**Accounting Estimates and Auditors’ Risk Premiums: Evidence from Unexplained Audit Fees**

Jason V. Chen

University of Illinois at Chicago

J. Scott Judd

University of Illinois at Chicago

Thomas Omer

University of Nebraska-Lincoln

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**ABSTRACT**

More accounting estimates increase the risk of an audit engagement because more estimates lead to increased financial statement uncertainty. As a result, on average, firms with more accounting estimates have higher audit fees. However, auditors have some discretion in how they respond to these risks, and the implication of this discretion on accruals estimates quality requires clarification. On the one hand, an auditor may employ additional effort. On the other hand, an auditor can charge the client a risk premium. We find that more accounting estimates are associated with lower accruals estimates quality in the presence of higher unexplained audit fees. Furthermore, additional tests indicate that more estimates are associated with a greater likelihood of future restatements and lower audit report lag for firms with higher unexplained fees. Overall, our results suggest that, on average, an auditor’s discretionary response to more accounting estimates is more indicative of a higher risk premium than additional audit effort.

**Keywords:** accounting estimates, risk premium, audit effort, earnings quality, audit fees

**JEL Classifications: M41, M49**

Corresponding Author: jsjudd@uic.edu. University of Illinois at Chicago, College of Business Administration, 601 S Morgan UH 2302 M/C 006 Chicago, IL 60607. Phone (312) 413-2131. We appreciate helpful feedback from Andrew Imdieke, Brant Christensen, Anne Thompson, Nate Newton, David Stroud (discussant), Melissa Martin, Gus De Franco, workshop participants at West Virginia University and the University of Texas at Arlington, and conference participants at the 2022 University of Illinois at Chicago Accounting Research Conference, the 2023 Hawaii Accounting Research Conference, and the 2023 American Accounting Association Audit Midyear Meeting. All errors are our own.

**1. INTRODUCTION**

The PCAOB proposes that uncertainty surrounding accounting estimates poses a significant risk to auditors.[[1]](#footnote-1) Specifically, AU 312 states that “accounts consisting of amounts derived from accounting estimates pose greater risks than do accounts consisting of relatively routine, factual data.” Prior research elaborates on these concerns by documenting that the number of accounting estimates leads to greater uncertainty in firms’ accruals, which is one explanation for lower total accruals quality (Sloan, 1996; Richardson, Sloan, Soliman, and Tuna, 2005; Chen, Chen, and Li, 2022). This occurs because the compounding of estimates leads to greater uncertainty about their collective outcome (i.e., when there are more estimates, their combined uncertainty is greater). While estimates are an intrinsic part of accruals accounting and regulators continue to acknowledge the challenges auditors face regarding estimates, the impact of the number of accounting estimates on auditors and the implications of how auditors respond are under-explored. Therefore, the primary purpose of this study is to shed light on how auditors respond to firms with more accounting estimates and its impact on accruals estimates quality.

We first establish that auditors, on average, act in expected ways to clients with more accounting estimates. Accounting estimates are difficult to audit because they require subjective forecasts of future events rather than a tally of past events (Griffith, Hammersley, and Kadous, 2015), leading to an increase in the inherent risk of the firm. According to the audit risk model, in such cases, auditors should reduce detection risk to maintain an acceptable level of audit risk, which is achievable through additional substantive testing (Bell, Landsman, and Shackelford, 2001). Another way auditors account for these risks is to charge the client a risk premium for accepting higher audit risk (Hribar, Kravet, and Wilson, 2014). Regardless of whether these risks, on average, lead to auditors exerting more effort (i.e., working more hours), a risk premium, or some combination of both, our baseline prediction is that a greater amount of accounting estimates results in a higher level of audit fees.

To test our baseline prediction, we measure the number of accounting estimates in a firm’s financial statements using the qualitative information found in its Notes to the Financial Statements (hereafter footnotes) of their annual 10-K filing. Chen et al. (2022) suggest that footnotes provide a means for managers to communicate their use of accounting estimates to market participants and find that the number of accounting estimates conveyed in the footnotes is informative of accruals quality. Following their study, we measure the amount of accounting estimates as the number of times the word *estimate* occurs in the footnotes. We then assess the impact of the number of estimates on audit fees. Consistent with our expectations, we find a significantly positive association between the number of accounting estimates and audit fees. Our results suggest that auditors recognize the impact of greater uncertainty associated with more estimates, which increases their risk, on clients’ financial statements and adjust audit fees accordingly. Furthermore, our partial correlation and effect size analyses indicate that the amount of accounting estimates in the financial statements is a significant factor to consider when modeling audit fees.

Prior literature suggests that audit fees represent the level of service provided to a client, which is primarily determined by the characteristics of the engagement (Whisenant, Sankaraguruswamy, and Raghunandan, 2003). However, auditors may have some discretion in what they do and how they respond to accounting estimates. Auditors could respond to firms with more accounting estimates with more audit effort. Audit effort affects the likelihood that auditors identify and correct problems with firms’ financial statements (e.g., Caramanis and Lennox, 2008). Thus, if auditors’ discretionary response indicates more effort, we expect this response to be associated with higher accruals estimates quality. However, uncertainty related to accounting estimates provides a unique challenge for auditors. Specifically, increased auditor effort may not necessarily lead to notable improvements in audit quality because of the forward-looking nature of accounting estimates. Thus, auditors could, alternatively, charge a risk premium for the residual risk remaining after completing the audit procedures for estimates (e.g., Hope, Hu, and Zhao, 2017; Krishnan, Sun, Wang, and Yang, 2013). To the extent that auditors’ discretionary response is more indicative of a risk premium, we expect this response not to be associated with higher accruals estimates quality.[[2]](#footnote-2)

To perform our analysis, we measure the discretionary response by auditors using unexplained audit fees from our audit fees model. We then adopt the models from Chen et al. (2022) to test the association between unexplained audit fees and accruals estimates quality. Hribar et al. (2014) and Dechow and Schrand (2004) define accounting quality as the extent to which accounting information accurately reflects firms’ current operating performance, helps predict future performance, and helps assess firm value.[[3]](#footnote-3) We find incrementally lower accruals estimates quality associated with more accounting estimates in the presence of more unexplained audit fees. This result suggests that auditors’ discretionary response does not lead to improved accruals estimates quality, which is more consistent with the risk premium argument. We then examine the robustness of our results to an alternative measure of financial reporting quality, restatements. We find a positive association between firms with greater amounts of accounting estimates and the likelihood of future restatements for firms with higher unexplained audit fees. This finding provides additional evidence consistent with our principal hypothesis.

Prior studies suggest that a longer audit report lag indicates more audit effort. Therefore, if more accounting estimates in the presence of higher unexplained audit fees are more indicative of a risk premium, then we do not expect them to be associated with longer audit report lag. Consistent with this argument, in additional analyses, we document a negative association between more accounting estimates in the presence of higher unexplained audit fees and audit report lag. This result suggests that higher unexplained audit fees do not result from additional time to complete the audit, i.e., greater auditing effort. This finding is further consistent with the argument that auditors’ discretionary response to firms with more estimates is more indicative of a risk premium.

 Our study makes several contributions to the literature. First, our findings contribute to the literature examining the influence of auditors on accruals quality. Much of this literature provides evidence that auditors constrain income-increasing discretionary accruals (e.g., Becker, DeFond, Jiambalvo, and Subramanyam, 1998; Frankel, Johnson, and Nelson, 2002; Francis and Yu, 2009; Dechow, Ge, and Schrand, 2010; Myers, Myers, and Omer, 2003). Prior studies also suggest associations between greater audit effort, higher ERCs, and better earnings quality (e.g., Caramanis and Lennox, 2008; Francis and Wang, 2008). Griffith et al. (2015) note that insufficient audit effort in testing the underlying data and assumptions of complex accounting estimates is a critical problem that results in an overreliance on management’s process for generating estimates. Our findings of a negative association between unexplained audit fees and accruals estimate quality add to this literature by providing evidence that unexplained audit fees, in this context, are more reflective of a risk premium, which does not result in better accounting quality.

Next, our findings could be of interest to regulators and policymakers. Our results may be informative to the PCAOB as they evaluate the efficacy of the updated auditing standard for accounting estimates (AS 2501). Seidel, Simon, and Stephens (2020) suggest that PCAOB standard-setting may have increased auditor scrutiny of accounting estimates. However, estimates can be problematic for audits because they require more judgment and are more susceptible to managerial error and bias. For example, Ding, Lev, Peng, Sun, and Vasarhelyi (2020) find that estimates from machine learning are superior, in general, to managerial loss estimates. However, complex estimate accuracy only sometimes improves as an auditor performs more work (Griffith et al., 2015). In addition, Stuber and Hogan (2021) find that PCAOB inspections do not improve estimate accuracy suggesting that firms manage inspection risk at the expense of audit quality. We complement these studies by documenting the implications of auditors’ discretionary responses to firms with more accounting estimates. Most notably, we document that a client with more accounting estimates does not have enhanced accruals estimates quality due to auditors receiving higher unexplained audit fees.

Lastly, we contribute to the literature investigating the determinants of audit pricing. Over the past 27 years, many studies have examined the determinants of audit fees, starting with Simunic’s (1980) work on the pricing of audit services (Hay, Knechel, and Wong, 2006). We contribute to this line of research by providing evidence that more accounting estimates, indicative of greater uncertainty, lead to higher audit fees. Furthermore, most studies suggest that higher audit fees are associated with additional audit effort but do not address whether fees may also reflect a risk premium (DeFond and Zhang, 2014). We provide evidence suggesting auditors with unexpectedly higher audit fees do not necessarily enhance firms’ accruals estimates quality. While some prior studies indicate that unexplained audit fees reflect additional audit effort, resulting in improved quality, in the context of our study, unexplained audit fees are more indicative of a risk premium.[[4]](#footnote-4)

The remainder of the paper follows: Section 2 develops our hypotheses. Section 3 describes our data and empirical methodology. Section 4 discusses the empirical results. Section 5 presents additional analyses and the robustness of our results. Lastly, Section 6 concludes.

**2. MOTIVATION AND HYPOTHESES**

**2.1 Baseline Hypothesis**

 Estimates pertain to future events, which are innately challenging to audit, and uncertainty in a firm’s financial statements due to accounting estimates poses a risk to auditors. Martin F. Baumann (PCAOB Chief Auditor and Director of Professional Standards) said, “accounting estimates often represent the areas of greatest risk in an audit.[[5]](#footnote-5) Auditing standards stipulate that “the risk of material misstatement of the financial statements is greater when account balances or classes of transactions include accounting estimates rather than essentially factual data because of the inherent subjectivity in estimating future events (AU 312).” AU 312 highlights the inherent difficulties in auditing accounting estimates because they are subject to the unpredictability of future events, inadequate or inappropriate data, and the misapplication of appropriate data. Griffith et al. (2015) highlight these difficulties in auditing accounting estimates. They suggest that accounting estimates are difficult to audit because of the subjective forecasts of future events rather than recording past events. Therefore, the number of accounting estimates in a firm’s financial statements generates more uncertainty, increasing the firm’s inherent risk.

Based on auditing standards, auditors must make risk assessments of their clients in the audit planning process (Auditing Standard Nos. 8, 12, and 13). Accordingly, auditing standards developed the conceptual audit risk model to help auditors with these risk assessments. The audit risk model stipulated in *Statement on Auditing Standards* (*SAS*) *No. 47* is:

*Audit Risk = Inherent Risk x Control Risk x Detection Risk*

Inherent and control risks exist independent of the auditor. As noted previously, accounting estimates increase firms’ inherent risk because the susceptibility of an assertion to material misstatement is more likely when more estimates exist. To respond to the heightened inherent risk, an auditor reduces the level of detection risk. According to the audit risk model, reduced detection risk should result in additional substantive testing.

The prior research contains examples of how auditors respond to various risk factors. In their meta-analysis on audit fees, Hay et al. (2006) review the existing literature to highlight how auditors adjust audits considering the clients’ various risk factors. For example, O’Keefe, Simunic, and Stein (1994) document that size, complexity, and risk measures explain approximately 80 percent of the cross-sectional variation in audit hours. Bell et al. (2001) use survey data to document increased audit hours worked when client business risk is higher. Gul, Chen, and Tsui (2003) find that auditors charge higher fees to firms with higher discretionary accruals. Overall, these studies and others (e.g., Charles, Glover, and Sharp, 2010; De George, Ferguson, and Spear, 2013; Lennox and Kausar, 2017; Moon and Swanquist, 2018) support the claim that auditors expand the scope of their audit to generate additional audit evidence for clients with higher inherent risk. The increased audit effort should translate into higher audit fees.

Auditors could also respond to clients’ greater inherent risk related to higher accrual estimates by charging a risk premium rather than increasing audit effort (Bell, Doogar, and Solomon, 2008; Hribar et al., 2014). We note that this can occur by having more of the work done by upper-level audit team members (i.e., partners and managers), bringing on specialists, etc. Whether the auditor responds to greater inherent risk from estimates with more effort, a fee premium, or both, more accounting estimates should result in higher audit fees.[[6]](#footnote-6)

Based on the above discussion, we state our baseline hypothesis as follows:

**Baseline Hypothesis: Auditors charge higher audit fees for clients with more estimates**

**2.2. Principal Hypothesis**

Prior research suggests that one reason for lower accruals quality is the number of accounting estimates in a firm’s financial statements (Sloan, 1996; Barth, Beaver, Hand, and Landsman, 1999).[[7]](#footnote-7) Chen et al. (2022) find that more accounting estimates lead to lower-quality accruals, suggesting that accounting estimates play a role in financial reporting quality. In addition, prior studies indicate that accrual estimates quality is a joint product of the manager and the auditor (Magee and Tseng, 1990; Dye, 1991; Antle and Nalebuff, 1991) and that auditors can positively impact financial reporting quality (Krishnan, 2003a; DeFond and Zhang, 2014). For example, prior research finds that Big N auditors (Becker et al., 1998; DeFond and Subramanyam, 1998; Francis, Maydew, and Sparks, 1999), larger audit offices (Francis and Yu, 2009), auditor effort (Caramanis and Lennox, 2008), industry expertise (Krishnan, 2003b), and auditor tenure (Myers et al., 2003) positively impact firm’s financial reporting quality. Therefore, a higher-quality audit may improve accruals estimates quality.

However, the uncertainty related to the number of accounting estimates provides a unique audit challenge. Prior studies suggest auditors can experience significant problems auditing estimates, risking financial reporting quality (Griffith, Hammersley, Kadous, and Young, 2015). Furthermore, Griffith et al. (2015) note that auditors can over-rely on management’s process for generating estimates because of the inherent difficulties in auditing accounting estimates; Auditors can fail to adequately test the underlying data and assumptions used in management’s estimates. A recent experimental study by Wolfe, Fitzgerald, and Newton (2017) suggests that management presentations of alternative estimates bias auditors toward a management-preferred estimate. Therefore, the more accounting estimates in firms’ financial statements, the more uncertain or difficult it is to audit the estimates. Consistent with this notion, PCAOB inspectors continue identifying deficiencies in auditing accounting estimates.[[8]](#footnote-8) The auditor can address the uncertainty from accounting estimates by reporting more conservatively. Francis and Krishnan (1999) find evidence consistent with this argument by providing evidence that auditors are more likely to issue a modified audit report for high-accrual firms.

Therefore, the implications of an auditor’s discretionary response on accruals estimates quality are unclear. As noted in relevant auditing standards, auditors should obtain evidence that is more persuasive in the presence of higher levels of risk (Auditing Standard No. 13). The more hours an auditor works on testing and verifying the financial statements (i.e., greater auditor effort), the greater likelihood the auditor has of identifying problems with firms’ financial statements. Thus, audit effort affects the probability that the auditor detects an existing problem in clients’ financial statements (Caramanis and Lennox, 2008).[[9]](#footnote-9) When clients have low audit fees, the auditor is more likely to over-rely on client controls and reduce substantive testing (i.e., less audit effort) to ensure the profitability of the engagement (Blankley et al., 2012). However, in doing so, the auditor is less likely to identify problems within firms’ financial statements. Using a unique database from Greece that compiles the hours an auditor worked on their client, Caramanis and Lennox (2008) find that low audit effort increases firms’ ability to be more aggressive in reporting their earnings.

Further, Blankley et al. (2012) find that restatement firm auditors charged unexpectedly low audit fees the year before the restatement, suggesting a lack of auditor effort. Relatedly, Lobo and Zhao (2013) argue that unexplained audit fees reflect audit effort, as documented by their study’s negative association between unexplained audit fees and annual report restatements. Further, Eshleman and Guo (2014) also support the argument that unexplained audit fees indicate greater audit effort by documenting a positive association between unexplained audit fees and audit quality measures. To the extent that an auditor’s unexpected response reflects more effort, we expect the discretion in an auditor’s response to be positively associated with a client’s accruals estimates quality.

 However, due to the uncertainty from the forward-looking nature of accounting estimates, greater effort may not lead to improved audit quality. Prior studies suggest that auditors can impose a risk premium when providing additional effort to improve quality (i.e., lower audit risk) is not a productive course of action (e.g., Krishnan et al., 2013; Doogar, Sivadasan, and Solomon, 2015; Hope et al., 2017). Auditors may require a risk premium to compensate for the residual risk not reduced through further detection efforts (Krishnan et al., 2013). This residual risk could lead to more accounting quality issues. Consistent with this notion, Hribar et al. (2014) find positive associations between unexplained audit fees and restatements, fraud, and SEC comment letters. These results suggest that unexplained audit fees are associated with lower-quality audits. In addition, Asthana and Boone (2012) document that absolute discretionary accruals and the probability of meeting or beating earnings forecasts increase as the auditor receives abnormally higher audit fees, which indicates an association between unexplained audit fees and a lower quality audit.

Furthermore, additional audit fees received from an auditor’s discretionary response can reduce auditors’ independence, which can influence the willingness of auditors to question clients’ financial statements. Consistent with this notion, Choi, Kim, and Zang (2010) suggest that abnormally high audit fees incentivize auditors to acquiesce to client pressure resulting in reduced audit quality, finding results consistent with that argument. To the extent that an auditor’s unexpected response indicates a risk premium, we expect a negative association between the discretion in auditors’ responses and clients’ accruals estimates quality.

Based on the above arguments, we state our principal hypothesis in null form as follows:

**Principal Hypothesis: There is no association between the discretion in an auditor’s response and accrual estimates quality**

**3. DATA AND METHODOLOGY**

**3.1 Sample Selection**

Our primary sample is primarily from the intersection of Compustat, Audit Analytics, and firms’ 10-K filings and contains fiscal periods between 2000 and 2020.[[10]](#footnote-10),[[11]](#footnote-11) We merge data from Audit Analytics with Compustat eliminating any firm-year observations unavailable in Audit Analytics. Finally, we merge additional firm-level data from Compustat Annual and our estimates measure. We eliminate any firm-year observations missing relevant data for variables from Compustat, Audit Analytics, or our estimates measure. This selection process results in a final sample size of 42,568 firm-year observations. We winsorize all continuous variables at the 1st and 99th percentiles to reduce the influence of outliers.

**3.2 Measuring the Amount of Accounting Estimates**

 We measure the amount of accounting estimates in firms’ financial statements using the number of estimates mentioned in the qualitative portions of firms’ footnotes. This section of 10-K filings provides information about the accruals-generating process, including discussions about the accounting estimates needed when generating accruals (Chen et al., 2022). Consistent with this, they find that the number of accounting estimates gleaned from the footnotes is associated in expected ways with determinants of accrual quality and is informative of the quality of the accruals portion of earnings but not the cash flows portion.

Following Chen et al. (2022), $Estimates\_{i,t}$ is the number of times the word *estimate* occurs in the footnotes. This count incorporates the relations between the words in each sentence of the footnotes. Specifically, Chen et al. (2022) indicate that considering the connections between words in a sentence provides more context to the use of each word. To illustrate this point, consider the following sentence: “We estimated cash flows and a discount rate.” A simple word count of the word *estimate* yields a count of 1. However, this sentence indicates two estimates, *cash flows* and *discount rate*. Since *estimated* relates to *cash flows* and *discount rate*, their method yields a count of 2 for the number of accounting estimates. Further details about this method are in Chen et al. (2022).

**3.3 Empirical Models**

We begin our analysis by examining the incremental informativeness of the number of accounting estimates for audit fees using the following model:

|  |  |
| --- | --- |
| $$AuditFees\_{i,t}=β\_{0}+β\_{1}\*Estimates\_{i,t}+Σβ\_{j}\*Controls\_{i,t}+IndFE\_{i,t}+YearFE\_{i,t}$$$$+AuditorFE\_{i,t}+ϵ,$$ | (1) |

where $AuditFees\_{i,t}$ is the external audit fees for firm *i* in year *t*. $Estimates\_{i,t}$ is the number of accounting estimates from the footnotes section of 10-K filings (Chen et al., 2022). $Controls\_{i,t}$ are the audit fee determinants from Messier, Reynolds, Simon, and Wood (2011). These determinants include assets, inventory risk, complexity, leverage, return on assets, loss indicator, non-audit fees, Big N indicator, specialist indicator, Andersen indicator, December year-end indicator, current ratio, acquisition accounts indicator, auditor change indicator, going concern opinion indicator, foreign sales indicator, weak internal controls indicator, restatement indicator, audit report lag, and auditor tenure. See Appendix 1 for detailed variable descriptions. $IndFE\_{i,t}$ is industry fixed effects, using 2-digit SIC codes, and $YearFE\_{i,t}$ is fiscal year fixed effects. $AuditorFE\_{i,t}$ is audit firm fixed effects.

To test our principal hypothesis, we first construct a measure of the discretion in an auditor’s response to a greater number of accounting estimates as the residual from model (1).[[12]](#footnote-12) We then use the following model to examine how the association between the number of accounting estimates and unexplained audit fees impacts accruals estimates quality:

|  |  |
| --- | --- |
| $$Estimates Quality\_{i,t}=β\_{0}+β\_{1}\*Estimates\_{i,t}+β\_{2}\*UAuditFees\_{i,t}$$$$+β\_{3}\*Estimates\_{i,t}\*UAuditFees\_{i,t}+Σβ\_{i}\*Controls\_{i,t}$$$$+IndFE\_{i,t}+YearFE\_{i,t}+AuditorFE\_{i,t}+ϵ,$$ | (2) |

where $Estimates Quality\_{i,t}$is one of two measures: (1) $SD DDRes\_{i,t}$ and (2) $|Abn Accruals\_{i,t}$|. $SD DDRes.\_{i,t}$ is the standard deviation of the residual from the Dechow and Dichev (2002) model over the prior five years (three years minimum). The standard deviation of the residual from the model for each firm over the past five years (three-year minimum) indicates how well firms’ accruals map into cash flows (Dechow and Dichev, 2002).[[13]](#footnote-13) $Abn Accruals\_{i,t}$ is discretionary accruals measured as the residual from the modified Jones Model (Jones, 1992; Dechow, Sloan, and Sweeney, 1995). DeFond and Zhang (2014) noted that financial reporting quality proxies, such as discretionary accruals, are appealing as they are designed to detect opportunistic earnings management.

$Estimates\_{i,t}$ is defined previously and follows Chen et al., 2022. $UAuditFees\_{i,t}$ is the residual from the audit fees determinants model. $Controls\_{i,t}$ are the determinants of accruals quality (Dechow and Dichev, 2002) and include assets, loss indicator, the standard deviation of sales over the prior five years (three years minimum), the standard deviation of cash flows over the prior five years (three years minimum), and the length of the firms operating cycle. We acknowledge that including $UAuditFees\_{i,t}$ can lead to biased coefficients and standard errors, as suggested by Chen, Hribar, and Melessa (2018). Therefore, we follow an approach documented by Chen et al. (2018) to eliminate this bias. Specifically, we include all regressors from the model of $AuditFees\_{i,t}$, shown in model (1),as controls in model (2). Refer to Appendix 1 for detailed variable descriptions. $IndFE\_{i,t}$ is industry fixed effects using 2-digit SIC codes and $YearFE\_{i,t}$ is fiscal year fixed effects. $AuditorFE\_{i,t}$ is audit firm fixed effects.

**4. EMPIRICAL RESULTS**

**4.1 Descriptive Statistics and Univariate Results**

Table 1 reports descriptive statistics for our audit fees (Panel A) and audit quality (Panel B) samples. Across all three samples, we note that $Estimates\_{i,t}$ is similar. In Panel A, we note that $AuditFees\_{i,t}$ has a mean of 13.485, which indicates that average audit fees for our firm-year observations are approximately $718,557.[[14]](#footnote-14) The mean (median) natural log of total assets is 6.203 (6.186) for our sample firms, suggesting the average firm-year observation has total assets of approximately $494 ($486) million.[[15]](#footnote-15) Big N accounting firms audit 75.5 percent of firm-year observations, and the average auditor tenure is about ten years. A national specialist auditor audits 24.1 percent of our firm-year observations. Approximately 37 percent of our sample observations are firm loss years. Finally, the mean (median) of $ROA\_{i,t}$ is -6.7 percent (2.1 percent), suggesting that loss firms tend to have significant losses. In Panel B, we find that $SD DDRes.\_{i,t}$ and $Abn Accruals\_{i,t}$ have means of 0.085 and 0.091, respectively. The mean (median) natural log of total assets is 6.171 (6.125), consistent with our audit fee model. We also note that 36.4 percent of firm-year observations have negative earnings.

< INSERT TABLE 1 HERE >

**4.2 Multivariate Results**

Table 2 presents the results of our multivariate regression analysis on the effect of $Estimates\_{i,t}$ on audit fees. We find that the coefficient on $Estimates\_{i,t}$ is significantly positive (coefficient of 0.139 and significant at the 0.01 level), indicating that firms with more estimates are associated with greater audit fees. Regarding economic significance, a one standard deviation increase in estimates translates into a 9.9 percent increase in audit fees.[[16]](#footnote-16) A 9.9 percent increase in audit fees for our mean (median) firm is $71,137 ($73,524). Overall, Table 2 provides evidence consistent with our baseline hypothesis that auditors respond to the greater uncertainty associated with more estimates by charging higher audit fees.

 Table 2 also indicates that the signs on the coefficients for the control variables are consistent with prior research (e.g., Messier et al., 2011). We note positive and significant $Assets\_{i,t}$*,* $Irisk\_{i,t}$*,* $Complexity\_{i,t}$*,* $Leverage\_{i,t}$*,* $Loss\_{i,t}$*,*$ NationalSpecialist\_{i,t}$*,* $GoingConcern\_{i,t}$*,* $Foreign\_{i,t}$*,* $AuditLag\_{i,t}$*,* and $Tenure\_{i,t}$ coefficients. We also note negative and significant $ROA\_{i,t}$*,* $NonAuditFees\_{i,t}$*,* $CurrentRatio\_{i,t}$*,* and $AuditorChange\_{i,t}$ coefficients. Inconsistent with prior studies, we note that the coefficient on $Anderson\_{i,t}$is positive yet statistically insignificant, whereas the $BigN\_{i,t}$ and $Acquisition\_{i,t}$ coefficients are negative and significant.[[17]](#footnote-17) The adjusted R-squared is 0.838, which indicates that our audit fee model explanatory power is consistent with prior studies.

< INSERT TABLE 2 HERE >

 To avoid overreliance on the significance of statistical correlations in our analyses from Table 2, we also conduct partial correlation and effects size analyses. These analyses provide an understanding of the impact of estimates on audit fees, conditional on the other determinants in the audit fees model. Our findings from these analyses are in Table 3. Unsurprisingly, we find that firm size, measured by $Assets\_{i,t}$, has the largest semi-partial correlation of 0.495. This semi-partial correlation suggests that firm size explains a significant amount of the conditional variation in the audit fees received by the auditor. Interestingly, we find a semi-partial correlation of 0.113 for $Estimates\_{i,t}$. Of the 18 determinants included in the model, the number of accounting estimates explains the fourth most amount of conditional variation; It explains substantially more variation in audit fees than a number of the common determinants, such as $BigN\_{i,t}$,$Loss\_{i,t}$,$NationalSpecialist\_{i,t}$, and$Complexity\_{i,t}$. In addition, we present the results of our effect size (ω2) analysis in the last column of Table 3. We note that the overall effect size of our model is 0.787, untabulated, which suggests that our determinants model explains a substantial portion of audit fees. While the absolute magnitude of the effect size on $Estimates\_{i,t}$ of 0.057 is small, the number of accounting estimates is the fourth largest relative effect size. This result suggests that the number of accounting estimates is a strong determinant of audit fees compared to other commonly included audit fee model characteristics. Together, these findings support the argument to include $Estimates\_{i,t}$ in the audit fee model because of its effect on audit fees relative to other more familiar audit fee determinants.

< INSERT TABLE 3 HERE >

 Table 4 presents the results examining whether auditors with higher unexplained audit fees can mitigate the effect of more estimates on accruals estimates quality.[[18]](#footnote-18) In columns 1 (3) and 2 (4), we present the results with $SD DDRes.\_{i,t}$ ($Abn Accruals\_{i,t}$) as our dependent variable. First, in column (1), we find a positive association between greater estimates and the standard deviation of the DD residual consistent with prior research (Chen et al., 2022). In addition, we also find a positive association between greater estimates and abnormal accruals. Furthermore, we find that the directions of the estimated coefficients on the determinants of accruals estimates quality are consistent with prior studies (Chen et al., 2022; Francis, LaFond, Olsson, and Schipper, 2005; Dechow and Dichev, 2002).

Next, in column (2) of Table 4, we add in $UAuditFees\_{i,t}$ and the interaction between $UAuditFees\_{i,t}$and $Estimates\_{i,t}$.[[19]](#footnote-19) We find a positive and significant $UAuditFees\_{i,t}$coefficient (coefficient of 0.005 and significant at the 0.10 level). This finding suggests an association between unexplained audit fees and greater accrual errors. Therefore, firms paying unexpectedly higher audit fees exhibit a weaker association between accruals and cash flows. Above all, we find the $Estimates\_{i,t}$and $UAuditFees\_{i,t}$interaction coefficient is positive and significant (coefficient of 0.002 and significant at the 0.05 level). This finding provides evidence that accruals estimates quality for firms with more accounting estimates is lower when those firms pay abnormally high audit fees. In column (4), we find a negative and significant $UAuditFees\_{i,t}$ coefficient (coefficient of -0.009 and significant at the 0.10 level). This suggests that unexplained audit fees are associated with lower abnormal accruals, reflective of better accruals estimates quality. More importantly, we find that the interaction between $Estimates\_{i,t}$and $UAuditFees\_{i,t}$ is positive and significant (coefficient of 0.005 and significant at the 0.05 level). This finding also supports the notion that accruals estimates quality for firms with more accounting estimates is lower when those firms pay abnormally high audit fees.

Overall, the results in Table 4 support the notion that the added fees an auditor receives from their discretionary response are not associated with enhanced audit quality. This finding supports the argument that unexplained audit fees are more reflective of a risk premium that does not provide enhanced financial reporting to the client. These results also provide some insights regarding the quality of a firm’s estimates. Specifically, higher unexplained audit fees indicate lower accruals estimates quality for a given level of estimates. Thus, unexplained audit fees, in part, indicate the inherent challenges auditors face regarding a client’s accounting estimates.

< INSERT TABLE 4 HERE >

**4.3 Restatements**

DeFond and Zhang (2014) suggest that financial reporting quality measures, such as accruals quality, may be subject to measurement error and bias. Therefore, in this section, we seek to provide additional evidence consistent with our principal hypothesis by examining another financial reporting quality measure, restatements, which is more direct and egregious. Restatements indicate instances where the auditor had issued an unqualified audit opinion when the financial statements contained a material misstatement and are the most observable indicator of low audit quality (DeFond and Zhang, 2014; Christensen, Glover, Omer, and Shelley, 2016).[[20]](#footnote-20)

We first extend the findings of Chen et al. (2022) by examining whether the number of accounting estimates affects the likelihood of restatements. As noted, the risk of material misstatement is higher when the financial statements contain more accounting estimates (AU 312) because accounting estimates contain subjective forecasts of future events that generate more uncertainty (Griffith et al., 2015). Therefore, we expect firms with more estimates to have more difficulty applying GAAP and have a higher likelihood of restatements.

We next examine whether an auditor’s response to the number of accounting estimates is related to the likelihood of a restatement. Restatements can occur for numerous reasons; however, the auditor must bear responsibility for failing to identify the misstatement. Specifically, Francis et al. (2013) argue that auditors are at least partially culpable for restatements involving complex accounting standards regarding the quality of their judgments in interpreting those standards. Therefore, an auditor providing a higher-quality audit will be more likely to detect and correct material misstatements, lowering the incidence of restatements. Our arguments for whether auditors’ response to accounting estimates is associated with the quality of a client’s accruals also generate a similar prediction for the likelihood of a restatement.

To assess our predictions, we follow prior research, which examines determinates of the probability of a restatement of a firm (Cao, Myers, and Omer, 2012). In addition to controlling for determinates of restatements, we include controls for the innate determinants of accruals quality, which may also be related to restatement risk (Dechow and Dichev, 2002).

|  |  |
| --- | --- |
| $$Restatement\_{i,t}=β\_{0}+β\_{1}\*Estimates\_{i,t}+β\_{2}\*UAuditFees\_{i,t}$$$$+β\_{3}\*Estimates\_{i,t}\*UAuditFees\_{i,t}+Σβ\_{i}\*Controls\_{i,t}$$$$+IndFE\_{i,t}+YearFE\_{i,t}+AuditorFE\_{i,t}+ϵ,$$ | (3) |

where $Restatement\_{i,t}$ is an indicator variable equal to one when the firm subsequently restates its financial statements for a given year and zero otherwise. $Estimates\_{i,t}$ and $UAuditFees\_{i,t}$ are defined previously. Controls include determinants of accruals quality and misstatements: size, loss indicator, the standard deviation of sales over the prior five years (three years minimum), the standard deviation of cash flows over the prior five years (three years minimum), length of the operating cycle, book-to-market, leverage, return on assets, percentage of assets in receivable and inventory, merger indicator, financing indicator, daily return volatility over the prior two years, external audit fees, non-audit fees, foreign and segments sales concentration (Herfindahl-Hirschman Index), national specialist, board of director size, the percentage of independent board of director members, percentage of outstanding shares owned by executives and board of director members, and the tenure of the CEO. To address potential bias in the coefficients and standard errors, as noted by Chen et al. (2018), by including $UAuditFees\_{i,t}$we also include all regressors from model (1) as control variables. We estimate the model using OLS and include fixed effects for auditor, industry, and year. Appendix 1 provides details for each of the variables.[[21]](#footnote-21)

 Table 5 presents the results of this analysis. In Panel A of Table 5, we present the descriptive statistics for our restatement sample. We find that $Restatement\_{i,t}$ is 0.168, suggesting that 16.8 percent of firm-year observations have financial statements that are subsequently restated. We also note that the control variables that overlap our audit fee and accruals estimates quality samples have consistent summary statistics. In Panel B of Table 5, we present the results of our multivariate analysis. In column (1), we exclude $UAuditFees\_{i,t}$and the interaction between $UAuditFees\_{i,t}$and $Estimates\_{i,t}$.[[22]](#footnote-22) Column (2) presents the results for Model (3).[[23]](#footnote-23) In columns (1) and (2), we find that the $Estimates\_{i,t}$ coefficient is positive (0.026 and 0.024, respectively) and significant (p-value < 0.01), suggesting that the odds of a restatement for firms with more estimates are two percent higher. These results suggest that firms with a greater number of estimates have a higher likelihood of restatement. Next, the $Estimates\_{i,t}\*UAuditFees\_{i,t}$ coefficient is positive (a coefficient of 0.022) and significant (at the 0.05 level) in column (2). This result suggests that more accounting estimates, in the presence of higher unexplained audit fees, increase the odds of a restatement by approximately two percent.

Overall, our findings are consistent with our earlier results that auditors receiving higher unexplained audit fees are not associated with a higher quality audit of accounting estimates. These results indicate that unexplained audit fees are less likely to represent additional auditor effort, and instead, these results are more consistent with an increased audit risk premium. Like our principal analysis, these results also suggest that higher unexplained audit fees indicate lower accruals estimates quality for a given level of estimates.

< INSERT TABLE 5 HERE >

**5. ADDITIONAL ANALYSES**

**5.1 Audit Report Lag**

 Our results thus far indicate that an auditor’s response to a client with greater accounting estimates are more indicative of a risk premium than additional audit effort. Prior studies intuitively suggest that hours worked are an appropriate proxy for audit effort (Davis, Ricchiute, and Trompeter, 1993). However, audit hours are not easily obtainable. Therefore, prior research commonly relies on more widely available proxies, such as audit report lag.[[24]](#footnote-24) Audit report lag is typically associated with a more thorough audit (e.g., Knechel and Payne, 2001; Knechel, Rouse, and Schelleman, 2009; Zhang, 2018). To the extent that the unexplained audit fees represent a risk fee premium, we expect to find either a negative or no relation between unexplained audit fees and audit report lag. On the other hand, if they capture more audit effort for firms with more accounting estimates, we expect a positive association with audit report lag. To assess our predictions, we use the following audit lag model adapted from Knechel and Sharma (2012):

|  |  |
| --- | --- |
| $AuditLag\_{i,t}=β\_{0}+β\_{1}\*Estimates\_{i,t}+β\_{2}\*UAuditFees\_{i,t}$$$+β\_{3}\*Estimates\_{i,t}\*UAuditFees\_{i,t}+Σβ\_{i}\*Controls\_{i,t}$$$+IndFE\_{i,t}+YearFE\_{i,t}+AuditorFE\_{i,t}+ϵ$,  | (4) |

where $AuditLag\_{i,t}$ is the difference between companies’ fiscal year-end and audit report issuance dates. $Estimates\_{i,t}$ and $UAuditFees\_{i,t}$ are defined previously. Controls include the following: auditor tenure, non-audit fees, size, loss indicator, SPI, age, an indicator for December fiscal year-end firms, an indicator for firms that had EPS that was greater than the prior year, leverage, the ratio of current assets to current liabilities, number of business segments, going concern opinion indicator, restatement indicator, and book-to-market. As in previous analyses, we also include all regressors from model (1) as control variables to address potential bias in the coefficients and standard errors (Chen et al., 2018). We also include auditor, industry, and year-fixed effects. Appendix 1 provides detailed descriptions for each of the variables.

 Table 6 presents the results of Model (4). Column 1 (2) presents results excluding (including) $UAuditFees\_{i,t}$ and the interaction of $Estimates\_{i,t}$and $UAuditFees\_{i,t}$. In addition, we again exclude the first-stage regression variables in column (1). In columns (1) and (2), we find positive and significant $Estimates\_{i,t}$ coefficients. This result suggests that the audit report lag increases as accounting estimates increase. In column (2), the $UAuditFees\_{i,t}$ coefficient is positive and significant, which suggests an association between the receipt of higher unexplained audit fees and a more thorough audit, consistent with prior research (e.g., Davis et al., 1993). Finally, the $Estimates\_{i,t}\*UAuditFees\_{i,t}$, interaction coefficient is negative (-0.008) and significant (p-value < 0.01). This result suggests an association between more accounting estimates and a decrease in audit report lag in the presence of higher unexplained audit fees. This result, combined with our earlier findings, suggests that higher unexplained audit fees, in the context of our study, are more likely to result from a risk premium than additional audit effort. Finally, this result also corroborates our insights regarding the quality of a firm’s estimates, i.e., holding estimates constant, higher unexplained audit fees reflect lower accruals estimates quality.

< INSERT TABLE 6 HERE >

**5.2 Additional Analysis: Auditor Busyness**

As noted by Goodwin and Wu (2016), attention demands time, and when individuals must allocate attention across multiple projects or activities, attention inevitably limits an individual’s span of control. In addition, the escalating workload of the busy season leads to employee burnout (Sweeney and Summer, 2002). These factors limit an auditor’s ability to perform consistently at a high level. Lopez and Peters (2012) find that busy season companies and the concentration of busy season engagements in an auditor’s portfolio are associated with reduced audit quality. Therefore, we expect that the effect of workload compression during the busy season will magnify the results in our principal analyses.

We construct a measure of auditor busyness following prior studies to perform our analyses. Since most public companies close their fiscal year in December, this creates a condition known as the busy season for public accounting firms. Thus, we follow prior studies, such as Lopez and Peters (2011, 2012), to measure auditor busyness. Specifically, $BusySeason\_{i,t}$is an indicator variable equal to 1 if a company has a fiscal-year end in December and 0 otherwise.

For our baseline analysis, we include $BusySeason\_{i,t}$and its’ interaction with *Estimates* in Model (1). Table 7 presents the results of this analysis. First, the estimated coefficient on $Estimates\_{i,t}$is positive and significant, consistent with our baseline hypothesis. Next, we note that $BusySeason\_{i,t}$is also positive and significant, suggesting that audit fees are higher for clients with a December fiscal year end. Finally, we note that the interaction term, $Estimates x BusySeason\_{i,t}$, is negative (-0.040) and significant (p-value < 0.05). This finding suggests that auditors charge incrementally lower audit fees for clients with more estimates during the busy season. We argue that this finding may be caused by an auditor’s inability to put forth the additional effort necessary to audit the greater number of accounting estimates.

< INSERT TABLE 7 HERE >

Next, we examine whether auditor busyness affects clients’ accruals estimates quality. To perform this analysis, we rerun model (2) on sample splits for whether the client is a busy season client. Table 8 presents the results of this analysis. In columns (1) ((3)) and (2) ((4)), the accruals estimates quality variable of interest is $SS DD Res\_{i,t}$($|Abn. Accruals\_{i,t}|$). In column (1), we note a negative and statistically insignificant coefficient on the interaction term, $Estimates\_{i,t}\*UAuditFees\_{i,t}$; whereas, in column (2), we document a positive (0.03) and significant (p-value < 0.01) effect on the interaction term. Furthermore, the estimated coefficients are significantly different (p-value of 0.057). Thus, higher unexplained audit fees for a given level of estimates is indicative of lower accruals estimates quality for busy season clients. In column (3), we find a statistically insignificant coefficient on the interaction term, $Estimates\_{i,t}\*UAuditFees\_{i,t}$*,* and in column (4), we document a positive (0.05) and significant (p-value < 0.10) coefficient on this term. The finding on the interaction term in column (4) is consistent with the argument that higher unexplained audit fees for a given level of estimates reflect lower accruals estimates quality for busy season audit clients. However, we find that the coefficients are not statistically different from one another (p-value = 0.501). Thus, we acknowledge that when accruals estimates quality is measured by $|Abn. Accruals\_{i,t}|$*,* our evidence is more limited. Overall, we find evidence in Table 8 to support the argument that workload compression from auditing busy season clients can limit an auditor’s ability to improve accruals estimates quality for clients with more estimates.

< INSERT TABLE 8 HERE >

Finally, we examine whether the likelihood of restatements is impacted by auditor busyness. We rerun model (3) on sample splits for busy and non-busy season clients to perform this analysis. Table 9 presents the results of this analysis. In column (1), we note that the interaction term of $Estimates\_{i,t}\*UAuditFees\_{i,t}$is positive but statistically insignificant for non-busy season clients. In column (2), we note that the interaction term, $Estimates\_{i,t}\*UAuditFees\_{i,t}$, is positive (0.023) and significant (p-value < 0.05) for busy season clients. We also note that the coefficients are statistically different (p-value = 0.05). Thus, higher unexplained audit fees indicate lower accruals estimates quality for a given level of estimates is concentrated among busy season clients. This result suggests that workload compression during the busy season may limit an auditor’s ability to address the uncertainty associated with more accounting estimates.

< INSERT TABLE 9 HERE >

**5.3 Additional Analysis: Length**

 Chen et al. (2022) indicate that one potential concern about the variable $Estimates\_{i,t}$ is that it correlates with the length of the footnotes. Therefore, to ensure the robustness of our results, we rerun all principal analyses to include a measure of footnote length as a control variable. To measure footnote length, we follow Chen et al. (2022) and compute the log of one plus the number of non-stop words in the footnotes ($Length\_{i,t}$). In untabulated analyses, we continue to find that estimates are positively associated with audit fees. More importantly, consistent with our primary analyses, we find that accounting estimates, in the presence of higher unexplained audit fees, are associated with incrementally lower accruals estimates quality, increased likelihood of future restatements, and incrementally lower audit report lag.

**5.4 Additional Analysis: Post-SOX**

The auditing environment drastically changed with the passage of the Sarbanes-Oxley Act in July 2002. As a result, we seek to rule out a concern that our results could derive solely from the pre-SOX period, a much different auditing environment than today. To perform this analysis, we restrict our sample period to the post-SOX period (i.e., 2003 – 2020) and rerun our primary analyses on the revised sample period. In untabulated analyses, our results are quantitatively and qualitatively similar. Thus, our findings do not result from the different regulatory environment before SOX.

**6. CONCLUSION**

 The use of more accounting estimates can pose a greater risk to auditors. Consistent with our expectations, firms with more accounting estimates have higher audit fees. However, auditors have some discretion in how they respond to firms with more accounting estimates. To explore our principal research question, we examine the implications of an auditor’s discretionary response on accruals estimates quality to determine how they respond. An auditor can respond with more effort because of the greater uncertainty associated with a higher number of accounting estimates. If auditors exert greater effort, we expect this discretionary response to be associated with higher accruals estimates quality. However, additional effort may not enhance audit quality due to the inherent difficulties in validating the forward-looking nature of accounting estimates. Thus, auditors may charge a risk premium to compensate for the added riskiness beyond the work performed by the auditor. If auditors charge a risk premium, we expect a negative association between the discretion in an auditor’s response and accruals estimates quality.

 To perform our analyses, we measure the total use of accounting estimates in firms’ financial statements using the qualitative information in firms’ footnotes. Using this measure, we first examine our baseline hypothesis that the aggregate use of accounting estimates is positively associated with audit fees and find evidence consistent with our expectations. A one standard deviation increase in the number of accounting estimates suggests an increase in audit fees by 9.9 percent. Furthermore, accounting estimates are one of the primary determinants of audit fees. We next examine the association between an auditor’s discretionary response and the quality of firms’ accruals estimates, using unexplained audit fees to measure the discretion in an auditor’s response. Accounting estimates result in incrementally lower accruals estimates quality for firms with greater unexplained audit fees. We then find that more accounting estimates, in the presence of higher unexplained audit fees, are associated with an increased likelihood of future restatements. Finally, we document that accounting estimates are associated with incrementally lower audit report lag for firms with higher unexplained audit fees. Overall, these findings suggest that higher unexplained audit fees, in our study, are more indicative of a risk premium, which does not lead to improved audit quality.

 Our study contributes to prior literature examining the influence of auditors on accruals quality. We find that unexplained audit fees are not associated with improved accruals estimates quality, indicating that higher unexplained audit fees, in the context of our study, reflect a risk premium that does not translate into the enhanced quality of firms’ accounting estimates. Our results may interest regulators and policymakers as they evaluate the effectiveness of the recently updated standard related to auditing accounting estimates. Finally, we contribute to the literature on the determinants of audit fees by providing evidence that accounting estimates are associated with higher audit fees and are an important determinant of audit fees.

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| **Appendix 1** |
| **Variables Descriptions** |
| Variable | Description |
| *Abn. Accrualsi,t* | Abnormal accruals measured as the residual from the modified Jones Model (Jones 1992; Dechow et al. 1995) |
|  |   |
| *Acquisitioni,t* | An indicator variable equal to 1 if a company has any nonzero amount listed in acquisition-related accounts in their statement of cash flows or in their income statement and 0 otherwise. |
|  |   |
| *Agei,t* | The age of the firm is computed as the difference the current fiscal year minus the first year that accounting information is available in Compustat. |
|  |   |
| *Andersoni,t* | An indicator variable equal to 1 when the company’s external auditor during that year was Arthur Anderson and 0 otherwise. |
|  |   |
| *ARInvi,t* | Receivables plus inventory divided by total assets. |
|  |   |
| *Assetsi,t* | The natural log of total assets. |
|  |   |
| *AuditFeesi,t* | The natural log of external audit fees. |
|  |   |
| *AuditorChangei,t* | An indicator variable equal to 1 if the company changed auditors in the last year and 0 otherwise. |
|  |   |
| *AuditLagi,t* | The difference between a company’s fiscal year-end and the date the audit report was issued. |
|  |   |
| *BigNi,t* | An indicator variable equal to 1 when the company is audited by a Big N auditor and 0 otherwise. |
|   |   |
| *BTMi,t* | The firms book-to-market, calculated as total assets divided by the sum of the firms market value of equity and liabilities. |
|  |   |
| *BusySeasoni,t* | An indicator set to 1 if the fiscal period end date for the firm is December and 0 otherwise. |
|  |   |
| *CACLi,t* | Total current assets divided by total current liabilities. |
|  |   |
| *Complexityi,t* | The number of business segments that the company has listed in the Compustat segments file. |
|  |   |
| *CurrentRatioi,t* | The ratio of current assets divided by current liabilities. |

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| **Appendix 1 - Variables Descriptions (continued)** |
| *EPSUpi,t* | An indicator variable equal to 1 if earnings per share in the prior year is greater than the prior year and 0 otherwise. Earnings per share is calculated as income before extraordinary items divided by the number of common shares outstanding. |
|  |   |
| *Estimatesi,t* | Is the log 1 plus the number of estimates found in the footnotes of the firm’s 10-K filing. Estimates are the number of estimate-related words in the footnotes (Chen et al., 2022). |
|  |   |
| *Financingi,t* | An indicator variable set to one if *Mergeri,t* is zero and if the number of shares outstanding increased by more than 10 percent during the year, or if *Mergeri,t* is one and long-term debt increased by more than 20 percent during the year, zero otherwise. |
|  |   |
| *Foreigni,t* | An indicator variable equal to 1 if the company has any foreign sales listed in the Compustat segments file and 0 otherwise. |
|  |   |
| *ForeignHHIi,t* | A measure of firm complexity using segment sales, calculated as 1 - HHI\_Foreign, where HHI\_Foreign is the Hirfindahl-Hirschman index using the company’s sales across geographic regions. |
|  |   |
| *FYEDecemberi,t* | An indicator set to 1 if the fiscal year end month is December and 0 otherwise. |
|  |   |
| *GoingConcerni,t* | An indicator variable equal to 1 if the auditor issues a going-concern opinion and 0 otherwise. |
|  |   |
| *Iriski,t* | The ratio of inventory plus receivables divided by total assets. |
|  |   |
| *Leveragei,t* | The ratio of long-term debt plus current liabilities divided by total assets. |
|  |   |
| *Lossi,t* | An indicator equal to 1 if the company experienced a loss in the previous year and 0 otherwise. |
|  |   |
| *Mergeri,t* | An indicator variable equal to 1 if the company engaged in a merger or acquisition during the year and 0 otherwise. |
|  |   |
| *NationalSpecialisti,t* | An indicator variable equal to 1 when the company is audited by an auditor that is a national industry specialist and 0 otherwise. We define a national industry specialist auditor if the auditor’s annual industry market share is greater than 30 percent within the national audit market. |
|  |   |
| *NegativeEarningsi,t* | An indicator set to 1 if annual earnings for the fiscal period are less than 0 and 0 otherwise. |
|  |   |
| *NonAuditFeesi,t* | The ratio of non-audit fees scaled by the external audit fees. |

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| **Appendix 1 - Variables Descriptions (continued)** |
| *OperatingCyclei,t* | Length of the firms operating cycle calculated as log⁡[(inventory/cost of goods sold) \* 360 + (receivables/sales) \* 360] |
|  |   |
| *ReturnVolatilityi,t* | The standard deviation of the firm’s daily returns over the prior two years. |
|  |   |
| *Restatementi,t* | Restatement is an indicator variable equal to 1 if any part of the current year is subsequently restated and 0 otherwise.  |
|  |   |
| *ROAi,t* | Net income divided by total assets. |
|  |   |
| *SD CashFlowsi,t* | The standard deviation of cash flows calculated over the prior five years (minimum of three years required). |
|  |   |
| *SD DDResi,t* | The standard deviation of the residual from the Dechow and Dichev (2002) model of the relation between accruals and cash flows. A minimum of five years of data is required to compute this variable. |
| *SD Salesi,t* | The standard deviation of sales calculated over the prior five years (minimum of three years required). |
|  |   |
| *Segmentsi,t* | The number of business segments. |
|  |   |
| *SegmentHHIi,t* | A measure of firm complexity using segment sales, calculated as 1 - HHI\_Seg, where HHI\_Seg is the Hirfindahl-Hirschman 1 calculated using sales across the companies segments. |
|  |   |
| *Sizei,t* | The natural log of the market value of equity. The market value of equity is calculated as the number of shared outstanding multiplied by its share price at the end of the fiscal period. |
|  |   |
| *SPIi,t* | An indicator set to 1 if special items are less than 0 and 0 otherwise. |
|  |   |
| *Tenurei,t* | The number of continuous years the external auditor has provided the company’s external audit. |
|   |   |
| *UAuditFeesi,t* | Unexplained audit fees, calculated as the residual from the audit fees model, model (1). |
| This appendix presents detailed descriptions for each of the variables used in our study. |





 



  

  









1. In fact, the PCAOB recently updated AS 2501: Auditing Accounting Estimates, Including Fair Value measurements, as the PCAOB’s oversight activities continue to identify deficiencies in auditing accounting estimates. [↑](#footnote-ref-1)
2. We acknowledge that prior research suggests additional audit fees can reflect economic bonding between client and auditor (e.g., Asthana and Boone, 2012; Blankley, Hurtt, and MacGregor, 2012). A greater economic bond between an auditor and a client can impair the auditor’s judgment and compromise their independence. Therefore, to the extent that higher audit fees indicate greater economic bonding, we expect that the impact on a client’s estimates quality will be similar to the risk premium story, which is no improvement or even a decline in client estimates quality. Therefore, we focus our discussion on the risk premium argument in the remainder of the paper. [↑](#footnote-ref-2)
3. DeFond and Zhang (2014) note that financial reporting quality measures are well suited to measure audit quality. Specifically, they argue that measures, such as accruals quality, are well suited to measure audit quality when defining audit quality as a greater assurance that the financial statements faithfully reflect the firm’s underlying economics. [↑](#footnote-ref-3)
4. Estimates are innately challenging to audit, as future outcomes are uncertain. Thus, additional audit effort may not help to improve predictions of future events associated with accounting estimates. [↑](#footnote-ref-4)
5. See: <https://pcaobus.org/News/Releases/Pages/accounting-estimates-proposal-6-1-17.aspx>. [↑](#footnote-ref-5)
6. Anecdotally, we had discussions with an audit partner at one of the Big N accounting firms to discuss how auditors respond to the uncertainty of a client with more accounting estimates. We note that the discussion with the audit partner was consistent with the theory presented in our baseline hypothesis. [↑](#footnote-ref-6)
7. Lower accruals quality can also come about due to accounting manipulation; however, since the footnotes are reviewed and attested to by auditors and must conform with regulatory disclosure requirements, managers’ leeway to manipulate their financial reporting and/or disclosure through the footnotes is constrained. [↑](#footnote-ref-7)
8. See: <https://pcaob-assets.azureedge.net/pcaob-dev/docs/default-source/rulemaking/docket043/2018-005-estimates-final-rule.pdf?sfvrsn=568f8167_0>. [↑](#footnote-ref-8)
9. The probability of detecting a material error and the likelihood the auditor reports the material error affects audit quality (DeAngelo, 1981). An auditor’s independence affects the probability that the auditor will report the detected error (Caramanis and Lennox, 2008). [↑](#footnote-ref-9)
10. Our sample period starts in 2000 because audit fee data are available in Audit Analytics starting from 2000. [↑](#footnote-ref-10)
11. In additional analysis, we examine the robustness of our results to using a sample comprise of observations only in the Post-Sox period. Our findings are not materially affected. See Section 5.4 of our additional analyses. [↑](#footnote-ref-11)
12. We estimate the residual audit fee by dropping industry and year fixed effects and computing the residual by industry and fiscal year. [↑](#footnote-ref-12)
13. Following prior research, we measure this mapping of accruals into cash flows using the model proposed in Dechow and Dichev (2002) (hereafter DD). The DD model assumes that accruals shift the recognition of firms’ cash flows across time. Therefore, accruals that map firms’ cash flows more closely have higher quality. We follow the specification of the model proposed by McNichols (2002), which regresses current period working capital accruals on the prior period, current period, and next period operating cash flows, as well as the change in sales and total property, plant, and equipment. [↑](#footnote-ref-13)
14. This is, e13.485 = $718.557. [↑](#footnote-ref-14)
15. This is, e6.203 = $494.23 (e6.186 = $485.90). [↑](#footnote-ref-15)
16. The standard deviation of $Estimates\_{i,t}$ is 0.679 and e(0.139 \* 0.679) = 1.099. [↑](#footnote-ref-16)
17. It is worth noting that the negative coefficient on the *BigN* variable could relate to the inclusion of auditor fixed effects in the model. In untabulated analyses, we note that the coefficient on *BigN* is positive and significant, consistent with prior literature, if we exclude auditor fixed effects. [↑](#footnote-ref-17)
18. In untabulated analysis, we also test whether more accrual estimates, in the presence of higher unexplained audit fees, is associated with lower accrual earnings persistence. We find that the coefficient on the interaction term, $Estimates\_{i,t}$and $UAuditFees\_{i,t}$, is not statistically significant. This finding suggests that there is no difference in estimates quality for firms with more accrual estimates that are paying abnormally high audit fees. [↑](#footnote-ref-18)
19. We also include the regressors from model (1) as control variables in column (2) to address the potential bias in coefficients and standard errors, as noted by Chen et al. (2018). [↑](#footnote-ref-19)
20. Francis, Michas, and Yu (2013) suggest that a client restatement indicates that the auditor did not correctly enforce GAAP. [↑](#footnote-ref-20)
21. In untabulated analyses, we also estimate our model using logit and probit and our results are unchanged. [↑](#footnote-ref-21)
22. Since column (1) does not include $UAuditFees\_{i,t}$, we do not include the first stage regression variables to address potential bias in the coefficients, as suggested by Chen et al. (2018). [↑](#footnote-ref-22)
23. In untabulated analyses, we examine the robustness of our results to including controls for executive and board of director characteristics. We note this significantly reduces the sample size for two main reasons. First, these characteristics come from Execucomp, which only provides data on a limited subset of firms. Second, executive and board of director ownership information are only available post-2006. Notwithstanding, we find that our results are quantitatively and qualitatively similar with the added controls. [↑](#footnote-ref-23)
24. Glover, Hansen, and Seidel (2022) highlight that regulatory actions, audit practice changes, and professional standard-setting changes between 2003 and 2009 resulted in a change in how auditors date the audit report. These actions have obscured the public’s visibility into the completion date of the audit fieldwork. Thus, we caveat that audit report lag has some limitations as a proxy for audit effort. [↑](#footnote-ref-24)