PCAOB Inspections and the Financial Reporting Quality of Complex Financial Instruments

Carol Callaway Dee
University of Colorado Denver
1475 Lawrence Street, Denver CO 80202
carol.dee@ucdenver.edu

Katherine Gunny
University of Colorado Denver
1475 Lawrence Street, Denver CO 80202
katherine.gunny@ucdenver.edu

William R. Strawser*
Sam Houston State University
1821 Avenue I, Huntsville Texas 77341
wxs018@shsu.edu

October 2020

An earlier version of this paper was titled "PCAOB Monitoring and the Information Uncertainty Associated with Fair Value Estimates". This paper has benefited from the helpful comments of Hailey Ballew and Senyo Tse as well as the workshop participants at the University of Denver, San Diego University, Sam Houston State University, Boise State University, the 2017 AAA Auditing Midyear Conference, and the 2019 Hawaii Accounting Research Conference. We also thank the University of Colorado Denver for its generous funding.
* Corresponding author: William Robert Strawser (720-539-5399)

PCAOB Inspections and the Financial Reporting Quality of Complex Financial Instruments

Abstract

We examine whether fair value (FV) deficiencies highlighted in Public Company Accounting Oversight Board (PCAOB) inspection reports of Big 4 audit firms improve the quality of fair value reporting for the auditor's portfolio of clients. Since prior literature finds positive consequences from inspection reports, we might expect those positive associations to extend to the fair value setting. However, qualitative studies show the challenges auditors face in providing positive assurance on complex financial instruments, while Glover et al. (2019) suggest that differences in opinion between auditors and PCAOB inspectors about what constitutes a fair value audit deficiency may hinder improvements in the fair value audit process. Using a market-based measure of financial reporting quality (i.e., implied asset-specific betas related to FV disclosures), we find evidence that the intensity of FV deficient reports is positively associated with the quality of fair value financial reporting and that the association is driven by audit clients facing the greatest exposure to fair value assets. We utilize a measure of office-level FV audit expertise and find that our results are also driven by the clients of Big 4 audit offices with high levels of FV expertise. Our evidence is consistent with PCAOB inspections and auditors playing a critical role in improving the quality of the fair value audit process and financial reporting.

Data Availability:
All data are publicly available as described in the text.

Keywords:
PCAOB inspections; fair value estimates; financial instruments; SFAS No. 157; ASC 820; information uncertainty; information risk; Big 4; Big N

JEL Classification M41, M42, M48

1. Introduction

We examine whether fair value (FV) deficiencies highlighted in Public Company Accounting Oversight Board (PCAOB) inspection reports of Big 4 audit firms improve the quality of FV reporting for an auditor's portfolio of clients in the financial services industry. That FV deficiencies continue to be raised in PCAOB inspection reports causes concern among both domestic and international regulators, given that such deficiencies may raise investors' apprehensions regarding the level of audit quality and, consequently, financial statement reliability (Glover, Taylor and Wu 2019; IFIAR 2020; PCAOB 2014). In fact, the FV audit process is distinct from most other areas of accounting because it involves complex and subjective estimates (those that involve multiple assumptions or complicated valuation models). The PCAOB (2018) writes

> By their nature, accounting estimates, including fair value measurements, generally involve subjective assumptions and measurement uncertainty, making them susceptible to management bias. Some estimates involve complex processes and methods. As a result, accounting estimates are often some of the areas of greatest risk in an audit, requiring additional audit attention and appropriate application of professional skepticism. The challenges of auditing estimates may be compounded by cognitive bias, which could lead auditors to anchor on management's estimates and inappropriately weight confirmatory over contradictory evidence.

Prior interview- and survey-based research illustrates the extreme difficulties auditors face in auditing FV estimates—for example, Griffith (2020); Glover, Taylor and Wu (2019); Cannon and Bedard (2017); Glover, Taylor and Wu (2017); Griffith, Hammersley and Kadous (2015); and Christensen, Glover and Wood (2012). Additionally, results in Glover et al. (2019) suggest that audit firms may respond to FV inspection deficiencies by revising audit procedures to appease PCAOB inspectors—that is, by responding to "inspection risk"—rather than by making changes to audit procedures that actually improve FV auditing. For these reasons, we

argue that prior research showing improvements in audit quality from PCAOB inspections (e.g., DeFond and Lennox 2017; Lamoreaux 2016) may not apply to audits of FV estimates.

We use an archival setting to empirically investigate whether FV inspection report deficiencies are associated with improvements in the quality of FV reporting. Our analysis is primarily motivated by findings in qualitative research illustrating the difficulties experienced by both auditors and PCAOB inspectors in the FV context. Given the challenging nature of auditing FV estimates suggested by regulators and prior qualitative research, we propose that an empirical research setting examining whether the PCAOB inspection process improves the quality of *fair value* audits and *fair value* financial reporting presents a distinct finding—not only from other studies evaluating improvements from the inspection process from other (non-FV) deficiencies (e.g., DeFond and Lennox 2017; Lamoreaux 2016), but also the interview- and survey-based literature that has explored difficulties with fair value audits.

Consistent with prior literature, we limit our sample to the financial services industry because these audit clients face significant exposure to assets requiring FV estimation methods (Riedl and Serafeim 2011). We also limit our sample to the clients of Big 4 audit firms to mitigate concerns that client self-selection influences our results (i.e., higher quality clients with higher quality FV reporting choose Big 4 auditors). To measure financial reporting quality, we rely on prior literature that supports the assumption that investors recognize improvements in audit quality (e.g., Teoh and Wong 1993; Willenborg 1999; Mansi, Maxwell and Miller 2004; Minnis 2011) and use a market-based measure to reflect changes in audit quality and financial reporting quality. More specifically, we adopt the methodology in Riedl and Serafeim (2011) that employs asset-specific betas of FV assets to measure information uncertainty. They note (p. 1084) that "[h]igher-quality reporting enables better estimation of valuation parameters by

financial statement users (i.e., low information risk), while lower-quality reporting leads to a noisier estimation of these parameters (i.e., high information risk)."[1] As such, if FV deficient reports improve the quality of FV reporting, we would expect a reduction in information uncertainty related to FV assets.

To measure FV deficient inspection reports (our variable of interest), we use the ratio of auditor clients receiving a FV deficiency to the total number of clients receiving any audit deficiency in the inspection report. Using this ratio captures the pervasiveness of FV deficiencies among an audit firm's inspected clients for that report—the "intensity" of FV deficiencies compared to other audit deficiencies in the report.[2] This is similar to the approach taken by Acito et al. (2018), who use textual analysis of client financial statements to estimate the "relative importance" of an audit firm's PCAOB deficiencies to a specific client.

Our results show that the intensity of FV deficient reports are negatively associated with information uncertainty related to level 2 and level 3 FV estimates of financial assets. Further supporting the notion that audit firms (and audit quality) are the primary driver of this change, we find that the negative association between information uncertainty and the intensity of a FV deficient report is driven by a subsample of auditor clients with the greatest exposure to level 2 and level 3 assets. To offer further evidence of an auditor-based impact to FV financial reporting, we utilize a measure of office-level FV audit expertise (Ahn, Hoitash and Hoitash 2020) and find that our results are also driven by the clients of Big 4 audit offices with high levels of FV expertise. Our results are consistent with FV deficient inspection reports improving FV financial reporting because of auditors responding to FV deficiencies.

[1] Prior research uses both the terms "information risk" (Riedl and Serafeim 2011) and "information uncertainty" (Bens, Cheng, and Neamtiu 2016). We use the phrase "information uncertainty".
[2]Our results are robust to an alternative specification for a FV deficient report (see Table 4).

We conduct multiple sensitivity tests. Our results are robust to using a variation of our main variable of interest that scales for the impact of repeated FV deficiencies experienced by the same audit firm. Our results are also robust to combining level 2 and level 3 FV assets, excluding financial crisis bank-years, excluding issuers that changed auditors, excluding bank-years that receive a Securities and Exchange Commission (SEC) comment letter pertaining to FV, and excluding bank-years that issue a restatement.[3]

We provide additional analysis to support our finding that FV deficient reports lead to changes in the FV audit process.[4] First, after the FV deficient report is issued, we find an increased association between audit fees and information uncertainty reduction associated with level 3 assets, suggesting an increase in auditor effort. Second, we investigate changes in disclosure in response to the FV deficient report by hand-collecting FV disclosures from the footnotes of annual reports. We find increased word count in the FV footnote and increased segregation of categories of FV assets, suggesting enhanced disclosure after the release of the FV deficient report. Lastly, we find that the reduction for level 3 assets occurs during the quarter following the fiscal year-end (in timing with the release of audited annual information) rather than following the issue of interceding quarterly reports, which are unaudited. Together, these

[3] Bens et al. (2016) find a positive association between FV comment letters issued by the SEC and information uncertainty of fair value assets. Ahn et al. (2020) find a positive association between the resolution of FV issues raised in SEC comment letters and office-level FV audit expertise. The mechanisms by which the SEC and PCAOB influence financial reporting quality are different— the SEC focuses on issuer companies, and the PCAOB focuses on auditors. Therefore, it is important to understand whether the significant resources dedicated by the PCAOB to improve the FV audit process are effective. In addition, as discussed later in the paper, our results are qualitatively similar when we remove the 69 bank-years that receive a comment letter or the 31 bank-years that have a restatement.

[4] With respect to the fair value audit process, we interviewed a Big 4 senior manager with 20 years of experience in fair value in the financial services industry. He stated that avoiding fines by the PCAOB, part II PCAOB inspection findings, and client loss provide strong incentives for auditors to improve the fair value audit process after receiving a FV deficient report.

tests provide additional evidence that FV deficient reports lead auditors to make changes to the FV audit process.

We contribute to the literature that examines the effectiveness of the PCAOB inspection process as it relates to complex financial instruments. Qualitative research documents the challenging environment faced by auditors in evaluating the fair presentation of FV estimates (Griffith 2020; Glover et al. 2019; Cannon and Bedard 2017; Glover et al 2017; Griffith et al. 2015; Christensen et al. 2012). Ours is the first study to empirically examine whether FV deficiencies identified in PCAOB inspection reports are associated with improvements in the auditing of FV estimates.

Additionally, Glover et al. (2019) provide evidence of a "fair value measurement" gap, in which auditors and PCAOB inspectors disagree about whether FV audit procedures in inspected engagements were sufficient. This suggests that changes to the FV audit process based on these identified deficiencies might lead audit firms to attempt to minimize inspection risk (to assuage the probability of future reported deficiencies) rather than audit risk. Our evidence suggests that, even if audit firms are responding to inspection risk rather than audit risk, their actions in response to FV deficiencies still lead to improvements in FV reporting of complex financial instruments. Thus, we argue that PCAOB inspections play a critical role in improving the quality of FV reporting for Big 4 auditors' portfolios of clients.

2. Background Information

Fair Value Estimates and Reporting under SFAS 157

The FASB issued Statement of Financial Accounting Standards (SFAS) 157 in 2006, requiring adoption for fiscal years ending after November 15, 2007.[5] This standard defines FV as

[5] SFAS 157 is now codified as Accounting Standards Codification (ASC) 820 "Fair Value Measurement" by the FASB. The bulk of the standard is unchanged from SFAS 157.

"the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." The standard also introduced a three-tier classification system to distinguish between FV estimates that were determined by management through procedures of varying objectivity. In particular, level 1 inputs are those estimates derived from quotable prices in active markets for assets and liabilities that are identical to the asset or liability being measured. Level 2 inputs represent estimates derived from observable quoted prices of identical assets and liabilities in *inactive* markets, or *similar* assets and liabilities in active markets, as well as inputs other than quoted prices that are observable and related to the value of the asset (e.g., yield curves, price indices or exchange rates). Hence, level 2 estimates may lack the precision of level 1 estimates due to illiquid markets or volatile inputs that may increase the variance of the estimate itself under shifting economic trends.

While level 2 estimates suggest a level of reliability to market participants by virtue of their rank in the fair value hierarchy, they may also be a source of opportunistic management. Hanley, Jagolinzer and Nikolova (2018) find that the incidence of value inflation for level 2 estimates may be as prominent as level 3 instruments in the insurance industry Level 3 estimates (typically considered the most opaque) represent unobservable, management-supplied estimates and forecasts sometimes derived from valuation models and assumptions (e.g. forecasted home price depreciation and credit loss severity on mortgage-related positions). Level 3 estimates result in "mark-to-model" rather than mark-to-market valuations of assets and liabilities that are "largely undisciplined by market information" (Riedl and Serafeim 2011, p. 1086). Because these estimates lack reliability and are highly subjective, expanded disclosures are required for level 3 estimates.

PCAOB Inspection Reports and Audits of Fair Value Estimates

The PCAOB is a nonprofit corporation created by the Sarbanes-Oxley Act of 2002 to oversee the audits of public companies to further protect the interests of the investing community. A noteworthy way in which the PCAOB executes this charge is by inspecting the audit and assurance processes of firms that audit (or assist in the audit of) issuer companies around the world. Audit firms with greater than 100 issuer audit clients are inspected annually; firms with 100 or fewer issuer audit clients are inspected every three years.[6] The PCAOB focuses its inspection efforts at the engagement level and reports its results at the audit-firm level. Although the identities of the audit clients inspected are not publicly disclosed, the PCAOB describes in detail audit deficiencies found on each of the inspected engagements. The PCAOB bases its inspection choices on an internal risk-based model and examines those engagements for which it believes the risk of audit failure is highest, although recently the Board began studying the use of a random process (rather than risk-based) to select some engagements for inspection (Ryan 2017).

The relatively high frequency of FV deficiencies (VRC 2013; Glover et al. 2017), the perceived inconsistencies of current audit standards and the growing use of third-party specialists in determining FV measurements led the PCAOB to issue Release No. 2018-005, *Auditing Accounting Estimates Including Fair Value Estimates and Amendments to PCAOB Audit Standards*, on December 20, 2018.[7] The standard emphasizes the need for professional skepticism in evaluating the accuracy of accounting and FV estimates, as well as acknowledging the potential for managerial opportunism to affect these estimates. That the PCAOB and FASB

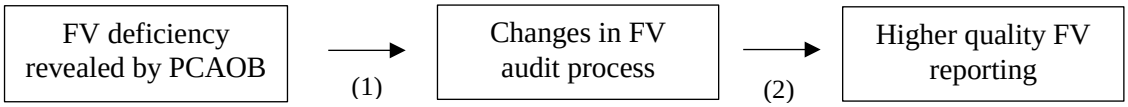
[6] https://pcaobus.org/Inspections/Pages/InspectedFirms.aspx

[7] The standard effectively replaces and retitles AS 2501 *Auditing Accounting Estimates* and rescinds AS 2502 *Auditing Fair Value Measurements and Disclosures* and AS 2503 *Auditing Derivative Instruments, Hedging Activities and Investments in Securities*.

(2018) continue to amend audit and reporting standards surrounding FV estimates indicates a perceived need among regulators for improving accounting and auditing processes in this area and further motivates our investigation.

3. Hypothesis Development

Our hypothesis examines whether FV deficient reports are associated with improvements in FV reporting. The link between FV deficiencies and higher quality FV reporting is indirect and requires two steps: (1) FV deficient PCAOB inspection reports lead auditors to change their FV audit processes, and (2) changes in FV audit processes improve audit quality and lead to higher quality FV reporting.



For step (1), prior literature finds auditors change the audit process in response to deficient PCAOB reports. In a qualitative study using questionnaires and interview techniques, Westermann, Cohen and Trompeter (2018) show that auditors and audit firms change their behavior in reaction to PCAOB inspections. Acito et al. (2018) find audit firms have incentives to change the audit process in response to deficiencies revealed in PCAOB inspection reports in an effort to avoid losing clients; additionally, they show that audit effort (measured by audit fees) increases for clients with higher accounting exposure to those particular deficiencies. Aobdia (2018) finds that audit firms increase effort (measured by audit hours) on both the inspected engagement and non-inspected engagements both within the office of the inspected engagement and the firm's other offices in response to a deficient PCAOB report. Hence, prior research

indicates that deficiencies, although identified at the engagement level, will have impacts beyond the particular engagement with which they are associated.[8]

We focus on step (2) and investigate whether changes in the FV audit process, in response to FV deficient reports, improve audit quality and the quality of fair value reporting. Prior literature finds positive consequences to the PCAOB inspection process, including improved audit quality and internal control audits. Lamoreaux (2016) finds that foreign firms listing on US exchanges exhibit improved audit quality resulting from PCAOB inspection. DeFond and Lennox (2017) find PCAOB inspection reports discussing internal control deficiencies are positively associated with the quality of internal control audits. Therefore, we might expect changes in the FV audit process to lead to improvements in audit quality related to FV estimates.

Alternatively, a rich stream of questionnaire- and interview-based research shows the extreme difficulties auditors face in auditing FV estimates—for example, Griffith (2020); Glover et al. (2019); Cannon and Bedard (2017); Glover et al. (2017); Griffith et al. (2015); and Christensen et al. (2012). Thus, prior research showing improvements in audit quality from PCAOB inspections may not apply to audits of FV estimates; however, no archival analysis has been conducted to date. Christensen et al. (2012, 139) note "…auditors are currently asked to evaluate the acceptability of the estimation uncertainty and to audit, within the bounds of materiality, estimates associated with reasonable ranges that are larger than materiality— an

[8] We affirmed the reasonableness of our presumption within the area of fair value reporting by consulting with a Big 4 audit manager who has served as a financial institution specialist for 20 years. He confirms that his audit firm responds to engagement-specific FV deficient inspections at a national level by instituting training sessions led by area experts where the audit staff is updated on topical deficiency issues (e.g. FV accounting) that the audit firm is facing. These sessions use actual deficiencies noted in inspections, as well as the actions taken by the engagement team to rectify and remediate the deficiencies for that engagement. Staff question and answer sessions follow regarding compliance and interpretation issues of the audit and financial reporting standards that encompass the topical area.

impossible task." Some auditors interviewed by Glover et al. (2017) assert that the PCAOB expects what, in some cases, may not be deliverable: positive assurance that FV estimates are not materially misstated. Glover et al. (2019, p. 1435) quote an audit partner "In general terms, [the PCAOB] expectation was for us to be able to audit assumptions that are subjective as if they were objective." Taken together, prior survey-based evidence exposes the extreme difficulties auditors face when auditing complex FV estimates, such as those examined in our study.

An additional issue in auditing FV estimates is presented by Glover et al. (2019) in their survey of audit experts. They find evidence of a "fair value measurement" (FVM) gap, in which PCAOB inspectors expect more evidence and audit testing than audit partners believe is required by auditing standards. Glover et al. (2019) find that inherent subjectivity in FV estimates and lack of inspector knowledge and expertise contributes to the gap. The FVM gap highlights the possibility that inspectors do not appropriately identify deficient FV auditing; therefore, changes auditors make in response to FV deficiencies might not improve the FV audit process. In particular, quotes from audit experts in the Glover et al. (2019) study suggest the possibility that audit procedures enacted may stem from audit firms preventing the likelihood of future deficiencies (i.e. responding to inspection risk) rather than areas of audit risk.[9] If inspection risk and audit risk are not strongly correlated, then auditors' responses to FV deficient inspection reports may bear costs with little external benefit to financial reporting quality.

[9] For example, "The engagement team documented risks associated with various investments and thus bifurcated the population into various risk buckets... [The] PCAOB did not have any issues with the higher-risk buckets. However, in the low-risk bucket (only had 49 level 1 securities), the engagement team tested 38 of the 49 but did not test an item over [tolerable misstatement]. Overall, 80 percent of fair values had been tested through various strategies involving risk ratings and *we disagree* that [auditing standards require that] the engagement team MUST test the item over [tolerable misstatement] in the low-risk bucket. *The PCAOB inspector disagreed*. When they write observations, you must address them. Most of the time, it is less costly to agree and perform some minor testing and put the matter behind us, than to fight." [emphasis added], (Glover et al. 2019, p. 23)

Overall, changes to the fair value audit process in response to FV deficient inspection reports could lead to higher quality financial reporting if the changes implemented improve the FV audit process. However, research shows the subjectivity and uncertainty posed by FV estimates exacerbates the auditor's task of providing positive assurance on FV accounting measures, and the additional challenges of convincing PCAOB inspectors that their auditing procedures were sufficient. If FV deficient reports lead auditors to make changes that do not improve audit quality related to fair value—for example, if audit firms change procedures to reduce inspection risk rather than audit risk—or if the task complexity involved in auditing FV estimates hinders the ability of auditors to enactment improvements, we would expect no association between FV deficient reports and higher quality FV reporting.

This leads to the following hypothesis, stated in the alternative:

H1: Fair value deficiencies in PCAOB inspection reports are associated with improvements in fair value reporting.

4. Research Methods

Since we cannot directly measure the quality of fair value reporting, we rely on prior literature that supports the assumption that investors recognize higher quality reporting (e.g., Teoh and Wong 1993; Willenborg 1999; Mansi et al. 2004; Minnis 2011). We proxy for the quality of fair value reporting using information uncertainty (or risk) following Lambert et al. (2007) who derive a model establishing the presence of undiversifiable information risk. Riedl and Serafeim (2011, p. 1084) define information risk as "…the ability of investors to ascertain the valuation parameters underlying a particular asset." They argue that this risk arises from two sources: (1) directly from investors' assessments of the covariance of the firm's future cash flows with those of other firms and (2) from operational and investment decisions arising from higher quality information that changes the expected value and covariance of cash flows with other

firms.[10] Higher quality reporting leads to lower information risk, therefore, to the extent FV deficient reports lead to higher quality fair value reporting, we would observe a reduction in information risk.

To study whether FV deficient reports yield significant changes in the information uncertainty for level 2 and level 3 FV estimates, we adopt a methodology used by Riedl and Serafeim (2011) that examines asset-specific betas of FV assets—a proxy for information uncertainty—for issuer clients before and after the issuance of an inspection report to the auditor. Because full audit processes are unlikely to be performed on interim (quarterly) financial statements, we select data from the first annual report after the issuance of a FV deficient inspection report to measure variables in testing for the effects of reduced information uncertainty.

Riedl and Serafeim (2011) derive asset-specific betas through manipulations of the balance sheet identity (A=L+E). First, they decompose assets into level 1, level 2, level 3 designations and assets not measured at fair value (A = FVA1 + FVA2 + FVA3 + NFVA) and substitute this into the balance sheet identity. They then divide through by total assets to provide the following derivation of a weighted-average beta for each issuer:

$$\beta_{A1}\frac{FVA1}{A} + \beta_{A2}\frac{FVA2}{A} + \beta_{A3}\frac{FVA3}{A} + \beta_{OA}\frac{NFVA}{A} = \beta_{L}\frac{LEV}{A} + \beta_{E}\frac{E}{A} \quad (1)$$

Where:

FVA1, FVA2, FVA3 = fair value of assets designated at levels 1, 2 and 3;
NFVA = other assets not measured at fair value;
A = total assets;
LEV = total liabilities; and
E = book value of total equity.

[10] Lambert et al. (2007) provide evidence that increases in the quality of information or disclosures can directly impact the assessed covariance of cash flows and alter the cost of capital for the firm and that this effect may be captured in a firm's market beta.

Rearranging to solve for equity beta yields:

$$\beta_E \frac{E}{A} = \beta_{A1} \frac{FVA1}{A} + \beta_{A2} \frac{FVA2}{A} + \beta_{A3} \frac{FVA3}{A} + \beta_{OA} \frac{NFVA}{A} - \beta_L \frac{LEV}{A} \quad (2)$$

Riedl and Serafeim (2011) test this model in their primary analysis to determine whether information uncertainty increases over the designation of FV estimate levels 1, 2 and 3. We modify their approach to determine whether PCAOB inspections act as a moderating influence on information uncertainty by estimating the following regression for all issuers in our sample:

$$\begin{aligned} Beta\_adj_{it} = {} & (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + \alpha_4 FVDEF + FVDEF \\ & \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA2_{it} + \alpha_{3a} FVA3_{it}) + \alpha_5 NFVA_{it} + \alpha_6 LEV_{it} + \epsilon \end{aligned} \quad (3)$$

BETA_ADJ is an estimate of each issuer's equity beta using daily-return data and a single-factor CAPM multiplied by the ratio of equity to total assets. In their quarterly analysis, Riedl and Serafeim (2011) assess information uncertainty using market data in the quarter following the release of quarterly FV estimates (i.e. estimates generated by market data in quarter t+1 are regressed on reported financial statement data for quarter t). The authors argue that this window captures the filing date of 10-Qs as well as the release of quarterly earnings information through alternate venues during the months after the quarterly earnings report, such as earnings press releases. We follow this methodology.[11] To ensure all relevant information is captured and available to the public, we assess equity beta over the four months beginning the first day following the fiscal year-end. We assess our estimates over four months (as opposed to three) because some of our sample banks do not file 10-Ks with the SEC until mid to late March,

[11] While Bens et al. (2016) utilize the standard deviation of returns and bid-ask spread as measures of information uncertainty, we believe *BETA_ADJ*, as measured by Riedl and Serafeim (2011) provides a more robust measurement. In particular, due to the closed-form derivation of our model from the accounting identity, our tests may be less susceptible to the omission of correlated omitted variables in measuring uncertainty than these other measures.

though our results are robust to limiting the period to three months.[12] Figure 1 showcases the timeline of the inspection process and our primary measurement window of *BETA_ADJ*.

[PLEASE INSERT FIGURE 1]

FVDEF represents the pervasiveness or intensity of FV deficiencies in a PCAOB inspection report and is calculated as the ratio of issuers receiving a FV deficiency in a single inspection report to the total number of deficient issuers listed in the report. The construction of *FVDEF* promotes a measure of saliency of the fair value issue to each audit firm's decision in how to allocate its resources in response to deficient inspection reports (e.g. *FVDEF* = 0.10 would indicate that 10% of all noted engagements pertained to fair value, we might expect that an audit firm with *FVDEF* = 10% would feel less pressure to remediate deficiencies than an audit firm with *FVDEF* = 0.40, indicating 40% of all noted engagements pertained to fair value). We ensure that the issue date of the FV deficient report occurs before the fiscal year-end to allow for improvements to controls, audit procedures or other potential deficiencies in the disclosure practices of the audit firm's issuer clients.[13] We also append year fixed effects and audit firm fixed effects to estimations of equation (3). All model variables are defined in the appendix.

In line with prior studies (Riedl and Serafeim 2011; Song, Thomas and Yi 2010), we anticipate $\alpha_1 < \alpha_2 < \alpha_3$ owing to the increased uncertainty associated with level 2 and level 3 asset disclosures, although we do not formally test this. Hypothesis 1 tests whether $\alpha_{2a} < 0$ and $\alpha_{3a} < 0$, which would suggest that the intensity of FV deficiencies noted in PCAOB inspection

[12] We also assess other estimation windows for calculating *BETA_ADJ*: (1) beginning the first day following the fiscal year-end over the subsequent fiscal year; (2) for the third month following the fiscal year-end (as most sample banks have filed with the SEC by the end of this month); (3) for the three months following the date that each firm filed its 10-K with the SEC. Our main result is unaltered by any of these shifts in the estimation window of equity beta.

[13] We use the public issue date of the inspection report similar to prior literature (e.g. Acito et al. 2018; Defond and Lennox 2017). To the extent the audit firm learns information about fair value estimate deficiencies prior to the public release of this report, choosing this date biases against our results.

reports results in reductions in the association of information uncertainty with level 2 and level 3 assets. Because level 1 FV estimates are based on readily available price quotes from active markets, we do not anticipate that inspection deficiencies will bring improvements to the evaluation and general audit processes involved with level 1 estimates; hence, we make no prediction for α_{1a}.

5. Sample Selection

We use the Audit Analytics database to identify audit firms receiving a FV deficient inspection report from the PCAOB. This results in 123 inspection reports for annually and triennially inspected audit firms, domiciled in the US, that include FV deficiencies during the fiscal years 2008-2015. We form a sample of all issuers reporting non-zero level 2 or level 3 recurring FV asset estimates during the sample years 2008-2015.[14] Then, we restrict the sample to issuers in the financial services industry.[15] From this, we pair each bank issuer-client with its audit firm and construct the *FVDEF* variable from inspection report data. We then pull all relevant financial information concerning FV assets from the Compustat Bank file. Next, we delete triennial audit firm issuer clients for two reasons. First, the relative dearth of observations arising from triennial inspections of audit firms engaged by financial institutions with level 2 and level 3 assets creates potential issues for statistical power. Second, because triennial firms are inspected once every three years while other firms are inspected annually, comparisons between the subsamples could be confounded by the failure to inspect at an equivalent frequency. Next, we delete all non-Big 4 audit firm issuer clients because prior literature suggests that self-

[14] To the extent the financial crisis influences our results, in sensitivity analysis we exclude observations from 2008 and 2009 and find that our main results are unaltered.

[15] This is consistent with prior literature (e.g., Riedl and Serafeim 2011) as financial service firms tend to face the most exposure to assets subject to fair value estimation techniques. Glover et al. (2017) also report differences in concerns reported by auditors in assessing estimates provided by financial institutions versus non-financial institutions.

selection (i.e., higher quality firms with higher quality financial statements choose Big 4 auditors) can explain results when the sample consists of a mix of Big 4 and non-Big 4 audit clients (e.g., DeFond and Zhang 2014).[16] After keeping only FV deficiencies that pertain to estimates made on a recurring basis and deleting all observations without complete data from CRSP, Audit Analytics, and the FR-Y9C reports used to construct variables in our analyses, we have 930 bank issuer-years representative of 27 FV deficient inspections.

[PLEASE INSERT TABLE 1]

Table 1, Panel A details the sample selection procedure, while Panel B displays the frequency of FV deficient reports released by the PCAOB on Big 4 audit firms in each year. While Big 4 audit firms commonly receive FV deficiencies in a given year, the construction of *FVDEF* contains variation because the intensity varies for each audit firm and from year-to-year. Panel C of Table 1 breaks this variation down for each Big 4 audit firm over our sample years. *FVDEF* peaks in 2011 and diminishes substantially by 2015, a trend similar to that reported by the PCAOB (2018). To the extent that audit firms are executing improvements based on deficiencies found in inspection reports, we anticipate that the severity of FV deficiencies might diminish provided that additional audit procedures were successful in assuaging concerns raised by the PCAOB.

Panel D of Table 1 contains descriptive statistics for our sample of issuer clients. All variables are winsorized at the first and 99th percentiles. We report descriptive statistics for our three FV variables—*FVA1*, *FVA2* and *FVA3*—along with other variables in our main analysis.

[16] Glover et al. (2017) provide interview and survey evidence from national firm partners that suggest differences between processes (e.g. the use of in-house specialists) between Big 4 and non-Big 4 audit firms. The authors also note differences between financial (e.g. financial instruments and derivatives) fair value audit work and non-financial (e.g. impairments). Hence, our work focuses on recurring estimates of financial fair values audited by the Big 4.

Similar to prior studies, we document greater concentrations of level 2 estimates (18.6% of total assets) than concentrations of either level 1 (1.1% of total assets) or level 3 estimates (0.5% of total assets) and positive skewness for all three distributions of FV assets.

Table 2 presents a correlation matrix for our main analysis variables. *BETA_ADJ* and *FVA3* are positively and significantly associated according to both Spearman and Pearson correlation coefficients, while *BETA_ADJ* and *FVA1* are significantly and positively associated according to Spearman coefficients.[17] *BETA_ADJ* and *FVA2* are negatively and significantly associated according to both Spearman and Pearson correlation coefficients suggesting level 2 assets decrease with equity-beta. While the pattern of univariate associations exhibited by these coefficients suggests that level 3 and level 1 assets exhibit risk characteristics to a greater extent than do level 2 assets, these interpretations should be qualified as *FVA1*, *FVA2* and *FVA3* are all positively and significantly associated with each other. *FVDEF*, our construct representing the intensity of FV deficiencies in an inspection report, is positively and significantly associated with *FVA2* (both Spearman and Pearson correlations), and negatively associated with *FVA1* (Pearson only) and *FVA3* (Spearman only). With respect to the correlation of *FVDEF* and *FVA2*, this may be due to the greater proportion of *FVA2* assets owned by issuer clients, triggering a greater prevalence of FV deficient issues in a given inspection report.

[PLEASE INSERT TABLE 2]

[17] These results suggest that on a univariate basis, both level 3 and level 1 assets increase with equity-beta though likely for different reasons. Specifically, level 3 assets likely contain increased information risk, while level 1 inputs, based on quoted market prices, likely reflect, in part, the covariance with market beta.

6. Multivariate Analysis

Main Analysis (Full Sample)

Table 3 presents results for our full sample (Column A), and analyses for subsamples based on high and low exposure to FV asses (Columns B and C), and subsamples based on audit firms with high and low FV expertise (Columns D and E). All models include standard errors clustered by bank issuer clients. We include audit firm fixed effects in addition to year fixed effects, which together amounts to a difference-in-differences estimation with an on-going treatment effect (DeFond and Lennox 2017).[18] Across all five models, the *LEV* coefficient has a negative and significant association with *BETA_ADJ*, while the coefficient on *NFVA* is insignificant in all models.

[PLEASE INSERT TABLE 3]

In Column A, the estimated regression coefficients for the interaction terms *FVA2*×*FVDEF* (−0.110) and *FVA3*×*FVDEF* (−1.836) are negative and significant. The results show reductions in information uncertainty that increase in the intensity of FV deficiencies contained in an inspection report for level 2 (*FVA2*) and level 3 (*FVA3*) estimated assets.

6.2. Results Partitioned by Exposure to Level 2 and Level 3 Assets

The results presented in Table 3, Column A assume a homogeneous effect on issuer clients of all audit firms that are annually inspected by the PCAOB as well as an equivalent impact on each audit firm's entire portfolio of bank clients. However, if auditor resources are

[18] Our estimated coefficients for FVA1, FVA2, and FVA3 are insignificant but in Riedl and Serafeim (2011, p. 1109) they are positive and significant. The major difference between the two models is that we control for year and audit firm fixed effects whereas Riedl and Serafeim (2011) only control for quarter fixed effects. For our particular setting, we believe it is important to control for audit firm fixed effects to mitigate concerns that audit firm characteristics explain the results. However, to ensure consistency with the coefficient estimates in Riedl and Serafeim (2011), in untabulated analysis, we estimate a model with only year fixed effects (excluding audit firm fixed effects) and the coefficient estimates are consistent with their study (i.e., estimated coefficients for FVA1, FVA2 and FVA3 are 1.351, 1.329, and 2.365, respectively, and all are significant at the 0.01 level).

limited, we believe auditors will respond more strongly to issuer clients that face greater exposure to FV assets in an effort to limit the risk of their most exposed clients. Therefore, we partition the sample by issuer-client exposure to level 2 and level 3 assets by combining *FVA2* and *FVA3* into a single variable *FVA23,* and designate high exposure as those issuer clients who have greater than the median *FVA23* by audit firm and fiscal year. We construct our partition in this manner to account for differences in the market share and issuer client profile of audit firms.

Columns B and C of Table 3 present models partitioned on high exposure versus low exposure issuer clients. For the high exposure subsample in Column B the coefficients on both *FVA2×FVDEF* and *FVA3×FVDEF* are negative and significant ($p<0.01$, $p<0.05$, respectively). Column C shows estimation results for the low exposure subsample; the coefficients on both interaction terms *FVA2×FVDEF* and *FVA3×FVDEF* are insignificant. The pattern of results suggests that audit firms may prioritize their efforts by targeting their initial response to FV deficient reports on issuer clients with the largest exposure to complex FV assets that correspond to listed deficiencies. Overall, the results presented in Table 4, Panels B and C yield insights consistent with audit firms prioritizing changes to the audit process for issuer clients that face relatively high exposure to audit risks involving complex fair value assets.

Results Partitioned by Auditor FV Expertise

We conduct an additional subsample analysis that separates our issuer-clients based on fair value expertise. Ahn et al. (2020) find that fair value expertise (specifically office-level expertise with level 3 estimates) translates to higher audit quality within a research setting that analyzes the incidence and rectification of SEC comment letters. We measure expertise by the market share of level 2 and level 3 assets audited by the Big 4 in each metropolitan statistical

area (MSA).[19] If the level 2 and level 3 estimated assets of the audit office's clientele comprise more than the median in a particular MSA, then that office is considered to possess high fair value expertise. We then separate office experts from non-experts and run our main regression on these two subsamples found in Table 3, Columns D and E.

In Column D, the estimated regression coefficients for *FVA2×FVDEF* and *FVA3×FVDEF* in our high fair value expertise subsample are both negative and significant ($p<0.10$ and $p<0.01$), respectively; these regression coefficients are insignificant in the low fair value expertise subsample (Column E). These results provide evidence that our main findings are driven by audit offices with expertise regarding fair value estimates. Our findings are complementary to but distinct from the results of Ahn et al. (2020), who find that the incidence and remediation of SEC comment letters is limited to level 3 expertise at the office-level.

We note that the counterintuitive positive and significant coefficients on the interaction *FVA1×FVDEF* in Table 3 Columns C and E, suggesting PCAOB inspections increase the information risk associated with level 1 FV estimates, is consistent with results in Bens et al. (2016). Bens et al. (2016) find similar results for level 1 assets after the issuance of SEC comment letters dealing with FV disclosures, documenting that the association with level 1 assets and their proxies for information uncertainty increase for firms that receive such comment letters.

[19] While Ahn et al. (2020) find a positive association only with level 3 office-level expertise, we run the expertise variable based on level 2 and level 3 office-level expertise. Our results are unchanged when we run alternative constructs to define expertise based solely on level 3 or solely on level 2 expertise.

7. Sensitivity Analyses

Robust to Combining Level 2 and Level 3 FV Assets

In Columns A and B of Table 4, we test a modified version of equation (3) where *FVA2* and *FVA3*—the ratio of FV assets estimated by level 2 and level 3 inputs, respectively—are combined into a single variable *FVA23* (Bens et al. 2016). Botosan et al. (2011) argue that designations of level 2 and level 3 assets may result from strategic considerations outside of the original intent of SFAS No. 157. Kohlbeck et al. (2017) also provide evidence that auditors may curb their clients' reclassification of assets as level 3 assets, especially when such transfers are regarded as managerially opportunistic. Finally, prior research (e.g. Chircop and Novotny-Farkas 2016) suggests the presence of a "return to liquidity" effect, wherein certain financial assets that suffered from severe market illiquidity stemming from the financial crisis were eventually reclassified as level 2 or level 1 assets once the crisis abated and markets became "orderly" again with increased liquidity. These studies provide compelling reasons why the classification of level 2 versus level 3 assets may not be clear-cut in all sample years.

Columns A and B present results for subsamples of issuers with high exposure to FV assets, and those with auditors with high FV expertise, respectively. Results show that the coefficient estimates on the interaction of *FVA23*×*FVDEF* are negative and significant (−0.282, $p<0.01$; −0.171, $p<0.01$) in both subsamples, consistent with our main result.

[PLEASE INSERT TABLE 4]

Alternative Measure of the Inspection Event Variable

Our main PCAOB inspection variable of interest, *FVDEF*, is intended to capture the pervasiveness or intensity of FV deficiencies in a PCAOB inspection report relative to other deficiencies. To provide assurance that our results are robust to the construction of *FVDEF* we define an alternative variable *FVDEF_SCALED*, calculated as *FVDEF* divided by the cumulative

number of times a FV deficient inspection report has been issued to the audit firm during the sample period. The measure *FVDEF_SCALED* effectively "discounts" our report intensity variable by the number of times a FV deficient report has been received during the sample period, thereby capturing a potential diminishing impact of repeated deficient reports for the same audit firm.[20]

Table 4, columns C and D presents results with this alternate definition of the inspection event for subsamples of issuers with high exposure to FV assets, and those with auditors with high FV expertise, respectively. Column C shows the coefficient estimates on *FVA2×FVDEF_SCALED* and *FVA3×FVDEF_SCALED* are both negative; however only the estimate for *FVA2×FVDEF_SCALED* is significant ($p<0.05$). The results in column D for the high expertise subsample corroborate our main findings. Coefficient estimates on both *FVA2×FVDEF_SCALED* and *FVA3×FVDEF_SCALED* are significantly negative ($p<0.01$), indicating reduction in information uncertainty associate with both level 2 and level 3 FV assets.

Additional Sensitivity Analysis

In this section, we perform additional (untabulated) sensitivity analysis to ensure the results reported in Table 3 are robust. First, we exclude 2008 and 2009 from our sample years to see if the financial crisis influences our results. We find the variable *FVA2×FVDEF* is significantly negative; *FVA3×FVDEF* is negative but insignificant. Second, we exclude any bank-years with an auditor change and find that auditor changes do not influence our results; coefficient estimates on both *FVA2×FVDEF* and *FVA3×FVDEF* remain significantly negative. Third, since Bens et al. (2016) find FV comment letters influence information uncertainty, we

[20] For example, if three of five engagements in a report indicated FV deficiencies, *FVDEF* would equal 0.60. However, if this were the fifth report received by the audit firm during the sample period, then *FVDEF_SCALED* would equal 0.12 (0.60 ÷ 5), reducing the impact of this fifth report.

exclude the 69 bank-years (7.4% of sample observations) in our sample that received a Securities and Exchange Commission (SEC) comment letter pertaining to a fair value issue. Our results are robust; *FVA2×FVDEF* and *FVA3×FVDEF* remain significantly negative. Finally, since Ahn et al. (2020) find a positive association between FV restatements and audit quality, we exclude the 31 bank-years (3.3% of the sample) that have a restatement and our results continue to hold. These analyses suggest that, in general, our results are robust to other regulatory events.

Overall, results of sensitivity tests are consistent with our main finding: the intensity of FV deficient reports are negatively associated with information uncertainty related to level 2 and level 3 FV estimates of financial assets.

8. Changes in Auditor Behavior after the Inspection Event

Our main finding suggests that FV deficient reports are effective in decreasing information uncertainty surrounding FV asset estimates. As described in the hypothesis section this relation requires FV deficient reports to lead to changes in the fair value audit process which is consistent with the evidence in prior literature (Acito et al. 2018; Aobdia 2018). However, in this section, we attempt to provide direct evidence that FV deficient reports lead to changes in the auditor's fair value audit process.

PCAOB Deficiencies and Audit Fees

To test for potential shifts in audit effort, we use an audit fee model designed for the banking industry, developed by Fields et al. (2004) and used by Ettredge et al. (2014) in documenting that fair value asset holdings are positively associated with audit fees. We modify the model to analyze the auditor response to an inspection event as follows:

$$
\begin{aligned}
LnAFEES_{it} = {} & (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + \alpha_4 FVDEF + FVDEF \\
& \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA2_{it} + \alpha_{3a} FVA3_{it}) + \alpha_5 LnASSET_{it} + \alpha_6 BIG4_{it} \\
& + \alpha_7 LOSS_{it} + \alpha_8 STDRET_{it} + \alpha_9 TRANSACCT_{it} + \alpha_{10} SECURITIES_{it} \\
& + \alpha_{11} EFFICIENCY + \alpha_{12} COMMLOAN_{it} + \alpha_{13} NONPERFORM \\
& + \alpha_{14} CHGOFF_{it} + \alpha_{15} MTGLOAN_{it} + \alpha_{16} CAPRATIO_{it} + \alpha_{17} INTANG_{it} \\
& + \alpha_{18} SENSITIVE_{it} + \alpha_{18} SAVING_{it} + \epsilon
\end{aligned}
\tag{5}
$$

Our fair value variables (*FVA1*, *FVA2*, *FVA3*) and FV deficiency intensity variable (*FVDEF*) are as defined before. The remaining control variables are defined in the appendix. Results from Ettredge et al. (2014) suggest that additional audit effort is necessary to provide assurance for subjective fair value estimates, indicating premiums to the proportion of level 2 and level 3 designated FV assets (i.e. $\alpha_2 > 0$ and $\alpha_3 > 0$). Because level 1 inputs are based on quoted market prices, which should—in theory—be easily verifiable, we make no prediction for α_{1a}.

Table 5 presents the audit fee model result. The control variables included in the model demonstrate patterns of significance and magnitude consistent with those found in Ettredge et al. (2014). The results reveal a positive and significant coefficient on the interaction of *FVA3*×*FVDEF* ($p<0.10$), suggesting that audit fee premiums associated with level 3 assets are increasing with respect to the intensity of the deficiencies contained in a PCAOB inspection report. The regression coefficients for the interaction of level 2 assets with our intensity measure (*FVA2*×*FVDEF*) are negative and insignificant. The significance of level 3 assets suggests that audit efforts as proxied by audit fees, appear concentrated in the most difficult to value and highly subjective level 3 designated assets. While this appears contrary to our primary results, which suggest that both level 2 and level 3 estimated assets are associated with reduced information asymmetry, it may be due to a decreased burden in substantiating or revisiting level 2 assets that have some level of market corroboration by definition. Moreover, our discussions with a financial institution expert, Big 4 manager reveal that audit fee premiums resulting from

workload due to FV deficiencies would not necessarily be priced into the audit engagement (unless some completely new process needed to be instituted in order to rectify the deficiency going forward).

[PLEASE INSERT TABLE 5]

PCAOB Deficiencies and Changes in Fair Value Footnote Disclosure

SFAS 157 requires footnote disclosures related to fair value. In particular, issuer-clients are required to disaggregate fair value assets and liabilities for each designation (level 1, level 2 and level 3). While SFAS 157 does not mandate specific requirements for the number of categories each level should be broken into, it suggests that companies meet the objective of the requirement by considering the nature and risks of the fair value estimates in question.[21]

In this section, we explore the potential for increased auditor effort and focus to influence footnote disclosures about FV. Similar to Bens et al. (2016), we measure disclosure in the FV footnote to provide evidence of increased disclosure practices after the issuance of a FV deficient report. We hand-collect data about disclosures in the FV footnote (number of words and asset categories) to provide additional support for the "spillover" effects to issuers of increased monitoring by auditors after the issuance of a deficient FV report. Table 6, Panel A provides descriptive statistics for these measures of real changes to issuer client disclosures. Notably, there is significant deviation in the number of asset categories reported by issuer-clients even among those engaging Big 4 audit firms.[22]

[21] "A reporting entity shall determine the appropriate classes for those disclosures on the basis of the nature and risks of the assets and liabilities and their classification in the fair value hierarchy (that is, Levels 1, 2, and 3)… The classification of the asset or liability in the fair value hierarchy also shall affect the level of disaggregation because of the different degrees of uncertainty and subjectivity involved in Level 1, Level 2, and Level 3 measurements. For example, the number of classes may need to be greater for fair value measurements using significant unobservable inputs (that is, Level 3 measurements) to achieve the disclosure objectives because Level 3 measurements have a greater degree of uncertainty and subjectivity." (ASC 820-10-50-2A)

[22] This deviation reflects survey evidence gathered by Glover et al. (2017) who report that only half of their surveyed audit partners agreed that footnote disclosures are consistent among clients (50% strongly disagree);

[PLEASE INSERT TABLE 6]

To determine whether client FV disclosures change after the auditor receives a FV deficient report, we count the number of words in each issuer client's FV footnote disclosure and take the natural log (*LN_WORD*). We also count the number of categories into which each issuer-client breaks its FV asset estimates measured on a recurring basis (*ASSET_CAT*). Table 6, Panel A presents the descriptive statistics for the fair value footnote variables. The mean number of words in a fair value footnote for a client of the Big 4 is 2,554 (*LN_WORD* = 7.844) and the mean number of asset categories (*ASSET_CAT*) is 8.330.

Table 6, Panel B shows that clients for which the PCAOB reveals a FV deficiency (*INSPECT* = 1), average *LN_WORD* increases ($p<0.10$), while the average *ASSET_CAT* increases by 1.279 ($p<0.05$). These results provide evidence of changes in the disclosure practices of issuer clients that corroborate the association of increased audit focus following a FV deficient inspection report. Because SEC comment letters typically result in changes to footnote disclosure, Table 7, Panel C repeats this analysis but excludes those issuers with fair value SEC comment letters during the year. Results reveal that once comment letter issuer clients are excluded, only *ASSET_CAT* exhibits a positive and significant increase, suggesting issuer-clients break their FV assets into more categories. Overall, these results are consistent with issuer clients changing fair value disclosures following FV deficient reports.

Quarterly Response to FV Deficient Reports

If FV deficient reports spur auditors to conduct higher quality audits with more rigorous testing of FV assets, then we would expect the reduction in information uncertainty to occur in

moreover, 37.5% of these partners strongly disagreed that the disclosures regarding estimation uncertainty are adequate.

the first audited quarter after the inspection report, *viz*. the fiscal year-end. Therefore, in this section we examine quarterly data after the inspection event and make a distinction between quarters that are only reviewed and the audited "fourth quarter" report.[23]

We estimate equity betas similar to our main analysis but begin the estimation procedure for *BETA_ADJ* in the three months following the quarter for which FV estimates are gathered (see Figure 2).[24] Because we are interested in whether improvement in information uncertainty occurs prior to the fourth quarter, we construct our sample with FV deficient reports that were issued during the first, second and third quarters to compare the information uncertainty estimated in the quarters following the issue of a FV deficient report to that estimated after the release of "quarter 4" audited financial results. Thus, for inspection reports issued during quarter 2, we examine estimation windows *following* quarter 2, quarter 3 and quarter 4; for inspection reports issued during quarter 3, we examine estimation windows *following* quarter 3 and quarter 4. To the extent that auditors make corrective actions or mediate with their clients regarding their processes involving FV estimated assets *prior to* the audited fourth quarter, this would bias against finding a reduction in information uncertainty in the fourth quarter.

Table 7 provides results of our primary model, equation (3), estimated on a quarterly basis and appended with year and audit firm fixed effects. *Q4* is a dichotomous variable taking the value of 1 during the fourth fiscal quarter and 0 otherwise. Because the sample is restricted to years with FV deficient reports, we no longer include our main variable of interest (*FVDEF*) and are instead interested in the interaction between *Q4* and our complex fair value variables (*FVA2*

[23] While there is no 10-Q released for quarter four and the audited annual report supplants the need for the submission of a fourth quarter 10-Q, we refer to the annual report as the fourth quarter financial results for ease of exposition.

[24] This is consistent with Riedl and Serafeim's (2011) quarterly assessments of *BETA_ADJ*. They argue that while quarterly reports may be issued in the second month following the end of the quarter, utilizing a three-month window captures quarterly earnings releases as well as other information released that precedes the registration of 10-Qs with the SEC.

and *FVA3*). If FV deficient reports increase the scrutiny of audit firms and the audit process, we would anticipate the reduction of information uncertainty to appear as a negative and significant coefficient on these interactions. While the coefficient on the interaction term *FVA2*×Q4 is not significant, the coefficient on the interaction term *FVA3*×Q4 is negative and significant ($p<0.10$). The result for level 3 but not level 2 is not particularly surprising given that our discussion with a Big 4 manager with expertise over financial institutions expert suggested that internal controls for the most risky assets are conducted in the fourth quarter. The results in Table 7 suggest that the reduction in information uncertainty documented in our main analysis coincides with the release of audited financial statements, supporting the role of the auditor in facilitating an increase in FV estimate transparency rather than improvements initiated by their issuer clients.

[PLEASE INSERT TABLE 7]

9. Conclusion

Despite a decade of implementation and practice, fair value accounting presents a formidable and complex task for audit professionals. When queried about the proliferation of fair value estimates in practice, 96.9% of audit experts strongly agreed that the number of FV estimates in financial statements has significantly increased, and 93.8% of these experts strongly agree that the relative proportion of FV estimates with high degrees of measurement uncertainty has increased (Glover et al. 2017). This prevalence of complex FV estimates raises concern among both regulators and auditors (PCAOB 2015, Glover et al. 2019), causing auditors to question whether audit work can rise to the level required by the PCAOB.[25]

We examine whether fair value (FV) deficiencies highlighted in Public Company Accounting Oversight Board (PCAOB) inspection reports of Big 4 audit firms improve the

[25] One audit expert writes, "By definition, the fair value models are estimates [that] *cannot be audited to the level of precision* that the PCAOB is expecting." [emphasis added], (Glover et al. 2019, p. 33)

quality of fair value reporting for the auditors' portfolio of clients operating in the financial industry. While prior literature finds a positive association between inspection report deficiencies and improved audit quality and internal control audits (DeFond and Lennox 2017, Lamoreaux 2016), the fair value audit process is different than most other areas of accounting because it involves complex estimates for which it is difficult for auditors to provide positive assurance. A rich qualitative literature supports the notion that auditing FV estimates is extremely challenging for auditors (Griffith 2020; Glover et al. 2019; Cannon and Bedard 2017; Glover et al 2017; Griffith et al. 2015; Christensen et al. 2012). Additionally, Glover et al. (2019) provide evidence that auditors may respond to FV deficiencies by changing audit procedures to minimize "inspection risk" rather than make changes that actually improve audit quality. We seek to build on this prior qualitative literature and empirically investigate whether inspection report deficiencies related to FV improve the quality of FV reporting despite these noted complexities.

To measure financial reporting quality, we use asset-specific betas of fair value assets, a market-based measure of the information uncertainty generated by these estimates. Higher quality fair value reporting is associated with a lower information uncertainty. To measure a deficient PCOAB inspection report related to fair value, we capture the pervasiveness of FV deficiencies among an audit firms' inspected clients—the "intensity" of FV deficiencies in the report. We calculate our proxy for intensity as the ratio of the number of auditor clients receiving a FV deficiency to the total number of clients receiving any audit deficiency in the report.

We find a negative association between the intensity of a FV deficient report and information uncertainty related to level 2 and level 3 FV estimates of financial assets. We also find that the association is stronger for a subsample of auditor clients with above the median exposure to FV assets, suggesting that audit firms are most responsive to issuer clients with the

greatest exposure to FV assets. Finally, we find that fair value expertise measured at the office-level drives our main results, corroborating evidence that such expertise drives audit quality in the context of SEC comment letters (Ahn et al. 2020). This subsample analysis also bolsters our contention that reductions in information asymmetry following FV deficient inspection reports are tied to changes in the audit process.

Our results are robust to using an alternative measure of FV deficient reports; combining level 2 and level 3 fair value assets; excluding financial crisis bank-years; excluding clients that change auditors; and excluding bank-years that receive an SEC comment letter pertaining to FV. We provide additional analysis to ensure FV deficient reports lead to changes in the fair value audit process. We find evidence to suggest increased auditor effort (measured by audit fees) and changes to the fair value footnotes after receiving a FV deficient report as well as using quarterly analysis to document that the reduction in uncertainty occurs during the audited "fourth quarter".

Ours is the first study to empirically examine whether FV deficiencies identified in PCAOB inspection reports are associated with improvements in the auditing of FV estimates. Our evidence suggests that, even if audit firms are responding to inspection risk rather than audit risk, their actions in response to FV deficiencies still lead to improvements in FV reporting of complex financial instruments. Thus, we argue that PCAOB inspections play a critical role in improving the quality of FV reporting for Big 4 auditors' portfolios of clients within the financial industry.

Glover et al. (2019) provide evidence that FV deficiencies may not be exclusively driven by the failure of the auditor, but by other variables and biases in the inspection process (e.g. lack of expertise on the part of PCAOB inspectors in the area of FV estimates; legitimate disagreements in reasonable estimates that inherently arise in assessing highly complex FV

estimates; and differing incentives between auditors and regulators). The possibility that deficient auditor performance alone may not explain the issuance of FV deficiencies not only (a) dampens the likelihood that FV deficient inspection reports would be associated with an increase in FV financial reporting quality, but (b) also suggests why, in spite of any such improvement, FV deficiencies continue to be noted by the PCAOB. Irrespective of why FV deficiencies remain as noted issues in PCOAB inspection reports, the results of our study suggest that they are associated with improvements of FV reporting quality.

Appendix

Variable Definitions

Inspection Event Variables	
FVDEF	the ratio of number of fair value deficient issuers listed in an inspection report to the total deficient issuers listed in that inspection report
Information Uncertainty Reduction Analysis Variables	
BETA_ADJ	equity beta as assessed in the four months after the fiscal year-end, multiplied by the ratio of equity to total assets
FVA1	fair value of assets designated at level 1 scaled by total assets
FVA2	fair value of assets designated at level 2 scaled by total assets
FVA3	fair value of assets designated at level 3 scaled by total assets
NFVA	other assets not measured at fair value scaled by total assets
LEV	total liabilities scaled by total assets
Audit Fee Analysis Variables	
LnAFEES	the natural-log-transformed value of audit fees
LnASSET	the natural-log-transformed value of total assets
LOSS	a dichotomous variable coded 1 for issuers with net income less than 0, 0 otherwise
STDRET	firm-specific standard deviation of 12 monthly returns ending at the fiscal year-end
TRANSACCT	total transaction accounts divided by total deposits
SECURITIES	[1-(total securities/total assets)]
EFFICIENCY	total operating expenses divided by total revenue
COMMLOAN	the sum of commercial and agricultural loans divided by gross loans
NONPERFORM	nonperforming loans divided by gross loans
CHGOFF	net charge-offs divided by the loan loss reserve
MTGLOAN	total domestic real estate and home equity loans divided by gross loans
CAPRATIO	total risk-adjusted capital ratio
INTANG	intangible assets divided by total assets
SENSITIVE	(rate-sensitive assets – rate-sensitive liabilities)/total assets
SAVING	dichotomous variable coded 1 if the company is a savings institution (SIC codes 6035 and 6036), and 0 otherwise
Additional Sensitivity Analysis Variables	
LN_WORD	Natural log of the number of words disclosed in the issuer's fair value footnote
ASSET_CAT	number of fair value asset categories disclosed in issuer's fair value footnote
LIAB_CAT	number of fair value liability categories disclosed in issuer's fair value footnote
FVDEF_SCALED	*FVDEF* scaled by the cumulative number of FV deficient reports received by the audit firm during the sample period
INSPECT	a dichotomous variable coded 1 if a fair value deficient inspection was issued during the fiscal year and 0 otherwise

References

Abbott, A. 1988. *The system of professions: An essay on the division of expert labor*. Chicago: University of Chicago Press.

Acito, A., Hogan, C., & Mergenthaler, R. 2018. The effects of PCAOB inspections on auditor-client relationships. *The Accounting Review* 93(2): 1-35.

Ahn, J., Hoitash, R. & U. Hoitash. 2020. Auditor task-specific expertise: The case of fair value accounting. *The Accounting Review* 95(3): 1-32.

Aobdia, D. 2018. The impact of the PCAOB individual engagement inspection process—Preliminary evidence. *The Accounting Review* 93(4): 53-80.

Bens, D. A., Cheng, M., & Neamtiu, M. 2016. The Impact of SEC disclosure monitoring on the uncertainty of fair value estimates. *The Accounting Review* 91(2): 349-375.

Botosan, C., Carrizosa, R, & Huffman, A. 2011. Factors influencing banks' use of level 3 valuation inputs during the financial crisis. Working Paper, University of Utah.

Cannon, N., & Bedard, J. C. 2017. Auditing challenging fair value measurements: Evidence from the field. *The Accounting Review* 92 (4): 81-114.

Chircop, J., & Novotny-Farkas, Z. 2016. The economic consequences of extending the use of fair value accounting regulatory capital calculations. *Journal of Accounting and Economics* 62(2-3): 183-203.

Christensen, B., Glover, S., & Wood, D. 2012. Extreme estimation uncertainty in fair value estimates: Implications for audit assurance. *Auditing: A Journal of Practice and Theory* 31(1): 127-157

DeFond, M. L., & Lennox, C. 2017. Do PCAOB inspections improve the quality of internal control audits? *Journal of Accounting Research* 55(3): 591-627.

DeFond, M., & Zhang, J. 2014. A review of archival auditing research. *Journal of Accounting and Economics* 58: 275-326.

Ettredge, M.; Yang, X., & Yi, H. 2014. Fair value measurements and audit fees: Evidence from the banking industry. *Auditing: A Journal of Practice and Theory* 33(3): 33-58.

Fields, L., Fraser, D., & Wilkins, M. 2004. An investigation of the pricing of audit services for financial institutions." *Journal of Accounting and Public Policy* 23(1): 53-77.

Giddens, A. 1990. *The consequences of modernity*. Stanford, CA: Stanford University Press.

Giddens, A. 1991. *Modernity and self-identity*. Stanford, CA: Stanford University Press.

Glover, S., Taylor, M, & Wu, Y. 2017. Current practice and challenges in auditing fair value measurements and complex estimates: Implications for auditing standards and the academy. *Auditing: A Journal of Practice and Theory* 36(1): 63-84.

Glover, S., Taylor, M, & Wu, Y. 2019. Mind the gap: Why do experts have differences of opinion regarding the sufficiency of audit evidence supporting complex fair value measurements? *Contemporary Accounting Research* 36(3): 1417-1460.

Griffith, E. 2020. Auditors, specialists and professional jurisdiction in audits of fair value. *Contemporary Accounting Research* 37(1): 245-276.

Griffith, E., Hammersley, J., & Kadous, K. 2015. Audits of complex estimates as verification of management numbers: How institutional pressures shape practice. *Contemporary Accounting Research* 32 (3): 833-863.

Griffith, E., Hammersley, J., Kadous, K., & Young, D. 2015b. Auditor mindsets and audits of complex estimates. *Journal of Accounting Research* 53(1): 49-77.

Hanley, K.W., Jagolinzer, A.D., & Nikolova, S. 2018. Strategic estimation of asset fair values. *Journal of Accounting and Economics* 66: 25-45.

International Forum of Independent Audit Regulators (IFIAR). 2020. Survey of Inspection Findings 2019. https://www.ifiar.org/?wpdmdl=10453 . Accessed October 9, 2020.

Kohlbeck, M., Smith, T., & Valencia, A. 2017. Auditors and net transfers of level 3 fair-valued financial instruments. *Advances in Accounting* 36: 27-39.

Lambert, R., Leuz, C., & Verrechia, R. 2007. Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45(2): 385-420.

Lamoreaux, P. 2016. Does PCAOB inspection access improve audit quality? An examination of foreign firms listed in the United States. *Journal of Accounting and Economics* 61: 313–337.

Mansi, S.A., Maxwell, W.F. & Miller, D.P. 2004. Does auditor quality and tenure matter to investors? Evidence from the bond market. *Journal of Accounting Research* 42(4): 755-793.

Minnis, M. 2011. The value of financial statement verification in debt financing: Evidence from private US firms. *Journal of Accounting Research* 49(2): 457-506.

Prasad, A., and Webster, J. 2020. What are the trends in PCAOB inspections and the reported audit deficiencies? *Journal of Accounting, Auditing & Finance* (forthcoming).

Public Company Accounting Oversight Board (PCAOB). 2014. Standing Advisory Group Meeting. October 2. Washington, DC: PCAOB.

Public Company Accounting Oversight Board (PCAOB). 2018a. Public Company Accounting Oversight Board 2020 Budget by Division/Office. https://pcaobus.org/About/Administration/Documents/Fiscal%20Year%20Budgets/2020.pdf. Accessed July 22, 2020.

Public Company Accounting Oversight Board (PCAOB). 2018. Auditing Accounting Estimates, Including Fair Value Measurements and Amendments to PCAOB Auditing Standards. Release No. 2018-005. Accessed March 5, 2019. https://pcaobus.org/Rulemaking/Docket043/2018-005-estimates-final-rule.pdf

Quaadman, T. 2015. Letter written to James Schnurr of the SEC and James Doty of the PCAOB. May 29, 2015. Accessed July 30, 2019. https://www.centerforcapitalmarkets.com/letter/letter-to-the-sec-and-pcaob-regarding-financial-reporting-052915/

Riedl, E., & Serafeim, G. 2011. Information risk and fair value: An examination of equity betas. *Journal of Accounting Research* 49(4): 1083 – 1122.

Robinson, D., Smith, T., & Valencia, A. 2018. Does managerial opportunism explain the differential pricing of level 3 fair value estimates? *Journal of Financial Research* 41(2): 253-289.

Ryan, V. 2017. PCAOB trying different tack in selecting audits. *CFO.Com.* May 10. http://ww2.cfo.com/auditing/2017/05/pcaob-trying-different-tack-selecting-audits/ Accessed April 27, 2018.

Song, C., Thomas, W., & Yi, H. 2010. Value relevance of SFAS No. 157 fair value hierarchy information and the impact of corporate governance mechanisms. *The Accounting Review* 85(4): 1375-1410.

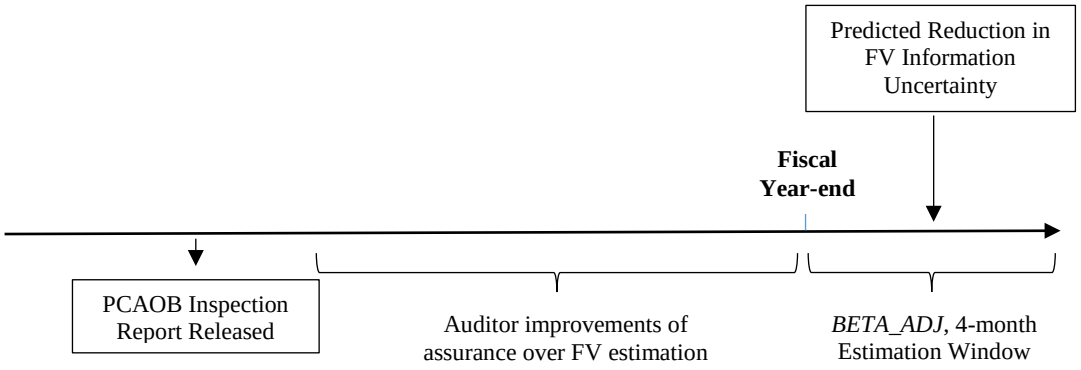
Teoh, S.H. & Wong, T.J. 1993. Perceived auditor quality and the earnings response coefficient. *The Accounting Review*, 68(2): 346-366.

Valuation Research Corporation (VRC). 2013. Alert: PCAOB Comments Increase Auditor Scrutiny of Fair Value Measurements. January. Boston, MA: VRC.

Westermann, K., J. Cohen, and G. Trompeter. 2019. PCAOB inspections: Public accounting firms on "trial". *Contemporary Accounting Research* 36: 694–731.

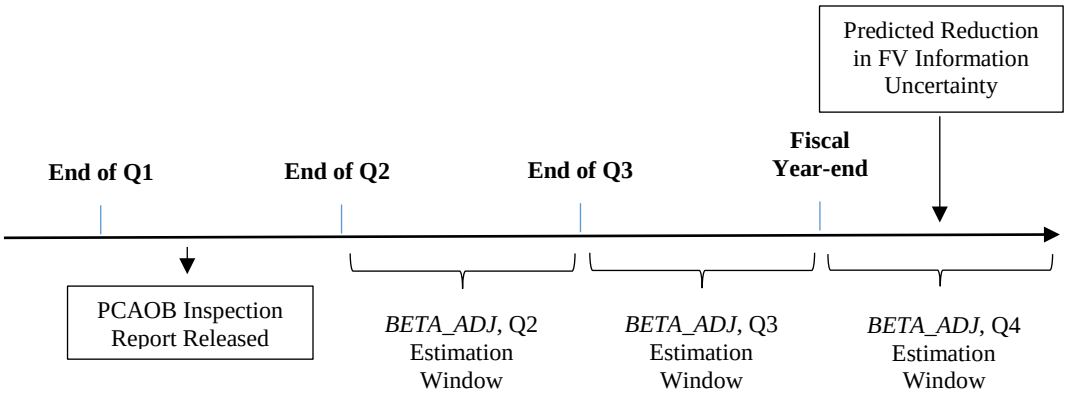
Willenborg, M. 1999. Empirical analysis of the economic demand for auditing in the initial public offering market. *Journal of Accounting Research* 37(1): 225-238.

Figure 1: Annual information uncertainty analysis timeline



This figure presents the timeline of events for our analyses using issuer client annual data. The PCAOB releases the audit firm's inspection report describing FV deficiencies sometime during the year. After its release, the audit firm responds by improving its processes over auditing FV estimates for all clients. We measure the reduction (if any) in information uncertainty in the first audited quarter following the release of the inspection report. The audit firm learning of FV deficiencies before public release of the report would bias against our findings.

Figure 2: Quarterly information uncertainty analysis timeline



This figure presents the timeline of events for our sensitivity analyses using issuer client quarterly data. The PCAOB releases the audit firm's inspection report describing FV deficiencies sometime during the year. After its release, the audit firm responds by improving its processes over auditing FV estimates for all clients. Because only Quarter 4 is audited, we predict that the reduction in FV information uncertainty will occur only after the annual audit and not in any of the earlier quarters. The audit firm learning of FV deficiencies before public release of the report would bias against our findings. (Note: this figure maps a hypothetical report issued in Q2; however, our quarterly analysis includes reports issued in Q1 and Q3 as well.)

Table 1 Sample

Panel A: Sample selection procedure

Sample Screen	**N**
Number of inspection reports of US domiciled audit firms with fair value deficiencies 2008-2015	123
Bank and nonbank issuers clients of deficient audit firms reporting positive values of level 2 and level 3 fair value assets 2008-2015	24,242
Less: Nonbank issuers	(21,223)
Bank issuer-years of audit firms with fair value deficiencies 2008-2015	3,019
Less: Bank issuer-years without sufficient data for uncertainty analysis	(1,386)
Bank issuer-years of inspected audit firms with sufficient data for analysis	1,633
Less: Bank issuer-years of triennially inspected audit firms	(158)
Bank issuer-years of annually inspected audit firms with sufficient data for uncertainty analysis	1,475
Less: Bank issuer-years of non-Big 4 audit firms	(545)
Bank issuer-years of Big 4 audit firms with sufficient data for uncertainty analysis	930

Panel B: Frequency of fair value deficient inspection reports for Big 4 audit firms

Inspection issued	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
PWC	0	0	2	1	1	1	1	1
E&Y	0	0	1	1	1	1	1	1
D&T	1	1	0	1	1	1	0	1
KPMG	1	1	1	1	1	1	1	1
Total FV Deficient Inspections	2	2	4	4	4	4	3	4

Panel C: Intensity of fair value deficient inspection reports, *FVDEF*, for Big 4 audit firms

Inspection issued	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
PWC	0	0	0.44	0.25	0.38	0.19	0.11	0.06
E&Y	0	0	0.44	0.62	0.25	0.12	0.14	0.05
D&T	0.44	0.14	0	0.12	0.23	0.08	0	0.27
KPMG	0.10	0.22	0.63	0.67	0.58	0.29	0.33	0.07
Avg. *FVDEF*	0.14	0.09	0.37	0.42	0.36	0.17	0.15	0.11

Panel D: Descriptive statistics

	Mean	**Q1**	**Median**	**Q3**	**Standard Deviation**
BETA_ADJ	0.128	0.090	0.128	0.162	0.065
FVA1	0.011	0.000	0.001	0.007	0.024
FVA2	0.186	0.111	0.158	0.230	0.126
FVA3	0.005	0	0.000	0.005	0.009
NFVA	0.789	0.753	0.832	0.880	0.137
LEV	0.894	0.879	0.895	0.908	0.023
FVDEF	0.281	0.100	0.250	0.444	0.222

Panel A presents our sample selection process. Panel B shows by year the frequency that Big 4 audit firms received a PCAOB inspection report containing at least one FV deficiency. Panel C presents our variable of interest *FVDEF* by year. Panel D presents descriptive statistics. *FVDEF* equals the ratio of number of fair value deficient issuers listed in an inspection report to the total deficient issuers listed in that inspection report. *BETA_ADJ* equals equity beta as assessed in the four months following the fiscal year-end, multiplied by the ratio of equity to total assets. *FVA1, FVA2, FVA3, FVA23* are fair value of assets designated at levels 1, 2, 3 and 2 and 3, respectively, scaled by total assets. *NFVA* equals other assets not measured at fair value scaled by total assets. *LEV* is equal to total liabilities scaled by total assets.

Table 2 Correlation matrix for variables of interest

(Pearson coefficients above the diagonal; Spearman below the diagonal)

	BETA_ADJ	***FVA1***	***FVA2***	***FVA3***	***NFVA***	***LEV***	***FVDEF***
BETA_ ADJ		0.015	-0.062*	0.114***	0.046	-0.459***	-0.068**
FVA1	0.124***		0.290***	0.174***	-0.459***	0.051	-0.060*
FVA2	-0.081**	0.099***		0.336***	-0.980***	0.175***	0.093***
FVA3	0.116***	0.113***	0.108***		-0.397***	0.068**	-0.050
NFVA	0.069**	-0.221***	-0.973***	-0.148***		-0.172***	-0.071**
LEV	-0.497***	-0.020	0.154***	0.031	-0.150***		-0.007
FVDEF	-0.042	-0.047	0.118***	-0.056*	-0.100***	-0.006	

*, **, *** indicate significance at the 0.10, 0.05 and 0.01 level, respectively. *BETA_ADJ* equals equity beta as assessed in the four months following the fiscal year-end, multiplied by the ratio of equity to total assets. *FVA1, FVA2, FVA3,* are fair value of assets designated at levels 1, 2, 3, respectively, scaled by total assets. *NFVA* equals other assets not measured at fair value scaled by total assets. *LEV* is total liabilities scaled by total assets. *FVDEF* is equal to the number of issuers with fair value deficiencies in a PCAOB inspection report divided by the total number of issuers listed in a PCAOB inspection report

Table 3 Information uncertainty of FV assets post-inspection

$$BETA\_ADJ_{it} = (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + \alpha_4 FVDEF + FVDEF \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA2_{it} + \alpha_{3a} FVA3_{it}) + \alpha_5 NFVA_{it} + \alpha_6 LEV_{it} + \epsilon$$

Variable (Predicted Sign)	(A) Full Sample	(B) High Exposure	(C) Low Exposure	(D) High Expertise	(E) Low Expertise
FVA1	−0.009	0.103	−0.656	−0.142	0.008
	(−0.04)	(0.34)	(−1.33)	(−0.51)	(0.02)
FVA2	0.076	0.154	−0.261	−0.111	0.234
	(0.45)	(0.66)	(−0.63)	(−0.55)	(0.73)
FVA3	1.324***	1.400***	0.942	1.240***	0.893
	(4.61)	(3.33)	(1.41)	(3.69)	(1.23)
FVDEF	0.046**	0.075***	0.007	0.079***	−0.030
	(2.06)	(2.92)	(0.13)	(3.22)	(−0.64)
FVA1×FVDEF	0.394	0.315	1.383**	0.230	1.069**
	(1.11)	(0.76)	(2.20)	(0.48)	(2.04)
FVA2×FVDEF (−)	−0.110*	−0.237***	0.154	−0.111*	−0.114
	(−1.34)	(−2.44)	(0.39)	(−1.32)	(−0.67)
FVA3×FVDEF (−)	−1.836***	−1.493**	−1.587	−2.501***	2.471
	(−2.87)	(−1.92)	(−1.05)	(−3.65)	(1.10)
NFVA	0.043	0.125	−0.392	−0.149	0.213
	(0.24)	(0.48)	(−1.20)	(−0.65)	(0.75)
LEV	−1.424***	−1.282***	−1.587***	−1.384***	−1.416***
	(−11.06)	(−7.37)	(−1.05)	(−8.85)	(−7.04)
Untabulated Fixed Effects	**Year and Audit firm**	**Year and Audit firm**	**Year and Audit firm**	**Year and Audit firm**	**Year and Audit firm**
Clustered Standard Error	**By Bank**	**By Bank**	**By Bank**	**By Bank**	**By Bank**
Observations	930	449	481	602	311
Adjusted R-squared	88.7%	89.66%	88.37%	90.16%	86.33%

*, **, *** indicate significance at the 0.10, 0.05 and 0.01 level, respectively.
Column A presents results for our full sample, main analysis using year and audit firm fixed effects.
Columns B and C present subsample analyses for clients with high and low exposure to FV assets.
Columns D and E present subsample analyses for clients engaging audit firm offices with high and low expertise with FV assets.
T-statistics in parentheses. *BETA_ADJ* equals equity beta as assessed in the four months following the fiscal year-end, multiplied by the ratio of equity to total assets. *FVA1, FVA2, FVA3,* are fair value of assets designated at levels 1, 2, 3, respectively, scaled by total assets. *NFVA* equals other assets not measured at fair value scaled by total assets. *LEV* is total liabilities scaled by total assets. *FVDEF* is equal to the number of issuers with fair value deficiencies in a PCAOB inspection report divided by the total number of issuers listed in a PCAOB inspection report.

Table 4 Alternate Specifications for High Exposure Issuers and Issuers with High Expertise Auditors

$$BETA\_ADJ_{it} = (\alpha_1 FVA1_{it} + \alpha_2 FVA23_{it}) + FVDEF + FVDEF \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA23_{it}) + \alpha_4 NFVA_{it} + \alpha_5 LEV_{it} + \epsilon$$

$$BETA\_ADJ_{it} = (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + FVDEF\_SCALED + FVDEF\_SCALED \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA2_{it} + \alpha_{3a} FVA3_{it}) + \alpha_4 NFVA_{it} + \alpha_5 LEV_{it} + \epsilon$$

	Levels 2 and 3 combined		***FVDEF*, scaled**	
Variable (Predicted sign)	**(A) High Exposure**	**(B) High Expertise**	**(C) High Exposure**	**(D) High Expertise**
FVA1	0.249	0.047	0.247	−0.042
	(0.87)	0.17	(0.93)	(−0.15)
FVA23	0.276	0.047		
	(1.27)	0.24		
FVA2			0.117	−0.049
			(0.51)	(−0.23)
FVA3			1.091***	0.909***
			(2.68)	2.71
FVDEF	0.093***	0.079***		
	(3.13)	(3.16)		
FVA1×FVDEF	0.189	0.058		
	(0.49)	0.13		
FVA23×FVDEF (−)	−0.282***	−0.171**		
	(−3.16)	(−2.10)		
FVDEF_SCALED			0.118**	0.107***
			(2.42)	2.84
FVA1×FVDEF_SCALED			−0.575	0.284
			(−1.08)	0.28
FVA2×FVDEF_SCALED (−)			−0.279**	−0.380***
			(−2.13)	(−2.71)
FVA3×FVDEF_SCALED (−)			−1.224	−3.035***
			(−0.60)	(−1.71)
NFVA	0.192	−0.02	0.095	−0.089
	(0.77)	(−0.09)	(0.37)	−0.37
LEV	−1.298***	−1.369***	−1.273***	−1.372***
	(−7.25)	(−8.71)	(−7.27)	(−8.72)
Untabulated Fixed Effects	**Year and audit firm**	**Year and Audit firm**	**Year and Audit firm**	**Year and Audit firm**
Clustered Standard Error	**By Bank**	**By Bank**	**By Bank**	**By Bank**
Observations	457	602	457	602
Adjusted R-squared	89.16%	89.83%	88.58%	90.01%

*, **, *** indicates significance at the 0.10, 0.05 and 0.01 level, respectively. T-statistics in parentheses. *BETA_ADJ* = equity beta as assessed in the four months beginning after the fiscal year-end, multiplied by the ratio of equity to total assets. *FVA1*, *FVA2*, *FVA3* = fair value of assets designated at levels 1, 2, and 3, respectively, scaled by total assets. *FVA23* = fair value of assets designated at levels 2 and 3 combined, scaled by total assets. *NFVA* = other assets not measured at fair value scaled by total assets. *LEV* = total liabilities scaled by total assets. *FVDEF* = ratio of fair value deficient issuers in an inspection report to the total deficient issuers in an inspection report. *FVDEF_SCALED* = *FVDEF* scaled by the total number of fair value deficient inspections received by an auditor during the sample period to date.

Table 5 Audit fee model

$$LnAFEES_{it} = (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + \alpha_4 FVDEF + FVDEF \times (\alpha_{1a} FVA1_{it} + \alpha_{2a} FVA2_{it} + \alpha_{3a} FVA3_{it}) + \alpha_5 LnASSET_{it} + \alpha_6 BIGN_{it} + \alpha_7 LOSS_{it} + \alpha_8 STDRET_{it} + \alpha_9 TRANSACCT_{it} + \alpha_{10} SECURITIES_{it} + \alpha_{11} EFFICIENCY + \alpha_{12} COMMLOAN_{it} + \alpha_{13} NONPERFORM + \alpha_{14} CHGOFF_{it} + \alpha_{15} MTGLOAN_{it} + \alpha_{16} CAPRATIO_{it} + \alpha_{17} INTANG_{it} + \alpha_{18} SENSITIVE_{it} + \alpha_{18} SAVING_{it} + \epsilon$$

Variable	Predicted Sign	
INTERCEPT		3.488***
		(6.92)
FVA1		−0.486
		(−0.44)
FVA2	+	0.764***
		(2.71)
FVA3	+	6.719*
		(1.72)
FVDEF		−0.138
		(−0.94)
*FVA1*FVDEF*		4.974*
		(1.84)
*FVA2*FVDEF*	+	−0.637
		(−1.21)
*FVA3*FVDEF*	+	12.469*
		(1.39)
LnASSET		0.556***
		(24.69)
LOSS		−0.003
		(−0.05)
STDRET		2.372*
		(1.72)
TRANSACCT		−0.057
		(−0.23)
SECURITIES		1.197***
		(4.79)
EFFICIENCY		0.369**
		(2.13)
COMMLOAN		−0.643*
		(−1.79)
NONPERFORM		3.644***
		(3.09)
CHGOFF		0.062
		1.12
MTGLOAN		−0.431*
		(−1.73)

(Table continues next page)

Table 5 Audit fee model (cont.)

Variable	Predicted Sign	
CAPRATIO		0.024***
		(4.32)
INTANG		0.031
		(0.02)
SENSITIVE		−0.094
		(−0.73)
SAVING		−0.001
		(−0.02)
Untabulated Fixed Effects		**Year and Audit firm**
Clustered Standard Errors		**By Bank**
Observations		916
Adjusted R-squared		91.11%

*, **, *** indicates significance at the 0.10, 0.05 and 0.01 level, respectively. T-statistics in parentheses. All tests two-tailed unless hypothesized. *FVA1*, *FVA2*, *FVA3* = fair value of assets designated at levels 1, 2, 3, respectively, scaled by total assets. *LnAFEES* = logged audit fees in the year following the deficient inspection. *INSPECT* = 1 if fair value deficient inspection was issued prior to end of fiscal year and 0 otherwise. *LnASSET* = natural log of assets. *BIG4* = 1 if the issuer employs a big-4 auditor and 0 otherwise. *LOSS* = 1 if net income is less than zero and 0 otherwise. *STDRET* = issuer-specific standard deviation of 12 monthly returns ending at the fiscal year-end. *TRANSACCT* = total transaction accounts divided by total deposits. *SECURITIES* = [1-(total securities/total assets)]. *EFFICIENCY* = total operating expenses divided by total revenue. *COMMLOAN* = the sum of commercial and agricultural loans divided by gross loans. *NONPERFORM* = nonperforming loans divided by gross loans. *CHGOFF* = net charge-offs divided by the loan loss reserve. *MTGLOAN* = total domestic real estate and home equity loans divided by gross loans. *CAPRATIO* = total risk-adjusted capital ratio. *INTANG* = intangible assets divided by total assets. *SENSITIVE* = (rate-sensitive assets – rate-sensitive liabilities)/total assets. *SAVINGS* = dichotomous variable coded 1 if the company is a savings institution (SIC codes 6035 and 6036), and 0 otherwise.

Table 6 Fair value footnote disclosure variables

Panel A: Descriptive statistics of fair value footnote variables

	Mean	Q1	Median	Q3	Standard Deviation
LN_WORD	7.844	7.470	7.869	8.204	0.606
ASSET_CAT	8.330	5	7	10	5.454

Panel B: Differences in means pre-/post-inspection for fair value footnote variables

Variables	*INSPECT* = 1	*INSPECT* = 0	Difference in means	t-test
LN_WORD	7.855	7.769	0.086	1.47*
ASSET_CAT	8.488	7.209	1.279	2.24**

Panel C: Differences in means pre-/post-inspection for fair value footnote variables excluding comment letter years

Variables	*INSPECT* = 1	*INSPECT* = 0	Difference in means	t-test
LN_WORD	7.831	7.752	0.079	1.14
ASSET_CAT	8.158	7.146	1.012	1.52*

*, ** indicates significance at the 0.10 and 0.05 level, respectively.
LN_WORD = log of the number of words contained in the fair value footnote of the annual report. *ASSET_CAT* = number of categories related to fair value assets measured on a recurring basis disclosed in the fair value footnote of the annual report. *INSPECT* equals one if a FV deficient report is issued prior to the fiscal year-end of the issuer-client; zero otherwise.

Table 7 Quarterly tests of information uncertainty and FV assets

$$BETA\_ADJ_{it} = \alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it} + Q4 + Q4 \times (\alpha_1 FVA1_{it} + \alpha_2 FVA2_{it} + \alpha_3 FVA3_{it}) + \alpha_4 NFVA_{it} + \alpha_5 LEV_{it} + \epsilon$$

Variable	Predicted Sign	
FVA1		-0.019
		(-0.10)
FVA2		-0.062
		(-0.38)
FVA3		0.858***
		(3.57)
Q4		-0.008**
		(-2.48)
*FVA1*Q4*		0.114
		(1.38)
*FVA2*Q4*	−	0.004
		(0.26)
*FVA3*Q4*	−	−0.379*
		(−1.58)
NFVA		-0.050
		(-0.28)
LEV		−1.164***
		(−8.53)
Untabulated Fixed Effects		**Year and audit firm**
Clustered Standard Errors		**By Bank**
Observations		1,365
Adjusted R-squared		84.90%

*, **, *** indicates significance at the 0.10, 0.05 and 0.01 level, respectively. T-statistics in parentheses. All tests two-tailed unless hypothesized. *BETA_ADJ* = equity beta as assessed in the three months following the end of the quarter after inspection, multiplied by the ratio of equity to total assets. *FVA1, FVA2, FVA3* = fair value of assets designated at levels 1, 2, 3, scaled by total assets. *NFVA* = other assets not measured at fair value scaled by total assets. *LEV* = total liabilities scaled by total assets. *Q4* = 1 if the fiscal quarter is equal to the audited fourth quarter and 0 otherwise.