0.31)	(0.30)
INDSPEC	−	−0.001	0.011	0.009	0.009
		(−0.04)	(0.46)	(0.40)	(0.35)
LOGASSETS	−	−0.007	−0.006	−0.006	−0.006
		(−1.38)*	(−1.16)	(−1.05)	(−1.19)
GROWTH	+	0.095	0.090	0.092	0.096
		(1.86)**	(1.82)**	(1.86)**	(1.81)**
PB	+	−0.009	−0.009	−0.009	−0.009
		(−1.98)	(−1.98)	(−1.95)	(−2.02)
LEVERAGE	?	−0.025	−0.038	−0.031	−0.034
		(−0.41)	(−0.63)	(−0.51)	(−0.55)
INV	+	−0.083	−0.086	−0.105	−0.106
		(0.72)	(−0.78)	(−0.92)	(−0.93)
LOSS	+	−0.041	−0.041	−0.045	−0.042
		(−1.67)	(−1.68)	(−1.84)	(−1.74)
OCF	−	−0.059	−0.076	−0.084	−0.091
		(−0.43)	(−0.55)	(−0.62)	(−0.66)
AC	−	−0.007	−0.007	−0.009	−0.008
		(−0.39)	(−0.38)	(−0.49)	(−0.42)
LAGWCA	−	−0.793	−0.802	−0.814	−0.799
		(−5.58)***	(−5.65)***	(−5.77)***	(−5.72)***
STDSALES	+	0.150	0.148	0.150	0.146
		(1.63)*	(1.60)*	(1.61)*	(1.48)*
Audit firm fixed effects?		Yes	Yes	Yes	Yes
Year fixed effects?		Yes	Yes	Yes	Yes
Industry fixed effects?		Yes	Yes	Yes	Yes
Intercept		0.212	0.199	0.191	0.203
		(1.96)*	(1.82)*	(1.78)*	(1.91)**
Adjusted R^2		0.49	0.49	0.50	0.49

(*Continued*)

Table 5. Continued

Panel C: Sample of income-decreasing ABWCA (N = 197)

Dependent variable	Exp. sign	(1) |ABWCA| Coef. (t-value)	(2) |ABWCA| Coef. (t-value)	(3) |ABWCA| Coef. (t-value)	(4) |ABWCA| Coef. (t-value)
PUBS	−	−0.006			
		(−1.45)*			
PUBS ≥ 3	−		−0.042		
			(−1.57)*		
PUBS:					
PUBS ≥ 6	−			−0.037	
				(−1.17)	
3 ≤ PUBS < 6	−			−0.046	
				(−1.77)**	
PUBS ≥ 7	−				−0.042
					(−1.08)
PUBS = 6	−				−0.067
					(−1.78)**
PUBS = 5	−				−0.064
					(−1.53)*
PUBS = 4	−				−0.065
					(−1.94)**
PUBS = 3	−				−0.072
					(−2.12)**
PUBS = 2	−				−0.035
					(−1.42)*
LOGEXP	−	−0.006	−0.002	−0.002	−0.004
		(−0.19)	(−0.07)	(−0.05)	(−0.10)
INDSPEC	−	0.009	0.016	0.016	0.014
		(0.37)	(0.69)	(0.69)	(0.55)
LOGASSETS	−	−0.011	−0.011	−0.011	−0.010
		(−1.37)*	(−1.37)*	(−1.37)*	(−1.19)
GROWTH	+	−0.029	−0.027	−0.026	−0.026
		(−0.39)	(−0.38)	(−0.36)	(−0.35)
PB	+	0.000	0.000	0.000	0.001
		(0.02)	(0.05)	(0.05)	(0.19)
LEVERAGE	?	−0.129	−0.130	−0.129	−0.131
		(−2.46)**	(−2.64)***	(−2.63)***	(−2.65)***
INV	+	−0.314	−0.319	−0.323	−0.333
		(−2.68)	(−2.72)	(−2.76)	(−2.91)
LOSS	+	0.043	0.040	0.040	0.041
		(1.14)	(1.07)	(1.07)	(1.05)
OCF	−	−0.069	−0.068	−0.070	−0.075
		(−0.61)	(−0.59)	(−0.61)	(−0.64)
AC	−	0.022	0.021	0.020	0.017
		(0.95)	(0.98)	(0.92)	(0.79)
LAGWCA	−	0.734	0.722	0.716	0.725
		(4.47)	(4.51)	(4.44)	(4.24)
STDSALES	+	0.091	0.082	0.083	0.089
		(2.30)**	(2.25)**	(2.27)**	(2.54)***
Audit firm fixed effects?		Yes	Yes	Yes	Yes
Year fixed effects?		Yes	Yes	Yes	Yes
Industry fixed effects?		Yes	Yes	Yes	Yes
Intercept		0.321	0.319	0.316	0.325
		(2.08)**	(2.06)**	(2.05)**	(2.15)**
Adjusted R^2		0.57	0.58	0.58	0.58

Notes: All variables are defined in Table 2. The following symbols indicate significant effects: * = <0.10; ** = <0.05; *** = <0.01, with probability levels one-tailed for directional expectations. The reported t-values are based on clustered standard errors within companies (Petersen, 2009). For simplicity, results for the fixed effects are not reported.

column (3), and dichotomous variables for the different levels of public clients in column (4). All probability levels are one-tailed for directional expectations.

The results in column (1) indicate that the number of public clients (PUBS) is marginally significantly and negatively associated with |ABWCA| ($p = 0.073$), implying that companies audited by partners with greater public-client specialisation have somewhat higher audit quality. The results in column (2) further indicate that public-client specialisation as proxied by PUBS ≥ 3 is significantly negatively associated with |ABWCA| ($p = 0.035$). This finding suggests that auditors who have three or more public-clients perform higher quality audits than auditors with less than three public clients. Column (3) shows that $3 \leq$ PUBS < 6 is significantly associated with |ABWCA| ($p = 0.015$), whereas the coefficient on PUBS ≥ 6 is insignificant. This finding implies that the association is robust for audit partners with three to five public clients. Overall, these results suggest that there is a positive relationship between public-client specialisation and audit quality, supporting H1.

Column (4) provides more detailed information about the different levels of specialisation. The results indicate significantly less abnormal accruals for companies audited by partners with three to six public clients. Regarding Research Question 1, these results imply that there is, indeed, a point at which a partner becomes so 'busy' auditing public clients that the audit quality benefits of public-client specialisation are mitigated. That point seems to be when a partner has more than six public clients.

In terms of the economic significance of our results, the results in column (2) imply that companies with partners that audit greater than or equal to three public clients have (on average) about 39% lower ABWCA than companies with auditors having less than three public clients. The results for our control variables in column (1) indicate that STDSALES ($p = 0.004$) is positively associated with |ABWCA|. LOGEXP is marginally negatively associated with |ABWCA| ($p = 0.093$), suggesting that companies audited by partners with more general audit experience have higher audit quality. LOGASSETS ($p = 0.006$), LEVERAGE ($p = 0.060$), and OCF ($p = 0.028$) are negatively associated with |ABWCA|. In general, our control variables perform similarly across the different estimations.

In Table 5 Panels B and C, we split the sample into two sub-samples based on whether the abnormal accruals are greater than zero (income-increasing abnormal accruals, ABWCA > 0) or less than zero (income-decreasing abnormal accruals, ABWCA < 0), respectively. In Panel B columns (1) and (2), the association between public-client specialisation and income-increasing abnormal accruals is insignificant. In column (3) the negative and significant ($p = 0.035$) coefficient on the dichotomous variable $3 \leq$ PUBS < 6 indicates that the lower income-increasing ABWCA is related to audit partners that had three to five public clients. In column (4), PUBS $= 3$ is negative and significant ($p = 0.039$), and PUBS $= 5$ is marginally negative and significant ($p = 0.091$).

Panel C columns (1) and (2) indicate that the extent of public-client specialisation is marginally negatively ($p = 0.076$ and $p = 0.060$) associated with income-decreasing abnormal accruals. The results reported in column (3) indicate that companies audited by partners with three to five public clients have significantly smaller income-decreasing abnormal accruals ($p = 0.040$). Moreover, column (4) shows that the association is attributable to companies audited by partners with two to six public-clients. Taking Table 5 Panels B and C together, these results suggest that the negative association between public-client specialisation and |ABWCA| is primarily driven by income-decreasing abnormal accruals.

4.3. Robustness Checks

As a first robustness check, we employ the propensity score matching technique to control for differences in client characteristics between those that have an audit partner with more versus

Table 6. Logit regression for modelling the decision to hire an audit partner with greater public-client specialisation

Dependent variable: PUBS ≥ 3	Coef.	Wald χ^2
Total sample ($N = 420$)		
LOGASSETS	0.015	0.03
LEVERAGE	−0.965	1.73
LOSS	0.057	0.04
OCF	0.742	0.42
STATEOWN	0.680	2.39
AC	0.933	12.05***
Year fixed effects?	Yes	
Industry fixed effects?	Yes	
Intercept	−0.159	0.01
Likelihood ratio		
χ^2		57.02
Pr > χ^2		<.0001

Note: Industry dummies are based on one digit SIC codes.
*** = 0.01, with Probability level one-tailed for directional expectations.

less public-client specialisation (Lawrence, Minutti-Meza, & Zhang, 2011; Lennox, Francis, & Wang, 2012; Rosenbaum & Rubin, 1983). We match, without replacement, each company with an audit partner with more public-client specialisation (based on PUBS ≥ 3), with a partner with less public-client specialisation (two or fewer public clients) that has the closest predicted value based on the estimated logit model.[11] The estimates from that model are reported in Table 6. All matches are within a maximum distance of 1%. The results show that the decision to hire an audit partner with greater public-client specialisation is strongly associated with the existence of an audit committee.

Next, we the use the matched sample of 306 observations and re-estimate model (2). The results in Table 7 show that PUBS ≥ 3 in column (2), and 3 ≤ PUBS ≤ 5 in column (3) are negative and significant ($p = 0.081$ and $p = 0.036$). Moreover, PUBS = 3, PUBS = 5, and PUBS = 6 are significantly and negatively associated with |ABWCA| in column (4) ($p = 0.005$ and $p = 0.011$, and $p = 0.098$, respectively). The regression results for the income-increasing and income-decreasing sub-samples (untabulated) indicate that the negative association between public-client specialisation and client abnormal accruals is primarily driven by income-decreasing abnormal accruals. Consequently, the estimations on the matched samples add credibility to our main findings in Table 5. While matching cannot entirely solve the problem of endogeneity, it does to some extent alleviate concerns about the issue.

As a second robustness check, we repeat the analyses using alternative proxies for audit partners' public-client specialisation. First, we measure public-client specialisation based on the average number of public clients in years $t-1$ and $t-2$ to provide a longer-term average measure of public-client specialisation. The sample used in these regressions covers the fiscal years 2007–2010, since we need the information about the number of public clients from the previous two years. This gives us a sample size of 347 observations. The results

[11] Adapted from Zerni et al. (2012) the following logit model is used to estimate the probability of employing a public-client specialist audit partner: Prob(PUBS≥3) = $a + \beta_1$LOGASSETS + β_2LEVERAGE + β_3LOSS + β_4OCF + β_5STATEOWN + β_6AC + annual fixed effects + industry fixed effects + ε. STATEOWN equals one if the Finnish government has ownership in the company and zero otherwise. Industry fixed effects are based on one-digit SIC codes. Other variables are described in Table 2.

Table 7. Robustness tests: propensity score matched sample ($N = 306$)

Dependent variable	Exp. sign	(1) |ABWCA| Coef. (*t*-value)	(2) |ABWCA| Coef. (*t*-value)	(3) |ABWCA| Coef. (*t*-value)	(4) |ABWCA| Coef. (*t*-value)
PUBS	−	−0.004			
		(−0.89)			
PUBS ≥ 3	−		−0.034		
			(−1.41)*		
PUBS:					
PUBS ≥ 6	−			−0.016	
				(−0.50)	
3 ≤ PUBS < 6	−			−0.044	
				(−1.82)**	
PUBS ≥ 7	−				−0.008
					(−0.18)
PUBS = 6	−				−0.043
					(−1.30)*
PUBS = 5	−				−0.074
					(−2.34)**
PUBS = 4	−				−0.031
					(−0.92)
PUBS = 3	−				−0.085
					(−2.64)***
PUBS = 2	−				−0.030
					(−1.27)
LOGEXP	−	−0.041	−0.033	−0.032	−0.025
		(−1.47)*	(−1.24)	(−1.22)	(−0.93)
INDSPEC	−	0.005	0.014	0.014	0.008
		(0.16)	(0.45)	(0.46)	(0.26)
LOGASSETS	−	−0.020	−0.021	−0.022	−0.022
		(−2.67)***	(−2.77)***	(−2.84)***	(−2.95)***
GROWTH	+	0.095	0.091	0.091	0.096
		(1.83)**	(1.82)**	(1.81)**	(1.82)**
PB	+	−0.004	−0.004	−0.004	−0.005
		(−0.71)	(−0.68)	(−0.64)	(−0.76)
LEVERAGE	?	−0.177	−0.176	−0.167	−0.166
		(−2.72)***	(−2.82)***	(−2.71)***	(−2.78)***
INV	+	−0.299	−0.304	−0.319	−0.320
		(−2.08)	(−2.15)	(−2.18)	(−2.19)
LOSS	+	0.034	0.034	0.033	0.037
		(1.40)*	(1.42)*	(1.41)*	(1.57)*
OCF	−	−0.181	−0.176	−0.173	−0.170
		(−2.12)**	(−2.05)**	(−2.01)**	(−1.97)**
AC	−	0.040	0.040	0.039	0.040
		(1.57)	(1.62)	(1.64)	(1.71)
LAGWCA	−	0.036	0.024	0.017	0.032
		(0.21)	(0.14)	(0.10)	(0.19)
STDSALES	+	0.167	0.163	0.164	0.175
		(2.89)***	(2.74)***	(2.80)***	(3.08)***
Audit firm fixed effects?		Yes	Yes	Yes	Yes
Year fixed effects?		Yes	Yes	Yes	Yes
Industry fixed effects?		Yes	Yes	Yes	Yes
Intercept		0.563	0.564	0.576	0.591
		(2.97)***	(3.05)***	(3.13)***	(3.25)***
Adjusted R^2		0.31	0.32	0.32	0.33

Notes: All variables are defined in Table 2. The following symbols indicate significant effects: * = <0.10; ** = <0.05; *** = <0.01, with probability levels one-tailed for directional expectations.
The reported *t*-values are based on clustered standard errors within companies (Petersen, 2009). For simplicity, results for the fixed effects are not reported.

(untabulated) support the inferences derived from the main results in Table 5, although the significances are weaker. We find that companies audited by partners with greater public-client specialisation have higher audit quality. In particular, companies audited by partners with on average three to five public clients have lower |ABWCA| ($p = 0.076$) than companies audited by partners with less than three public clients, whereas companies audited by partners with on average at least six clients do not have significantly lower abnormal accruals than the control group.

Next, we measure public-client specialisation based on the aggregated number of public clients in years $t-1$ and $t-2$ (results untabulated). First, the coefficient of the continuous variable PUBS is negative and marginally significant ($p = 0.061$). Second, a dummy variable PUBS ≥ 5[12] is negative and significant at the 0.05 level ($p = 0.026$). Third, $5 \leq$ PUBS < 10 is negative and significant at the 0.05 level ($p = 0.013$), whereas PUBS ≥ 10[13] is negative and marginally significant at the 0.10 level ($p = 0.082$).

In addition, we conducted a sensitivity test (results not tabled) in which we measured public-client specialisation as the square root of the sum of partners' clients' total assets in the previous year scaled by largest partner's total assets. The results from this analysis are, however, statistically insignificant. This result is perhaps not surprising given that prior research generally shows that task-specific auditing experience is associated with superior performance. Thus, it is not the size of the assets audited, but rather the number of client engagements that the partner has been involved in that appears to be important.

Finally, since we are using panel data, we estimate the main regressions with company fixed effects instead of industry fixed effects to control for any unobserved heterogeneity across sample companies. The inferences derived from this analysis are mainly similar to the results in Table 5, but with lower significance levels. In contrast to Table 5, we find a negative and marginally significant coefficient on PUBS ≥ 6 in the full sample and a negative and marginally significant coefficient on PUBS ≥ 7 in the income-decreasing sub-sample. While the results of the regressions with company fixed effects support our main findings, we note that company dummies might cause problems in examining the research question if the public-client specialisation variables do not vary enough within companies across years and therefore interpretations must be made with caution.

4.4. Supplemental Tests

Based on previous findings suggesting that auditor experience may affect audit quality (Kaplan et al., 2008), it could be expected that the importance of public-client specialisation is different for auditors with lower general audit experience compared to auditors with higher experience. Therefore, we examine whether public-client specialisation affects the expected negative association between shorter audit experience and earnings quality. To address this, we estimate Model (2) after including an interaction term of public-client specialisation and experience (PUBS*LOGEXP). The results are reported in column (1) of Table 8. The results indicate that while public-client specialisation and experience alone are significantly and negatively associated with abnormal accruals ($p = 0.022$ and $p = 0.020$, respectively), the coefficient of their interaction term is significant and positive ($p = 0.059$ based on a two-tailed test). This implies that public-client specialisation compensates for lower audit experience.

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[12]Consistent with our main variable definition, we observe that only the top 20% of partners have five public clients or more during $t-1$ and $t-2$. Consequently, PUBS$\geq$5 represents the public-client specialisation in this analysis.

[13]The variable PUBS$\geq$10 represents the top 5% of partners based on the number of public clients during $t-1$ and $t-2$, and in this analysis they represent the partners with the highest level of public-client specialisation.

Table 8. Supplemental tests

General auditing experience, public-client specialisation, and |ABWCA|						
		The interaction between PUBS and LOGEXP	The sample partitioned based on audit partner's general experience (Mean = 19.298, Median = 20)			
		(N = 420)	Audit partner experience is less than 20 years (N = 187)		Audit partner experience is at least 20 years (N = 233)	
		(1)	(2)	(3)	(4)	(5)
Dependent variable	Exp. sign	Coef. (t-value)	|ABWCA| Coef. (t-value)	|ABWCA| Coef. (t-value)	|ABWCA| Coef. (t-value)	|ABWCA| Coef. (t-value)
PUBS	−	−0.057	−0.018		−0.001	
		(−2.05)**	(−2.18)**		(−0.19)	
PUBS ≥ 3	−			−0.079		0.000
				(−2.29)**		(0.00)
LOGEXP	−	−0.064	−0.047	−0.043	0.064	0.060
		(−2.08)**	(−0.83)	(−0.79)	(0.60)	(0.55)
PUBS*LOGEXP	?	0.017				
		(1.91)*				
INDSPEC	−	−0.013	0.030	0.035	−0.040	−0.041
		(−0.52)	(0.71)	(0.85)	(−2.50)***	(−2.51)***
LOGASSETS	−	−0.014	−0.022	−0.024	−0.004	−0.004
		(−2.55)***	(−2.71)***	(−2.86)***	(−0.50)	(−0.47)
GROWTH	+	0.031	0.034	0.039	−0.016	−0.015
		(0.70)	(0.53)	(0.64)	(−0.23)	(−0.22)
PB	+	−0.009	−0.016	−0.015	0.007	0.007
		(−1.98)	(−3.21)	(−3.14)	(1.13)	(1.13)
LEVERAGE	?	−0.113	−0.254	−0.257	−0.033	−0.032
		(−1.98)*	(−2.81)***	(−3.01)***	(−0.47)	(−0.42)
INV	+	−0.240	−0.217	−0.245	−0.213	−0.213
		(−2.03)	(−1.37)	(−1.51)	(−1.73)	(−1.71)
LOSS	+	0.014	0.057	0.052	−0.023	−0.023
		(0.69)	(1.53)*	(1.49)*	(−0.84)	(−0.83)
OCF	−	−0.126	0.002	−0.012	−0.294	−0.293
		(−1.88)**	(0.02)	(−0.13)	(−2.95)***	(−2.86)***
AC	−	0.023	0.038	0.034	−0.018	−0.019
		(1.02)	(1.13)	(1.02)	(−0.90)	(−0.95)
LAGWCA	−	0.023	−0.290	−0.318	0.337	0.338
		(0.17)	(−2.66)***	(−2.65)***	(1.75)	(1.79)
STDSALES	+	0.126	0.061	0.047	0.163	0.162
		(2.68)***	(0.81)	(0.63)	(4.62)***	(4.76)***
Audit firm fixed effects?		Yes	Yes	Yes	Yes	Yes
Year fixed effects?		Yes	Yes	Yes	Yes	Yes
Industry fixed effects?		Yes	Yes	Yes	Yes	Yes
Intercept		0.616	0.804	0.826	−0.036	−0.033
		(3.44)***	(3.23)***	(3.24)***	(−0.09)	(−0.08)
Adjusted R^2		0.29	0.39	0.40	0.36	0.35

Notes: All variables are defined in Table 2. The following symbols indicate significant effects: * = <0.10; ** = <0.05; *** = <0.01, with probability levels one-tailed for directional expectations. The reported t-values are based on clustered standard errors within companies (Petersen, 2009). For simplicity, results for the fixed effects are not reported.

Moreover, we split the sample based on the median of auditor experience (20 years), and separately estimate Model (2) for the sub-sample of observations where auditor experience is less than 20 years, and for the sub-sample of observations where auditor experience is greater than or equal to 20 years. The results in columns (2)–(5) of Table 8 indicate that public-client specialisation is significantly and negatively associated with abnormal accruals in the below-average experience sub-sample, but insignificant in the above average experience sub-sample. In sum, it appears that public-client specialisation has its most important impact on audit quality when general auditing experience is less than 20 years, but does not have a significant impact on audit quality when audit experience is higher.[14]

4.5. Limitations

Prior to discussing our conclusions, we acknowledge certain limitations of the study. First, due to data limitations, the public-client specialisation variable does not take into account partners' entire career-long past experience in auditing public clients, public client experience gained when working on public client audits without signing the audit report, or the time available for public clients given the number of other (private) clients they have in their portfolio. We attempt to address the first issue by additionally using the averages and cumulative number of public clients from the previous two years. In addition, we acknowledge that as a robustness check it would be interesting to construct a measure of specialisation that takes into account the individual partner's entire portfolio of clients, both public and private. For example, two audit partners with the same number of public clients may still differ in the quality of the audits they provide because they may differ in terms of their private client portfolio. Measuring audit partner portfolios to include both public and private clients would be an extremely onerous task, since e.g. the Orbis database reveals that there are about 180,000 active private companies in Finland and we would have to manually track the name of the audit partner because it is not available in the database. Therefore, we opt to use a measure based on public clients only. It should be noted that the variable measuring audit partner industry specialisation is affected by data limitations in that we are able to determine industry specialisation based only on the data of listed companies.

Second, our sample is limited to one geographic region of the world. Replication in a broader European setting would also be appropriate. For example, it would be interesting to replicate our study in a European country that has low alignment between financial reporting and tax accounting to determine how our results might change regarding income-decreasing abnormal accruals as the driver of the association between public-client specialisation and audit quality. Third, abnormal accruals are a noisy measure of audit quality. While prior related research also uses this measure (Francis et al., 2009; Zerni et al., 2012), future research using more direct audit quality metrics would be a useful extension. Fourth, it is possible that the regression model used in this study suffers from self-selection caused by some client characteristics simultaneously affecting both the test variables and the dependent variables. We considered controlling for self-selection, but were unable to find an exogenous variable that strongly affects the company's choice of public-specialist auditors but has no direct effect on abnormal accruals. Following the conclusions of Larcker and Rusticus (2010) and Lennox et al. (2012), who emphasise that implementing selection models without valid instrumental variables can cause extremely fragile inferences, we are unable to control for self-selection. The matching procedures reported in the robustness checks should alleviate these concerns to some extent.

[14]Results using cutoffs of 19, 18, 17, and 16 years yield the same inference.

5. Conclusions

In this paper we empirically examine the association between abnormal accruals and Big 4 audit engagement partner specialisation in public clients. Based on the literature showing that firm, office and partner-level specialisation improves audit quality, we hypothesise that audit engagement partners with greater specialisation in public clients have superior knowledge concerning financial reporting and auditing requirements, and a better understanding of the litigation risks that such clients present as compared to partners with less public-client specialisation. Consequently, these partners should be able to address the complex financial reporting, regulatory, and litigation-related issues related to public clients, and thus, outperform non-specialist audit partners in terms of audit quality. Furthermore, partners with greater public-client specialisation are likely more willing to resist client pressure because dependence on any one client diminishes with a larger public-client portfolio.

Our analyses consider the association between audit partner public-client specialisation and audit quality, proxied by the absolute value of client ABWCA. Extending research on audit quality at the individual audit partner level, our results reveal a statistically significant negative association between abnormal accruals and individual audit partner public-client specialisation. Specifically, companies with partners having greater public-client specialisation have lower abnormal accruals, and thus higher actual audit quality, compared to companies with partners having less public-client specialisation. It appears that partners with greater public-client specialisation seem better able to talk clients away from relatively more aggressive financial reporting compared to partners with less public-client specialisation. Extending Zerni's (2012) findings that clients appear to recognise and value the knowledge that specialised partners bring to the audit task, thus, implying *perceived* audit quality, our results suggest that public-client specialists bring *actual* audit quality into their audit tasks. In terms of the level of public-client specialisation that may be optimum, the results show that the association between specialisation and audit quality is most pronounced for partners with three to six public clients; thus, there may be a point at which 'busyness' becomes an issue.

Moreover, our results suggest that companies audited by partners with greater public-client specialisation have significantly smaller income-*decreasing* abnormal accruals. In the Finnish setting that is characterised by high-tax and high alignment between taxation and financial reporting, the tax authorities are likely to monitor corporations' tax minimisation strategies and thus auditors with greater public-client specialisation appear to recognise the downside reputational implications and achieve audit quality by discouraging tax avoidance. Finally, the results of supplemental tests suggest that public-client specialisation compensates for potential lower audit quality of less experienced auditors; public-client specialisation appears to be most important for less experienced audit partners.

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Appendix

Descriptive data on the number of public-clients of audit partners

Year	Number of signing partners of listed companies	Average number of public clients per partner	≥2 Public clients (%)	≥3 Public clients (%)	≥4 Public clients (%)	≥5 Public clients (%)	≥6 Public clients (%)
2005	90	1.89	38 (42)	18 (20)	10 (11)	6 (7)	3 (3)
2006	89	1.91	37 (42)	17 (19)	10 (11)	7 (8)	4 (4)
2007	86	1.91	38 (44)	18 (21)	8 (9)	5 (6)	3 (3)
2008	80	1.94	35 (44)	15 (19)	10 (13)	6 (8)	5 (6)
2009	76	1.95	35 (46)	16 (21)	9 (12)	5 (7)	4 (5)
2010	74	1.95	32 (43)	16 (22)	9 (12)	6 (8)	4 (5)
Mean	82.5	1.92	36 (44)	17 (20)	9 (11)	6 (7)	4 (5)