

Audit Quality of Complex Accounting Estimates: Evidence from Audit Tests of Goodwill and Special Charges

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January 2016

Version 6.1

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We greatly benefited from the comments of Kathleen Bakarich, Jane Barton, Jeremy Bertomeu, Bob Colson, Ming Deng, Rajib Doogar, John Elliott, Henry Jarva, Karla Johnstone, Gopal Krishnan, Edward Li, Chen Li, Steve Lilien, Emma-Riikka Myllymäki, Hugo Nurnberg, Liz Peltier, Karthik Ramanna, Tom Ray, Bill Ruland, Min Shen, Jackie Siriviriyakul, the participants at the 2015 Annual Meetings of the American Accounting Association in Chicago, Aalto University Finance and Accounting workshop (Helsinki), and Oklahoma University accounting seminar. We are especially indebted to Chris Hogan and Carol Marquardt for suggesting some extensions.

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Abstract

Because auditing complex accounting estimates are particularly challenging for the auditor, and given the PCAOB inspections reports indicating audit deficiencies with the valuation tests of goodwill and other complex estimates, we highlight the quality of audit stress tests of goodwill, and audit tests of impairments, restructuring charges and other types of special charges. We find that: (1) auditors charge a substantial fee premium for testing goodwill account balances and there is an auxiliary fee surcharge for impairments, restructuring and other types of special charges, (2) audit tests of goodwill, impairments and other special charges lead to longer audit report lags, but not for restructuring charges, (3) the likelihood of an impairment or a special charge increases with audit quality, and (4) investors react negatively to all types of complex accounting estimates but the reaction depends on audit quality for impairments only. Collectively, our results underscore the prominence and relevance of audits of complex accounting estimates, especially goodwill account balances, which helps explain why goodwill impairments and special charges are timely and informative for investors.

Keywords

Audit tests of goodwill; Goodwill impairments; Audit fees; Audit report lag; Timeliness of goodwill; Informativeness of goodwill impairments; audit quality

JEL Classification

M40; M42; C42

1. Introduction

Auditing complex accounting estimates are particularly challenging for the auditor because of estimation uncertainty, volatility in the financial markets, macroeconomic risks, and injection of managerial biases (e.g., Griffith et al. 2015, Christensen et al. 2015, Bratten et al. 2013, Beatty and Webber 2005). The rising importance of complex accounting estimates in today's financial statements (Barth 2006), which affects financial reporting quality, dictates a better understanding of the audit tests involving such estimates. In addition, PCAOB (2010, 2012) inspection reports have identified chronic deficiencies in audits of fair value estimates and impairments, which raises concerns about audit quality and integrity of financial statements.

Despite the prominence of goodwill and other complex accounting estimates including restructuring charges, write-downs, write-offs, impairments, and reserves (commonly known as "special charges") in today's financial statements,¹ very little is known how auditors make their decisions in complex and judgment-laden settings (Martin et al. 2006). In this study, we fill this void by underscoring key auditing attributes of engagements with complex accounting estimates and the associated stock market reaction to the announcement of such estimates. By comparing the various attributes of engagements with and without complex accounting estimates, we can remark on the quality of audits and whether investors view such information as timely and useful.

¹According to Financial Times (July 17, 2008), the aggregate goodwill (goodwill impairment) recognized by S&P 1500 companies exceeded \$2 trillion (\$281 billion). For some companies, goodwill is the single largest asset on their balance sheet (Chasan and Murphy 2013, Gu and Lev 2011). Similarly, the 1990s was marked by a dramatic rise in restructuring charges, write-offs and other special charges (Bens and Johnston 2009, Elliott and Hanna 1996, Francis et al. 1996).

While we analyze key complex accounting estimates, our pivotal research interest remains goodwill, which is potentially more challenging to audit than other classes of complex accounting estimates. For instance, audits of goodwill encompass fair value estimates of Level 3 assets (ASU 820), which are hard to verify, contain subjective information inputs and are prone to managerial biases (Johnstone et al. 2014, Griffin 2014). Therefore, auditors must carefully evaluate the underlying data, determine the appropriateness of assignments of assets/liabilities to reporting units, and assess the appropriateness of discount rates and other assumptions used to generate fair value estimates of reporting units by comparing them to historical experience and industry standards (Deloitte 2011), which makes the audit task more onerous (Martin et al 2006). Further, goodwill testing must be conducted at least annually using a demanding “two-step” procedure,² while special charges are more infrequent and management has considerable latitude in its estimation because the professional guidance is less detailed, which could render audit tests of special charges somewhat less challenging.

According to the “professional perspective,” goodwill testing constitutes a large portion of audit fees and the detailed testing leads to substantial delays in audit report date because auditors must test all assertions associated with goodwill account balances (AU 328, AU 342),

² Under ASU 350, in the first step, the company calculates the fair value of the reporting unit and then compares that amount with the carrying amount of the unit including goodwill. If the carrying amount exceeds the fair value, the company must perform the second step, which measures the amount of the goodwill impairment by comparing the implied fair value of the reporting unit’s goodwill with the carrying amount of that goodwill. In response to concerns about the costs associated with the two-step impairment testing process, FASB introduced a simplified optional “qualitative assessment” framework that allows companies to skip the annual two-step test (ASU 2011-08).

verify fair value estimates, rely on valuation experts for independent verification of fair value estimates,³ confront potential manipulation by management with the timing of impairments, and require appropriate adjustments to fair value estimates when audit tests indicate biases or errors in estimates. A contrasting “regulatory perspective” is that audit testing of goodwill is lacking in quality because auditors often inappropriately rely on clients’ estimation of fair value estimates to determine whether goodwill is impaired without obtaining sufficient independent audit evidence (Komissarov et al. 2014, Herron and Gilbertson 2011), which suggests that goodwill testing may not have a material effect on audit fees and audit report lag.

Similarly, special charges are material amounts and often subject to manipulation by management (e.g. Riedl 2004, Burgstahler et al. 2002, Pourciau 1992), which increase the risk of material misstatements (Bills et al. 2015). Therefore, according to the professional perspective, auditors are expected to increase audit effort, conduct detailed substantive testing, invest more in technology, require more experienced personnel, which is expected to lead to higher fees and audit report delays. A conflicting viewpoint is that testing of special charges do not lead to higher fees or delays in audit report date because of insufficient professional guidance pertaining to these accounting estimates (Bens and Johnston 2009), which circumvents detailed audit testing.

Our study provides a deeper understanding of the quality of audit based on the following tests. First, using audit fees as a proxy for audit effort (e.g., Bell et al. 2001, Bedard and Johnstone 2004), we investigate whether auditors charge a fee-premium for complex accounting estimates

³Because fair value estimates are difficult to verify (Ramanna and Watts 2012), auditors frequently seek the help of valuation specialists for independent verification of fair value estimates and assumptions (AU 328).

and whether the fee-premium varies with auditor size, audit complexity, and auditor switching. Second, using auditor report lag as a more direct measure of audit effort (e.g., Ashton et al. 1987, Bamber et al. 1993), we analyze whether audit tests of goodwill and other complex accounting estimates lead to unusual delays in auditor report lag. Third, we study whether audit quality plays a role in the timing of impairments and the recognition of special charges. Finally, we analyze the usefulness of complex accounting estimates by evaluating investor reactions to the release of such information and whether the quality of information depends on audit quality.

Our tests are based on a large sample of publicly traded firms with available data from 2000 to 2013. To facilitate our analyses, we partition complex accounting estimates into four board groups: (1) annual stress tests of goodwill, (2) goodwill impairments, (3) restructuring charges, which include estimated exit/closing costs, and (4) other types of special charges including impairment of intangibles, write-down of long-lived assets, and losses from discontinued operations. Consistent with the professional perspective, the univariate analysis indicates that clients with goodwill, with goodwill impairments, with restructuring costs, and with other special charges pay considerably more than other clients without such traits.

In multivariate regressions of audit fees on *Goodwill* (goodwill to total assets) and *Goodwill-Impair* (indicator for goodwill impairment), *Restructuring-Charges* (indicator for restructuring charges), *Special-Charges* (indicator for other special charges), and after including control variables, all the coefficients are highly significant which suggests that auditors charge considerably more for audit tests of all classes of complex accounting estimates. Our estimates suggest that the fee premium is large for testing goodwill for impairments; clients pay an

additional 1% for every 1% increase in goodwill. Further, clients pay an added 10% when goodwill is impaired, an added 26% for restructuring charges, and an added 12% for other special charges. When we partition the sample into Big 4 and non-Big 4, we find that the fee premium is significantly larger for the Big 4 sample for goodwill testing and goodwill impairments but not for restructuring or other complex accounting estimates.

A more powerful test of whether auditors are diligent in audits of goodwill is to study variations in the goodwill-fee-premium over the changing landscape of goodwill accounting. Between 2000 and 2001 when goodwill was amortized, the *Goodwill* coefficient is around 0.44. For the transition period (2002), when goodwill amortization was no longer permitted, the *Goodwill* coefficient increases to 0.53. The *Goodwill* coefficient jumps to 0.82 for fully phased in two-step testing period (2003-2011). Finally, between 2012 and 2013 when goodwill testing was simplified by FASB, the *Goodwill* coefficient remains at 0.70. Further, consistent with auditing theories, we examine and find that that the goodwill-related fee premium is larger for companies with more reportable segments, for companies with more foreign operations, for clients more likely to have their goodwill impaired, and for companies with more intangible assets (excluding goodwill).

Assuming that fees are a reliable proxy for effort (e.g., Ghosh and Tang 2015), our results suggest that auditors charge more because testing complex estimates entails added audit work. It is highly unlikely that the fee premium represents compensation for higher litigation risk. For instance, a securities class action lawsuit was filed against Regions Financial Corp., and its auditors, alleging that the goodwill impairment charge of \$6 billion in the company's 2008 fourth

quarter results was false and misleading. The plaintiffs asserted that the market turmoil of 2007 and 2008 should have led Regions to adjust goodwill much more and much earlier (Milbank et al. 2011). The District Court dismissed all claims on the grounds that goodwill impairment charge represents “judgment and opinion, rather than fact.”⁴ Nonetheless, we also examine whether audit testing of goodwill and other complex accounting estimates require more effort using audit report lag as a more direct proxy for audit effort (e.g., Schwartz and Soo 1996). Consistent with the audit fee results, we find that goodwill, goodwill impairments, and other special charges are all associated with economically longer audit report lags, which suggest that goodwill testing, goodwill impairments, and tests of other special charges are significantly involved. However, the coefficient on restructuring charges is negative which raises some concerns about the audits of restructuring charges.

We also investigate the role of audit quality on the timing of goodwill impairments, restructuring and other special charges. Using auditor tenure, and auditor specialization as alternative constructs for superior audit quality, and after controlling for other factors, we find that goodwill impairments are more frequent when tenure is long and auditors are industry specialists, which suggest that client- and industry-specific knowledge improves audit quality of goodwill impairments. In contrast, restructuring and other special charges are more frequent for clients with longer tenure but not when auditors are industry specialists, which suggest that only client-specific knowledge improves audit quality of restructuring and other special charges.

⁴The plaintiffs subsequently appealed to the U.S. Court of Appeals, but the Second Circuit Court affirmed the dismissal (see *Fait v. Regions Financial Corp.*, No. 10-2311-cv; 2d Cir. Aug. 23, 2011).

If goodwill impairments provide timely new information, we expect investors to incorporate this information at the time of the earnings announcements. Although prior studies examine the information content of accounting estimates (e.g., Bens and Johnston 2009, Li et al. 2011, Francis et al. 1996, Elliott and Hanna 1996), the results are inconclusive. More importantly, prior studies do not consider how audit quality might affect the information content of accounting estimates. We find a strong negative stock market reaction around the earnings release date for firms with goodwill impairments, with restructuring and other special charges. More importantly, we show that the stock market reaction to accounting estimates is more negative when audit quality is high. The results are the strongest for goodwill impairments which is consistent with our priors that auditors are more diligent in their audits of goodwill relative to other classes of accounting estimates.

Our study contributes to the literature as follows. We document that goodwill impairments are timely and informative particularly when audit quality is high. However, our results also suggest that goodwill testing imposes larger costs on clients who must pay more and encounter potential delays in earnings announcements because auditors take longer to complete their audits. Our results can inform regulators whether their concerns regarding audit testing of goodwill, which are based on a limited number of inspections of actual audit procedures and tests, extend to a broader cross section of companies. One concern with our study is that, in the absence of access to audit work papers, we cannot test audit effort directly but must rely on indirect proxies, which makes our analysis prone to measurement error.

We organize the remainder of the paper as follows. Section 2 develops our hypotheses. Section 3 describes research methodologies. Section 4 shows data selection procedures. Section 5 presents empirical test results. Section 6 reports sensitivity analyses test results. Section 7 concludes the paper.

2. Background and hypotheses development

2.1. Background

PCAOB defines accounting estimate as “an approximation of a financial statement element, item, or account. Accounting estimates are often included in historical financial statements because the measurement of some amounts or the valuation of some accounts is uncertain, pending the outcome of future events” (AU Section 342). While some accounting estimates may be easily determinable, others are inherently subjective or complex because the estimates involve multiple assumptions and intricate computational models. The subjective nature of assumptions and the use of intricate calculations or models to determine complex accounting estimates can result in a wide range of measurement uncertainty (PCAOB 2014).

In evaluating the degree of complexity or judgment in the recognition or measurement of an accounting estimate, especially those measurements involving a wide range of measurement uncertainty, PCAOB (2014) advises that the auditor should take into account: (a) the extent of unobservable inputs used, (b) the type of models or calculations used, if applicable, (c) the degree of subjectivity associated with a future occurrence or outcome of events underlying the assumptions used such as estimates of future cash flows or prepayment assumptions, and (d) the

extent of market liquidity or activity for the asset or liability, if relevant to the measurement objective.

Fair value measurements in the absence of reliable market prices are considered particularly complex classes of accounting estimates because they involve high degree of subjectivity and judgment, the estimation process often depends on subjective information inputs with imprecise range of possible outcomes, and they are prone to misstatements (Griffin 2014). Yet, PCAOB considers fair value estimates as an important part of a company's financial statements and critical to investors' decision-making. Goodwill constitutes a unique example of Level 3 fair value asset measurement.⁵ Prior to ASC 350, goodwill was recognized as an asset and amortized over a period not exceeding 40 years, which meant that goodwill was mostly exempt from fair value measurement. However, ASC 350 abolished goodwill amortization; instead, goodwill is to be evaluated for any impairment at least annually or when there are changes in the market conditions indicating that the carrying amount of an asset obtained in an acquisition may not be recoverable (Beatty and Weber 2006). Under ASC 350, the estimation of the fair value of goodwill relies exclusively on management's estimate of goodwill's current value which is a function of management's future actions and implementation of future strategy thereby making it particularly complex and challenging to audit (Ramanna and Watts 2012).

⁵Goodwill is recognized as an asset on the date of the acquisition measured as any excess of the acquisition-date amounts of the consideration transferred over the acquisition-date amounts of the net identifiable assets acquired (ASC 805).

The periodic tests for goodwill impairment are to be based on a two-step process. In the first step, the company calculates the fair value of the reporting unit and compares that amount with the carrying amount of the unit including goodwill. Therefore, the emphasis in step one is on discounted future cash flows, i.e., fair value estimates, and not on undiscounted future cash flows as in the case of impairment tests for assets with definite lives. Further, the analyses are performed at the reporting unit and not on asset groupings under SFAS 121. Reporting unit is defined by management and how they view their business. Finally, management is required to allocate goodwill to reporting units based on the expected synergistic benefits to those units (Beatty and Weber 2006). In the second step, which is required if the carrying amount exceeds the fair value, the company measures the amount of the goodwill impairment, if any, by comparing the implied fair value of the reporting unit's goodwill with the carrying amount of that goodwill. Goodwill is considered impaired when the implied fair value of goodwill in a reporting unit of a company is less than its carrying amount, or book value, including any deferred income taxes.

Public and private companies expressed serious reservations about the recurring cost and complexity of calculating the fair value of a reporting unit under the first step of the two-step goodwill impairment tests. This is because most clients have to retain the services of a reputable appraisal company to estimate the fair value of their reporting units which can become costly for the client as the appraisal must be done at least annually. Some preparers recommended that FASB consider allowing companies to use a qualitative approach to testing for goodwill impairment. Responding to the market place concerns, FASB issued an update that simplifies how

companies test for goodwill impairment (ASC 2011-08). The amendments in the update permit a company to first assess qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount as a basis for determining whether it is necessary to perform the two-step goodwill impairment. FASB defines more likely than not as having a likelihood of more than 50 percent.

In determining whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount under the qualitative test, the company must assess relevant events and circumstances including the following:

- Macroeconomic conditions (such as a deterioration in general economic conditions, limited access to capital and fluctuations in foreign exchange rates),
- Industry and market considerations (including a deterioration in the environment in which the company operates, increased competition, changes in the market for the company's products or services, and regulatory or political developments),
- Cost factors (such as increases in the costs of raw materials, labor and other items that have a negative effect on the company's earnings and cash flow),
- Overall financial performance (including negative or declining cash flow and declines in actual or planned revenue or earnings as compared with previous periods' actual and projected results),
- Other relevant company-specific events (such as changes in management, key staff, strategy or customers; potential bankruptcy; or litigation),
- Events affecting the reporting unit (for example, changes in the composition or carrying amount of net assets; a more-likely-than-not expectation of selling or disposing of all or part of the reporting unit; or recognition of a goodwill impairment loss in the financial statements of a subsidiary of the reporting unit), and
- For public companies, a sustained decrease in share price both in absolute and relative to peers.

Some other classes of complex accounting estimates that are recognized in the income statement include restructuring charges, asset write-offs or write-downs, litigation reserves, losses from disposal of assets, which are also collectively known as special charges. Special charges are considered complex because: (1) of the inherent estimation uncertainty, (2) the subjectivity involved and reliance on managerial judgements, and (3) they are frequently used as

device to manage earnings (Bens and Johnston (2009). A key distinction between testing goodwill for impairment and special charges is that any goodwill testing must be done periodically while special charges by definition are unusual and infrequent in nature.

2.2. Hypotheses development

2.2.1. Audit tests of goodwill and special charges

The independent auditor's objective is to obtain sufficient and appropriate audit evidence as a reasonable basis for forming an opinion (AU Section 230). However, obtaining audit evidence for soft assets like goodwill and special charges, some prominent examples of complex accounting estimates, poses special challenges for the auditor because verification is difficult. Auditing theory and accounting standards on goodwill and special charges suggest that the determination of the continued existence of goodwill and audits of special charges involve significant audit effort and difficult audit judgments for several reasons.

First, auditors need to evaluate the reasonableness of management's estimates, whether the assumptions are consistent with market conditions, management's plans and strategies, past experience, other financial statement assumptions, and the risk associated with the future cash flows based on the audit guidelines (AU Section 341). Second, because accounting standards require that goodwill and other long-lived assets be reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable, auditors must be alert for any changes that may affect the recoverability of the asset. Third, auditors need to consider the processes and controls used by management to develop the estimates and then examine appropriate internal and external data in support of the

significant assumptions (AU 342). The auditors need to consider whether the information gathered indicates that one or more significant assumptions are not reasonable. In some instances, auditors may also decide to use the services of a valuation specialist to determine whether there are material differences between the fair value estimates determined by an appraiser engaged by the auditor and those determined by management.

Fourth, audits of Level 3 fair values and other complex estimates often involve substantial risk of material misstatements (Whittington and Pany 2014, Watts 2003). The auditor must understand the business, the current strategy in utilizing assets, and the likelihood of future success. The level of the risk is influenced by length of the forecast period, the number of complex assumptions, the degree of subjectivity associated with those assumptions, and the availability of objective data. Therefore, auditors need to design added tests and procedures to reduce the risk of material misstatements. Finally, when assets are impaired, losses are estimated, restructuring charges are computed, auditors need to evaluate the reasonableness of management's determination of the magnitude of the charges (AU 328).

Collectively, the professional perspective suggests that auditing goodwill and other complex accounting estimates are time consuming and costly because of the need for added substantive testing, use of services of external specialist experts, reliance on more senior manager and partner time, which is why clients are expected to pay more for such testing.

An opposing regulatory viewpoint is that auditors are not rigorous in their tests of goodwill account balances or other complex accounting estimates because they tend to rely on management's representations without obtaining independent verification of the estimates

(Church and Shefchik 2012). For instance, the Audit Quality Review (AQR) team, formerly the Audit Inspection Unit (AIU), which monitors the audit quality of major audit firms in the UK, identified deficiencies in the audit of fair value measurements and impairments identified in a significant number of audits inspected in 2013/14 (FRC 2014). For example, AIU raised concerns about the adequacy of audit work carried out by KPMG in connection with the carrying value of goodwill (Crump 2012). Failings included insufficient consideration of the reasonableness of growth rates, source data and methodologies used by management in considering the potential for impairment.

Similarly, PCAOB inspectors found deficiencies in connection with the valuations inherent in performing a goodwill impairment test (PCAOB 2013, 2008). At the AICPA Fair Value conference in 2012, PCAOB Board Member Jay D. Hansen (Hansen 2012) asserted that “PCAOB inspectors identified deficiencies that included auditors' failures to evaluate the reasonableness of significant assumptions used by issuers to estimate the fair value of reporting units in their goodwill impairment assessments or in measuring fair value for other intangible assets and other long-lived assets acquired in business combinations.” Inspectors also identified instances in which auditors did not test, or tested only through inquiry of management, issuers' significant assumptions, such as forecasted revenue growth rates, operating margins, discount rates, implied control premiums, and weighted average cost of capital measures. Firms sometimes neglected to challenge issuers' conclusions that goodwill need not be tested for impairment despite the existence of impairment indicators, such as recent declines in issuers' stock prices or reduced estimates of future revenue.

Thus, the conflicting theories make it difficult to predict whether tests of goodwill account balances or special charges involve significant incremental audit effort which leads to auditors charging more and whether the added tests lead to delays in the audit report date. Therefore, our first two hypotheses stated in alternative form are as follows.

Hypothesis 1: *Auditors charge considerably more for tests related to goodwill account balances and special charges.*

Hypothesis 2: *Audit report date is delayed because of tests of goodwill account balances and special charges.*

2.2.2. Audit quality and goodwill impairment and special charges

Ramanna and Watts (2012) investigate whether agency-based contracting motivations explain the likelihood, the timing, and the amount of a goodwill impairment. In particular, they examine whether the managerial decision to delay recognition of losses from goodwill impairments depends on debt and compensation contracts, management reputation, and stock price concerns. Similarly, Beatty and Webber (2006) examine whether managers use their reporting discretion around the adoption of goodwill impairment standard (ASU 350) to accelerate or delay the recognition of goodwill impairment charges.

Auditors are expected to play a strategic role in the timely recognition of impairments and special charges when they are more independent, have greater expertise, or conduct added audit testing and procedures because they are more likely to: (1) detect and correct material misstatements, (2) ensure that financial statements comply with generally accepted accounting principles, and (3) generally constrain managerial reporting discretion (Carmichael 1999, DeAngelo 1981). Therefore, independence, expertise, and effort improve audit quality, which in

turn has a positive influence on the likelihood of goodwill impairments and special charges. Thus, our third hypothesis is as follows.

Hypothesis 3: *The likelihood of a goodwill impairment and special charges increases with audit quality.*

2.2.3. *Investor reactions to goodwill impairments and audit quality*

If auditors are diligent in auditing goodwill account balances and special charges, goodwill impairments and recognition of special charges are expected to be timely and informative for investors. Therefore, one key implication is that the announcement of goodwill impairments and special charges is associated with negative stock price reaction. In general, prior studies find conflicting evidence surrounding the announcement of special charges (e.g., Li et al. 2011, Elliott and Hanna 1996, Francis et al. 1996). We reexamine the results from prior studies by focusing on a comprehensive sample of companies with impairments and special charges. More importantly, if auditors play a critical role in evaluating goodwill account balances, assessing whether goodwill is impaired and then estimating the amount of the write-off or other charges, we expect the stock market reaction to the announcement of goodwill impairments to be strongly associated with audit quality. Therefore, our fourth hypothesis is as follows.

Hypothesis 4: *The information content of goodwill impairments and special charges is positively associated with audit quality.*

3. **Research design**

3.1. *Audit fees and complex accounting estimates*

We partition complex accounting estimates into four groups: (1) *Goodwill* (ratio of goodwill to total assets) (2) *Goodwill-Impair* (indicator variable for clients with a goodwill

impairment charges), (3) *Restructuring-Charges*⁶ (indicator variable for clients with restructuring charges, which include estimated exit costs, closing costs, severance pay, reductions in workforce, relocation charges and early retirements), and (4) *Special-Charges* (indicator variable for clients with other types of special items, which exclude goodwill impairments and restructuring charges, but include impairment of intangibles, write-down of inventory, assets and receivables, reserves for litigation, and losses from discontinued operations or sale of assets or investments).⁷ Drawing on the prior audit fee studies (e.g., Whisenant et al. 2003, Ghosh and Lustgarten 2006, Hogan and Wilkins 2008), we estimate the following augmented audit fee pricing regression model to estimate the effect of complex accounting estimates on audit fees.

$$\begin{aligned}
 \text{Audit-fee} = & \beta_0 + \beta_1 \text{Goodwill} + \beta_2 \text{Goodwill-Impair} + \beta_3 \text{Restructuring-Charges} + \beta_4 \text{Special-Charges} + \\
 & \beta_5 \text{Size} + \beta_6 \text{Segments} + \beta_7 \text{F-Sale} + \beta_8 \text{Ca-CI} + \beta_9 \text{Inventory} + \beta_{10} \text{Roa} + \beta_{11} \text{Loss} + \beta_{12} \text{Leverage} \\
 & + \beta_{13} \text{Ca-Ta} + \beta_{14} \text{Growth} + \beta_{15} \text{Market-Book} + \beta_{16} \text{M\&A} + \beta_{17} \text{Discontinued} + \epsilon \quad (1)
 \end{aligned}$$

The dependent variable *Audit-fee* is the logarithmic transformation of the total fees charged by the auditor for audit work. If auditors charge more for testing goodwill account balances, for goodwill impairment, for restructuring charges, and for other special charges, β_1 to β_4 are expected to be all positive.

⁶One prevalent and controversial special item is restructuring charge (Bens and Johnston 2009). Since the 1990s, an increasing number of companies have recorded restructuring charges and the magnitude of the charges have been increasing over time (Chaney et al. 1999, Elliott and Hanna 1996, Francis et al. 1996). Restructuring charges are prone to manipulation by management and frequently used to manage earnings (Burgstahler et al. 2002). Therefore, we separate restructuring charges from special items to better understand how auditors approach engagements with restructuring charges from other types of special items.

⁷Special items reflect all types of unusual or infrequent charges recognized on the income statement. Our discussions with *Compustat's Capital IQ* data specialists confirm that *Compustat* includes all classes of special items in their data variable *SPI*, which represents special items. Since we separately analyze goodwill impairments and restructuring charges, our definition of *Special-Charges* excludes these two items.

The control variables related to client characteristics are defined as follows. *Size* is the logarithmic transformation of total assets, *Segments* is the sum of the number of operating segments, *F-Sale* is the ratio of sales from foreign operations to total sales, *Ca-CI* is the ratio of current assets to current liabilities, *Inventory* is the ratio of inventory to total assets, *Roa* is the ratio of operating income to total assets, *Loss* is an indicator variable equal to one when net income is negative and zero otherwise, *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets, *Ca-Ta* is the ratio of current assets to total assets, *Growth* is the percentage change in revenues between the current year and the prior year, *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets, *M&A* is an indicator variable when a client engages in mergers and acquisitions and zero otherwise,⁸ and *Discontinued* is an indicator variable equal to one for clients with discontinued operations and/or extraordinary items and zero otherwise,

3.2. *Audit report lag and complex accounting estimates*

As in prior studies (e.g., Ashton et al. 1987, Bamber et al. 1993), we use audit report lag as a proxy for audit investments or audit effort. When audit investment needs are greater, auditors are expected to work longer, which leads to longer audit report lags. As in Bronson et

⁸In Compustat EXPRESSFEED data, any merger/acquisition is determined by the mnemonic *COMPSTAT* with the following codes: AA, AB, AF, AR and AS. AA reflects a merger/acquisition, AB reflects a merger with a new company being formed, AF reflects a combination AA and AN, where AN is the adoption of new accounting principles, AR reflects a combination AA and AZ, where AZ reflects data excluding discontinued operations, and AS reflects a combination AA and AC, where AC reflects accounting changes.

al. (2011), we estimate the following comprehensive audit report lag specification to study the effects of complex accounting estimates on audit report lag.

$$\begin{aligned}
 \text{Reportlag} = & \beta_0 + \beta_1 \text{Goodwill} + \beta_2 \text{Goodwill-Impair} + \beta_3 \text{Restructuring-Charges} + \beta_4 \text{Special-Charges} + \\
 & \beta_5 \text{Size} + \beta_6 \text{Volume} + \beta_7 \text{Loss} + \beta_8 \text{Roa} + \beta_9 \text{Variance} + \beta_{10} \text{Leverage} + \beta_{11} \text{Beta} + \\
 & \beta_{12} \text{Concentration} + \beta_{13} \text{Book-Market} + \beta_{14} \text{Inv\&Rec} + \beta_{15} \text{Discontinued} + \beta_{16} \text{M\&A} + \\
 & \beta_{17} \text{Going-Concern} + \beta_{18} \text{Big4} + \beta_{19} \text{Busy} + \text{Industry} + \varepsilon
 \end{aligned}
 \tag{2}$$

The dependent variable *Reportlag* is the number of days between the fiscal year end and the auditor signature date. If goodwill entails more audit effort which leads to delays in the audit report, β_1 to β_4 are all expected to be positive.

We include several control variables that proxy for the (1) demand for information, (2) proprietary costs, and (3) accounting and audit complexity. The following variables proxy for the demand for information. *Volume* is the number of shares traded divided by the number of shares outstanding. *Variance* is the standard deviation of daily returns over 200 trading days ending 45 days before the earnings announcement. *Beta* is estimated from the market model using daily returns over 200 trading days ending 45 days before the earnings announcement.

The following variables proxy for proprietary costs. *Concentration* is the total sales of the largest five companies within the same industry, where industry is based on the two-digit SIC code, as a proportion of total sales within the industry. The following variables proxy for the demand for information. *Book-Market* is the ratio of the book value of equity to the market value of equity. *Inv\&Rec* is the sum of receivables and inventory divided by total assets. *Going-Concern* is an indicator variable which equals one when an auditor issues a going-concern opinion and zero otherwise. *Big4* is an indicator variable which equal one for companies with a Big 4 auditor

and zero otherwise. *Busy* is an indicator variable which equals one when client's fiscal year-end is December and zero otherwise. We also include industry controls for *Utility* (SIC code is between 4900 and 4949), *Financial* (SIC code is in the 6000s), and *Technology* (SIC codes are 2833-2836, 3570-3577, 3600-3674, 7371-7379, or 8731-8734). All the other variables are defined previously.

3.3. *Audit quality and goodwill impairments*

Drawing on Ramanna and Watts (2012) and Beatty and Weber (2006), we rely on the following logistic model to estimate the likelihood of a charge.

$$\text{Charges} = \beta_0 + \beta_j \text{Audit quality} + \beta_k \text{Managerial opportunism} + \beta_l \text{Control variables} + \varepsilon \quad (3)$$

The dependent variable *Charges* is an indicator variable that equals one for clients with goodwill impairment charges, for clients with restructuring charges, and for clients with other types of special charges, and zero otherwise. We use two proxies for audit quality: (1) *Tenure*, length of the audit engagement, and (2) *Industry-Specialist*, an indicator variable equal to 1 when the auditor's market share in the industry is larger or equal to 20%. Audit quality is expected to higher when tenure is long and with auditor specialization.

Similar to Ramanna and Watts (2012), we include four managerial opportunism variables: (1) *CEO-tenure*, logarithm transformation of the number of years a CEO has served in office, (2) *Bonus*, an indicator variable that equals one when the CEO is paid cash bonus and 0 otherwise, (3) *Leverage*, the ratio of the sum of the long-term and short-term debt to total assets, and (4) *Goodwill*, the ratio of goodwill to total asset. The coefficients on the managerial opportunism proxies (β_k) are expected to be negative.

The control variables are defined as follows. *Internal-Control* is an indicator variable equal to 1 when a client's internal control is effective. *Age* is the number of years the client is publicly traded. *ERC* is the coefficient of the time series regression of price on earnings from continuing operations per share using the 20 quarters of data. *Relative-ROA* is industry-adjusted ROA where ROA is income before extraordinary items to total assets. *Volatility* is the standard deviation of daily returns. *Delist* is an indicator variable which equals one if the client is traded on NASDAQ or AMEX. *Intangibles* is intangible assets divided by total assets. *Lag-size* is *Size* from the prior year. *Returns* is the buy-and-hold raw returns. All the other variables are defined previously.

3.4. *Investor reactions to goodwill impairments and audit quality*

We measure investor reactions to news about the recognition of various types of charges around the earnings announcement date using the following specification

$$CAR = \beta_0 + \beta_1 \text{Charge-ratio} + \beta_2 \Delta \text{Earnings} + \beta_3 \text{Size} + \beta_4 \text{Market-Book} + \beta_5 \text{Beta} + \varepsilon \quad (4)$$

The dependent variable CAR (cumulative abnormal returns) is measured over three-days around the quarterly earnings announcement date where abnormal returns is defined as raw returns less value-weighted market returns. The main independent variable (*Charge-ratio*) is defined as follows: (1) *Impair-Ratio* is the absolute value of goodwill impairment charges divided by total assets, (2) *Restructure-Ratio* is the absolute value of restructuring charges divided by total assets, and (1) *Special-ratio* is the absolute value of other types of special charges divided by total assets. If goodwill impairment and special items on the income statement provides new information to investors, we expect β_1 to be negative.

The control variables are defined as follows. $\Delta Earnings$ is income before extraordinary items for current quarter minus the corresponding number four quarters prior divided by the market value of equity at the beginning of the current fiscal quarter. All the other variables are defined previously.

4. Data

Our data period begins with 2000 when audit fee data first became publicly available and ends with 2013. For our audit fee and audit report lag tests, we collect data from the following sources: (1) accounting data are from the S&P COMPUSTAT database, (2) audit fees are from Ives Group's *Audit Analytics* database, and (3) stock market data are from the CRSP database, and (4) Analyst forecasts and firms' actual earnings are from IBES.

Between the years 2000 and 2013, *Audit Analytics* has 167,184 observations with audit fee data. When we match *Audit Analytics* with COMPUSTAT, we are able to identify 90,223 observations with information on both databases. The following 27,727 (observations) are deleted because of missing data: audit fees (313), total assets (378), revenues for the current or prior year (5,793), segments information (7,154), current assets or current liabilities (8,672), inventory (807), income (142), long-term debt or short-term debt or preferred stock (4,468). Finally, we delete 7,263 observations because audit report lag is either missing or negative or greater than 365 days. Thus, data availability reduces our final sample to 55,233 firm-year observations (8,732 unique clients).⁹

⁹To limit the effect of outlier observations, we winsorize the top and bottom one percent of the following variables: *Roa*, *Volume*, *Beta*, *Market-Book*, *Ca-CI*, *Leverage*, and *Growth*.

Table 1 presents the summary statistics (mean, median, first quartile and third quartile) for the variables used in the audit fee regressions. The mean (median) audit fees are \$1.520 (\$0.434) million. The mean (median) audit report lag is 70 (68) days. The mean (median) *Goodwill* is 9.4% (1.1%), and the third quartile is 14.2% which suggests that the magnitude of goodwill tends to be large. The mean value of *Goodwill-Impair* is 8%. About 8% of the observations are associated with restructuring charges (*Restructuring-Charges*), while about 55% of the observations are associated with special items (*Special-Charges*) which excludes restructuring and goodwill impairments.

We also analyze several other client characteristics. The mean (median) size of a company is \$3.7 (\$0.21) billion. The average company in the sample has 24% of its sales in foreign jurisdictions (*F-Sale*) and has more than two operating segments (*Segments*). The mean (median) liquidity as measured by current assets to current liability (*Ca-Cl*) and current assets to total assets (*Ca-Ta*) is 2.87 (1.86). The mean (Median) *Inventory* is 0.095 (0.04). The median profitability ratio based on *ROA* is around 2% with about 43% of the sample being associated with losses (*Loss*). The mean value of *Leverage* is around 33%. The median growth in sales is 8% (*Growth*). The median market-to-book ratio (*Market-Book*) is 1.277. About 18% are involved in mergers and acquisitions (*M&A*). On average, 19% of the sample reports discontinued operations (*Discontinued*).

Table 2 reports the distribution of the goodwill impairment, restructuring and other types of special items. In Panel A, the mean goodwill impairment is \$223 million (27%), the mean restructuring charge is \$30 million (4%), and the mean special items is \$61 million (31%), which

indicates that the magnitudes are economically large. Panel B reports the frequency of impairments/charges. About 60% (=1,625/2690) of the observations in the sample report only 1 impairment, about 10% only 1 restructuring charge, and about 5% only 1 special item. The number of observations with 5 or more impairments/charges drops rapidly.

Table 3 reports the industry distribution of firms with goodwill impairment ratio, restructuring ratio and special items ratio. The industries with the highest *Impairment ratios* are in Shipbuilding, Railroad equipment and Candy & Soda industries with ratios above 200%. *Restructuring ratios* are mostly in the single digits other than one industry (Other industries). Like *Impairment ratios*, *Special ratios* tend to be high and more evenly distributed across the industries.

5. Empirical results

5.1. Audit fee univariate results

Panel A of Table 4 reports univariate audit-fee differences between clients with and without complex accounting estimates. The mean audit fees for clients with goodwill is \$2.271 million, while that for clients without goodwill is \$0.623 million. Thus, an average client pays about 264% more when they have goodwill than when they do not. The difference in audit fees is statistically significant at less than 1% level. The mean audit fees for clients with goodwill impairments is \$2.969 million, while that for clients without impairments is \$1.395 million, which indicates that an average client pays about 200% more when they have goodwill impairments relative to other cases. Similarly, the fee differences are about 300% more when clients have restructuring charges and about 200% more when clients have other special charges relative to

when they do not have such charges. Thus, the univariate results indicate that auditors charge considerably more for complex accounting estimates.

5.2. *Audit fee regression results*

Table 4 reports the audit fee regression results where the dependent variable is the natural logarithm of audit fees. In Model (1), which includes client attributes that are known to affect audit fees, the coefficients on *Goodwill* (0.914, t-stat=41.93), *Goodwill-Impair*, (0.101, t-stat=9.27), *Restructuring-Charges* (0.265, t-stat=35.18), and *Special-Charges* (0.122, t-stat=19.80) are all positive and highly significant. Our audit fee regression results are consistent with Hypothesis 1 stating that auditors charge more for complex accounting estimates. The adjusted R-square is around 80%. Because fees are transformed to natural logarithm while goodwill is a ratio, our results suggest that for a 1% increase in goodwill, auditors charge about 1% fee surcharge. In addition, auditors charge an additional 10% ($=1-e^{0.101}$) fee premium when goodwill is impaired. Similarly, auditors charge an additional 30% fee premium for audit tests related to restructuring charges and an added 13% for tests related to other special items.¹⁰

Because large auditors with deeper pockets and more resources can provide superior audit quality, Big 4 might charge a larger fee premium for conducting goodwill audits than non-

¹⁰We get very similar results when we use an indicator variable for goodwill (instead of using *Goodwill*) or when we use ratios (dollar amounts deflated by total assets) for goodwill impairments and special items. The results on the control variables are very similar to those reported in prior studies. Firm size is positive and highly significant which indicates that bigger clients pay more. In addition, clients pay more fees when they are more geographically and industrially diversified, report a loss, have higher leverage, have more current assets, have more growth options, and report discontinued operations. Clients pay less fees when they are more liquid, have lower inventory, and have higher sales growth.

Big 4. Therefore, we separately report the results for Big 4 and non-Big 4 in Models (3) and (4).¹¹ We find that the coefficient on *Goodwill*, *Goodwill-Impair*, *Restructuring-Charges*, and *Special-Charges* are all positive and highly significant for the Big 4 and the non-Big 4 samples with one key difference. The coefficients on *Goodwill* (1.106 versus 0.574) and *Goodwill-Impair* (0.124 versus 0.064) in the Big 4 regression are almost twice that in the non-Big 4 regression. In sharp contrast, the coefficients on *Restructuring-Charges* (0.230 versus 0.284) and *Special-Charges* (0.113 versus 0.120) are very similar and not statistically different from one another. Consistent with the importance and complexity of goodwill testing, we find that the Big 4 charge a high fee premium for audit tests of goodwill and goodwill impairments but not for testing special items.

5.3. *Additional goodwill and audit fee results*

We conduct several additional analyses to increase the confidence in our results related to the goodwill fee premium. First, we examine annual variations in the fee premium over the changing landscape of goodwill accounting. We divide our sample into four time periods. “Amortization” (2000 and 2001) reflects the years when goodwill was amortized, “Transition” (2002) reflects the effective year for ASC 350, “Impairment” (2003-2011), when goodwill was to be tested for any impairment (annually) using the two-step process, and “Qualitative assessment” (2012-2013), when clients could rely on qualitative factors to determine whether to perform the two-step goodwill impairment test. In Table 5, based on annual audit fee regressions,

¹¹We prefer estimating separate regression for the two subsamples, rather than include Big 4 in Model 1 with added interactions between Big 4 and the goodwill variables, because our less restrictive estimation allows the coefficients on the control variables to vary between the Big 4 and non-Big 4.

we find that the average *Goodwill* coefficient from the Amortization period (2000-2001) is 0.44. The *Goodwill* coefficient from the Transition period (2002) is 0.53. The difference between the coefficients from two periods is statistically insignificant. However, the coefficient jumps to 0.82 for the Impairment period (2003-2013). The difference between the Impairment and Transition periods is statistically significant. Finally, the *Goodwill* coefficient from the Qualitative assessment period (2012-2013) is 0.70 and the difference between the Qualitative and the Impairment periods is again statistically significant. Overall, our results from Table 5 suggest that, as the accounting standards and the audit requirements became more complex for goodwill, the premium associated with auditing goodwill for impairments also increased and when the standards became less stringent fees also declined but not by as much.¹²

Second, it is possible that *Goodwill* regression estimates are biased upwards because we pool companies with goodwill for the current and prior year along with companies having goodwill only for the current year but not the prior year. Our primary interest is in the first group of companies, i.e., testing for the continued existence of goodwill account balances.¹³ To better understand the effect of auditing the continued existence of goodwill, in Table 6 we include (1) an indicator variable $Goodwill_{t-1\&t}$ which equals one when a client has goodwill for the current

¹²Although FASB is allowing companies to bypass the two-step goodwill impairment test based on qualitative considerations from 2012 (ASU 2011-08), it is unlikely to have a considerable impact on audit effort. Auditors need to review various qualitative factors, assess the reasonableness of the company's position, conduct ancillary analyses using projections derived at the reporting unit level, rely on sensitivity analyses based upon detailed qualitative factors associated with the company's budget, and its most recent valuation (Deloitte 2013).

¹³It is not surprising that any goodwill created because of an acquisition is expected to increase audit fees because of the added work related to an acquisition. Even though we include a variable which captures the effect of acquisitions (M&A), it may not fully incorporate the effect of the added audit work related to the current year acquisition.

year and the prior year, and (2) an interaction between *Goodwill* and *Goodwill*_{*t-1&t*}. In Model (1), we find that the coefficient on *Goodwill*_{*t-1&t*} is positive and significant (0.351, t-stat=54.93) indicating that auditors charge more for testing whether beginning goodwill account balance is impaired. Further, in Model (2), the coefficient on the interaction between *Goodwill* and *Goodwill*_{*t-1&t*} is also positive and significant (0.590, t-stat=9.99) which suggests that the goodwill-related fee premium increases with the magnitude of the goodwill.

Third, we examine whether the goodwill-related fee premium varies predictably according to auditing theories. Under ASC 350, companies must allocate goodwill across various reporting units and goodwill is to be tested for impairment for each reporting unit. Therefore, the complexity of auditing goodwill is expected to increase as companies have more reporting units (business or foreign operations). While information on reporting units are not publicly disclosed, we use the mandated disclosures on segment reporting (*Segments*) and foreign operations (*F-Sale*) as a surrogate for the complexity of auditing goodwill account balances. In Model 1 of Table 7, when we interact *Segments* with *Goodwill*, the coefficient on *Goodwill*×*Segments* (0.082, t-stat=8.37) is positive and significant. Similarly, in Model (2), when we interact *F-Sale* with *Goodwill*, we find that the coefficient on *Goodwill*×*F-Sale* is again positive and significant (0.965, t-stat=14.12). In Model (3), we interact *Goodwill* with an indicator variable (*Low-M/B*) which equals one when the market-to-book ratio is less than one. When market values are less than book values, it indicates deterioration in the market conditions and signals that goodwill might be impaired which is why auditors are expected to charge more for testing goodwill account balances in such instances. As expected, *Goodwill*×*Low-M/B* (0.110, t-stat=2.64)

is positive and significant. In Model (4), we interact *Goodwill* with intangible assets (*Intangibles*), which is defined as intangible assets, excluding goodwill, to total assets. When clients have more intangible assets, the reliance on fair value measurements increases and therefore auditors are expected to charge more because the verification of assets becomes more complex. As expected, *Goodwill*×*Intangibles* (2.054, t-stat=9.93) is positive and significant.

Overall, we find the following fee results: (1) a 1% increase in goodwill increases audit fees by almost 1%, (2) when goodwill is impaired, there is an added fee premium of nearly 10%, (3) the Big 4 charge significantly more than non-Big 4 for goodwill testing, (4) there is a significant jump in the audit fee premium associated with goodwill for the post 2003 period which coincides with the two-step goodwill impairment rule, (5) the goodwill-related fee premium is larger for firms with more reportable segments, with low market-to-book and with high intangible assets, and (6) auditors charge a fee premium of about 30% for restructuring charges and about 13% for other special items. Our audit fee results are consistent with auditors charging substantially more for testing complex accounting estimates because it involves significantly added audit work.

5.4. *Goodwill, auditor switches and audit fees*

Prior studies find that auditors offer a fee discount on initial engagements to attract new clients (e.g., Ghosh and Lutgarten 2006, Craswell and Francis 1998, DeAngelo 1981). Therefore, it is possible that auditors offer a similar fee discount for complex accounting estimates to attract new clients. In Model (1) of Table 8, we replicate prior studies on low-balling or fee-discounting of initial audit engagements. The coefficient on *Initial*, which is one when clients switch auditors,

is negative and significant (-0.083, t-stat=-7.42), which suggests that, relative to continuing engagements, auditors offer a fee discount for initial engagements.

In Model (2), we additionally include the interaction between *Initial* and the four variables measuring complex accounting estimates. We find that the coefficients on *Goodwill×Initial* (-0.072, t-stat=-0.97) and that on *Goodwill-Impair×Initial* (0.031, t-stat=0.81) are both insignificant, which suggest that auditors do not offer a fee discount for goodwill or goodwill impairments when they acquire new clients. Similarly, the coefficient on *Special-Charges×Initial* is insignificant (0.028, t-stat=1.27), which again suggests that auditors do not offer a fee discount for special items. However, the coefficient on *Restructuring-Charges×Initial* is negative and significant (-0.092, t-stat=-3.48), which suggests that auditors offer a fee discount for restructuring charges when they acquire new clients.

While we find no evidence of fee discounting for goodwill or goodwill impairments, we find some evidence of fee discounting when clients have some special items which can be a potential source of concern.

5.5. *Direct test of added audit effort: Audit report lag*

In Table 9, we provide more direct evidence of the relationship between complex accounting estimates and audit effort using audit report lag as a more direct proxy for audit effort. The dependent variable *Reportlag* is the number of days between the fiscal end and the auditor signature date. The number of observations drops because: (1) stock returns are missing so *Variance* cannot be computed for 11,434 observations, (2) accounts receivable or inventory is not available so *Invrec* cannot be computed for 136 observations, and (3) we delete 5,208

observations with *Reportlag* values greater than 90. Therefore, 38,455 observations are used to estimate the audit report lag regressions.

Model (1) replicates the results from prior studies (Branson et al. 2011).¹⁴ In Model (2) we additionally include the four variables measuring complex accounting estimates. The coefficients on *Goodwill* (4.872, t-stat=7.89), *Goodwill-Impair* (1.600, t-stat=5.00), and *Special-Charges* (0.984, t-stat=5.52) are all positive and significant. Consistent with Hypothesis 2, which states that goodwill testing leads to delays in audit report date, our results suggest that a 1% increase in goodwill leads to a delay in the audit report date by 5 days and by another 2 days when a client reports a goodwill impairment charge, and by another day for special charges. However, the coefficient on *Restructuring-Charges* (-1.095, t-stat=-5.46) is negative and significant. Inconsistent with Hypothesis 1, our results on restructuring charges suggest that auditors take less time for auditing these types of complex accounting estimates. Because the 10-K and 10-Q filing requirements vary between accelerated and non-accelerated filers, which might be correlated with goodwill, in unreported results, we also estimate the audit report lag regressions separately for accelerated and non-accelerated filers and find consistent results for both subsamples.

¹⁴Although Branson et al. (2011) include special items in their regression, they do not separate restructuring charges from other types of special items. Similar to their results, we find that *Loss*, *Leverage*, *Beta*, *Concentration*, *Discontinued*, *Going-Concern*, and *Busy* are all positive and statistically significant, which suggests that clients with losses, with more debt, from industries with higher sales concentration, with discontinued operations, with going concern modified reports or having fiscal year ends that coincide with the busy season have longer audit report lags. The coefficients on *Size*, *Volume*, *Roa*, *Inv&Rec*, and *Big4* are negative and statistically significant, which suggests that clients that are larger, with larger percentage of shares traded, with superior performance, having more inventory and receivables, and those audited by the Big 4 have shorter audit report lags. The coefficient on *Book-Market* is insignificant.

Consistent with the audit fee results, the results from audit report lag tests provide more direct corroborating evidence that audit testing for goodwill, goodwill impairments and other special items leads to significant delays in auditor report date but not for restructuring charges. Because any delay in the audit report date is most likely to precipitate delays in earnings announcement date, goodwill testing imposes real costs on clients both in terms of higher audit fees and potential delays in earnings announcements.

5.6. *Audit quality and the likelihood of goodwill impairments*

In Table 10, we consider whether the likelihood of goodwill impairments, restructuring and other special charges are affected by audit quality using two measures of audit quality – auditor tenure (*Tenure*) and auditor specialization (*Industry-Specialist*). In Model 1, when the dependent variable is *Goodwill-Impair*, *Tenure* (0.015, $z=3.19$) and *Industry-Specialist* (0.433, $z=4.11$) are both positive and significant at the 1% level. Thus, consistent with Hypothesis 3, our results suggest that the likelihood of a goodwill impairment increases with higher audit quality. We also find that various contracting motivations (debt, compensation), and managerial reputation affects the timeliness of goodwill impairments. CEOs with longer tenure, those that are paid bonuses, and clients with higher leverage and a higher goodwill balance are less likely to impair goodwill. The results on the control variables are also consistent with prior studies. Clients that remain public for a longer period, that are bigger, and that have superior performance are less likely to impair goodwill. In contrast, clients with higher volatility, with more reportable segments, with more intangible assets, and those that were bigger the prior year are more likely

to impair goodwill. The pseudo R-square is around 13%. The observations decline to 8,052 because compensation and CEO-tenure data from *Execucomp* limit our sample to S&P 1500 firms.

In Models 2 and 3, when we use *Restructuring-Charges* and *Special-Charges* as dependent variables, respectively, only *Tenure* is positive and significant (0.021, $z=7.11$; 0.010, $z=3.16$). *Industry-Specialist* is insignificant. Thus, our results suggest that only auditor tenure has an effect on the likelihood that a client recognizes special items.

5.7. *Investor reactions to goodwill impairments and audit quality*

If audit testing of complex accounting estimates are stringent and timely, a key prediction is that investors are expected to respond to the announcement of goodwill impairments, restructuring charges and other special charges. In contrast, if complex accounting estimates are lacking in quality because the disclosure of such news provides limited information to investors, we do not expect any stock market response to the announcement of complex accounting estimates (Li et al. 2011).

In Table 11, we report the results of the stock market reaction around the earnings announcement date. Because companies are expected to disclose and discuss important reporting issues including any impairments and special charges, and how they impact earnings, we concentrate on the earnings announcement date to assess how investors respond to goodwill impairments and special charges. As in prior studies, our measure for stock market reaction is cumulative abnormal returns (CAR) over a three-day window around the announcement date where cumulative abnormal returns is raw returns minus value-weighted market returns.

In Panel A, we use a multivariate regression analysis to analyze how the stock market reacts to the information contained in goodwill impairments by including *Impair-Ratio* (absolute value of goodwill impairment divided by total assets) and after controlling for earnings surprise and risk factors ($\Delta Earnings$, *Size*, *Market-Book* and *Beta*). In Model 1, the coefficient on *Impair-Ratio* is negative and significant (-0.067; t-stat=-7.51). In Model 2, additionally include a variable for long auditor tenure (*Long-Tenure* is defined as 1 when auditor tenure is longer than 10 years and 0 otherwise) and an interaction between *Long-Tenure* and *Impair-ratio* to examine whether the information content of goodwill impairments varies with audit quality. We find that *Impair-ratio* continues to be negative and significant (-0.053; t-stat=-5.14). Consistent with prior research, we find that *Long-Tenure* is also positive and significant (0.001; t-stat=2.20). More importantly, the coefficient on the interaction between *Long-Tenure* and *Impair-ratio* is negative and significant (-0.058; t-stat=-2.77), which suggests that the stock market reaction to goodwill impairments is more negative when the auditor-client relationship is long.

In Panels B and C, we repeat our analysis using *Restructure-Ratio* (absolute value of restructuring charges divided by total assets) and *Special-Ratio* (absolute value of other special charges divided by total assets), respectively. Similar to the Panel A results, we find that the coefficients on *Restructure-Ratio* and *Special-Ratio* are both negative and significant (-0.049; t-stat=-2.25; -0.045; t-stat=-6.42). The interaction coefficient between *Restructure-Ratio* and *Long-Tenure* weakly significant (-0.099, t-stat=-1.82), while that between *Special-Ratio* and *Long-Tenure* is insignificant (0.018, t-stat=1.09).

In Table 12, we construct a counter-factual market-based test to better understand the value of audit stress tests of goodwill account balances. If goodwill impairments have negative information content, firms with large amounts of goodwill not recognizing impairments is expected to be good news to investors. Thus, we expect a positive stock market reaction to earnings announcements when firms with large goodwill balances do recognize any goodwill impairments. To test this conjecture, we create an indicator variable *Goodwill-High* which equals one when goodwill to total assets is greater than the median value (0.097). We then estimate a regression of CAR around the earnings announcement date on *Goodwill-High*. In Model (1), *Goodwill-High* is positive and significant at the 5% level (0.001; t-stat=2.16). In Model (2) when we include the other control variables from Table 11, the coefficient on *Goodwill-High* remains positive and significant at the 1% level (0.002; t-stat=3.08). Our results suggest that the stock market responds favorably to lack of goodwill impairments when firms have large goodwill balances.

Overall, we find strong evidence consistent with Hypothesis 4 indicating that goodwill impairments have information content and that this information content varies with audit quality. While we find strong stock market reaction to the announcement of all types of special charges, the stock market reaction to this type of information does not appear to vary with audit quality.

6. Additional tests and analyses

6.1. Mergers, goodwill and audit fees

Auditors are expected to charge more following acquisitions because consolidations increase: (1) the probability of a restatement, (2) the likelihood of new, difficult, or contentious accounting issues arising during the merger year, and (3) the chances of business integration problems. Therefore, it is important to account for all merger-related activities in our research design before drawing inferences about impairment tests of existing goodwill account balances. As in prior studies, we include an indicator variable *M&A*. However, one potential concern is that our proxy for any merger and acquisition activity is not fully captured by the *M&A* variable.

Our own investigation of the data indicates that goodwill increases in instances when the *M&A* variable indicates that a company did not engage in a merger or acquisition activity as indicated by *Compustat*. Our conversations with *Compustat* data consultants confirm that the *M&A* variable defined using *Compustat* codes may not capture all merger and acquisition activity. We address this concern by creating another indicator variable *M&A-Plus* which equals one when *Goodwill* increases but *M&A* is equal to zero. Thus, *M&A-Plus* captures instances that *Compustat* coding indicates there were no merger-related activity but goodwill nonetheless increased from the prior year.¹⁵

In a sensitivity analysis, we replicate our audit fee regression analysis after additionally including *M&A-Plus* as an control variable. Unreported results indicate the both *M&A* and *M&A-Plus* are positive and significant which suggests that auditors are charging more for the years clients engaging in mergers (as designated by *Compustat*) and for the years when goodwill

¹⁵Our data analysis indicates that 7,912 observations (or 14.32% of our sample) have *M&A* equal to zero but are associated with an increase in *Goodwill* relative to the number reported in the prior year.

increases but compustat does not classify such observations as mergers. More importantly, the coefficient on *Goodwill* remains positive and significant (0.901, t-stat=39.77) and that on *Goodwill-Impair* is also positive and significant (0.165, t-stat=15.07).

6.2. *Intangible versus tangible assets*

Because all “soft assets” are hard to verify, auditors might charge a premium for all intangible assets and not just goodwill. Also, auditors may not charge a fee premium for auditing “hard assets” like plant, property, and equipment (PPE) because testing for their continued existence involves less audit risk as verification is easier. In unreported results, we include *Intangibles-Other* (total intangible assets less goodwill divided by total assets), *Goodwill*, *Fixed-Assets* (PPE to total assets) and other control variables in the audit fee regressions. The coefficient on *Goodwill* is positive and significant (0.864, t-stat=30.20), while that on *Fixed-Assets* is negative and significant (-0.174, t-stat=-7.27). More importantly, the coefficient on *Intangibles-Other* is positive and significant (0.763, t-stat=22.48). An F-test indicates that the coefficient on *Goodwill* is larger than that on *Intangibles-Other*. Our results provide evidence that auditors charge a large fee premium for all intangible assets, and not just goodwill, although the premium on goodwill testing is larger.

7. **Conclusions**

We scrutinize whether auditors are diligent in their audit stress tests of complex accounting estimates by analyzing how testing of complex accounting estimates like goodwill, goodwill impairments, restructuring charges, and other types of special items/charges recognized on the Income Statement affect audit fees and audit report lag, whether audit quality affects the

likelihood of impairments and charges, and whether investor response to impairments/charges depends on audit quality. Our results can inform academics, practitioners and regulators on the quality, timing and informativeness of audit tests related to goodwill impairments and other types of complex accounting estimates.

Our multivariate audit fee regression analyses suggest that: (1) a 1% increase in goodwill leads to a 1% increase in audit fees, (2) clients pay an added 10% fee premium when goodwill is impaired, (3) Big 4 charge considerably more for goodwill testing than non-Big 4, (4) the goodwill fee premium varies with the complexity of goodwill audits, (5) auditors do not offer a fee discount on testing goodwill or for goodwill impairments when clients switch auditors, and (6) clients pay about 30% more for restructuring and about 13% more for other types of special charges. Using audit report lag as a more direct proxy for audit effort, we find that goodwill testing and goodwill impairments are associated with longer audit report lags, which suggest that auditing goodwill is more involved. We find similar results for tests of other types of special charges. However, audit report lag is less for firms with restructuring charges which can be a potential source of concern.

Using various proxies for audit quality, we also show that the audit quality is positively associated with the likelihood of goodwill impairments which suggests that audit quality affects the timing of goodwill impairments and other special charges. Finally, we show that the stock market reaction around the earnings announcement date is negative to goodwill impairments and that the magnitude of the negative market reaction depends on audit quality. While we find evidence of strong and negative stock market reaction to restructuring and other types of special

charges, the magnitude of the market reaction to such news does not appear to depend audit quality.

In summary, we provide strong and compelling evidence that auditors charge more for goodwill, that goodwill testing leads to delays in the audit report date, and that goodwill impairments are timely and informative. For special items the results are somewhat mixed. Auditor charge considerably more for all types of special items but they take longer to sign off on audit reports only for other types of special items. Investors respond to all types of special charges but that reaction does not depend on audit quality.

Overall, our results provide evidence consistent with auditors recognizing the prominence of testing goodwill, or other intangible assets, for impairments and that they appear to be diligent in their audits, which is an essential result given the recent regulatory concerns related to audit testing of goodwill. However, because audit tests of goodwill involve fair value estimates and significant audit judgments, auditors can only test, document their tests, and comment on the reasonableness of the assumptions made by management underlying the computations of fair value estimates which is likely to make their assertions subjective and open to criticism. Notwithstanding the regulatory concerns, our results also indicate that goodwill impairment decisions are timely and informative for investors.

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Table 1
Summary statistics

	Mean	Median	First Quartile	Third Quartile
<i>Audit Fees</i> (\$ million)	1.520	0.430	0.145	1.300
<i>Report Lag</i> (days)	70	68	54	84
<i>Goodwill</i>	0.094	0.011	0.000	0.142
<i>Goodwill-Impair</i>	0.080	0.000	0.000	0.000
<i>Restructuring-Charges</i>	0.231	0.000	0.000	0.000
<i>Special-Charges</i>	0.545	1.000	0.000	1.000
<i>Total Assets</i> (\$ billion)	3.649	0.207	0.034	1.249
<i>Segments</i>	2.428	1.000	1.000	3.000
<i>F-Sale</i>	0.235	0.022	0.000	0.419
<i>Ca-Cl</i>	2.868	1.863	1.220	3.230
<i>Inventory</i>	0.095	0.040	0.000	0.156
<i>Roa</i>	-0.321	0.017	-0.138	0.066
<i>Loss</i>	0.431	0.000	0.000	1.000
<i>Leverage</i>	0.329	0.176	0.010	0.365
<i>Ca-Ta</i>	0.507	0.504	0.289	0.724
<i>Growth</i>	0.253	0.080	-0.056	0.260
<i>Market-Book</i>	3.448	1.277	0.834	2.279
<i>M&A</i>	0.179	0.000	0.000	0.000
<i>Discontinued</i>	0.194	0.000	0.000	0.000

Audit Fees are the fees charged by the external auditor for audit related work (in million dollars). *Report Lag* is the difference between the auditor signature date and the firm's fiscal year end date. *Goodwill* is the ratio of goodwill to total assets. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charges and zero otherwise. *Restructuring-Charges* is an indicator variable that equals one for clients with restructuring charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Segments* is the number of operating segments, *F-Sale* is sales from foreign operations to total sales, *Ca-Cl* is current assets to current liabilities, *Inventory* is inventory to total assets, *Roa* is operating income to total assets, *Loss* is an indicator variable which equals one when net income is negative and zero otherwise, *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets, *Ca-Ta* is current assets to total assets, *Growth* is the percentage change in revenues between the current and prior year, *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets, *M&A* is an indicator variable that equals one when a client engages in mergers and acquisitions and zero otherwise, and *Discontinued* is an indicator variable which equals one for clients with discontinued operations and/or extraordinary items and zero otherwise. The total number of observations is 55,233.

Table 2

Distribution of goodwill impairments, restructuring and special charges

	Million dollars	Ratio	
<i>Panel A: Magnitude of impairments, restructuring and special charges</i>			
<i>Impairment</i>	223.310	27.33%	
<i>Restructure-Charges</i>	29.963	3.58%	
<i>Special-Charges</i>	61.145	31.29%	
			<i>Goodwill-Impair Restructure-Charges Special-Charges</i>
<i>Panel B: Frequency impairments, restructuring and special charges</i>			
<u>Frequency of impairments/charges</u>			
1	1,625	1,314	1,722
2	1,238	1,456	2,384
3	747	1,362	2,694
4	408	1,220	3,088
5	240	1,020	3,220
6	108	984	2,922
7	77	903	3,073
8	56	720	2,720
9	36	945	2,421
<u>10 or larger</u>	<u>77</u>	<u>2,827</u>	<u>9,676</u>
Total	4,607	12,751	33,920

In Panel A we report the magnitude (in million dollars) of goodwill impairment charges (*Goodwill-Impair*), restructuring charges (*Restructuring-Charges*) and special items recognized on the income statement other than goodwill impairment and restructuring charges (*Special-Charges*). We also report the corresponding ratios (expressed as a percentage of total assets). In Panel B we report the frequency of goodwill impairments, restructuring and special charges.

Table 3

Industry distribution

Name of Industry	<i>Impairment ratio</i>	<i>Restructuring ratio</i>	<i>Special ratio</i>
Aircraft	6.24%	0.64%	4.34%
Agriculture	11.36%	1.41%	2.88%
Automobiles and Trucks	7.69%	2.00%	31.12%
Banking	67.29%	1.18%	36.28%
Beer & Liquor	5.51%	0.63%	6.21%
Construction Materials	6.25%	1.61%	5.13%
Printing and Publishing	16.86%	2.81%	87.06%
Shipping Containers	3.24%	0.94%	11.48%
Business Services	61.58%	6.35%	18.59%
Chemicals	6.14%	1.63%	7.08%
Electronic Equipment	19.40%	2.86%	45.21%
Apparel	94.11%	1.86%	7.83%
Construction	8.50%	1.42%	3.32%
Coal	8.07%	2.54%	49.67%
Computers	33.06%	2.80%	16.47%
Pharmaceutical Products	22.74%	5.07%	28.41%
Electrical Equipment	13.38%	1.67%	5.90%
Fabricated Products	7.23%	1.36%	2.59%
Trading	15.54%	5.55%	23.93%
Food Products	5.29%	1.17%	5.56%
Entertainment	18.96%	2.31%	411.24%
Precious Metals	5.12%	0.97%	10.39%
Defense	8.53%	0.56%	30.58%
Healthcare	21.55%	1.80%	7.77%
Consumer Goods	6.79%	2.03%	2.72%
Insurance	18.95%	0.91%	8.90%
Measuring and Control Equipment	19.10%	3.88%	29.86%
Machinery	15.72%	1.41%	8.84%
Restaraunts, Hotels, Motels	2.43%	9.33%	4.97%
Medical Equipment	19.42%	2.01%	16.36%
Non-Metallic and Industrial Metal Mining	12.90%	1.03%	19.50%
Petroleum and Natural Gas	57.73%	1.60%	9.47%
Other Industries	27.94%	28.22%	221.62%
Business Supplies	6.44%	2.18%	3.16%
Personal Services	11.42%	1.37%	2.89%
Real Estate	6.19%	1.07%	320.48%
Retail	17.09%	2.14%	7.49%
Rubber and Plastic Products	9.15%	2.06%	17.57%
Shipbuilding, Railroad Equipment	207.92%	1.29%	87.86%
Tobacco Products	0.89%	0.73%	6.83%
Candy & Soda	236.17%	0.87%	11.57%
Steel Works Etc	6.04%	2.20%	6.51%
Communication	18.60%	4.82%	61.18%
Recreation	19.72%	1.76%	27.59%
Transportation	6.33%	2.89%	2.98%
Textiles	5.16%	1.82%	4.85%
Utilities	1.79%	0.41%	1.68%
Wholesale	10.42%	1.39%	9.06%

Impairment ratio, Restructure ratio and Special ratio represent goodwill impairment charges, restructuring charges and other types of special charges, each deflated by total assets. We report the mean values.

Table 4

Audit fees differences for companies with and without complex accounting estimates

	Mean Audit Fee	(million dollars)	Mean Audit Fee	Difference
<i>Panel A: Audit fee differences</i>				
<i>Goodwill</i>	2.271	<i>No-Goodwill (million \$)</i>	0.623	1.647 (50.66)***
<i>Goodwill-Impair</i>	2.969	<i>No-Goodwill-Impair (million \$)</i>	1.395	1.574 (26.45)***
<i>Restructuring-Charges</i>	3.200	<i>No-Restructuring-Charges (million \$)</i>	1.022	2.177 (57.05)***
<i>Special-Charges</i>	1.989	<i>No-Special-Charges (million \$)</i>	0.969	1.019 (30.92)***
	Full Sample		Big4	Non-Big4
	Model (1)		Model (2)	Model (3)
<i>Panel B: Multivariate audit fee regressions</i>				
<i>Intercept</i>	9.521 (680.45)***		9.355 (440.92)***	9.860 (489.03)***
<u>Experimental variables</u>				
<i>Goodwill</i>	0.914 (41.93)***		1.106 (40.81)***	0.574 (16.27)***
<i>Goodwill-Impair</i>	0.101 (9.27)***		0.124 (9.61)***	0.064 (3.30)***
<i>Restructuring-Charges</i>	0.265 (35.18)***		0.230 (27.16)***	0.284 (17.41)***
<i>Special-Charges</i>	0.122 (19.80)***		0.113 (14.73)***	0.120 (12.16)***
<u>Control variables</u>				
<i>Size</i>	0.513 (319.50)***		0.531 (226.13)***	0.443 (147.05)***
<i>Segments</i>	0.027 (16.00)***		0.029 (15.39)***	0.011 (3.25)***
<i>F-Sale</i>	0.300 (31.33)***		0.321 (27.82)***	0.201 (12.15)***
<i>Ca-Cl</i>	-0.039 (-42.39)***		-0.046 (-34.77)***	-0.030 (-23.33)***
<i>Inventory</i>	-0.413 (-16.57)***		-0.431 (-12.03)***	-0.242(-7.16)***
<i>Roa</i>	-0.077 (-28.95)***		-0.153 (-15.55)***	-0.057 (-20.95)***
<i>Loss</i>	0.081 (11.84)***		0.031 (3.49)***	0.143 (13.12)***
<i>Leverage</i>	0.062 (13.08)***		0.032 (2.31)**	0.052 (10.72)***
<i>Ca-Ta</i>	0.978 (66.95)***		1.188 (57.99)***	0.657 (31.09)***
<i>Growth</i>	-0.033 (-11.26)***		-0.028 (-6.09)***	-0.038 (-9.93)***
<i>Market-Book</i>	0.001 (3.78)***		0.005 (7.85)***	0.000 (0.01)
<i>M&A</i>	-0.010 (-1.25)		-0.021 (-2.30)**	0.029 (1.91)
<i>Discontinued</i>	0.079 (10.51)***		0.074 (8.27)***	0.104 (7.86)***
Adjusted R-Square	80.49%		74.73%	67.21%
Observations	55,233		36,370	18,863

In Panel A we report the mean audit fees (in million dollars) between firms with and without complex accounting estimates (goodwill, goodwill impairment, restructuring and special charges). We also report the difference in audit fees between the two samples and the associated t-values. In Panel B, the dependent variable *Audit-fee* is defined as the logarithmic transformation of the fees charged by the external auditor for audit related work. The independent variables are defined as follows. *Goodwill* is the ratio of goodwill to total assets. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charges and zero otherwise. *Restructuring-Charges* is an indicator variable that equals one for clients with restructure charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Segments* is the number of operating segments. *F-Sale* is sales from foreign operations to total sales. *Ca-Cl* is current assets to current liabilities. *Inventory* is inventory to total assets. *Roa* is operating income to total assets. *Loss* is an indicator variable which equals one when net income is negative and zero otherwise. *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets. *Ca-Ta* is current assets to total assets. *Growth* is the percentage change in revenues between the current and prior year. *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets. *M&A* is an indicator variable that equals one when a client engages in mergers and acquisitions and zero otherwise. *Discontinued* is an indicator variable which equals one for clients with discontinued operations and/or extraordinary items and zero otherwise.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 5

Goodwill coefficients from annual audit fee regressions

Period	Goodwill	Difference	Obs.
<u>Amortization (2000-2001)</u>			
Average	0.44		6,634
<u>Transition (2002)</u>			
Average	0.53		4,390
Transition – Amortization		<u>0.09</u>	
<u>Impairment (2003-2011)</u>			
Average	0.82		37,143
Impairment – Transition		<u>0.29</u>	
<u>Qualitative assessment (2012-2013)</u>			
Average	0.70		7,066
Qualitative – Impairment		<u>-0.12</u>	

We report coefficients on *Goodwill* estimated from annual regressions based on Model 2 of Table 4. The sample period is divided into four sub-periods: (1) Amortization which includes the years when goodwill was amortized, (2) Transition which includes the effective year for ASC 350, (3) Impairment which represents the years when goodwill is to be tested for any impairment at least once a year, and (4) Qualitative assessment which represents the years when clients could rely on qualitative factors to determine whether to perform the two-step goodwill impairment test. We also report the difference in the average coefficients between the four sub-periods.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 6

Multivariate analysis of audit fees and goodwill for clients with beginning goodwill balances

	Model (1)	Model (2)
Intercept	9.586 (710.81)***	9.528 (691.24)***
<u>Experimental variables</u>		
<i>Goodwill</i>		-0.017 (-0.32)
<i>Goodwill_{t&t-1}</i>	0.351 (54.93)***	0.264 (35.05)***
<i>Goodwill × Goodwill_{t&t-1}</i>		0.590 (9.99)***
<i>Goodwill-Impair</i>	0.077 (7.14)***	0.073 (6.77)***
<i>Restructuring-Charges</i>	0.258 (34.61)***	0.244 (32.83)***
<i>Special-charges</i>	0.114 (18.80)***	0.113 (18.63)***
<u>Control variables</u>		
<i>Size</i>	0.499 (311.90)***	0.503 (313.55)***
<i>Segments</i>	0.022 (13.47)***	0.023 (13.92)***
<i>F-Sale</i>	0.270 (28.48)***	0.279 (29.39)***
<i>Ca-Cl</i>	-0.038 (-40.76)***	-0.038 (-40.85)***
<i>Inventory</i>	-0.473 (-19.21)***	-0.439 (-17.87)***
<i>Roa</i>	-0.077 (-29.17)***	-0.078 (-29.66)***
<i>Loss</i>	0.105 (15.46)***	0.109 (16.09)***
<i>Leverage</i>	0.059 (12.67)***	0.061 (13.16)***
<i>Ca-Ta</i>	0.873 (61.50)***	0.932 (64.58)***
<i>Growth</i>	-0.024 (-7.95)***	-0.024 (-8.11)***
<i>Market-Book</i>	0.001 (3.29)***	0.001 (3.36)***
<i>M&A</i>	0.033 (4.27)***	0.006 (0.71)**
<i>Discontinued</i>	0.084 (11.28)***	0.081 (10.89)***
Adjusted R-Square	80.91%	81.08%

The dependent variable *Audit-fee* is defined as the logarithmic transformation of the fees charged by the external auditor for audit related work. The independent variables are defined as follows. *Goodwill* is the ratio of goodwill to total assets. *Goodwill_{t&t-1}* is an indicator variable that equals one for clients with goodwill in years t-1 and t and zero otherwise. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charges and zero otherwise. *Restructuring-Charges* is an indicator variable equals one for clients with restructure charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Size* is the logarithmic transformation of total assets. *Segments* is the number of operating segments. *F-Sale* is sales from foreign operations to total sales. *Ca-Cl* is current assets to current liabilities. *Inventory* is inventory to total assets. *Roa* is operating income to total assets. *Loss* is an indicator variable which equals one when net income is negative and zero otherwise. *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets. *Ca-Ta* is current assets to total assets. *Growth* is the percentage change in revenues between the current and prior year. *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets. *M&A* is an indicator variable that equals one when a client engages in mergers and acquisitions and zero otherwise. *Discontinued* is an indicator variable which equals one for clients with discontinued operations and/or extraordinary items and zero otherwise. The total number of observations is 55,233.

Table 7

Variations on goodwill-related fee and the complexity of auditing goodwill account balances

	Complexity			
	Segments	Foreign	Low-M/B	Intangibles
Intercept	9.545 (688.27)***	9.540 (679.98)***	9.569 (676.36)***	9.506 (654.88)***
<u>Experimental Variables</u>				
<i>Goodwill</i>	0.704 (20.74)***	0.722 (28.10)***	0.842 (31.98)***	0.762 (28.78)***
<i>Complexity</i>	0.017 (8.37)***	0.222 (20.20)***	-0.151 (-20.27)***	0.300 (10.24)***
<i>Goodwill × Complexity</i>	0.082 (8.11)***	0.965 (14.12)***	0.110 (2.64)***	2.054 (9.93)***
<i>Goodwill-Impair</i>	0.100 (9.21)***	0.103 (9.51)***	0.125 (11.46)***	0.092 (8.48)***
<i>Restructuring-Charges</i>	0.267 (34.99)***	0.258 (34.23)***	0.268 (35.73)***	0.258 (34.32)***
<i>Special-Charges</i>	0.122 (19.92)***	0.122 (19.79)***	0.122 (19.93)***	0.115 (18.73)***
<u>Control Variables</u>	Included	Included	Included	Included
Adjusted R-Square	80.51%	80.56%	80.67%	80.62%
Observations	55,233	55,233	55,233	53,515

The dependent variable *Audit-fee* is defined as the logarithmic transformation of the fees charged by the external auditor for audit related work. The independent variables are defined as follows. *Goodwill* is the ratio of goodwill to total assets. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charges and zero otherwise. *Restructuring-Charges* is an indicator variable equals one for clients with restructure charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Complexity* represents cases when audits of goodwill are especially complex: (1) when clients have multiple operating segments (number of operating segments), (2) when clients have foreign operations (ratio of sales from foreign operations to total sales), (3) when market conditions suggest goodwill might be impaired (an indicator variable when market-to-book ratio is less than 1), and (4) when firms have high intangible assets (intangible assets excluding goodwill divided by total assets). Control variables are included in all models but not reported for brevity.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 8

Multivariate regression analyses of audit fees and complex accounting estimates for clients switching auditors

	Model (1)	Model (2)
Intercept	9.611 (694.45)***	9.531 (677.62)***
<u>Experimental variables</u>		
<i>Initial</i>	-0.083 (-7.42)***	-0.075 (-4.45)***
<i>Goodwill</i>		0.920 (40.72)***
<i>Goodwill-Impair</i>		0.099 (8.71)***
<i>Restructuring-Charges</i>		0.273 (34.87)***
<i>Special-Charges</i>		0.119 (18.57)***
<i>Goodwill × Initial</i>		-0.072 (-0.97)
<i>Goodwill-Impair × Initial</i>		0.031 (0.81)
<i>Restructuring-Charges × Initial</i>		-0.092 (-3.48)***
<i>Special-Charges × Initial</i>		0.028 (1.27)
<u>Control variables</u>		
<i>Size</i>	0.534 (335.25)***	0.513 (318.70)***
<i>Segments</i>	0.034 (19.39)***	0.027 (16.00)***
<i>F-Sale</i>	0.353 (35.61)***	0.301 (31.48)***
<i>Ca-Cl</i>	-0.045 (-46.90)***	-0.040 (-42.57)***
<i>Inventory</i>	-0.465 (-17.98)***	-0.413 (-16.59)***
<i>Roa</i>	-0.080 (-29.17)***	-0.077 (-28.86)***
<i>Loss</i>	0.141 (20.59)***	0.083 (12.04)***
<i>Leverage</i>	0.059 (12.00)***	0.062 (12.98)***
<i>Ca-Ta</i>	0.922 (62.20)***	0.978 (66.99)***
<i>Growth</i>	-0.048 (-15.59)***	-0.034 (-11.39)***
<i>Market-Book</i>	0.001 (2.72)***	0.001 (3.66)***
<i>M&A</i>	0.094 (11.71)***	0.010 (-1.21)
<i>Discontinued</i>	0.119 (15.31)***	0.080 (10.69)***
Adjusted R-Square	78.93%	80.52%

The dependent variable *Audit-fee* is defined as the logarithmic transformation of the fees charged by the external auditor for audit related work. The independent variables are defined as follows. *Initial* is an indicator variable which equals one when clients switch auditors and zero otherwise. *Goodwill* is the ratio of goodwill to total assets. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charges and zero otherwise. *Restructuring-Charges* is an indicator variable equals one for clients with restructure charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Size* is the logarithmic transformation of total assets. *Segments* is the number of operating segments. *F-Sale* is sales from foreign operations to total sales. *Ca-Cl* is current assets to current liabilities. *Inventory* is inventory to total assets. *Roa* is operating income to total assets. *Loss* is an indicator variable which equals one when net income is negative and zero otherwise. *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets. *Ca-Ta* is current assets to total assets. *Growth* is the percentage change in revenues between the current and prior year. *Book-Market* is the ratio of the book value of equity to market value of equity. *M&A* is an indicator variable that equals one when a client engages in mergers and acquisitions and zero otherwise. *Discontinued* is an indicator variable which equals one for clients with discontinued operations and/or extraordinary items and zero otherwise. The total number of observations is 55,233.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 9

Multivariate analysis of audit report lag for clients with goodwill

	Model (1)	Model (2)
Intercept	77.588 (134.84)***	76.979 (132.19)***
<u>Experimental variables</u>		
<i>Goodwill</i>		4.872 (7.89)***
<i>Goodwill-Impair</i>		1.600 (5.00)***
<i>Restructuring-Charges</i>		-1.095(-5.46)***
<i>Special-Charges</i>		0.984 (5.52)***
<u>Control variables</u>		
<i>Size</i>	-2.290 (-39.35)***	-2.332 (-39.43)***
<i>Volume</i>	-0.198 (-3.65)***	-0.210 (-3.87)***
<i>Loss</i>	1.786 (8.10)***	1.748 (7.76)***
<i>Roa</i>	-0.780 (-2.67)***	-0.748 (-2.55)**
<i>Variance</i>	-121.507 (-25.11)***	-119.723 (-24.71)***
<i>Leverage</i>	3.292 (8.82)***	2.892 (7.68)***
<i>Beta</i>	1.502 (9.70)***	1.532 (9.90)***
<i>Concentration</i>	1.722 (2.83)***	1.767 (2.91)***
<i>Book-Market</i>	-0.111 (-1.20)	-0.182 (-1.96)**
<i>Inv&Rec</i>	-2.470 (-4.91)***	-2.103 (-4.14)***
<i>Discontinued</i>	0.174 (0.83)	0.030 (0.14)
<i>M&A</i>	0.529 (2.52)**	-0.036 (-0.17)
<i>Going-Concern</i>	7.748 (13.59)***	7.660 (13.35)***
<i>Big4</i>	-3.831 (-17.55)***	-3.838 (-17.55)***
<i>Busy</i>	1.363 (7.09)***	1.387 (7.22)***
<i>Industry</i>	included	included
Adjusted R-Square	9.60%	9.94%

The dependent variable *Reportlag* is the number of days between the fiscal year end and auditor signature date. The independent variables are defined as follows. *Goodwill* is the ratio of goodwill to total assets. *Goodwill-Impair* is an indicator variable that equals one for clients with goodwill impairment charge and zero otherwise. *Restructuring-Charges* is an indicator variable equals one for clients with restructure charges and zero otherwise. *Special-Charges* is an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. *Size* is the logarithmic transformation of total assets. *Volume* is the number of shares traded divided by the number of shares outstanding. *Loss* is an indicator variable equal to one when net income is negative and zero otherwise. *Roa* is operating income to total assets. *Variance* is the standard deviation of daily returns over 200 trading days ending 45 days before the earnings announcement. *Leverage* is total debt to total assets. *Beta* is estimated from the market model using daily returns over 200 trading days ending 45 days before the earnings announcement. *Concentration* is the total sales of the largest five companies within the same industry, where industry is based on the two-digit SIC code, as a proportion of total sales within the industry. *Book-Market* is the ratio of the book value of equity to the market value of equity. *Inv&Rec* is the sum of receivables and inventory divided by total assets. *Discontinued* is an indicator variable which equals one for companies with discontinued operation or extraordinary items and zero otherwise. *M&A* is an indicator variable for mergers and acquisitions and zero otherwise. *Going-Concern* is an indicator variable which equals one when an auditor issues a going-concern opinion and zero otherwise. *Big4* is an indicator variable which equals one for companies with a Big 4 and zero otherwise. *Busy* is an indicator variable which equal one when client's fiscal year-end is December and zero otherwise. We have 38,455 observations because: (1) *Variance* cannot be computed for 11,434 observations from missing stock returns, (2) *Inv&Rec* cannot be computed for 136 observations from missing receivable/inventory, and (3) we delete 5,208 observations with *Reportlag* greater than 90.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 10

The likelihood of impairments and special charges and audit quality

	Impairments/Charges		
	Model 1 Goodwill-impair	Model 2 Restructuring-charges	Model 3 Special-charges
Intercept	-3.523 (-12.12)***	-1.958 (-10.27)***	-1.816 (-8.66)***
<u>Audit quality</u>			
<i>Tenure</i>	0.015 (3.19)***	0.021 (7.11)***	0.010 (3.16)***
<i>Industry-specialist</i>	0.433 (4.11)***	-0.145 (-1.92)	-0.076 (-0.93)
<u>Managerial opportunism</u>			
<i>CEO-tenure</i>	-0.126 (-2.94)***	-0.294 (-10.92)***	-0.052 (-1.85)
<i>Bonus</i>	-0.187 (-2.09)**	-0.292 (-5.36)***	-0.090 (-1.60)
<i>Leverage</i>	-0.543 (-2.42)**	-0.591 (-4.20)***	0.394 (2.77)***
<i>Goodwill</i>	-1.677 (-4.50)***	0.147 (0.88)***	-0.003 (-0.02)
<u>Control variables</u>			
<i>Internal-control</i>	0.207 (1.75)	-0.271 (-3.85)***	0.077 (1.06)
<i>Age</i>	-0.015 (-4.39)***	-0.001 (-0.30)***	-0.011 (-4.67)***
<i>ERC</i>	-0.001 (-0.54)	-0.002 (-1.97)**	-0.003 (-2.63)***
<i>Relative-ROA</i>	-0.024 (-0.20)	0.176 (2.37)**	0.110 (1.41)
<i>Volatility</i>	16.141 (5.46)***	13.172 (6.24)***	15.330 (6.42)***
<i>Delist</i>	0.321 (0.54)	0.725 (1.58)	0.667 (1.16)
<i>Size</i>	-0.693 (-11.07)***	-0.267 (-6.95)***	-0.175 (-4.43)***
<i>Segments</i>	0.293 (4.88)***	0.243 (6.58)***	0.216 (5.38)***
<i>Intangibles</i>	2.292 (7.53)***	1.314 (7.12)***	1.607 (7.37)***
<i>Lag-size</i>	0.783 (12.24)***	0.462 (11.82)***	0.449 (11.21)***
<i>Returns</i>	-0.266 (-3.39)***	0.065 (1.37)	0.094 (1.83)
Observations	8,010	8,010	8,010
Pseudo R-Square	13.23%	8.48%	7.54%

The dependent variable in Model 1 is *Goodwill-Impair* defined as an indicator variable that equals one for clients with goodwill impairment charge and zero otherwise, in Model 2 is *Restructuring-charges* defined as an indicator variable that equals one for clients with restructure charges and zero otherwise, and in Model (3) *Special-Charges* defined as an indicator variable that equals one for clients with special charges other than goodwill impairment and restructuring charges and zero otherwise. other types of special charges and zero otherwise. The two audit quality variables are *Tenure*, defined as the number of years the auditor has been engaged by the client, and *Industry-specialist*, defined as an indicator variable that equals one when the auditor's market share in the industry is larger or equal to 20% and zero otherwise. The four managerial opportunism variables are defined as follows. *CEO-tenure* is the logarithm transformation of the number of years a CEO has served in office. *Bonus* is an indicator variable that equals one when the CEO is paid cash bonus and 0 otherwise. *Leverage* is the ratio of the sum of the long-term and short-term debt to total assets. *Goodwill* is the ratio of goodwill to total asset from the previous year. The control variables are defined as follows. *Internal-control* is an indicator variable that is equal to 1 when the firm's internal control is effective and zero otherwise. *Age* is the number of years the client is publicly traded. *ERC* is the coefficient of the time series regression of price on earnings from continuing operations per share using the 20 quarters of data. *Relative-ROA* is industry-adjusted ROA where ROA is income before extraordinary items to total assets. *Volatility* is the standard deviation of daily returns. *Delist* is an indicator variable which equals one if the client is traded on NASDAQ or AMEX. *Size* is the logarithm transformation of the market value of equity. *Segments* is the logarithm transformation of the number of business segments. *Intangibles* is intangible assets divided by total assets. *Lag-size* is *Size* from the prior year. *Returns* is the buy-and-hold raw returns.

***, and ** denote significance at the 1% and 5% levels, respectively.

Table 11

Stock market reaction to goodwill impairments, restructuring and special charges and audit quality

	Model (1)	Model (2)
<i>Panel A: Goodwill impairments</i>		
Intercept	-0.0004 (-0.43)	-0.0003 (-0.39)
<i>Impair-Ratio</i>	-0.067 (-7.51)***	-0.053 (-5.14)***
<i>Long-Tenure</i>		0.001 (2.20)**
<i>Impair-Ratio</i> × <i>Long-Tenure</i>		-0.058 (-2.77)***
Δ <i>Earnings</i>	0.0003 (3.30)***	0.0003 (3.22)***
<i>Size</i>	0.001 (8.55)***	0.001 (7.87)***
<i>Market-Book</i>	-0.00002 (-1.51)	-0.00002 (-1.54)
<i>Beta</i>	-0.003 (-11.28)***	-0.003 (-10.98)***
Observations	255,697	255,622
<i>Panel B: Restructuring charges</i>		
Intercept	-0.0004 (-0.50)	-0.0004 (-0.45)
<i>Restructure-Ratio</i>	-0.049 (-2.25)**	-0.027 (-1.12)
<i>Long-Tenure</i>		0.001 (2.26)**
<i>Restructure-Ratio</i> × <i>Long-Tenure</i>		-0.099 (-1.82)*
Δ <i>Earnings</i>	0.0003 (3.41)***	0.0003 (3.32)***
<i>Size</i>	0.001 (8.68)***	0.001 (7.95)***
<i>Market-Book</i>	-0.00002 (-1.49)	-0.00002 (-1.52)
<i>Beta</i>	-0.003 (-11.35)***	-0.003 (-11.02)***
Observations	255,748	255,622
<i>Panel C: Special charges</i>		
Intercept	0.0002 (0.28)	0.0002 (0.18)
<i>Special-Ratio</i>	-0.045 (-6.42)***	-0.049 (-6.05)***
<i>Long-Tenure</i>		0.001 (1.84)*
<i>Special-Ratio</i> × <i>Long-Tenure</i>		0.018 (1.09)
Δ <i>Earnings</i>	0.0003 (3.32)***	0.0003 (3.32)***
<i>Size</i>	0.001 (8.17)***	0.001 (7.58)***
<i>Market-Book</i>	-0.00002 (-1.46)	-0.00002 (-1.51)
<i>Beta</i>	-0.003 (-10.97)***	-0.003 (-10.88)***
Observations	255,675	255,622

The dependent variable is three-day cumulative abnormal returns (CAR) around the earnings announcement date where abnormal returns is defined as raw returns less value-weighted market return. The independent variables defined as follows: *Impair-ratio* is the absolute value of goodwill impairment divided by total assets, *Restructure-Ratio* is the absolute value of restructure cost divided by total assets, *Special-Ratio* is the absolute special items after excluding goodwill impairment and restructure cost divided by total assets, *Long-Tenure* is an indicator variable that is equal to 1 if the length of the audit engagement is 10 years or more and zero otherwise, Δ *Earnings* is income before extraordinary items for current quarter minus the corresponding number four quarters prior divided by the market value of equity at the beginning of the current fiscal quarter, *Size* is the logarithmic transformation of total assets, *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets at the end of the current quarter, *Beta* is the systematic risk estimated from the market model using daily returns over 200 trading days ending 45 days before the earnings announcement. We limit *Impair-ratio*, *Restructure-Ratio*, and *Special-ratio* to be one or less than one to remove the effect of outlier observations.

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

Table 12

Stock market reaction when clients with large amounts of goodwill have no goodwill impairments

	Model (1)	Model (2)
Intercept	0.001 (5.58)***	-0.0002 (-0.21)
<u>Experimental variables</u>		
<i>Goodwill-High</i>	0.001 (2.16)**	0.002 (3.08)***
<u>Control variables</u>		
<i>ΔEarnings</i>		0.0003 (3.11)***
<i>Size</i>		0.001 (8.21)***
<i>Market-Book</i>		-0.00002 (-1.56)
<i>Beta</i>		-0.003 (-11.46)***
Year fixed effects	No	Yes
Observations	305949	250029

The dependent variable is three day cumulative abnormal returns (CAR) around the quarterly earnings announcement date where abnormal returns is defined as raw returns less value-weighted market return. The independent variables are defined as follows: *Goodwill-High* is an indicator variable that equals to 1 when the goodwill to total assets ratio is larger than the median ratio which 0.097, and zero otherwise, *ΔEarnings* is income before extraordinary items for current quarter minus the corresponding number four quarters prior divided by the market value of equity at the beginning of the current fiscal quarter, *Size* is the logarithmic transformation of total assets, *Market-Book* is the ratio of the sum of the market value of equity, the book values of preferred stock, and the book value of debt to total assets at the end of the current quarter, *Beta* is the systematic risk estimated from the market model using daily returns over 200 trading days ending 45 days before the earnings announcement. We limit Impair-ratio to be 0 in model 1 and model 2.

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