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Assurance level choice, CPA fees, and financial reporting benefits: Inferences from U.S. private firms

Brad A. Badertscher ^a, Jaewoo Kim ^b, William R. Kinney Jr. ^c, Edward Owens ^{d,*}^a University of Notre Dame, USA^b University of Oregon, USA^c University of Texas at Austin (Emeritus), USA^d University of Utah, USA

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ABSTRACT

Many U.S. private firms choose either a financial statement compilation or review rather than the higher assurance provided by an audit, yet little is known about these choices. We explore economic aspects of private firm choice of less-than-audit levels of assurance applied to GAAP-based financial statements. We find that CPA fees more than double for each increment in assurance. Commonly used financial reporting quality proxies are higher for both reviews and audits relative to compilations but are statistically indistinguishable on average between reviews and audits. Cost of debt is significantly lower for reviews than for compilations and significantly lower for audits than for reviews. Finally, we find that assurance level choices are associated with bank debt, trade credit, and potential internal information reliability and control concerns.

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1. Introduction

Demand for firms to provide high-quality financial statement information is rooted in agency conflicts and information asymmetries within and between a firm and outside contracting parties (Watts and Zimmerman 1986; Lisowsky and Minnis 2020). The efficacy of financial accounting information in alleviating agency conflicts and information asymmetries depends, in part, on the extent to which contracting parties are assured that financial statement information is prepared in accordance with GAAP and is free of material misstatement. Obtaining a higher level of assurance from an independent CPA firm is one way a firm's owners may improve the quality of financial statement information and internal controls and also provide such assurances to capital suppliers and other outsiders.

* Corresponding author. David Eccles School of Business, 1655 Campus Center Dr., Salt Lake City, UT, 84112, USA.
E-mail address: ed.owens@eccles.utah.edu (E. Owens).

U.S. private firms choose whether to obtain CPA firm services for any GAAP-based financial statements, and each private firm's choice of financial statement service will reflect its individual cost-benefit trade-offs (Dedman et al., 2014).¹ Although descriptive evidence suggests that more private firms choose "less-than-audit" levels of assurance than audits (e.g., Minnis 2011; Lisowsky et al., 2017; Lisowsky and Minnis 2020), there is little empirical evidence about the costs and benefits of reviews and compilations, relative to each other or to audits, or about the determinants of the choice of less-than-audit assurance levels.² What are the relative costs of CPA financial statement services? How much does financial reporting quality increase and cost of debt decrease with application of review procedures? How do various agency conflicts affect less-than-audit assurance level choice?

Using proprietary data on U.S. private companies from two independent sources, we relate the level of CPA firm assurance to common financial reporting quality proxies, cost of debt, and other agency-conflict-related demands. From a medium-sized CPA firm, we obtain a cross-section of that firm's fees for compilations, reviews, and audits. From Sageworks, we obtain a large database of financial statement information and the associated CPA service for (non-identified) U.S. private firms applying U.S. GAAP. We use the fee sample to impute CPA service fees for our Sageworks financial statement sample and find that imputed CPA fees more than double for each increment in assurance level.

To address questions about the relation between CPA assurance level and financial reporting benefits, we calculate four proxies for financial reporting quality used in prior literature and find that financial reporting quality is generally better for successively higher assurance levels. The mean financial reporting quality difference is large between compilations and reviews but modest (and mostly indistinguishable statistically) between reviews and audits. We also note that these on-average results do not preclude audits producing significantly higher quality than reviews in some cases. Specifically, we find that audits are associated with significantly better financial reporting quality relative to reviews for firms with high inventory, where the auditor's control evaluation, physical counts, and pricing tests should be most relevant.

We also explore the association between assurance level and cost of debt, which reflects lender perspectives on risk as well as reporting quality. Cost of debt for reviewed firms is 96 basis points lower than compiled firms and for audited firms is 45 basis points lower than reviewed firms, with both differences statistically significant. This latter difference suggests there are some audit benefits beyond financial reporting quality. For example, lower cost of debt for audited firms may reflect results of lenders' inferences from a firm's assurance level choice about managerial integrity, internal control quality, or future prospects. However, consistent with the literature that finds debtholder demand is not the only determinant of assurance level choice (e.g., Lisowsky and Minnis 2020), we document that incremental interest savings do not outweigh incremental service fees for many firms that choose review instead of compilation or audit instead of review.

Accordingly, we explore whether a firm's assurance level choice relates to agency conflicts with lenders, suppliers, and customers, and within the firm itself. We find that the choice of a higher assurance level (reviews versus compilations and audits versus reviews) is associated not only with the existence of bank debt but is also consistent with demand related to agency conflicts arising from both trade credit and internal control concerns of firm owners.

Because this study is largely descriptive in nature, our findings are suggestive rather than definitive, and several empirical limitations should be noted. First, we use imputed CPA fees based on client firm asset size, and fee data are from a single U.S. mid-sized accounting firm and may not be representative of the U.S. private firm market. Second, because most of our financial reporting quality proxies have been developed for and applied to public firms, their construct validity has not been tested as extensively for U.S. private firms. Third, we take firms' assurance decisions as given and thus face limitations in modeling selection of an assurance level. Finally, to reduce concerns about endogeneity and correlated omitted variables, we include firm fixed-effects, a propensity score matched analysis, and an impact threshold analysis.

We contribute to the literature by focusing on and providing novel evidence regarding the choice, benefits, and costs among the distinct *less-than-audit* assurance levels (i.e., reviews and compilations). The literature regarding financial statement assurance has generally focused only on the choice and benefits of audited, relative to non-audited, financial statements. In an exploratory analysis based on survey data, Allee and Yohn (2009) document that certain firm characteristics (such as firm age) are associated with generally higher levels of assurance but do not provide direct comparisons between various assurance levels. Guided by an agency theory framework, Lisowsky and Minnis (2020) show that several nondebt factors are associated with the choice to produce audited (versus non-audited) financial statements, but their data do not distinguish between reviews and compilations. We shed new light on the market for financial statement services by modeling the choice between both reviews versus compilations and reviews versus audits and, in both cases, find results consistent with an association between a higher assurance level and several sources of agency conflict (both external and internal).

Regarding benefits, Blackwell et al. (1998) and Minnis (2011) document that audits are associated with lower interest rates but report no difference in interest rates among less-than-audit assurance levels. We find that reviews are indeed associated with significantly lower interest rates compared to compilations. Minnis (2011) also finds that audits (versus non-audits) are associated with greater cash flow predictability but finds no difference in cash flow predictability between reviews and

¹ Private firms can choose among several financial statement services. *Compilations* state that financial statements are presented in GAAP format but express "no assurance" about possible material misstatement. *Reviews* begin with GAAP-form data and apply analytical procedures and inquiries of management to express moderate assurance. *Audits* apply review procedures, assess control and fraud risks, and empirically test financial details necessary to express high assurance.

² Vanstraelen and Schelleman (2017) review the costs and benefits of private company audits.

compilations. In contrast, we find significantly greater financial reporting quality (including cash flow predictability) for reviews versus compilations. Uniquely, we find that reviews and audits are associated with similar financial reporting quality on average. These analyses provide new evidence on important benefits of review procedures that were not previously documented. Finally, our imputed CPA fees allow us to provide novel (but limited) evidence into how costs relate to benefits across assurance levels.

2. Background and motivation

2.1. Private firm financial statement services

The AICPA's *Statements on Standards for Accounting and Review Services* and *Statements on Auditing Standards* (AICPA 2017) for private firms provide the basis for services by AICPA members and a means for their clients and third-party users to differentiate reliability of financial statements by assurance level. All three available services (compilation, review, and audit) result in a CPA firm report and require accounting expertise but differ as to verification procedures required, the relative precision of measurement, and the level of assurance given. Appendix A summarizes the requirements, and Appendix B provides examples of language commonly used by CPA firms for compilation, review, and audit reports.

For a *compilation*, the CPA “reads the financial statements” and considers whether the financial statements are free from “obvious material misstatement” with respect to GAAP. Zero verification is required, and *no* assurance is expressed. For a *review*, the primary verification procedures are application of analytical procedures and inquiries of management, and, based on this top down analysis, the CPA expresses “*moderate*” assurance that “we are not aware of any material modifications needed” to comply with GAAP. Thus, reviews are expected to identify any larger material misstatements and some (but not all) of any smaller material misstatements (i.e., those just above a material amount). An *audit* requires the CPA to apply review-level procedures, plus understand internal controls, assess misstatement and fraud risks, and selectively verify account balance details as deemed necessary to provide “*high*” assurance that the statements are free of all (i.e., large and small) material misstatement. Audits conclude that, “in our opinion, the statements are fairly presented with respect to GAAP.”

For our study, it is important to note two considerations. First, material misstatement likelihood and overall financial reporting quality for a particular private company depend on owner and management integrity, quality of internal control, and choice of assurance level, as well as the CPA's performance as compiler, reviewer, or auditor. Second, because review procedures are a *subset* of audit procedures and compilations have *zero* verification procedures, comparison of results between reviews versus compilations and between reviews versus audits allows assessment of the incremental effectiveness of review's analytical procedures and inquiries, as well as the incremental contribution of additional “full audit” procedures.

2.2. Prior literature

Blackwell et al. (1998) examine the association between assurance levels and interest rates using 212 revolving credit agreements from six banks. They estimate that firms with audited financial statements pay lower interest rates, compared to those receiving less-than-audit assurance levels, but they do not find differences in interest rates between reviewed and compiled financial statements. From a CPA firm, they obtain an “informal schedule of audit fees” that are “representative” of fees charged to their sample firms and estimate that the reduction in interest rates from an audit is associated with 28%–50% of typical audit fees.³ Although Blackwell et al. did not obtain a schedule of review or compilation fee rates, they note, based on conversations with their data source contact, that reviews cost about one-third the cost of an audit.

Allee and Yohn (2009) use a single year of data from firms with mean total assets of less than \$1 million, based on responses reported in the 2003 Survey of Small Business Finance, to study firm characteristics associated with the production, use, and level of assurance of financial statements. For the 790 respondent firms producing financial statements that are either compiled, reviewed, or audited, they find that older firms and firms with more employees are more likely to choose higher assurance levels, whereas those with more business sites and whose owners have higher levels of education are more likely to choose lower assurance levels. Allee and Yohn do not provide insights into the respondent firms' choice between the distinct assurance levels (e.g., review versus compilation or review versus audit), because they do not model pairwise comparisons among assurance levels. They also find that audits (but neither compilations nor reviews) are associated with greater access to credit but are not associated with cost of debt.

Minnis (2011) uses the Sagemworks database and primarily explores the association between assurance level choices and both interest rates and financial reporting quality (i.e., cash flow predictability of accruals). For a sample of 25,784 firm-years over the 2001–2007 period, he finds lower interest rates and higher financial reporting quality for audited versus non-audited financial statements, which include both reviews and compilations, but finds no significant differences in interest rates or reporting quality between reviewed and compiled financial statements. Minnis (2011) documents a negative association between audits and interest rates for a larger sample of private U.S. firms and links the association to improved cash flow predictability. Minnis (2011) also estimates an audit versus less-than-audit choice model and finds that

³ In an experiment with 67 bankers, Bandyopadhyay and Francis (1995) find that reviews yield lower debt cost than compilations, and audits yield lower debt cost than reviews.

larger firms, firms with more tangible assets, firms with negative equity, and C-corporations are more likely to choose audits.

Lisowsky and Minnis (2020) focus on larger U.S. private firms' audit choice using a broader sample of tax filing firms. Lisowsky and Minnis (2020) use Schedule M-3 of the U.S. federal income tax returns, which notes whether financial statements are audited or not, and examine factors associated with audit choice for U.S. private firms. They find that debt, equity capital, and trade credit are positively associated with audit choice, where the latter two associations highlight the presence of audit demand unrelated to the presence of debt.

We extend and differ from these studies in both research focus and data. Regarding research focus, unlike the prior studies' focus on audits, our focus is on the costs and benefits of reviews and compilations, relative to each other and to audits, and on the determinants of the choice of less-than-audit assurance levels, with particular focus on reviews. In contrast, the primary focus of Blackwell et al. (1998) and Minnis (2011) is assessing how audits are associated with cost of debt benefits. Lisowsky and Minnis (2020) focus on the determinants of audit versus less-than-audit assurance level choice. Finally, Allee and Yohn (2009) investigate the factors associated with the choice among all three assurance levels but do not investigate associated costs or benefits.

Regarding data, we obtain novel CPA fee data across all three assurance levels, which allows us to impute fees for our private firm sample observations and assess incremental financial reporting quality benefits and interest rate savings against the imputed CPA fees. Although Minnis (2011) also uses Sageworks data, our sample is four times the size due to both increased breadth and length.

2.3. Marginal returns to assurance levels

Our data allow exploration of the extent to which the three ordered levels of CPA assurance exhibit differing marginal returns. Our data do not allow testing for classical marginal returns to incremental units of CPA work effort (e.g., hours), because incremental effort is not observable on a unit-by-unit basis. However, we can estimate incremental fees between each CPA financial statement service (none, compilation, review, audit) and compare these estimates to incremental financial reporting quality and cost of debt benefits.

Because the verification procedures applied are approximately additive across assurance levels, we expect the benefits to increase monotonically as assurance level increases but beyond some level to exhibit diminishing marginal returns. The extent of incremental marginal returns to increased assurance levels depends critically upon the effectiveness of financial statement reviews, the middle level of CPA assurance. Specifically, if review procedures (i.e., analytical procedures and inquiries of management) are effective in identifying all large and many smaller material misstatements, then diminishing marginal returns to verification procedures beyond reviews would be expected.⁴

3. Research design

3.1. Financial statement service fees

To provide insight into the relative costs of different CPA financial statement services, we obtain confidential service fee data for compilations, reviews, and audits from a single U.S. mid-sized CPA firm that serves private firms. We use the following model to decompose fees for each service into fixed and variable components with respect to client assets:

$$AssurFees_i = \delta_0 Compile_i + \delta_1 Review_i + \delta_2 Audit_i + \delta_3 Compile_i * Assets_i + \delta_4 Review_i * Assets_i + \delta_5 Audit_i * Assets_i + \epsilon_i \quad (1)$$

where *AssurFees* is the fee associated with the CPA service. *Compile* (*Review*, *Audit*) is an indicator that equals one if firm *i*'s year *t* financial statements were compiled (reviewed, audited) and zero otherwise, where the indicators estimate fixed costs for each assurance level, and each indicator is interacted with *Assets* (i.e., total assets) to estimate variable costs.

3.2. Primary empirical specification

To examine the association between assurance level and outcomes, we use OLS to estimate the following regression model, with standard errors clustered by firm:

⁴ A former Auditing Standards Board member and CPA firm senior partner responded to the question of review effectiveness this way: "In my experience, an experienced audit partner engaged to conduct a two-day pre-acquisition review of a prospective business acquisition, who applies analytical procedures and asks clarifying questions, will typically identify 80%–90% of the major accounting problems eventually encountered in a subsequent audit of the entity." Also, multiple former CPA practitioners have told us they are "not surprised that reviews of smaller firms performed very well relative to full audits."

$$VOM_{i,t} = \beta_0 + \beta_1 Compile_{i,t} + \beta_2 Review_{i,t} + \beta_3 Audit_{i,t} + \sum \beta_k Controls_{i,t} + IndustryFE + YearFE + \varepsilon_{i,t} \quad (2)$$

VOM (verification outcome measure) represents one of our four alternative financial reporting quality proxies (FRQPs, hereafter) or cost of debt (as described below). *Compile* (*Review*, *Audit*) is an indicator that equals one if firm *i*'s year *t* financial statements were compiled (reviewed, audited) and zero otherwise, where the omitted category (i.e., captured by the intercept) reflects company-prepared statements. Thus, β_1 (β_2 , β_3) estimates the effect of a compilation (review, audit) on verification outcome measures relative to company-prepared statements.

Following Minnis (2011) and Hope et al. (2013), we include the following control variables for firm *i* in year *t*: natural log of total assets (*LnAssets*); percentage change in sales (*SalesGrowth*); percentage change in sales squared (*SalesGrowthSq*) to capture nonlinearities in the relation between sales growth and reporting quality (Collins et al., 2017); total liabilities-to-assets ratio (*Liabilities*); current ratio (*CurrRatio*); an indicator variable that equals one if the firm is a Subchapter C corporation and zero otherwise (*CCorp*); property, plant, and equipment deflated by total assets (*PPEta*); an indicator variable that equals one if total shareholders' equity is negative and zero otherwise (*NegEquity*); and interest coverage ratio (*IntCoverage*). All variables are defined in detail in Appendix C.

3.3. Financial reporting quality proxies

There is no universally accepted FRQP for public or private companies (Dechow et al., 2010; DeFond and Zhang 2014; Hope et al., 2013). Therefore, we consider four FRQPs widely used in prior research. All of these proxies use only financial statement data, and each of the resulting proxy values is inversely related to reporting quality.

First, we consider a "Financial Statement Divergence Score" (*FSDScore*) based on Benford's Law. Benford's Law describes the theoretical distribution of all "first digits" that appear in a given naturally occurring population of numbers (e.g., misstatement-free accounting records), has been shown to apply to financial statement data (Amiram et al., 2015), and has been advocated as a test for reliability of accounting data in the auditing literature (e.g., Nigrini and Mittermaier 1997; Durtschi et al., 2004; Nigrini and Miller 2009). Following Amiram et al. (2015), we measure *FSDScore* as follows:

$$FSDScore_{i,t} = \left(\sum_{k=1}^K |AD_{k,i,t} - TD_k| \right) / K, \quad (3)$$

where *AD* is the actual distribution of each leading digit for each line item in firm *i*'s year *t* financial statements, *TD* is the theoretical distribution of each leading digit under Benford's Law, and *K* is the number of distinct leading digits for line items that appear in firm *i*'s year *t* financial statements.⁵ Larger values of *FSDScore* are presumed to reflect accounting errors, whether accidental or intentional. One advantage of *FSDScore*, relative to accrual-based FRQPs, is that there is no clear reason why a measure based only on properties of naturally occurring numerical distributions would be correlated with innate firm characteristics, which mitigates endogeneity concerns for this FRQP.

Our second and third FRQPs are two traditional accrual-based measures from a variant of the modified cross-sectional Jones (1991) model. Specifically, we first estimate the following regression annually for each two-digit NAICS industry with at least ten observations:

$$\frac{Accruals_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}} \right] + \alpha_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \alpha_4 ROA_{i,t} + \alpha_5 SalesGrowth_{i,t} + \varepsilon_{i,t}. \quad (4)$$

Accruals is total accruals, *Assets* is total assets, $\Delta Sales$ is annual change in sales, $\Delta Receivables$ is the change in trade receivables, *PPE* is net property, plant, and equipment, *ROA* is return on assets (Kothari et al. 2005), and *SalesGrowth* is the percentage change in sales from year *t*-1 to year *t* (Collins et al., 2017). The residual from Eq. (4) is a proxy for discretionary, or "abnormal" accruals (*AbAccruals*) (Jones 1991). Following prior studies, our second FRQP is the unsigned residual, $|AbAccruals|$ in year *t*, which is generally interpreted as a measure of reporting quality (e.g., Dechow and Dichev 2002; Aobdia et al., 2015). Our third FRQP is the signed residual, *AbAccruals* in year *t*, which is generally interpreted as a measure of directional earnings management.⁶

⁵ We include all financial statement data items that appear in Sageworks for a given year, which include data from the income statement and balance sheet. The average number of data items for a firm-year is 74.

⁶ Chen et al. (2018) show that biased coefficients can result when using such residuals as dependent variables in subsequent regressions. Following the recommendation of Chen et al. (2018), we re-estimate Eq. (2) after the addition of all independent variables from Eq. (4) (untabulated), and inferences are unaffected.

Our fourth FRQP (*FScore*) is based on the material misstatement likelihood measure developed by Dechow et al. (2011). Our implementation of Dechow et al. (2011) necessarily omits the stock issuance variable, because by definition our private firm sample does not have publicly traded equity. Specifically, we compute the predicted value component of *FScore* as follows:

$$\text{PredictedValue} = -7.893 + 0.790*(rsst_acc) + 2.518*(ch_rec) + 1.191*(ch_inv) + 1.979*(soft_assets) + 0.171*(ch_cs) + (-0.932)*(ch_roa), \quad (5)$$

where the component variables are as defined in Appendix C within the definition of *FScore*. We then compute *FScore* as:

$$\text{FScore} = \left[\frac{e^{(\text{PredictedValue})}}{(1 + e^{(\text{PredictedValue})})} \right] / 0.0037, \quad (6)$$

where larger values of *FScore* imply a higher probability of material accounting misstatement.

As to limitations of these FRQPs, *FSDScore* is unlike abnormal accruals because it is devoid of accounting intuition that facilitates economic interpretation, and *FScore*, to our knowledge, has not been validated for private firms. A key disadvantage of the accruals-based FRQPs is that discretionary accruals estimated using a Jones-model approach are correlated with firm economic fundamentals.⁷

3.4. Cost of debt

Cost of debt reflects not only lenders' reaction to observable aspects of financial reporting quality but also reflects individual borrower and lender choices based on management's knowledge of its own unobservable quality, integrity, and future prospects for the entity, as well as the lender's perception and other contextual factors (e.g., implicit insurance from the CPA firm that comes with a higher assurance level). To assess the association between CPA assurance level and cost of debt, we estimate Eq. (2) with $CostOfDebt_{i,t+1}$ as the dependent variable, where we follow Minnis (2011) and measure *CostOfDebt* as interest expense in year $t+1$ divided by average debt (*Debt*) outstanding in year $t+1$ (where *Debt* equals total liabilities). Also, as in Minnis (2011), we truncate *CostOfDebt* at the upper and lower 5% levels and code *CostOfDebt* as missing for any firm years where *Debt* more than doubles or reduces by half, relative to the prior year.

4. Data and descriptive statistics

4.1. Financial statement service fee data

Our sample of U.S. private company CPA fee data are from 436 client engagements of a single CPA firm, comprised of 97 compilations (22%), 181 reviews (42%), and 158 audits (36%) from 2015 to 2016 for which no client appears more than once, and client firm identities were not provided. These data are limited to the financial statement service, the associated fee, and client total assets (which range from approximately \$1 million to \$100 million).

Panel A of Table 1 reports descriptive statistics for our fee sample by assurance level. The average compilation, review, and audit costs \$6,848, \$18,552, and \$45,924, respectively, suggesting that CPA fees more than double for each increase in assurance level. Average firm size also increases with each increment in assurance level. Panel B of Table 1 partitions our fee sample into deciles based on client asset size and reports the frequency of each service and average fees by asset decile. Compilations are least frequent in the largest asset decile (9.3%) and audits are least frequent in the smallest asset decile (11.6%), while audits, reviews, and compilations are relatively evenly populated in the middle asset deciles.

Panel C of Table 1 presents results from estimating Eq. (1), and Panel D of Table 1 presents the imputed fee models corresponding to Column (1) of Panel C based on separate assurance-level subsample regressions.⁸ Fixed costs associated with compilations, reviews, and audits are \$6,194, \$16,727, and \$31,738, respectively. As to variable costs, audit fees are most sensitive to client firm size, and compilations fees are least sensitive. Thus, while reviews require sizeable upfront costs relative to compilations, reviews have approximately half the fixed cost of audits and do not rise as steeply as audit fees as client size increases. This cost structure is consistent with reviews relying primarily on analytical procedures and inquiries, and thus, relative to an audit, the cost of a review is less sensitive to the size of the client.

⁷ As examples, see Hribar and Nichols (2007), Dechow et al. (2010), Ball (2013), and Owens et al. (2017).

⁸ In Column (2) of Table 1 Panel C, we estimate Eq. (1) using the natural logs of both CPA service fees and firm assets to address possible nonlinearity.

Table 1
CPA firm fee data.

Panel A: CPA service fees and client firm size by financial statement service											
	Mean	10th	25th	50th	75th	90th					
Compilation (N = 97, 22%)											
CPA fees	\$6848	\$2362	\$3200	\$5000	\$9060	\$13,930					
Assets (thousands)	\$5560	\$1275	\$1643	\$3396	\$6180	\$11,999					
Review (N = 181, 42%)											
CPA fees	\$18,552	\$8900	\$10,500	\$15,200	\$22,751	\$32,020					
Assets (thousands)	\$9105	\$2114	\$3055	\$6702	\$12,230	\$18,193					
Audit (N = 158, 36%)											
CPA fees	\$45,924	\$9500	\$17,000	\$36,775	\$58,900	\$92,897					
Assets (thousands)	\$15,100	\$3076	\$5634	\$9991	\$17,814	\$35,157					
Panel B: CPA service fees by client firm size decile											
Decile	Assets	Compilation			Review			Audit			Total
		Fee (\$)	N	%	Fee (\$)	N	%	Fee (\$)	N	%	N
10	21.8 M–100 M	11,848	4	9.3%	27,280	11	25.6%	67,004	28	65.1%	43
9	14.7–21.8 M	8433	3	6.8%	17,646	23	52.3%	45,217	18	40.9%	44
8	11.2–14.7 M	10,837	3	6.8%	21,226	19	43.2%	42,383	22	50.0%	44
7	8.5–11.2 M	5946	5	11.6%	23,977	17	39.5%	53,575	21	48.8%	43
6	7.0–8.5 M	8161	6	13.6%	19,076	21	47.7%	26,417	17	38.6%	44
5	4.9–7.0 M	10,324	10	22.7%	16,707	15	34.1%	41,812	19	43.2%	44
4	3.8–4.9 M	6501	10	23.3%	16,674	20	46.5%	33,436	13	30.2%	43
3	2.5–3.8 M	5717	18	40.9%	16,149	20	45.5%	35,673	6	13.6%	44
2	1.7–2.5 M	7159	12	27.3%	17,984	23	52.3%	35,466	9	20.5%	44
1	1–1.7 M	5426	26	60.5%	14,977	12	27.9%	16,104	5	11.6%	43
Panel C: Regression results											
Dep. Var.:	<i>AssurFees</i>						<i>LogAssurFees</i>				
Column:	(1)						(2)				
<i>Compile_i</i>	6194***						7.371***				
<i>Review_i</i>	590						0.773				
<i>Audit_i</i>	16,727***						8.366***				
<i>Compile_i*Assets_i</i>	1207						0.410				
<i>Review_i*Assets_i</i>	31,738***						8.765***				
<i>Audit_i*Assets_i</i>	3687						0.573				
	0.118**						0.148				
	0.059						0.097				
	0.550***						0.150***				
	0.116						0.046				
	0.939***						0.331***				
	0.180						0.061				
N	436						436				
R ²	52.32%						52.54%				
Panel D: Individual imputed fee models											
Model	N						R ²				
<i>CompFees</i> = \$6194 + \$0.118* <i>Assets_i</i>	97						33.21%				
<i>ReviewFees</i> = \$16,727 + \$0.550* <i>Assets_i</i>	181						37.29%				
<i>AuditFees</i> = \$31,738 + \$0.939* <i>Assets_i</i>	158						44.26%				

Utilizing the CPA firm obtained data, Panel A of Table 1 reports the CPA fees and client assets by financial statement service. Panel B of Table 1 presents average CPA service fees and number of observations by firm size decile. Panel C of Table 1 presents results of OLS estimation of Eq. (1), and Panel D summarizes the resulting imputed fee models. *Compile*, *Review*, and *Audit* are indicator variables that equal one if a firm's annual financial statements received a compilation, review, and audit, respectively, and zero otherwise. All variables are further defined in Appendix C. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors are reported below the associated coefficient estimates.

4.2. Sageworks sample selection

We obtain firm-year financial statement data for non-identified private firms from Sageworks, Inc.⁹ Sageworks contains both income-statement and balance-sheet data (similar to the corresponding data structure in Compustat for public firms)

⁹ Sageworks collects private firm financial data from banks and accounting firms, including large national accounting firms and smaller regional firms. Sageworks collects confidential financial statement information of non-listed clients of large and regional accounting firms and sells the data, aggregated by industry and region, with financial tools to its clients, which are the accounting firms, banks, and other financial institutions.

Table 2
Sageworks sample.

Panel A: Sample selection						
Sageworks private firm data (2001–2010)	# of firm-years			# of firms		
Observations with annual accounting reports	473,739			167,475		
Observations less Canadian firms	439,517			156,043		
Observations less financial, utilities, and missing industry	422,729			150,105		
Observations less firms with total assets < \$1 M or >\$100 M; sales <0;	221,786			76,953		
Observations with non-missing control variables ("sample")	101,802			40,604		
Observations with non-missing control variables and with outstanding debt ("debt subsample")	50,363			22,403		
Panel B: Imputed fees for Sageworks private firm data sample based on assets						
Financial statement service	Sample (N = 101,802)			Debt Subsample (N = 50,363)		
	Compile	Review	Audit	Compile	Review	Audit
Mean imputed fees by service	\$6849	\$20,174	\$45,898	\$6617	\$20,442	\$43,829
Percentage increase (Compile to Review)	195%			209%		
Percentage increase (Compile to Audit)	571%			562%		
Percentage increase (Review to Audit)	128%			114%		

Panel A of Table 2 outlines the drivers of the differential number of observations in the original Sageworks data set and the samples we use in this study. Panel B of Table 2 uses coefficient estimates presented in Table 1 Panel D to impute average fees for financial statement services in our Sageworks sample, holding firm size at the sample mean.

but does not provide statement of cash flow data. Additionally, Sageworks provides the financial statement service (i.e., company-prepared, compilation, review, or audit) chosen for each firm-year of accounting data and basic demographic information, such as geographic location and North American Industry Classification System (NAICS) industry codes.¹⁰

Table 2 details our Sageworks sample selection. Following Minnis (2011) and Badertscher et al. (2013), we exclude Canadian firms as well as observations with missing financial data or for which the accounting numbers fail to satisfy basic accounting identities. Following Badertscher et al. (2013), we exclude financial firms (finance and insurance industries, NAICS code 52) and utilities (NAICS code 22) because of their different business models. Finally, we exclude firms with total assets less than \$1 million and remove firms with total assets greater than \$100 million to ensure our Sageworks sample overlaps substantially with clients in our CPA service fee sample in terms of firm size.¹¹ All continuous variables are winsorized at 1% and 99%. The data span ten fiscal years from 2001 through 2010. We have a total of 101,802 firm-years and 40,604 firms with all necessary variables (the Sageworks "sample").¹² For analyses that involve cost of debt, we use the subsample of firms with outstanding debt (the Sageworks "debt subsample"), which consists of 50,363 firm-year observations across 22,403 distinct firms.

Because Sageworks does not provide CPA fee data, we use the estimated coefficients from Eq. (1) in Panel C of Table 1 to compute imputed fees for our Sageworks observations to allow exploratory insights into the relative costs and benefits of different assurance levels. For example, imputed fees for a firm acquiring a compilation would be $\$6194 + \$0.118 * \text{Assets}$. The imputed fees are presented in Panel B of Table 2 separately for the sample and the debt subsample.¹³ For the average size private firm in our sample, the imputed fee for a compilation, review, and audit is \$6,849, \$20,174, and \$45,898, respectively. This implies the percentage cost increase of going from a compilation to review is 195% and from a review to an audit is 128%. Imputed fees are remarkably similar for the average size private firm in our debt subsample (\$6,617, \$20,442, and \$43,829, respectively).

4.3. Financial statement services by firm size

To better understand how financial statement services vary with firm size, we partition our Sageworks sample into deciles based on total assets. Table 3 reports the frequency of company-prepared, compiled, reviewed, and audited financial statements for each asset decile. For instance, in the smallest asset decile, the percentage of company-prepared, compiled,

¹⁰ Sageworks assigns each firm a unique firm identifier that cannot be matched with any other dataset, and the CPA firm providing the service is not identified or characterized in any way. Sageworks provides the accounting method used by each company with "accrual-based" indicating U.S. GAAP, along with "cash-based," or "unknown." We exclude all "cash-based" observations. As a robustness test, we also excluded "unknown" observations, and our results are unchanged.

¹¹ Removing firms above \$100 million in assets result in the loss of ~1% of the sample (1312 firm years). Our results are quantitatively similar if we include these firms.

¹² We also examine a constant sample (20,324 firm-year observations) comprised of 5081 firms that are in the sample in all years from 2005 to 2009 (chosen because this period coincides with the broadest coverage available within Sageworks) to ensure that our results are not driven by firms that exit the sample. All results are similar when examining the constant sample (untabulated).

¹³ Our CPA fee data access is limited to service fees and client firm total assets. Based on our discussions with partners of the CPA firm from whom we obtained the fee data, the amount of debt is not a significant factor in the CPA firm's pricing of services. This is consistent with Hay et al. (2006), who report that only about half of prior studies find an association between leverage and audit fees. Hay et al. (2006) also report that size is the dominant determinant of audit fees.

Table 3
Sageworks financial statement service frequencies by firm size.

Decile	Assets	Company		Compilation		Review		Audit		Total
		N	Decile %	N	Decile %	N	Decile %	N	Decile %	N
10	18.5 M–100 M	108	1.1%	1757	17.3%	2385	23.4%	5930	58.3%	10,180
9	10.7–18.5 M	129	1.3%	1900	18.7%	4204	41.3%	3947	38.8%	10,180
8	7.3–10.7 M	132	1.3%	2117	20.8%	4902	48.2%	3029	29.8%	10,180
7	5.4–7.3 M	127	1.2%	2565	25.2%	5024	49.3%	2465	24.2%	10,181
6	4.1–5.4 M	113	1.1%	2892	28.4%	5208	51.2%	1967	19.3%	10,180
5	3.2–4.1 M	141	1.4%	3277	32.2%	5251	51.6%	1511	14.8%	10,180
4	2.5–3.2 M	127	1.2%	3839	37.7%	5031	49.4%	1184	11.6%	10,181
3	1.9–2.5 M	118	1.2%	4163	40.9%	4959	48.7%	940	9.2%	10,180
2	1.5–1.9 M	145	1.4%	4732	46.5%	4536	44.6%	767	7.5%	10,180
1	1–1.5 M	182	1.8%	5257	51.6%	4126	40.5%	615	6.0%	10,180
Total		1322		32,499		45,626		22,355		101,802

Utilizing the Sageworks sample, Table 3 reports the percentage of firm-years in each sample size decile with company-prepared, compiled, reviewed, and audited financial statements.

reviewed, and audited statements is 1.8%, 51.6%, 40.5%, and 6.0%, respectively. In contrast, in the largest asset decile, the percentages are 1.1%, 17.3%, 23.4%, and 58.3%, respectively. For the middle deciles, financial statement services are more evenly distributed. As shown in Table 3, a sizeable number of large firms obtain reviews and compilations, and a nontrivial number of small firms obtain audits. Thus, the frequency of compilation, review, and audit across asset deciles in our Sageworks data is similar to that of our CPA fee data in Table 1. As an example, 65% (58%) of the largest decile firms from the CPA fee (Sageworks) data obtain audits.

4.4. Descriptive statistics for FRQPs and control variables

Panel A of Table 4 presents descriptive statistics for our Sageworks sample as a whole and separately within each financial statement service. The univariate statistics reveal similar patterns in the data across FRQPs. Mean *FSDScore* decreases monotonically from the company-prepared statements to the audited statements. *FScore* likewise generally decreases as assurance levels increase, although reviewed statements have a slightly lower *FScore* than do audited statements. For $|AbAccruals|$, the mean and median across all observations are 0.100 and 0.070, respectively, which is similar in magnitude to corresponding data from public-firm studies (e.g., Owens et al., 2017) and other private-firm studies (e.g., Hope et al., 2013). *CostOfDebt* is lowest for the *Audit* firm years and highest for *Compile* firm years. As to control variables, mean *Assets* across compiled, reviewed, and audited firm years are \$5.6, \$6.3, and \$15.1 million, respectively.

Panel B of Table 4 displays Pearson and Spearman correlations. The correlations between the four FRQPs are positive (with the exceptions of *FSDScore* and *FScore*) but not large in magnitude, consistent with the observation of Dechow et al. (2010) that, among different earnings quality proxies, “low and even negative correlations should come as no surprise” (p. 349). Overall, the control variable distributional properties and correlation patterns are consistent with prior work (e.g., Minnis 2011; Badertscher et al., 2014).

5. Empirical results

5.1. Assurance levels and financial reporting quality

Table 5 presents results from estimating Eq. (2) using our four alternative FRQPs as dependent variables.¹⁴ The coefficients on *Compile*, *Review*, and *Audit* capture incremental effects of CPA services relative to company-prepared financial statements (as captured by the intercept), and coefficient differences capture differential effects of assurance levels on FRQPs. Collectively, there are two key results. First, for each FRQP, the *Review* coefficient is statistically more negative than the *Compile* coefficient, which provides evidence that reviews are associated with better financial reporting quality than compilations. Second, for each FRQP, *Review* and *Audit* have similar coefficient estimates, which suggests similar reporting quality for reviewed and audited financial statements.¹⁵

¹⁴ Francis et al. (2005) find that cash flow volatility is a key innate determinant of earnings quality. Therefore, in untabulated analyses, we also compute the standard deviation of cash flows (*CFstd*) and include it as an additional control in our Table 5 analysis. Because the calculation of *CFstd* requires three years of data, our sample size is significantly reduced (from 101,802 to 62,538). We continue to find results consistent with our Table 5 results.

¹⁵ In untabulated results, we replicate the cash flow predictability results from Table 8 of Minnis (2011). Consistent with Minnis we find that audited firms exhibit greater persistence estimates (both cash flows and accruals) when compared to all non-audited firms. However, when we split non-audited firms into compilations and reviews, the persistence of cash flows and accruals for audits is higher than that of reviews but the difference is not statistically significant (see Appendix D). Consistent with our main results, we find that reviews and audits exhibit greater persistence than compilations, and we continue to find no significant difference in financial reporting quality between reviewed and audited financial statements.

Table 4
Descriptive statistics and correlations for FRQPs and control variables.

Panel A: Descriptive statistics										
Variable	All Obs.		Company		Compilation		Review		Audit	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
FSDScore	0.054	0.052	0.056	0.055	0.055	0.054	0.053	0.052	0.052	0.051
AbAccruals	0.100	0.070	0.118	0.084	0.102	0.071	0.099	0.071	0.097	0.065
AbAccruals	0.004	0.010	0.010	0.020	0.009	0.015	0.002	0.007	0.002	0.008
FScore	0.413	0.360	0.457	0.435	0.436	0.385	0.393	0.337	0.421	0.367
CostOfDebt	0.082	0.075	0.091	0.081	0.091	0.081	0.081	0.075	0.072	0.066
Assets	7.987	4.081	7.239	3.670	5.566	2.825	6.262	3.875	15.072	9.081
ROA	0.130	0.088	0.127	0.069	0.139	0.091	0.128	0.087	0.118	0.086
SalesGrowth	0.195	0.026	0.160	-0.046	0.127	0.000	0.163	0.022	0.363	0.078
SalesGrowthSq	0.603	0.067	0.742	0.179	0.579	0.085	0.507	0.055	0.825	0.076
Debt	3.154	1.544	3.647	1.823	2.320	1.138	2.592	1.428	5.485	3.482
Liabilities	0.274	0.183	0.466	0.466	0.285	0.186	0.259	0.173	0.279	0.188
CurrRatio	2.406	1.610	2.536	1.523	2.679	1.709	2.302	1.596	2.215	1.531
CCorp	0.404	0.000	0.424	0.000	0.417	0.000	0.374	0.000	0.446	0.000
PPeta	0.622	0.461	0.535	0.337	0.642	0.473	0.628	0.469	0.584	0.435
NegEquity	0.078	0.000	0.130	0.000	0.091	0.000	0.065	0.000	0.083	0.000
IntCoverage	8.742	1.538	7.419	0.771	8.444	1.405	9.036	1.834	8.655	1.204
N	101,802		1322		32,499		45,626		22,355	

Panel B: Sample correlations																		
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Audit (1)		-0.48	-0.36	-0.05	0.01	-0.01	-0.02	-0.03	0.35	-0.03	0.12	0.31	0.01	-0.05	0.05	-0.04	0.01	0.00
Review (2)	-0.48		-0.62	-0.03	-0.07	-0.02	-0.01	0.01	-0.14	-0.01	-0.04	-0.13	-0.05	-0.05	-0.06	0.01	-0.04	0.02
Compile (3)	-0.36	-0.62		0.07	0.06	0.03	0.02	0.04	-0.15	0.03	-0.06	-0.14	0.03	0.09	0.02	0.03	0.03	-0.02
FSDScore (4)	-0.05	-0.02	0.06		-0.04	0.01	0.03	0.01	-0.06	0.07	0.00	-0.08	-0.15	0.06	-0.07	-0.08	-0.02	0.06
FScore (5)	0.02	-0.08	0.07	-0.05		0.28	0.07	0.01	0.05	-0.01	0.12	0.05	0.00	-0.10	0.02	-0.44	-0.04	0.00
AbAccruals (6)	-0.01	-0.02	0.03	0.01	0.27		0.07	0.00	0.00	-0.06	0.00	-0.02	0.03	0.10	0.07	-0.01	-0.06	-0.04
AbAccruals (7)	-0.04	0.00	0.03	0.03	0.03	0.01		0.00	-0.06	0.16	0.01	-0.04	0.05	0.00	-0.04	0.01	0.11	0.08
CostOfDebt (8)	-0.16	0.00	0.14	-0.04	-0.05	0.01	-0.05		-0.02	0.00	0.00	-0.03	0.01	0.03	-0.01	0.01	0.01	0.30
Assets (9)	0.35	-0.06	-0.24	-0.07	0.09	0.00	-0.10	-0.10		-0.01	0.25	0.77	0.10	-0.05	-0.01	-0.06	-0.05	-0.01
ROA (10)	-0.02	0.00	0.02	0.05	-0.05	-0.06	0.12	-0.09	0.01		0.11	-0.12	-0.13	0.18	-0.22	0.08	-0.18	0.47
SalesGrowth (11)	0.11	-0.01	-0.08	-0.01	0.14	0.01	0.00	-0.05	0.31	0.18		0.22	-0.01	-0.09	-0.01	-0.06	-0.03	0.06
Debt (12)	0.27	-0.07	-0.17	-0.11	0.07	-0.03	-0.06	0.05	0.73	-0.13	0.22		0.41	-0.24	-0.02	0.00	0.14	-0.17
Liabilities (13)	0.00	-0.03	0.01	-0.18	-0.01	0.03	0.00	0.35	0.10	-0.13	0.00	0.53		-0.22	-0.03	0.27	0.38	-0.31
CurrRatio (14)	-0.04	-0.01	0.06	0.06	-0.04	0.15	0.00	-0.14	-0.10	0.23	-0.06	-0.43	-0.31		-0.03	-0.06	-0.17	0.17
CCorp (15)	0.05	-0.06	0.02	-0.07	0.03	0.07	-0.04	-0.04	-0.03	-0.23	-0.01	-0.01	0.00	-0.01		0.01	-0.02	-0.14
PPeta (16)	-0.05	0.02	0.02	-0.09	-0.50	-0.01	0.00	0.16	-0.08	0.12	-0.03	0.03	0.29	-0.08	0.02		0.08	-0.04
NegEquity (17)	0.01	-0.04	0.03	-0.02	-0.04	-0.05	0.08	0.10	-0.08	-0.19	-0.05	0.19	0.29	-0.29	-0.02	0.06		-0.15
IntCoverage (18)	-0.02	0.03	-0.01	0.01	-0.02	-0.02	0.04	0.67	0.01	0.62	0.12	-0.12	-0.16	0.17	-0.13	0.07	-0.20	

Panel A of Table 4 presents Sageworks sample descriptive statistics for variables used in our analysis. Panel B of Table 4 presents sample correlations among variables used in our analysis (N for *CostOfDebt* = 50,363; all other variables N = 101,802), with Pearson (Spearman) above (below) the diagonal. Variable definitions are presented in Appendix C.

As to individual FRQPs, the *Compile*, *Review*, and *Audit* coefficients for *FSDScore* (Column 1) are all statistically significant and monotonically decreasing as the assurance level increases. In pairwise comparisons, F-tests on the difference between *Compile* and *Review* (-0.0019 versus -0.0036) and between *Compile* and *Audit* (-0.0019 versus -0.0039) are highly significant statistically and sizable in magnitude. The *Review* and *Audit* difference (-0.0036 versus -0.0039) is also statistically significant but modest in magnitude. Similarly, the *Compile*, *Review*, and *Audit* coefficients that use FRQPs based on relationships among each firm's financial statement values (i.e., Columns 2 through 4) are all negative and almost all are statistically significant. Further, F-tests of coefficient differences again indicate that reviews and audits are each associated with significantly better FRQP values than compilations. In contrast to Column (1), *Review* and *Audit* coefficients are *not* statistically different from each other, indicating that reviews and audits are associated with similar FRQP values, on average.¹⁶

¹⁶ Of the 101,802 sample observations, only 3.4% change at least one level of assurance year-over-year (1.3% [1.1%] increase [decrease] one level of assurance and the remaining increase or decrease two or more levels of assurance). Despite the lack of change in assurance levels, to mitigate concerns that these review versus audit results may be driven by a sample of reviewed firms that were formerly audited firms (i.e., the reviewed firm-year may have high financial reporting quality because the firm received an audit in a recent year), we repeat the Table 5 analysis using the subsample of firms that do not change assurance levels during our sample period. The results (untabulated) continue to support our main finding of no difference in FRQP values between reviews and audits.

Table 5
Financial statement services and financial reporting quality proxies.

Dep. Var.: Column:	FSDScore (1)	AbAccruals (2)	AbAccruals (3)	FScore (4)
<i>Compile</i>	−0.0019*** 0.0005	−0.0078** 0.0031	−0.0006 0.0015	−0.0075 0.0066
<i>Review</i>	−0.0036*** 0.0005	−0.0129*** 0.0031	−0.0049 0.0039	−0.0396*** 0.0066
<i>Audit</i>	−0.0039*** 0.0005	−0.0123*** 0.0032	−0.0060** 0.0029	−0.0408*** 0.0068
<i>LnAssets</i>	−0.0007*** 0.0001	−0.0089*** 0.0004	−0.0005 0.0005	0.0023** 0.0011
<i>SalesGrowth</i>	−0.0005*** 0.0001	0.0072*** 0.0008	0.0059*** 0.0010	0.0620*** 0.0019
<i>SalesGrowthSq</i>	0.0006*** 0.0001	0.0053*** 0.0005	−0.0027*** 0.0006	−0.0255*** 0.0012
<i>Liabilities</i>	−0.0074*** 0.0002	0.0140*** 0.0015	0.0309*** 0.0018	0.1261*** 0.0039
<i>CurrRatio</i>	0.0001** 0.0000	−0.0002 0.0002	0.0063*** 0.0002	−0.0130*** 0.0004
<i>CCorp</i>	−0.0023*** 0.0001	−0.0005 0.0007	0.0170*** 0.0008	0.0131*** 0.0019
<i>PPEta</i>	−0.0013*** 0.0001	−0.0038*** 0.0007	−0.0033*** 0.0009	−0.2191*** 0.0019
<i>NegEquity</i>	0.0020*** 0.0002	0.0393*** 0.0016	−0.0299*** 0.0018	−0.0583*** 0.0034
<i>IntCoverage</i>	0.0000*** 0.0000	0.0002*** 0.0000	−0.0003*** 0.0000	0.0005*** 0.0001
Fixed effects	I,Y	I,Y	I,Y	I,Y
N	101,802	101,802	101,802	101,802
R ²	4.80%	5.78%	2.68%	25.49%
F-tests:				
(<i>Compile</i> – <i>Review</i>)	127.31***	6.39**	14.17***	226.46***
(<i>Compile</i> – <i>Audit</i>)	130.17***	6.14**	17.49***	221.39***
(<i>Review</i> – <i>Audit</i>)	6.45**	1.40	2.02	1.22

Table 5 presents results of OLS estimation of Eq. (2) and F-tests of differences between assurance level coefficients using four alternative FRQPs as the dependent variable. *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to company-prepared financial statements. All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. Standard errors clustered by firm are reported below the associated coefficient estimates. *, **, and *** indicate two-sided significance at the 10%, 5% and 1% levels, respectively.

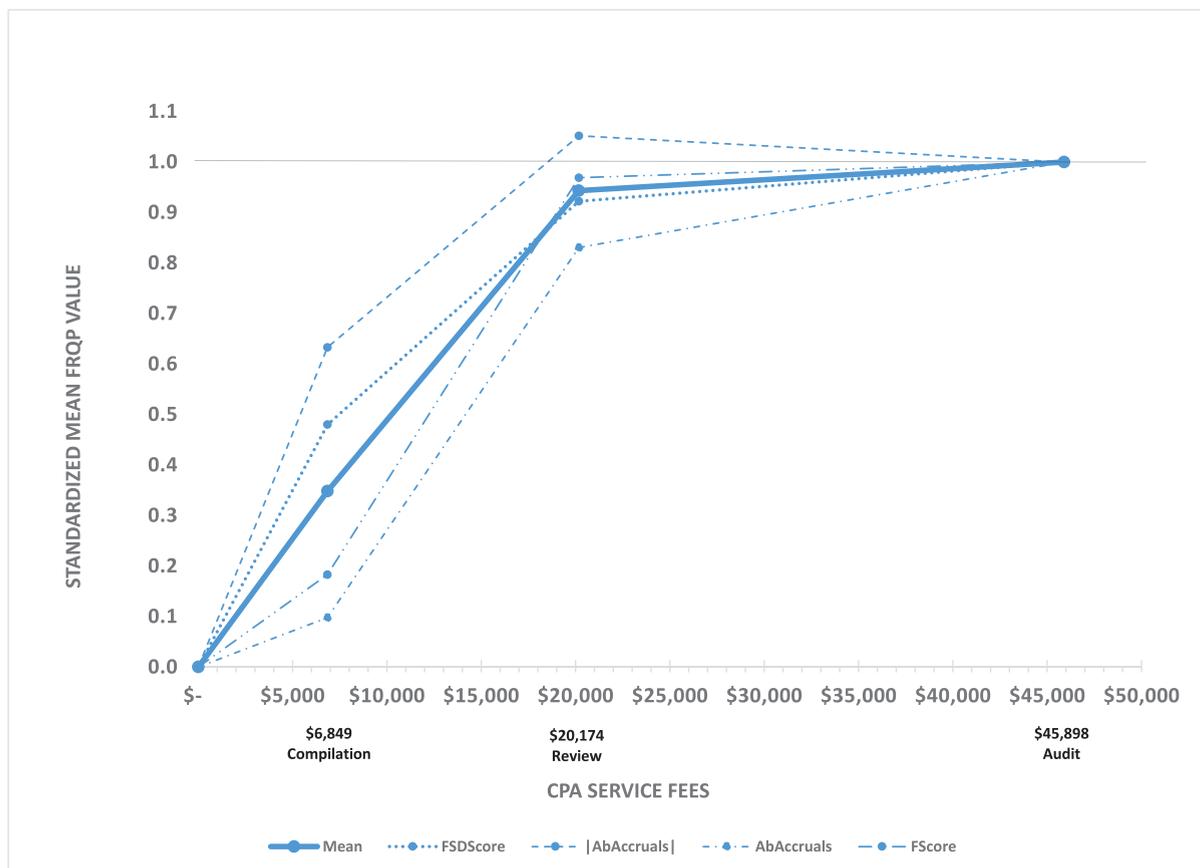
To relate CPA fees and FRQPs, we present a graphical analysis in Fig. 1, which can be viewed as a four-data-point representation of a “financial reporting quality returns to CPA assurance level” production function. Specifically, we use mean imputed compilation, review, and audit fees from Panel B of Table 2 to locate the assurance levels on the horizontal “CPA Service Fees” axis and plot a standardized FRQP value for each assurance level (on the vertical axis) based on the *Compile*, *Review*, and *Audit* coefficient estimates from Table 5, where the standardized value is increasing in financial reporting quality.¹⁷ The light dotted/dashed lines correspond to the four individual FRQPs, and, because each FRQP measures underlying financial reporting quality with error, we also calculate the mean of the standardized values across all four FRQPs (Column 5) and plot the result as the solid line in Fig. 1. As shown, the simple average of the FRQPs indicates that a compilation captures 35% and a review captures 94% of the overall improvement in financial reporting quality between company-prepared statements and audited financial statements.¹⁸

5.2. Sensitivity analysis of functional form and robustness to omitted variables

The OLS estimates in Table 5 rely on the assumptions that (1) the FRQPs are linear in the control variables, and (2) there are no omitted variables (Armstrong et al., 2010). To assess the robustness of our results to these assumptions, we (1) use propensity score matching and (2) conduct an impact threshold analysis to assess the impact of omitted variables following Frank (2000) and Larcker and Rusticus (2010).

¹⁷ To compute the standardized value for each assurance level, we standardize the *Audit* coefficient estimate to a value of 1.00 (with company-prepared statements implicitly standardized to a value of 0.00) and express the *Compile* and *Review* coefficient estimates as a decimal proportion of the *Audit* coefficient. For example, using Column (1) for FSDScore in the lower panel of Fig. 1, the *Review* coefficient estimate receives a standardized value of 0.92 (computed as $-0.0036/-0.0039$), indicating that a financial statement review captures 92% of the quality improvement between company-prepared and audited financial statements.

¹⁸ We re-estimate our Table 5/Fig. 1 analysis using the debt subsample, and inferences are unchanged. Specifically, the mean standardized FRQP coefficients for *Compile*, *Review*, and *Audit* are 0.25, 0.90, and 1.00, respectively.



Standardized FRQP Values based on Table 5 coefficients:

Dep. Var.:	<i>FSDScore</i>	<i> AbAccruals </i>	<i>AbAccruals</i>	<i>FScore</i>	Mean
Column:	(1)	(2)	(3)	(4)	(5)
<i>Compile</i>	0.48 ^a	0.63	0.10	0.18	0.35
<i>Review</i>	0.92 ^b	1.05	0.83	0.97	0.94
<i>Audit</i>	1.00 ^c	1.00	1.00	1.00	1.00

^a Standardized Compile value = (*Compile/Audit*) = (-0.0019/-0.0039) = 0.48.

^b Standardized Review value = (*Review/Audit*) = (-0.0036/-0.0039) = 0.92.

^c Standardized Audit value = (*Audit/Audit*) = (-0.0039/-0.0039) = 1.00.

Fig. 1. Financial reporting quality proxies and CPA service fees. Fig. 1 plots standardized average financial reporting quality values derived from the Table 5 coefficient estimates ($N = 101,802$) (where the standardized values are increasing in financial reporting quality) against our imputed CPA service fees from Table 2 Panel B. Specifically, the *Audit* coefficients are standardized to have a value of 1.00, and the other coefficients are expressed as a decimal proportion of the *Audit* coefficient.

To create a matched sample, we estimate a logistic propensity score model, where the propensity score is the conditional probability of receiving a particular assurance level given the observable covariates. Using a subsample of observations that received either a review or compilation, we create a propensity score for reviewed versus compiled firm-years by regressing *Review* on a set of 14 observable characteristics, including innate characteristics identified by Francis et al. (2005).¹⁹ We then match each reviewed firm to a compiled firm, without replacement, by the “nearest neighbor” based on the estimated propensity scores and apply a caliper restriction of 5% (Angrist and Pischke 2009). This process yields a sample of 23,930 observations comprised of 11,965 reviewed firm years and 11,965 compiled firm years. We repeat this matching process for

¹⁹ The 14 observable characteristics are the same independent variables used in our subsequent assurance level choice analysis in Section 5.5, i.e., Eq. (7).

Table 6
Propensity score matched sample and impact threshold analysis.

Panel A: Review versus compilation regression results				
Dep. Var.: Column:	FSDScore (1)	AbAccruals (2)	AbAccruals (3)	FScore (4)
<i>Review</i>	-0.0011*** 0.0003	-0.0044*** 0.0016	-0.0057*** 0.0021	-0.0573*** 0.0042
<i>LnAssets</i>	-0.0008*** 0.0002	-0.0127*** 0.0011	0.0018 0.0014	0.0040 0.0029
<i>SalesGrowth</i>	-0.0003 0.0003	-0.0055*** 0.0021	0.0078*** 0.0029	0.0262*** 0.0050
<i>SalesGrowthSq</i>	0.0005** 0.0002	0.0056*** 0.0013	-0.0031* 0.0018	-0.0135*** 0.0032
<i>BankDebt</i>	-0.0122*** 0.0008	0.0439*** 0.0052	0.0599*** 0.0068	0.5727*** 0.0128
<i>AcctsPayable</i>	-0.0030*** 0.0009	0.0744*** 0.0059	0.0107 0.0081	0.5658*** 0.0144
<i>OtherLiab</i>	0.0044 0.0057	0.4933*** 0.0367	-0.0805 0.0495	2.5804*** 0.0831
<i>CurrRatio</i>	-0.0001 0.0001	0.0064*** 0.0006	0.0059*** 0.0008	0.0209*** 0.0015
<i>CCorp</i>	-0.0021*** 0.0003	0.0238*** 0.0016	0.0182*** 0.0021	0.0058 0.0043
<i>PPEta</i>	-0.0023*** 0.0003	0.0062*** 0.0017	-0.0037* 0.0022	-0.1800*** 0.0041
<i>NegEquity</i>	0.0005 0.0006	0.0117*** 0.0045	-0.0212*** 0.0055	-0.1528*** 0.0085
<i>IntCoverage</i>	0.0000*** 0.0000	0.0008*** 0.0001	-0.0004*** 0.0001	0.0003 0.0002
<i>WorkCapital</i>	0.0020** 0.0008	0.0124** 0.0056	0.0161** 0.0075	0.0271** 0.0137
<i>Intangible</i>	-0.0171*** 0.0035	-0.0171 0.0220	-0.0597** 0.0276	0.1071** 0.0504
<i>Inventory</i>	0.0012* 0.0007	-0.0089*** 0.0038	0.0021 0.0047	0.0215** 0.0099
Fixed effects	I,Y	I,Y	I,Y	I,Y
N	23,930	23,930	23,930	23,930
R ²	5.10%	5.38%	2.17%	34.02%
ITCV	0.0224	0.0105	0.0059	0.0227
Largest impact control	<i>BankDebt</i>	<i>CCorp</i>	<i>BankDebt</i>	<i>BankDebt</i>
CIV	0.0033	0.0022	0.0014	0.0024
ITCV/CIV	6.79	4.77	4.21	9.46
Panel B: Audit versus review regression results				
Dep. Var.: Column:	FSDScore (1)	AbAccruals (2)	AbAccruals (3)	FScore (4)
<i>Audit</i>	-0.0008 0.0014	0.0023 0.0022	-0.0003 0.0029	0.0092 0.0057
<i>LnAssets</i>	-0.0012*** 0.0003	-0.0149*** 0.0015	0.0011 0.0019	-0.0053 0.0037
<i>SalesGrowth</i>	-0.0002 0.0005	-0.0054* 0.0031	0.0161*** 0.0043	0.0569*** 0.0071
<i>SalesGrowthSq</i>	0.0004 0.0003	0.0070*** 0.0019	-0.0070*** 0.0026	-0.0252*** 0.0044
<i>BankDebt</i>	-0.0119*** 0.0011	0.0996*** 0.0072	-0.0069 0.0100	0.4652*** 0.0174
<i>AcctsPayable</i>	0.0001 0.0012	0.0805*** 0.0079	-0.0028 0.0109	0.5857*** 0.0192
<i>OtherLiab</i>	0.0018 0.0076	0.5969*** 0.0515	-0.1668** 0.0718	2.6660*** 0.1178
<i>CurrRatio</i>	0.0000 0.0001	0.0059*** 0.0008	0.0047*** 0.0011	0.0556*** 0.0018
<i>CCorp</i>	0.0044*** 0.0004	-0.0068*** 0.0023	0.0183*** 0.0029	0.0129** 0.0059
<i>PPEta</i>	-0.0019*** 0.0004	0.0012 0.0023	0.0018 0.0032	-0.1613*** 0.0055
<i>NegEquity</i>	0.0014 0.0009	0.0145** 0.0063	-0.0218** 0.0086	-0.1514*** 0.0129
<i>IntCoverage</i>	0.0000 0.0000	0.0006*** 0.0001	-0.0003*** 0.0001	0.0005** 0.0002

(continued on next page)

Table 6 (continued)

Panel B: Audit versus review regression results				
Dep. Var.: Column:	FSDScore (1)	AbAccruals (2)	AbAccruals (3)	FScore (4)
<i>WorkCapital</i>	0.0019* 0.0011	0.0428*** 0.0073	0.0200** 0.0101	0.0375** 0.0180
<i>Intangible</i>	-0.0116** 0.0047	-0.0344 0.0304	-0.0408 0.0382	0.1558** 0.0648
<i>Inventory</i>	0.0008 0.0011	-0.0180*** 0.0060	-0.0024 0.0075	0.0292** 0.0141
Fixed effects	I,Y	I,Y	I,Y	I,Y
N	8072	8072	8072	8072
R ²	5.37%	6.43%	1.81%	34.00%
ITSV	0.0064	0.0334	0.0161	0.0121
Largest impact control	<i>CCorp</i>	<i>BankDebt</i>	<i>CCorp</i>	<i>CurrRatio</i>
CIV	0.0028	0.0122	0.0023	0.0022
ITSV/CIV	2.29	2.74	7.00	5.50

Table 6 Panel A (Panel B) presents OLS regression results using a one-to-one propensity-score-matched sample of reviewed and compiled (audited and reviewed) firm-years, where the dependent variables are four alternative FRQPs. In Panel A (Panel B), *Review (Audit)* is an indicator variable that equals one if a firm's annual financial statements received a review (audit), and equals zero if the statements received a compilation (review). All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. Standard errors clustered by firm are reported below the associated coefficient estimates. *, **, and *** indicate two-sided significance at the 10%, 5% and 1% levels, respectively. The bottom four rows in Panel A (Panel B) present an Impact Threshold for a Confounding (Suppressor) Variable analysis, where the ITCV/CIV (ITSV/CIV) ratio indicates the impact magnitude of a potential omitted variable relative to the impact of the largest-impact control variable included in the model (denoted CIV) necessary to make *Review (Audit)* insignificant (significant).

audited versus reviewed firm years using a subsample of observations that received either an audit or review. That is, we regress *Audit* on the same set of 14 observable characteristics and generate a propensity-score-matched sample of 8072 observations comprised of 4036 audited firm years and 4036 reviewed firm years.²⁰

Table 6 presents OLS regression results of the association between FRQPs and assurance level choice using the propensity-score-matched samples. The results for reviews versus compilations (Panel A) are consistent with Table 5 in that, across all four measures, reviews are associated with significantly lower FRQP values (i.e., better financial reporting quality) compared to compilations. The results for reviews versus audits (Panel B) are likewise consistent with Table 5 in that reviews and audits are associated with statistically indistinguishable FRQP values. Overall, our inferences remain unaffected when using propensity score matched analyses, suggesting that our assumption of a linear relation in Table 5 is not inducing either the result that *Review* is significantly different from *Compile* or the result that *Audit* is not significantly different from *Review*.

To shed light on the sensitivity of the results in Table 6 to omitted variables, we conduct an impact threshold analysis (Frank 2000; Larcker and Rusticus 2010).²¹ While this method cannot be used when testing whether multiple endogenous explanatory variables are different from each other (i.e., Table 5), it can be used when testing whether a single endogenous explanatory variable is different from zero (i.e., Table 6). As discussed in Larcker and Rusticus (2010, p. 202), for an omitted variable to affect the coefficient on *Review* in Table 6 Panel A, the omitted variable must be correlated with both *Review* and the FRQP (controlling for the other variables). The Impact Threshold for a Confounding Variable (ITCV) is defined as the lowest product of the partial correlation between the FRQP and the omitted variable and the partial correlation between *Review* and the omitted variable that would make the coefficient on *Review* statistically insignificant. The larger (smaller) the ITCV, the more (less) robust the OLS results are to omitted variable concerns (e.g., Fu et al., 2012).

The ITCV analysis results are shown in the bottom four rows of Panel A. As a benchmark for the size of the ITCV, we follow Larcker and Rusticus (2010) and compute the control impact value (CIV) of each control variable on the *Review* coefficient. Similar to the ITCV, the CIV is computed as the product of the partial correlation between the FRQP and the control variable and the partial correlation between *Review* and the control variable (partialling out the effect of the other control variables). We report the control variable with the largest CIV, and use the ratio of ITCV/CIV for this control variable to assess the likelihood that a correlated omitted variable affects our inferences. As reported in the last row of Panel A, the ITCV/CIV ratio ranges from 4.21 to 9.46. In other words, the impact of a potential correlated omitted variable would need to be between four and nine times as strong as the impact of the largest control variable included in the model to make the coefficient on *Review* in Panel A insignificant. This suggests that any unobserved confounding variable must be much more highly correlated with *Review* and the FRQP than any of our existing control variables in order to overturn our OLS results. Such a strong correlation seems unlikely, suggesting that the significance of *Review* is not sensitive to a correlated omitted variable.

²⁰ Untabulated analyses indicate that the matching algorithm was successful in achieving balance for most covariates. In particular, 12 of the 14 differences in means and medians are not statistically significant ($p > 0.10$) when examining covariate balance between reviewed and audited observations. Similar results are found when comparing reviewed and compiled observations.

²¹ We implement this analysis using the Stata `konfound` command (Xu et al., 2019).

Table 7
Inventory partitions.

Inventory Partition:	Low-to-Mid				High			
Dep. Var.:	<i>FSDScore</i>	<i> AbAccruals </i>	<i>AbAccruals</i>	<i>FScore</i>	<i>FSDScore</i>	<i> AbAccruals </i>	<i>AbAccruals</i>	<i>FScore</i>
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Compile</i>	−0.0016*** 0.0006	−0.0234*** 0.0041	−0.0016 0.0050	−0.0021 0.0086	−0.0032*** 0.0008	0.0119** 0.0056	0.0042 0.0046	0.0474*** 0.0100
<i>Review</i>	−0.0036*** 0.0006	−0.0237*** 0.0041	−0.0031 0.0050	−0.0472*** 0.0086	−0.0049*** 0.0008	0.0015 0.0056	−0.0008 0.0046	−0.0031 0.0099
<i>Audit</i>	−0.0037*** 0.0006	−0.0223*** 0.0041	−0.0024 0.0051	−0.0359*** 0.0087	−0.0072*** 0.0008	−0.0176*** 0.0038	−0.0123** 0.0048	−0.0346*** 0.0104
Controls Included	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y
<i>N</i>	76,279	76,279	76,279	76,279	25,523	25,523	25,523	25,523
<i>R</i> ²	4.08%	2.87%	1.90%	21.51%	4.66%	4.20%	4.90%	22.81%
F-tests:								
(<i>Compile</i> – <i>Review</i>)	97.58***	1.54	2.63	322.58***	29.71***	15.47***	37.61***	35.84***
(<i>Compile</i> – <i>Audit</i>)	101.87***	2.87*	2.01	157.99***	33.42***	41.91***	141.02***	172.26***
(<i>Review</i> – <i>Audit</i>)	0.44	1.15	0.89	1.24	12.98***	5.51**	2.74*	21.25***

Table 7 presents results of OLS estimation of Eq. (2) with four alternative FRQPs, separately for sample partitions based on the 75th percentile of inventory percentage (i.e., inventory-to-total-assets), *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to company-prepared financial statements. Control variables (*LnAssets*, *SalesGrowth*, *SalesGrowthSq*, *Liabilities*, *CurrRatio*, *CCorp*, *PPEta*, *NegEquity*, and *IntCoverage*) are included but not reported. All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. Standard errors clustered by firm are reported below the associated coefficient estimates. *, **, and *** indicate two-sided significance at the 10%, 5% and 1% levels, respectively.

In Table 6 Panel B, the coefficient on *Audit* is insignificant, and it is conceivable that the inclusion of a correlated omitted variable could make the coefficient significant. To shed light on the sensitivity of the results in Panel B to omitted variables, we assess the Impact Threshold for a Suppressor Variable (ITSV). The intuition for and calculation of ITSV is similar to the ITCV, and is described in Frank (2000, p. 155–157). The ITSV analysis results are shown in the bottom four rows of Panel B. As reported in the last row of Panel B, the ITSV/CIV ratio for the control variable with the largest CIV ranges from 2.29 to 7.00. This indicates that the impact of a potential correlated omitted variable would need to be between two and seven times as strong as the impact of the largest control variable included in the model to make the coefficient on *Audit* significant. Again, such a strong correlation seems unlikely, suggesting that the insignificance of *Audit* is not sensitive to a correlated omitted variable.

5.3. Relative importance of audit-specific risk assessments and verification procedures

The above analyses document little financial reporting quality difference between reviews and audits, on average. However, these results do not preclude the possibility that incremental audit procedures (relative to reviews) yield reporting quality benefits for some firms in the cross-section. In this section, we test for FRQP differences for a subset of firms where incremental audit verification procedures (relative to a review) would be expected to yield relatively larger marginal returns—firms with large inventories. Inventories tend to be prone to accounting errors and provide manipulation opportunities for which internal control evaluation and detailed physical counts and pricing tests unique to an audit should be diagnostic. In Table 7, we partition sample firm-years that have a low-to-moderate versus high inventory-to-total-asset ratios by bifurcating at the 75th percentile, and we estimate Eq. (2) separately for each partition.

Columns (1)–(4) (Columns 5–8) in Table 7 report the results for the low-to-moderate (high) inventory percentage partition. As evident in Columns (1) through (4), there is no statistically significant difference in financial reporting quality between reviews and audits using any of our four FRQPs for the low-to-moderate inventory percentage groups. In contrast, for the high inventory partition, all four FRQP values are significantly more negative (i.e., representing higher quality) for audits relative to reviews. This evidence mitigates a general concern that the FRQP metrics do not reflect the incremental quality effects of incremental assurance level effort.

In untabulated analyses, we also partition the sample into low-to-moderate versus high working capital (and alternately, intangible asset) to total asset ratios. As with the inventory partition, we find no statistically significant difference in financial reporting quality between reviews and audits using any of our four FRQPs for the low-to-moderate working capital (intangible asset) partition. However, all FRQPs except *AbAccruals* (*FSDScore*) indicate better FRQP values for audited, relative to reviewed, financial statements for the high working capital (intangible asset) partition.

5.4. Assurance levels and cost of debt

Table 8 presents results from Eq. (2) using the debt subsample with *CostOfDebt* in year $t+1$ as the dependent variable. To facilitate comparison with results of prior studies, Column (1) presents OLS estimates of audit effects on cost of debt relative to

Table 8
Financial statement services and cost of debt.

Dep. Var.: Column:	CostOfDebt _{t+1} (1)	CostOfDebt _{t+1} (2)
<i>Compile</i>		-0.0058 0.0050
<i>Review</i>		-0.0154*** 0.0030
<i>Audit</i>	-0.0098*** 0.0021	-0.0199*** 0.0032
<i>LnAssets</i>	-0.0008 0.0016	-0.0002 0.0016
<i>SalesGrowth</i>	0.0016 0.0023	0.0021 0.0023
<i>SalesGrowthSq</i>	0.0006 0.0013	0.0001 0.0013
<i>Liabilities</i>	-0.0243*** 0.0061	-0.0255*** 0.0062
<i>CurrRatio</i>	0.0055*** 0.0017	0.0053** 0.0016
<i>CCorp</i>	-0.0104*** 0.0021	-0.0108*** 0.0021
<i>PPEta</i>	0.0039* 0.0016	0.0040* 0.0016
<i>NegEquity</i>	0.0071* 0.0027	0.0069** 0.0026
<i>IntCoverage</i>	-0.0013*** 0.0002	-0.0013*** 0.0002
Fixed effects	I,Y	I,Y
N	50,363	50,363
R ²	11.59%	11.79%
F-tests:		
(<i>Compile</i> – <i>Review</i>)		18.81***
(<i>Compile</i> – <i>Audit</i>)		21.58***
(<i>Review</i> – <i>Audit</i>)		3.15*
Difference in basis points:		
(<i>Compile</i> – <i>Review</i>)		96
(<i>Compile</i> – <i>Audit</i>)		141
(<i>Review</i> – <i>Audit</i>)		45

Table 8 presents debt subsample results of OLS estimation of Eq. (2) using *CostOfDebt* in year *t+1* as the dependent variable. *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to company-prepared financial statements. All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

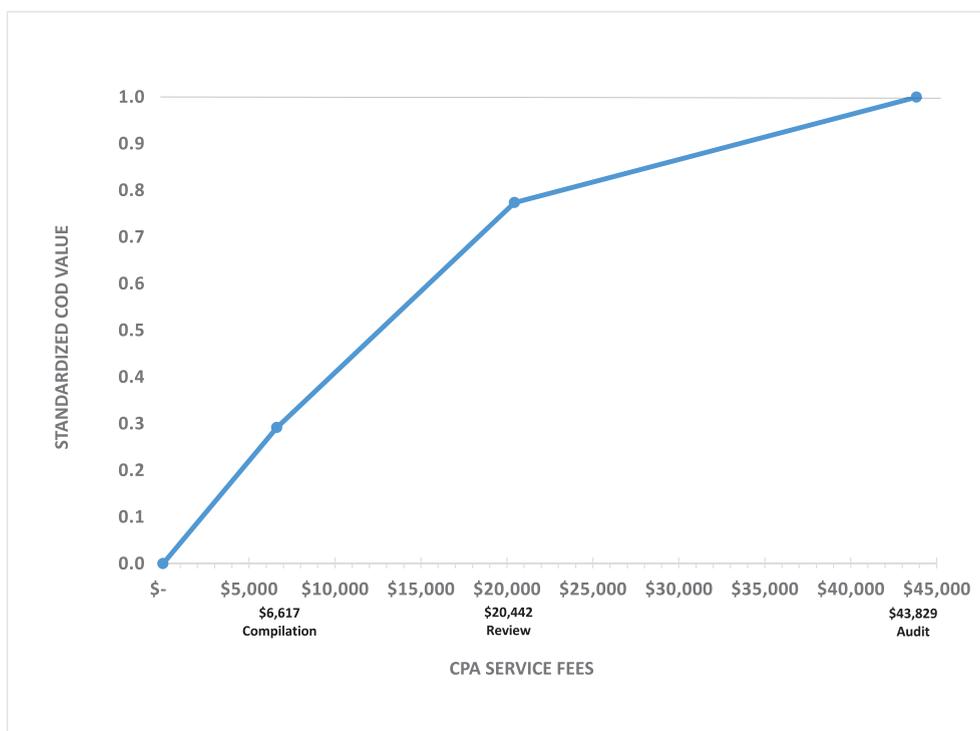
non-audits (which combine all firm years with reviews, compilations, and company-prepared statements). The coefficient on *Audit* is -0.0098 , suggesting that an audit is associated with a 98 basis point interest rate decrease.²²

Column (2) shows the results for the three separate assurance levels. The results indicate negative and significant coefficients on *Review* and *Audit*, whereas *Compile* is insignificant, consistent with relatively little effect on cost of debt from obtaining a no-assurance compilation. As indicated by the F-tests, there is a significant reduction in debt cost among and between compilations, reviews, and audits. For example, the coefficient estimates on *Compilation*, *Review*, and *Audit* in Column (2) are -0.0058 , -0.0154 , and -0.0199 , respectively, suggesting that firms with reviews average 96 basis points lower than compilations, and audits average 45 basis points lower than reviews.

Fig. 2 plots imputed fee estimates from Panel B of Table 2 for the debt subsample against incremental cost of debt effects across assurance levels, where the cost of debt effect is standardized (following the same procedure described for Fig. 1) based on coefficient estimates from Table 8 Column (2). As indicated, a compilation captures 29% and a review captures 77% of the cost of debt benefits between company-prepared and audited financial statements.

In summary, the cost of debt analysis in Table 8 and Fig. 2 is consistent with the FRQP analyses in that both reviews and audits have a larger effect than compilations, and reviews are associated with a substantial portion of the full benefit differential between compilations and audits. In contrast to the FRQP analyses, there is also a statistically significant and economically important difference in debt cost between reviewed and audited financial statements. This suggests that cost of

²² This result is consistent with Minnis (2011), who finds that an audit is associated with a decrease in basis points ranging from 25 to 105.



Standardized COD Values based on Table 8 coefficients:

Dep. Var.:	<i>CostofDebt</i>
Column:	(1)
Compile	0.29
Review	0.77
Audit	1.00

Fig. 2. Cost of debt and CPA service fees. Fig. 2 plots standardized cost of debt (basis points) values derived from the Table 8 coefficient estimates ($N = 50,363$) (where a higher standardized value is associated with lower cost of debt) against our imputed CPA service fees from Table 2 Panel B using the debt subsample. Specifically, the *Audit* coefficients are standardized to have a value of 1.00, and the other coefficients are expressed as a decimal proportion of the *Audit* coefficient.

debt may reflect economic benefits associated with the audit choice that FRQPs do not capture, such as the integrity of management, perceived management skills, signaling of future firm performance (e.g., Kausar et al., 2016), and implicit quality insurance provided to lenders by a borrower's choice of a higher assurance level.

We also know that firms choose higher levels of assurance based on many factors in addition to debt-related demands (e.g., Lisowsky and Minnis 2020). To reinforce this point, in Table 9 we use assurance-level partitions from the debt subsample to relate the cost of debt basis point differentials to the imputed service fee differentials across assurance levels. In Panel A of Table 9, we partition the reviewed firm-years ($N = 24,832$) into deciles based on their debt level, and for each decile we present the average debt and total asset amounts. For each decile we compare the additional interest cost the reviewed firm would have paid to the imputed CPA fee savings it would have enjoyed had it chosen compilation instead of review. Specifically, we compute the additional interest cost as the basis point differential between compilation and review from the Table 8 Column (2) coefficient estimates (i.e., $-0.0154 - -0.0058$) times the average debt level in each decile. We compute the imputed fee savings by applying the coefficient estimates from Table 1 Panel C to the average assets in each decile. In Panel B of Table 9, we use an analogous process with the audited firm years ($N = 11,085$) to compare the additional interest cost to the imputed CPA fee savings if the audited firms had instead chosen review.

As shown in Table 9 Panel A, many firms choose review, even though compilation would have yielded fee savings exceeding incremental interest costs (i.e., those in the lowest four deciles). Likewise, as shown in Panel B, many firms choose audit, even though review would have yielded fee savings exceeding incremental interest costs (i.e., those in the lowest five deciles). This descriptive evidence motivates further study of assurance level choice.

Table 9
CPA fee savings versus interest cost from hypothetical assurance level decreases.

Panel A: If reviewed firms instead chose compilation					
Debt Subsample: Reviews ($N = 24,832$)					
Debt Level Decile	Debt Amount (millions)	Assets (millions)	Interest Cost if Compilation Chosen	Fee Savings if Compilation Chosen	Fee Savings – Interest Cost
1	\$0.22	\$2.54	\$2111	\$11,633	\$9523
2	\$0.50	\$2.76	\$4797	\$11,729	\$6932
3	\$0.75	\$2.94	\$7215	\$11,804	\$4589
4	\$1.02	\$3.39	\$9787	\$12,001	\$2214
5	\$1.37	\$3.78	\$13,116	\$12,170	(\$946)
6	\$1.81	\$4.59	\$17,366	\$12,520	(\$4846)
7	\$2.43	\$5.71	\$23,354	\$13,004	(\$10,349)
8	\$3.38	\$7.29	\$32,449	\$13,686	(\$18,764)
9	\$5.11	\$9.63	\$49,010	\$14,700	(\$34,310)
10	\$10.53	\$19.09	\$101,032	\$18,791	(\$82,242)
Panel B: If audited firms instead chose review					
Debt Subsample: Audits ($N = 11,085$)					
Debt Level Decile	Debt Amount (millions)	Assets (millions)	Interest Cost if Review Chosen	Fee Savings if Review Chosen	Fee Savings – Interest Cost
1	\$0.39	\$3.92	\$1738	\$16,536	\$14,798
2	\$0.94	\$5.00	\$4189	\$16,956	\$12,767
3	\$1.54	\$6.11	\$6863	\$17,388	\$10,524
4	\$2.30	\$7.13	\$10,251	\$17,785	\$7534
5	\$3.31	\$9.00	\$14,752	\$18,512	\$3760
6	\$4.57	\$11.53	\$20,367	\$19,497	(\$871)
7	\$6.36	\$13.95	\$28,345	\$20,438	(\$7907)
8	\$9.14	\$19.36	\$40,735	\$22,543	(\$18,191)
9	\$13.03	\$24.58	\$58,072	\$24,574	(\$33,497)
10	\$15.33	\$41.85	\$68,322	\$31,294	(\$37,028)

Table 9 presents hypothetical comparative analyses regarding incremental interest costs and CPA service fee savings that would follow from sample firms choosing a lower level of financial statement assurance. Panel A reports effects if the reviewed firms in the debt subsample ($N = 24,832$) instead chose compilation. Panel B reports effects if the audited firms in the debt subsample ($N = 11,085$) instead chose review. Interest cost equals debt amount times the assurance level basis point differential from the Table 8 coefficient estimates. Fee savings are computed from Table 2 Panel B.

5.5. Agency conflicts and assurance level choice

We next analyze the association between assurance level choice and three sources of agency conflicts (including bank debt) that may be mitigated by higher assurance levels. First, agency conflicts arise between the firm and outside debtholders (e.g., Watts and Zimmerman 1986; Diamond 1991; Lisowsky and Minnis 2020). Debtholders and the borrowing firm write contracts to mitigate these agency conflicts, and these contracts often use financial statement information as a critical input for monitoring possible covenant violations. Accordingly, the extent to which debt contracts reduce the agency costs of debt hinges on outside contracting parties' confidence that the financial statements are free of material misstatement. We use the level of a firm's bank debt to proxy for this agency conflict.

Second, agency conflicts due to information asymmetries may emerge between the firm and other interested outsiders, such as suppliers (i.e., trade creditors) and customers, regarding the firm's credit quality and stability (Costello 2013). Higher assurance levels can mitigate such frictions by providing these outsiders with more reliable information about firm's fundamentals (Hui et al., 2011; Lisowsky and Minnis 2020). Thus, suppliers, customers, and others may reward higher-level assurance that customers' financial statements are free of material misstatement. We use accounts payable to proxy for this second conflict.

Third, agency conflicts arise due to information asymmetries *within* the firm between its owners, managers, and employees regarding the firm's operations. Higher assurance levels reduce the owner(s)' risk that material misstatements, whether large or small, have not been detected or that managers have mismanaged the firm. For reviews, analytical procedures and inquiries facilitate identification of account balances and relationships that are consistent with material accounting errors, employee fraud, or non-owner management fraud. Audits additionally (and uniquely) include "full" audit procedures and meetings of the firm owner(s) with the audit partner to allow discussion of the audit findings, internal control quality, and risk of fraud within the firm by employees or an owner/manager (Kinney 2000). We use firm size, inventory, and intangible assets to proxy for this third agency conflict.²³

²³ Intuitively, as a firm becomes larger or has more inventory, the risk of large accounting errors as well as opportunity for employee and management fraud increases. Further, intangible assets are associated with earnings management proxies and firm failure (Jones 2011).

Table 10
Economic determinants of assurance level choice.

Panel A: Review versus audit				
Partition	All	Bank Debt	No Bank Debt	Bank Debt–No Bank Debt
Dep. Var.:	Review	Review	Review	
Column:	(1)	(2)	(3)	(4)
<i>LnAssets</i>	–1.027*** 0.011	–1.096*** 0.017	–0.950*** 0.016	–0.146***
<i>SalesGrowth</i>	–0.176*** 0.026	–0.142*** 0.037	–0.215*** 0.037	0.073
<i>SalesGrowthSq</i>	0.101*** 0.015	0.122*** 0.021	0.179*** 0.021	–0.056*
<i>BankDebt</i>	–0.542*** 0.054	–0.270*** 0.077		
<i>AcctsPayable</i>	–0.232*** 0.063	–0.162** 0.069	–0.102* 0.057	–0.061
<i>OtherLiab</i>	–1.506*** 0.363	–1.063** 0.518	–0.917** 0.446	–0.146
<i>CurrRatio</i>	0.004 0.008	0.009 0.013	0.017* 0.010	–0.008
<i>CCorp</i>	–0.424*** 0.019	–0.426*** 0.026	–0.448*** 0.026	0.021
<i>PPEta</i>	–0.152*** 0.019	–0.097*** 0.026	–0.201*** 0.027	0.104***
<i>NegEquity</i>	0.717*** 0.039	0.675*** 0.055	0.578*** 0.054	0.097
<i>IntCoverage</i>	–0.001* 0.001	0.003*** 0.001		
<i>WorkCapital</i>	–0.106* 0.054	–0.122 0.081	–0.110 0.072	–0.012
<i>Intangible</i>	–1.385*** 0.203	–1.490*** 0.290	–0.955*** 0.281	–0.536
<i>Inventory</i>	–1.087*** 0.047	–1.133*** 0.068	–1.010*** 0.066	–0.123
Fixed effects	I, Y	I, Y	I, Y	
N	67,981	35,917	32,064	
R ²	22.33%	23.02%	21.72%	
Panel B: Review versus compilation				
Partition	All	Bank Debt	No Bank Debt	Bank Debt–No Bank Debt
Dep. Var.:	Review	Review	Review	
Column:	(1)	(2)	(3)	(4)
<i>LnAssets</i>	0.354*** 0.010	0.394*** 0.015	0.264*** 0.017	0.130***
<i>SalesGrowth</i>	–0.270*** 0.019	–0.265*** 0.027	0.068 0.053	–0.333***
<i>SalesGrowthSq</i>	0.308*** 0.012	0.248*** 0.017	0.018 0.042	0.230***
<i>BankDebt</i>	0.094** 0.045	0.366*** 0.068		
<i>AcctsPayable</i>	0.073* 0.044	0.011 0.059	0.091* 0.050	–0.080
<i>OtherLiab</i>	0.029 0.298	0.119 0.449	0.015 0.471	0.104
<i>CurrRatio</i>	0.153*** 0.006	0.191*** 0.009	0.109*** 0.009	0.082***
<i>CCorp</i>	0.176*** 0.015	0.232*** 0.023	0.129*** 0.027	0.103***
<i>PPEta</i>	0.074*** 0.015	0.101*** 0.022	0.112*** 0.026	–0.011
<i>NegEquity</i>	0.127*** 0.032	0.011 0.047	0.129** 0.055	–0.119**
<i>IntCoverage</i>	0.002*** 0.001	0.007*** 0.001		
<i>WorkCapital</i>	–0.518*** 0.044	–0.725*** 0.068	–0.420*** 0.076	–0.305***
<i>Intangible</i>	1.348*** 0.202	1.635*** 0.298	1.038*** 0.342	0.597
<i>Inventory</i>	1.158*** 0.037	1.349*** 0.054	1.055*** 0.069	0.295***

(continued on next page)

Table 10 (continued)

Panel B: Review versus compilation				
Partition	All	Bank Debt	No Bank Debt	Bank Debt–No Bank Debt
Dep. Var.:	Review	Review	Review	
Column:	(1)	(2)	(3)	(4)
Fixed effects	I, Y	I, Y	I, Y	
N	78,125	38,920	39,205	
R ²	18.93%	18.25%	17.52%	

Panel A (Panel B) of Table 10 presents results from estimation of Eq. (7) using a subsample of firm-year observations that received either a review or an audit (a review or a compilation). In Panel A, *Review* is an indicator variable that equals one (zero) if a firm's annual financial statements received a review (audit). In Panel B, *Review* is an indicator variable that equals one (zero) if a firm's annual financial statements received a review (compilation). All other variables are defined in Appendix C. Industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

To explore the association between these agency conflicts and assurance level choice, we estimate the following logistic model, which anchors on a firm's choice of review versus compilation or audit (alternately):

$$\begin{aligned}
 \text{Review}_{i,t} = & \beta_0 + \beta_1 \text{LnAssets}_{i,t} + \beta_2 \text{SalesGrowth} + \beta_3 \text{SalesGrowthSq}_{i,t} + \beta_4 \text{BankDebt}_{i,t} \\
 & + \beta_5 \text{AcctsPayable}_{i,t} + \beta_6 \text{OtherLiab}_{i,t} + \beta_7 \text{CurrRatio}_{i,t} + \beta_8 \text{CCorp}_{i,t} \\
 & + \beta_9 \text{PPEta}_{i,t} + \beta_{10} \text{NegEquity}_{i,t} + \beta_{11} \text{IntCoverage}_{i,t} + \beta_{12} \text{WorkCapital}_{i,t} \\
 & + \beta_{13} \text{Intangible}_{i,t} + \beta_{14} \text{Inventory}_{i,t} + \text{IndustryFE} + \text{YearFE} + \varepsilon_{i,t}.
 \end{aligned} \tag{7}$$

In Table 10 Panel A, we examine the choice between review and audit using firm years that were either reviewed or audited and define *Review* as an indicator that equals 1 (0) if firm *i*'s year *t* financial statements are reviewed (audited). In Panel B, we examine the choice between review and compilation using firm years that were either reviewed or compiled and define *Review* as an indicator that equals 1 (0) if firm *i*'s year *t* financial statements are reviewed (compiled). All other variables are either as previously defined or described in Appendix C. We also estimate Eq. (7) separately for firm-year observations with and without bank debt to assess the economic determinants of assurance level choice in an environment in which bank demand does not exist.

Consistent with agency conflicts between the firm and debtholders generating demand for higher assurance, in both Panels A and B we find that the presence of bank debt (*BankDebt*) is positively associated with higher assurance.²⁴ We also find that *AcctsPayable* is a positive determinant of higher assurance, consistent with trade creditor demand.

Further, in both Panels A and B, firms that are larger (*LnAssets*) and have high levels of inventory (*Inventory*) or intangible assets (*Intangible*) are more likely to choose higher assurance, consistent with demand related to internal agency conflicts. These results are consistent with the firm's owners choosing higher levels of assurance to better control misbehavior of employees (including managers) and enhance the quality of internal as well as external information. As documented in Column (3), these associations between assurance level choice and internal agency problems remain strong in the absence of bank debt.

6. Conclusion

Prior studies of the choice among assurance levels available to private firms have focused on audits while combining "less-than-audit" assurance levels (i.e., reviews and compilations). In contrast, we provide novel evidence on benefits of choice among and between all assurance levels, with particular focus on the distinction between the less-than-audit assurance levels. We also incorporate novel CPA fee data, which provides new (but limited) evidence into how costs relate to benefits across the entire range of assurance levels.

We separately model the choice between reviews versus compilations and reviews versus audits. In both cases, we find results consistent with associations between higher assurance levels and agency conflicts with capital providers, with trade creditors, and within the firm among its owners, managers, and employees. We find that reviews are associated with significantly lower interest rates compared to compilations, which contrasts with studies that report no difference in interest rates among less-than-audit assurance levels. We also find significantly greater financial reporting quality for reviews compared to compilations and further find that reviews and audits are associated with similar financial reporting quality on average. These novel findings provide evidence on important benefits of review procedures that are not previously documented.

Our study is subject to important caveats. Our private firms are not from a random sample, our data permits computation only of relatively noisy financial reporting quality proxies (each with its own set of shortcomings), and our financial statement services fees are imputed approximations based on data from a single CPA firm. Also, we are unable to assess other potential

²⁴ In Panel A, a negative coefficient indicates that a variable is associated with choice of higher assurance level (i.e., audit instead of review), and, in Panel B, a positive coefficient indicates that a variable is associated with choice of higher assurance level (i.e., review instead of compilation).

determinants of financial reporting quality, such as CPA firm size and relative service quality. Finally, our analysis does not purport to be a complete analysis of all costs or benefits involved in a firm's choice of assurance level.

Overall, our evidence provides a better understanding of the economics of firms' decisions among and between the full range of assurance levels available to private firms. Our results suggest that review-level verification procedures warrant further research by scholars, practitioners, and regulators. In addition, our study highlights the need for further research on the costs and benefits of less-than-audit assurance levels, including agency-related demands from internal and external users and the critical role of a firm's internal control quality.

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Appendix A. CPA Financial Statement Service Descriptions (source: AICPA 2017)

Comparative Snapshot			
	Compilation	Review	Audit
Level of Assurance Obtained by the Accountant/Auditor that the Financial Statements Are Not Materially Misstated	Accountant does not obtain or provide any assurance that there are no material modifications that should be made to the financial statements	Accountant obtains limited assurance that there are no material modifications that should be made to the financial statements	The auditor obtains a high, but not absolute, level of assurance about whether the financial statements are free of material misstatement
Objective	To assist management in presenting financial information in the form of financial statements without undertaking to provide any assurance that there are no material modifications that should be made to the financial statements	To obtain limited assurance that there are no material modifications that should be made to the financial statements	To obtain a high level of assurance about whether the financial statements as a whole are free of material misstatement thereby enabling the auditor to express an opinion on whether the financial statements are presented fairly, in all material respects
Assurance Provided to the User of the Financial Statements	None – the report states that no assurance is provided	None – the report provides a statement that the accountant is not aware of any material modifications that should be made to the financial statements	None – the auditor provides an opinion as to whether the financial statements present fairly, in all material respects, the company's financial position, results of operations and cash flows
The accountant is required to obtain an understanding of the entity's internal control and assess fraud risk			✓
The accountant is required to perform inquiry and analytical procedures		✓	✓
The accountant is required to perform verification and substantiation procedures			✓
Situations requiring different levels of service	Generally appropriate for privately held companies and are often prepared for simple situations (e.g., a lender needs GAAP financial statements instead of the statements the internal accounting system produces or the lender needs the comfort provided by knowing that an accountant read the financial statements)	Often prepared for privately held companies because of requirements of outside third parties (such as banks, creditors and potential purchasers) that are looking for comfort that the financial statements are not materially misstated	Often prepared for companies because outside third parties (such as banks, creditors, potential purchasers and outside investors) require an auditor's opinion on the financial statements
Differences in costs for each level of service	Involves the lowest amount of work and as a result is far less costly than a review or audit	More costly than a compilation but substantially lower in cost than an audit	Involves the most work and therefore the cost is substantially higher than a review or compilation

Appendix B. CPA Financial Statement Service Report Examples

CPA Firm's Compilation Report

Management is responsible for the accompanying financial statements of XYZ Company, which comprise the balance sheets as of December 31, 20X2 and 20X1 and the related statements of income, changes in stockholders' equity, and cash flows for the years then ended, and the related notes to the financial statements in accordance with accounting principles generally accepted in the United States of America. I (We) have performed compilation engagements in accordance with Statements on Standards for Accounting and Review Services promulgated by the Accounting and Review Services Committee of the AICPA.

I (We) did not audit or review the financial statements nor was (were) I (we) required to perform any procedures to verify the accuracy or completeness of the information provided by management. Accordingly, I (we) do not express an opinion, a conclusion, nor provide any form of assurance on these financial statements.

[Signature of accounting firm or accountant, as appropriate]

[Accountant's city and state]

[Date of the accountant's report]

CPA Firm's Review Report

I (We) have reviewed the accompanying financial statements of XYZ Company, which comprise the balance sheets as of December 31, 20X2 and 20X1, and the related statements of income, changes in stockholders' equity, and cash flows for the years then ended, and the related notes to the financial statements. A review includes primarily applying analytical procedures to management's (owners') financial data and making inquiries of company management (owners). A review is substantially less in scope than an audit, the objective of which is the expression of an opinion regarding the financial statements as a whole. Accordingly, I (we) do not express such an opinion.

Management's Responsibility for the Financial Statements

Management (Owners) is (are) responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement whether due to fraud or error.

Accountant's Responsibility

My (Our) responsibility is to conduct the review engagements in accordance with Statements on Standards for Accounting and Review Services promulgated by the Accounting and Review Services Committee of the AICPA. Those standards require me (us) to perform procedures to obtain limited assurance as a basis for reporting whether I am (we are) aware of any material modifications that should be made to the financial statements for them to be in accordance with accounting principles generally accepted in the United States of America. I (We) believe that the results of my (our) procedures provide a reasonable basis for my (our) conclusion.

Accountant's Conclusion

Based on my (our) reviews, I am (we are) not aware of any material modifications that should be made to the accompanying financial statements in order for them to be in accordance with accounting principles generally accepted in the United States of America.

[Signature of accounting firm or accountant, as appropriate]

[Accountant's city and state]

[Date of the accountant's review report]

CPA Firm's Audit Report

We have audited the accompanying balance sheets of X Company as of December 31, 20X2 and 20X1, and the related statements of income, retained earnings, and cash flows for the years then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above, present fairly, in all material respects, the financial position of X Company as of [at] December 31, 20X2 and 20X1, and the results of its operations and its cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America.

[Signature]

[Date]

Appendix C. Variable Definitions

<i>AbAccruals_{i,t}</i>	Firm <i>i</i> 's abnormal accruals in year <i>t</i> , computed as the residual from estimation of a variant of the modified cross-sectional Jones (1991) model, as outlined in Eq. (4). We estimate the model by industry-year using two-digit NAICS industry codes and require that at least 10 observations be available for each industry-year estimation. (data from Sageworks)
$ AbAccruals _{i,t}$	Firm <i>i</i> 's absolute abnormal accruals in year <i>t</i> , computed as the unsigned residual from <i>AbAccruals</i> . (data from Sageworks)
<i>Accruals_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> total accruals, measured as the change in non-cash current assets minus the change in current non-interest-bearing liabilities, minus depreciation and amortization expense. (data from Sageworks)
<i>AcctsPayable_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> accounts payable divided by ending total assets. (data from Sageworks)
<i>Assets_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> total assets (millions). (data from Sageworks)
<i>AssurFees_{i,t}</i>	Dollar cost of firm <i>i</i> 's year <i>t</i> financial statement service. (data obtained from a Midwest regional accounting firm for 424 client observations)
<i>Audit_{i,t}</i>	An indicator that equals one if firm <i>i</i> receives a financial statement audit in year <i>t</i> and equals zero otherwise. (data from Sageworks)
<i>BankDebt_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> short-term debt plus current portion of long-term debt plus senior debt plus subordinated debt, divided by ending total assets. (data from Sageworks)
<i>CCorp_{i,t}</i>	An indicator that equals one if the firm is incorporated under Subchapter C of the Internal Revenue Code and equals zero otherwise. (data from Sageworks)
<i>CFO_{i,t}</i>	Cash flow from operations calculated as net income minus <i>Accruals</i> divided by ending total assets. (data from Sageworks)
<i>CFstd_{i,t}</i>	Firm <i>i</i> 's standard deviation of cash flows scaled by lagged assets across years <i>t</i> , <i>t</i> -1, and <i>t</i> -2. (data from Sageworks)
<i>Compile_{i,t}</i>	An indicator that equals one if firm <i>i</i> receives a financial statement compilation in year <i>t</i> and equals zero otherwise. (data from Sageworks)
<i>CostOfDebt_{i,t+1}</i>	Firm <i>i</i> 's year <i>t</i> +1 interest expense divided by average <i>Debt</i> outstanding in year <i>t</i> +1. Following Minnis (2011), if debt more than doubles during the year or reduces by half we code it as missing. (data from Sageworks)
<i>CurrRatio_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> ending current assets divided by ending current liabilities. (data from Sageworks)
<i>Debt_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> short-term debt plus current portion of long-term debt plus long-term liabilities. (data from Sageworks)
<i>FScore_{i,t}</i>	A measure of financial statement misstatement likelihood, where larger values are associated with higher probability of material misstatement. Specifically, following Dechow et al. (2011) we compute <i>FScore</i> as $[e^{(PredictedValue)} / (1 + e^{(PredictedValue)})] / 0.0037$, where <i>PredictedValue</i> is computed as in our Eq. (5), and 0.0037 is the unconditional probability of financial misstatement as computed in Dechow et al. (2011). In our Eq. (5), $rsst_acc = [(change\ in\ current\ assets - change\ in\ cash) - (current\ liabilities - change\ in\ current\ long-term\ debt) + (total\ assets - current\ assets) - (total\ liabilities - current\ liabilities - long-term\ liabilities)] / average\ total\ assets$; <i>ch_rec</i> is the change in receivables divided by average total assets; <i>ch_inv</i> is the change in inventory divided by average total assets; $soft_assets = (total\ assets - net\ fixed\ assets - cash) / total\ assets$; <i>ch_cs</i> is the percentage change in cash sales, where cash sales equals sales - change in receivables; $ch_roa = ROA_t - ROA_{t-1}$.
<i>FSDScore_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> financial statement deviation score, which is a measure based on Benford's law that is decreasing in financial reporting quality. <i>FSDScore</i> is computed as in Eq. (3) and measures the extent to which the numbers reported in a given set of financial statements deviate from the theoretical distribution of numbers implied by Benford's law. (data from Sageworks)
<i>Intangibles_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> intangible assets divided by ending total assets. (data from Sageworks)
<i>IntCoverage_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> earnings before interest, taxes, depreciation, and amortization expenses divided by interest expense. (data from Sageworks)
<i>Inventory_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> inventory divided by ending total assets. (data from Sageworks)
<i>Liabilities_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> ending total liabilities divided by ending total assets. (data from Sageworks)
<i>LnAssets_{i,t}</i>	Natural logarithm of firm <i>i</i> 's year <i>t</i> total assets (millions). (data from Sageworks)
<i>NegEquity_{i,t}</i>	An indicator that equals one if firm <i>i</i> 's year <i>t</i> ending total liabilities are greater than ending total assets and equals zero otherwise. (data from Sageworks)
<i>NI_{i,t}</i>	Firm <i>i</i> 's net income divided by ending total assets. (data from Sageworks)
<i>OtherLiab_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> other liabilities, which equals total liabilities minus short-term debt minus current portion of long-term debt minus senior debt minus subordinated debt minus accounts payable, divided by ending total assets. (data from Sageworks)
<i>PPEta_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> ending net value of property, plant, and equipment divided by beginning total assets. (data from Sageworks)
<i>Review_{i,t}</i>	An indicator that equals one if firm <i>i</i> receives a financial statement review in year <i>t</i> and equals zero otherwise. (data from Sageworks)
<i>ROA_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> return on assets. (data from Sageworks)
<i>SalesGrowth_{i,t}</i>	The percentage change in sales from year <i>t</i> -1 to year <i>t</i> . (data from Sageworks)
<i>SalesGrowthSq_{i,t}</i>	<i>SalesGrowth</i> squared. (data from Sageworks)
<i>WorkCapital_{i,t}</i>	Firm <i>i</i> 's year <i>t</i> current assets less current liabilities divided by ending total assets (data from Sageworks)

Appendix D. Cash flow predictability

Appendix D presents results of OLS estimation of a model of cash flow predictability of accruals. All variables are defined in Appendix C. Standard errors clustered by firm are reported below the associated coefficient estimates. *, **, and *** indicate two-sided significance at the 10%, 5% and 1% levels, respectively.

Dep. Var.: Column:	CFO _{t+1} (1)	CFO _{t+1} (2)
<i>Compile</i>	0.0142* 0.0084	0.0045 0.0096
<i>Review</i>	0.0122 0.0083	0.0172* 0.0095
<i>Audit</i>	0.0095 0.0083	0.0185* 0.0096
<i>NI</i>	0.4481*** 0.0591	
<i>Compile*NI</i>	-0.0976 0.0600	
<i>Review*NI</i>	0.0412 0.0459	
<i>Audit*NI</i>	0.0841** 0.0402	
<i>CFO</i>		0.5189*** 0.0325
<i>Compile*CFO</i>		0.0978* 0.0534
<i>Review*CFO</i>		0.0875* 0.0532
<i>Audit*CFO</i>		0.0968* 0.0534
<i>ACC</i>		0.4127*** 0.0457
<i>Compile*ACC</i>		0.0413 0.0418
<i>Review*ACC</i>		0.0853** 0.0414
<i>Audit*ACC</i>		0.0872** 0.0422
Fixed effects	I, Y	I, Y
<i>N</i>	61,170	61,170
<i>R</i> ²	20.17%	22.20%
F-test (<i>Compile*NI</i> – <i>Review*NI</i>)	15.58***	
F-test (<i>Compile*NI</i> – <i>Audit*NI</i>)	16.91***	
F-test (<i>Review*NI</i> – <i>Audit*NI</i>)	2.02	
F-test (<i>Compile*CFO</i> – <i>Review*CFO</i>)		1.44
F-test (<i>Compile*CFO</i> – <i>Audit*CFO</i>)		1.78
F-test (<i>Review*CFO</i> – <i>Audit*CFO</i>)		0.89
F-test (<i>Compile*ACC</i> – <i>Review*ACC</i>)		17.05***
F-test (<i>Compile*ACC</i> – <i>Audit*ACC</i>)		18.12***
F-test (<i>Review*ACC</i> – <i>Audit*ACC</i>)		0.45

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