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Fair value measurements

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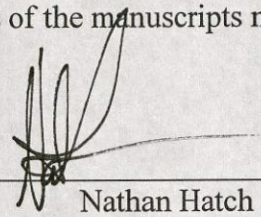
Signature 

Nathan Hatch Cannon

Date 5-16-13

DEDICATION

To my parents, Russell and Shelley Cannon, for inspiring me through their examples of hard work, instilling in me a love of learning, and providing unwavering support in all of my endeavors.

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ABSTRACT

Fair Value Measurements

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This dissertation consists of two empirical studies that investigate fair value measurement issues currently facing the accounting profession—one from the perspective of the auditor, and the other from the perspective of the financial statement user. The results of each study are described below.

This first study examines experienced auditors' descriptions of specific client experiences in which auditing fair value measurements (FVMs) was particularly challenging. Based on a field survey of high-level engagement team personnel from several large firms, we identify a number of key issues currently facing the profession in auditing FVMs. First, when asked about challenges faced in auditing FVMs, respondents cited most frequently the difficulties inherent in auditing management assumptions. Second, although 70 percent of respondents identified a range of estimation uncertainty equal to or exceeding materiality, inherent risk assessments for some FVMs are still within the low/moderate range. Lastly, relatively few audit adjustments were proposed. Auditors noted that when management assumptions are subjective and estimation uncertainty is large, it is difficult to prove that their assumptions and estimates are more accurate than the client's. Supplemental regression results also show that auditors are more likely to propose a decreasing audit adjustment when they have developed their own independent estimate, and are less likely to propose decreasing audit adjustments for financial instruments, as compared to other types of FVMs.

In my second study, I examine the extent to which the high degree of inherent risk noted in my first study is effectively communicated to financial statement users under conditions of high and low management aggressiveness. Specifically, I conduct an experiment that investigates which of three disclosure formats most effectively communicates the risk of high-uncertainty FVMs to users—a narrative sensitivity disclosure currently required in the U.S., a standard quantitative disclosure currently required under IFRS, or an "enhanced" disclosure I propose that also displays the impact of these changes on net income. Results of my study suggest that the standard quantitative sensitivity currently required under IFRS may have the unintended consequence of *decreasing* users' risk assessments when management aggressiveness is high. Increased perceptions of trust, competence, and reliability upon receiving this disclosure partially explain this relationship. As predicted, however, the enhanced disclosure condition is more effective than the standard condition at communicating risk to users under conditions of high management aggressiveness. Thus, the additional information in the enhanced disclosure condition appears to counteract the tendency to decrease risk assessments, thus providing increased benefit to users at little incremental cost to preparers.

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CHAPTER ONE: INTRODUCTION

One of the most critical issues currently facing the accounting profession is the increasing prevalence, complexity, and importance of issues surrounding fair value measurements (FVMs). The FASB's Statement of Financial Accounting Concepts No. 8 (2010) defines relevance and faithful representation as the central characteristics of financial information quality. Ideally, financial information would have both qualities, but the tradeoffs between them have long been recognized. In the past two decades, the FASB's standard setting, particularly as it relates to FVMs, has moved toward relevance, some would say at the expense of faithful representation and verifiability. This has put preparers, auditors, and users in an increasingly difficult position. The nature of financial statement line items has changed (becoming more subjective and obtuse) and financial reporting standards in many cases are less precise. The rapid development of new types of FVMs, increased complexity, heightened sensitivity to economic volatility, and the lack of objectively verifiable data has resulted in ranges of estimation uncertainty surrounding FVMs that can be many multiples of the auditors' materiality threshold. As a result of these trends, preparers are making more subjective assumptions, auditors are seeking adequate assurance despite less objectively verifiable evidence, and users are often faced with increasingly opaque financial statements as they seek information regarding these complex FVMs. The purpose of this dissertation is to investigate and shed further light on these important issues—from the perspective of both the auditor and the financial statement user.

Despite the fact that auditing fair values is among the most significant concerns currently facing the profession, recent PCAOB synthesis papers of research relevant to FVM issues (Martin et al. 2006; Bratten et al. 2013) find that the process of auditing

FVMs has received relatively little attention in the literature. I believe that one key factor slowing the production of quality research on auditing fair values is a lack of knowledge on the specific nature of the challenges faced in auditing financial instruments. Information is needed on such issues as what specific types of financial instruments are most difficult to audit, what features of those instruments contribute to that difficulty, the current status of controls over financial instrument valuation, what substantive procedures are used by auditors when auditing fair values, when and how specialists are used, how often audit adjustments are proposed, etc.

Chapter 2 describes information of this nature that has been systematically collected from a broadly based sample of auditing professionals. Results of this study could enable researchers to more effectively design research studying ways in which the challenges surrounding FVMs might be improved. Although results show that auditors frequently perform each of the multiple procedures listed in auditing standards, respondents frequently cited the difficulties inherent in auditing management assumptions. Further, we find that over 70 percent of our respondents identified a range of estimation uncertainty inherent in the FVM that is approximately equal to or greater than the auditors' materiality threshold. The prevalence of large estimation uncertainty is particularly important given that current audit guidance defines misstatements as only those differences that fall materially outside of the range of reasonable estimates (AS5, paragraph 13; AU 312.36). Thus, even when this range far exceeds the auditors' materiality threshold, auditors appear to lack the regulatory backing to challenge recorded FVMs that fall somewhere within this range.

Although results of the above study suggest that preparers, auditors, and audit committee members are all keenly aware of the high degree of inherent risk caused by these large ranges of estimation uncertainty, financial statement *users* appear to be insufficiently informed about the risks inherent in these situations. For instance, under current accounting guidelines, estimates with extreme estimation uncertainty are reported on the face of the financial statements using only a single point estimate, with no clear indication of the extent of estimation uncertainty provided in the footnotes. Copeland (2005) describes this communication gap as follows:

> The readers of financial statements are too often misled by what *The Economist* (2003) referred to as the "brittle illusion of exactitude" of the current accounting model. Accounting practitioners and academics understand the approximate nature of financial reporting, but a gap exists between what financial statements represent and what many readers believe they represent. This unrealistic expectation of precision in financial reporting can lead to suspicion and disillusionment when inherent judgments in financial statements prove to be inaccurate. (Copeland 2005)

Given that providing information to users is the entire reason for financial reporting, this situation is concerning. Although financial statement users have requested rules requiring much more detailed information about FVMs from the Financial Accounting Standards Board (FASB), preparer groups have vociferously resisted such disclosure expansions. According to these users, adequate communication mechanisms allowing them to make informed, intelligent investing decisions are not currently available to financial statement users in the U.S.

In Chapter 3, I address this communication gap by investigating, via an experiment, which of three disclosure formats most effectively communicates the risk of high-uncertainty FVMs to users, under conditions of high and low aggressiveness. In response to the user feedback noted above, recently updated accounting guidance requires

financial statement preparers to augment FVM disclosures (FASB 2011a, IASB 2011). Although the FASB in the U.S. and the International Accounting Standards Board (IASB) have worked together towards the goal of achieving common FVM disclosures to address user concerns, key differences still remain. Notably, whereas the IASB requires a *quantitative* analysis of sensitivity to changes in significant unobservable inputs, the FASB only requires a *narrative* disclosure providing directional implications of changes in FVM inputs. In addition to experimentally testing these two formats (i.e., narrative and standard quantitative), I also propose and test an "enhanced" quantitative format that also displays the impact of these changes on net income.

Results of my study suggest that the standard quantitative sensitivity currently required by the IASB may have the unintended consequence of *decreasing* users' risk assessments when management aggressiveness is high. In partial explanation of this finding, I find that perceptions of trust, competence, and reliability mediate the relationship between risk assessments and the interaction of management aggressiveness and disclosure format. As predicted, however, results show that the enhanced disclosure condition is more effective than the standard quantitative disclosure condition at communicating risk to users when management aggressiveness is high. Thus, the additional information in the enhanced disclosure condition appears to counteract the tendency to decrease risk assessments, thus providing increased benefit to users at little incremental cost to preparers. As such, the FASB and IASB should consider these results as they further debate the best way to communicate the risk of high estimation uncertainty through FVM sensitivity disclosures moving forward.

CHAPTER TWO: EVIDENCE FROM AUDITORS ABOUT AUDITING FAIR VALUE MEASUREMENTS

I. INTRODUCTION

The importance and complexity of auditing issues involving fair value measurement (FVM) have continued to increase in recent years. Environmental factors surrounding FVM, such as recent economic volatility and the development of complex and innovative financial instruments demanding application of new valuation models and assumptions, present major challenges to both preparers and auditors of FVMs. In fact, some have raised concerns that the difficulty of keeping up with the evolving nature of these FVMs has produced a complexity-competency gap that poses serious challenges to the accounting profession (Copeland 2005). Although a number of academic studies investigate the relevance and reliability of FVMs in the capital markets (Barth et al. 1995; Barth et al. 1996; Kolev 2008; Barth and Taylor 2010; Dechow et al. 2010; Song et al. 2010), very little research has been conducted to date that directly examines the *auditing* of FVMs (Martin et al. 2006). The production of high quality research on auditing FVMs requires that researchers are aware of the specific nature of the challenges faced in auditing financial instruments. We believe that one key factor slowing the production of quality research on auditing fair values thus far is a lack of knowledge on the specific nature of the challenges faced in auditing FVMs.

We address this gap in the literature by reporting on specific experiences of auditors faced with the challenge of FVMs that are especially difficult to audit. Following a design used by several prior studies of audit practice (e.g., Gibbins et al. 2001; Gibbins and Trotman 2002; Nelson et al. 2002), we developed a detailed questionnaire to capture information on specific client experiences in which auditing FVMs has been particularly challenging. The questionnaire asks professionals to provide information on a specific

engagement in their recent experience for which auditing a FVM was particularly challenging. The instrument contains questions regarding the nature of the chosen FVM, the features that made it difficult to audit, how the engagement team approached resolving those difficulties, the use of valuation specialists by the client and the engagement team, as well as audit outcomes (e.g., proposed and booked audit adjustments).

Results of our study build on recent work in this area that uses different methods. For instance, experimental studies investigating FVMs provide valuable theoretical contributions geared towards improving auditor decision-making and standard setting (e.g., Wang 2010; Griffin 2013; Maksymov et al. 2012; Montague 2012), and a recent semi-structured interview study by Griffith et al. (2013) provides insight into partner's generalized views about how complex estimates are audited and what problems are experienced in the process. The current study extends these findings by systematically collecting detailed data from a large sample of specific client engagements, allowing us to draw valuable inferences from statistical analysis of those data. For instance, our approach enables us to present results on what factors are associated with auditors' inherent risk assessments and clients' decisions to book audit adjustments.

Our data comprise detailed responses from 99 different engagement experiences from 80 high-level audit practitioners (primarily senior managers or managers) to gain insight into this critical area. Results identify a number of key issues currently facing the profession in auditing FVMs. Respondents frequently cited difficulties inherent in auditing management assumptions. With assumptions that were inherently subjective in nature, auditors expressed an inability to externally validate these FVM assumptions

using the auditing procedures prescribed in current auditing standards. These procedures include gaining an understanding of the entity's FVM process, documenting and testing any relevant controls, and then performing substantive procedures, including: (1) testing management's significant assumptions, the valuation model, and the underlying data; (2) developing independent fair value estimates for corroborative purposes; and (3) reviewing subsequent events and transactions (AU 328). In contrast to Griffith et al. (2013), our results show that in the challenging situations we study, auditors regularly test the client's valuation model, develop independent FVM estimates, and test subsequent events. Furthermore, we find in supplemental regression analysis that developing an independent estimate is a key factor driving the auditor's decision to propose an adjusting entry that would decrease client income if booked.

Another closely related issue is the broad range of estimation uncertainty created in part by these management assumptions. In over 70 percent of our sample, respondents assessed the degree of estimation uncertainty as approximately equal to or greater than materiality. Approximately 20 percent assessed this range of estimation uncertainty as greater than five times materiality. Survey responses indicate that these large ranges occur primarily for financial instruments and asset impairments such as goodwill. The prevalence of such situations in our sample is particularly troublesome, given the difficulty in providing positive assurance.[1] Our respondents described several factors contributing to high estimation uncertainty, including: (1) the nature of the valuation model; (2) the lack of verifiability of key assumptions underlying the valuation; and (3)

[1] It is important to note that our sample is intentionally constrained to especially challenging experiences. Thus, our results do not necessarily generalize to the population of audits as a whole, but rather to engagements in which auditing FVM was particularly difficult.
[2] Lloyd Blankfein, "Do not destroy the essential catalyst of risk," *Financial Times,* February 8, 2009.

the subjective nature of the model inputs, including the difficulty of forecasting future values.

We also note two issues of potential concern to practice that we believe would benefit from further research. First, in many cases of high estimation uncertainty, inherent risk for the FVM is still judged by participants to be below the maximum. Specifically, when the range of estimation of estimation uncertainty was greater than materiality, over 30 percent of participants rated inherent risk to be in the low to moderate range. Although our regression analysis results suggest a significantly positive association between estimation uncertainty and inherent risk, these univariate results suggest that this association does not hold in all cases. Future research could provide insight by further investigating this relationship. Second, we find relatively few cases in which audit adjustments were proposed, consistent with the subjective nature of some FVMs and the broad range of estimation uncertainty that can occur. However, our regression results show that decreasing audit adjustment proposals are more likely to occur when auditors develop their own independent estimates. Future research should further investigate the circumstances and factors leading to FVM audit adjustment proposals, particularly those that would decrease income if booked.

The remainder of this paper proceeds as follows. Section II reviews the recent history of fair value accounting, the increasing complexity and importance of auditing FVMs, the recent PCAOB inspection report findings, and the procedures used in auditing FVMs. Section III contains a review of the theory and literature relevant to auditing FVMs. Section IV discusses the rationale and methodology underlying the data collection

process, including a description of the nature of the participants and survey questions used in the study. Section V provides results, and Section VI concludes the paper.

II. BACKGROUND

Recent History of Fair Value Accounting

During the last several decades, the accounting profession has seen a progressive shift from the established historical-cost accounting paradigm to the fair value accounting paradigm (Barlev and Haddad 2004; Barth 2006; see also Emerson et al. 2010 for a detailed historical look at this shift to fair value accounting). Under Accounting Standards Codification (ASC) 820—originally passed as SFAS No. 157 in September of 2006—"fair value" is defined as 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 (FASB 2011a). This definition, along with ASC 820's associated framework for measuring fair value, was established, in part, to enable the realization of the Conceptual Framework outlined in Statement of Financial Accounting Concepts No. 8. Particularly, ASC 820 should help provide existing and potential investors, lenders, and other creditors with useful financial information that "faithfully represents" the phenomena that it purports to represent. The current framework, however, deals with inputs that are frequently subjective and unobservable, which require considerable judgment on the part of the preparer. The information provided by this framework increases in usefulness in direct correlation to the extent to which it is both consistent and reliable. Given the growing complexity of applying the fair value framework, the auditor plays an increasingly critical role in providing this necessary assurance to the capital markets. Recent changes to the standards, the increasing economic pressure from recent

events, and the increasing complexity of FVMs have made this an increasingly difficult task.

Although previously existing standards outlined the requirements of fair value accounting, ASC 820 clarified the definition of fair value, established a framework for measuring fair value, and expanded disclosures about FVMs (FASB 2006, 2011a). In response to the 2007-09 financial crisis, this standard was later updated to ease mark-to-market rules when markets are distressed or inactive (FASB 2009).

Increasing Complexity and Importance of Auditing Fair Values

The importance and complexity of auditing issues involving FVM have continued to increase in recent years, and this trend is likely to lead to a corresponding increase in the proportion of audit effort directed towards these issues (Martin et al. 2006). Auditors at the larger firms receive regular training on technical valuation topics, but complex and innovative financial instruments are constantly being developed that demand application of new valuation models and assumptions. Martin et al (2006) caution that the frequency and complexity of FVM application in this environment will significantly challenge auditors. Additionally, others have raised anecdotal concerns that neither accountants nor auditors have been able to keep up with the complexity, resulting in a complexity-competency gap that poses serious challenges to the accounting profession (Copeland 2005). In their analysis of the Enron scandal, Benston and Hartgraves (2002) find that the Andersen personnel were likely "incapable of understanding the complex financial entities and instruments structured by Enron's chief financial officer, Andrew Fastow." These auditors likely understood the company when it was an oil and gas producer, but the company gradually began moving towards dealing in complex financial instruments.

Even Lloyd Blankfein, the Chairman and CEO of Goldman Sachs, has written that one of the lessons learned from the recent financial crisis is that "complexity got the better of us."[2]

To aid in the unraveling of complex financial instruments that may not even be fully understood by their own creators, an array of specialists (both employed by and contracted by auditors and clients) has become increasingly necessary on audits involving FVMs. Although AU Sec. 336, *Using the Work of a Specialist* (AICPA 1998), makes clear that auditors need not be experts in all complex or subjective matters on an audit, they still must have sufficient understanding of these matters to evaluate the adequacy of the specialists' work for the auditor's purposes.[3] Auditors are expected to know *when* to engage a specialist and *how* to appropriately incorporate and interpret the specialist's work into the remainder of the audit. Using specialists on the audit team adds an additional layer of complexity to the audit, and some have voiced concerns regarding the impact of specialists on audit team structure, incentives, and knowledge sharing within firms (Martin et al. 2006; Vera-Munoz et al. 2006). Our own interviews with several Big 4 partners in preparing for this study corroborate the trend towards greater complexity in fair value auditing as well as the increasing need for specialists. This trend is likely to continue with the proposed adoption of International Financial Reporting Standards

[2] Lloyd Blankfein, "Do not destroy the essential catalyst of risk," *Financial Times,* February 8, 2009. Available at: http://www.ft.com/cms/s/0/0a0f1132-f600-11dd-a9ed-0000779fd2ac.html#axzz1CIZYF84L (accessed January 25, 2011).

[3] The Auditing Standards Board (ASB) and International Auditing and Assurance Standards Board (IAASB) have recently converged many of their standards as part of their recently completed "Clarity Project." These updated standards are effective for non-public audits ending on or after December 15, 2012 and will replace existing SASs beginning in 2014. The PCAOB, however, has not adopted these updated standards and as of yet has not indicated whether they plan to do so. As such, we cite from the current SASs still used by the PCAOB throughout our paper. See Glover et al. (2009) and footnote 1 of Christensen et al. (2012) for a more detailed discussion regarding current auditing standards and how audit firms incorporate these standards into their audit methodologies.

(IFRS) in the U.S. Clearly, gaining a better understanding of the fair value audit process and identifying potential problem areas is, and should continue to be, an important priority for the profession.

PCAOB Inspection Report Findings

In recent reports regarding their audit firm inspection process, the PCAOB indicates that lapses in audit procedures related to fair values continue to be one of the primary areas of concern for audit quality. Griffith et al. (2013) perform a detailed analysis of the 2008-2009 PCAOB inspection reports for the nine annually inspected firms and find that of the 130 deficiencies noted, fair value issues were the most frequent at 31.5 percent. The related issues of impairment and estimation also occurred frequently at 23.1 and 13.1 percent, respectively. Griffith et al. (2013) also code the 2008-2009 PCAOB inspection findings into unique deficiency types, with seven related directly to problems with how auditors use valuation or other models that underlie estimates. These seven problems, with their associated frequency, were: evaluate appropriateness of model assumptions (22.1 percent), test underlying data used in the model (15.4 percent), test controls over client method and data used (10.6 percent), consider whether relevant factors or assumptions are missing from model (7.9 percent), understand the client method/model (5.7 percent), identify accounts/areas with significant estimates (5.1 percent), and evaluate reasonableness of client model (1.8 percent). Combined, these valuation problems totaled 68.9 percent of the total number of deficiencies. These findings provide valuable insight regarding the areas of greatest concern to the PCAOB related to the auditing of FVMs and other estimates. The appropriate auditing of FVMs,

as highlighted by these findings, is clearly an area of major concern and focus for the PCAOB.

Auditing Standards for Fair Value Measurements

Although ASC 820 (*Fair Value Measurement*) defines fair value, establishes a framework for measuring fair value, and expands disclosures about FVMs, it does not provide guidance on the auditing of fair values (FASB 2011a). The general process for auditing FVMs and related disclosures is provided in AU 342, *Auditing Accounting Estimates* (AICPA 1989), and AU 328, *Auditing Fair Value Measurements and Disclosures* (AICPA 2003). Whereas AU 342 provides guidance on auditing accounting estimates in general, AU 328 addresses considerations specific to the context of FVMs and disclosures (AU 328.06). A PCAOB report issued in conjunction with a Standing Advisory Group (SAG) Meeting in 2007 provides a useful comparison of the similarities and differences between these two standards, including a discussion of whether they should be combined (PCAOB 2007).[4] As highlighted in that report and noted in Bratten et al. (2013), this duality of standards that still exists under PCAOB standards in the United States increases the task difficulty already faced by auditors in this area.[5] As the

[4] In this report, the PCAOB also provides useful examples of the types of measurements included in each standard. FVMs under AU 328 include derivatives, financial instruments, intangible assets, asset retirement obligations, stock-based compensation, and certain impairment issues. Examples of accounting estimates under AU 342 include uncollectible receivables, depreciation and amortization, warranty claims, and insurance company loss reserves.

[5] In order to converge with the International Auditing and Assurance Standards Board (IAASB) and to simplify authoritative guidance into a single standard in this area, the AICPA recently issued AU-C 540, *Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures* as part of its "Clarity Project" (AICPA 2011b). As the title suggests, this standard covers auditing guidance for both accounting estimates and fair value measurements. The PCAOB has expressed interest in pursuing a similar path (PCAOB 2009). In the PCAOB's recent standard setting agenda (PCAOB 2011d), they state that they are evaluating potential revisions to the standards on FVMs and other accounting estimates. Although an updated final standard specific to FVM of financial instruments was expected by the fourth quarter of 2012, and a proposed update specific to the broader topic of FVM and other accounting estimates was expected by the first quarter of 2013, no such guidance has yet been issued as of the time of this writing.

current study is only concerned with examining fair value measurements, as opposed to the broader topic of accounting estimates in general, the rest of this section focuses on the procedures required under AU 328 and other standards relevant to the auditing of FVMs.

The Process of Auditing Fair Value Measurements

AU 328 requires that the auditor first obtain an understanding of the entity's process for determining FVMs and disclosures and of the relevant controls (AU 328.09). In addition, the recently adopted Auditing Standard (AS) No. 12, *Identifying and Assessing Risks of Material Misstatement,* mandates that the auditor obtain an understanding of the company, its environment, and its control activities that is sufficient to assess the factors affecting the risks of material misstatement and to design further audit procedures (PCAOB 2010a). This understanding is then used to assess the risk of material misstatement, which then determines the nature, timing, and extent of the audit procedures to be performed.

When auditing a FVM, the auditor should also consider whether he/she has the necessary skill and knowledge to plan and perform the required audit procedures, or whether a specialist is required (AU 328.20). The PCAOB's Staff Audit Practice Alert No. 2 highlights several important factors that should be considered in making this determination: significant use of unobservable inputs, complexity of the valuation technique, and the materiality of the FVM (PCAOB 2007). Although determining the reasonableness of the assumptions and the appropriateness of the methods used is the responsibility of the specialist, AU Sec. 336, *Using the Work of a Specialist*, clarifies that the auditor should still (1) obtain an understanding of the methods and assumptions used by the specialist, (2) make appropriate tests of data provided to the specialist, and (3)

evaluate whether the specialist's findings support the related assertions in the financial statements.

The nature, timing, and extent of the auditor's planned substantive audit procedures can vary greatly depending on the auditor's risk assessment and understanding of the entity's process. AU 328 details the three main types of substantive tests that the auditor should use—alone, or in combination with one another—when planning the audit. These substantive tests include (1) testing management's significant assumptions, the valuation model, and the underlying data; (2) developing independent fair value estimates for corroborative purposes; and (3) reviewing subsequent events and transactions (AU 328.23). As noted above, the auditor should consider the need to use a specialist when performing any of these steps.

III. REVIEW OF PRIOR RESEARCH

As highlighted in a research synthesis prepared for the PCAOB by Martin et al. (2006), very little research has been performed to date that directly examines the *auditing* of FVMs. Although there are a few notable exceptions, not much has changed in the years since this observation; Bratten et al. (2013) note that "academic research in these areas is relatively sparse." This is somewhat surprising given the concentrated focus that the PCAOB and other regulatory bodies in recent years have placed on improving the perceived shortcomings of auditors surrounding this issue. Much of the existing research instead focuses on the impact of FVMs on capital market variables (e.g., Barth et al. 1995; Barth et al. 1996; Kolev 2008; Barth and Taylor 2010; Dechow et al. 2010; Song et al. 2010).[6] While this body of work does not address the actual process of auditing

[6] The stream of literature examining fair values in the capital markets has generally found a positive association between stock prices and FVMs (Barth et al. 1996, 2001; AAA 2005; Kohlbeck 2008; Kolev

FVMs, it does help to highlight the importance of these measurements to investors and to other users of financial statements. Knowing that these measurements are closely watched and have an impact on the capital markets underscores the importance of providing dependable assurance regarding their reliability and accuracy.

Another related stream of research has examined the role that fair value accounting played in the Enron scandal, which generally documents the ways in which Enron abused the fair value accounting rules to inflate its reported revenue, net income, and stockholder's equity (Benston and Hartgraves 2002; Barlev and Haddad 2004). Benston and Hartgraves (2002) also detail the ways in which Enron's audit committee and external auditor failed to exhibit sufficient professional skepticism in matters such as Enron's aggressive "mark-to-model" practices. Barlev and Haddad (2004) perform a similar analysis, but focus primarily on the failure of Enron—and by association its external auditor—to establish an effective and adequate control system to prevent the abuse and manipulation of fair value accounting that occurred. In a similar vein, there has also been considerable recent interest in both popular media and scholarly research surrounding the role that fair value accounting may or may not have played in the recent financial crisis (PCAOB 2007; Emergency Economic Stabilization Act of 2008; Forbes 2009; Norris 2009; SEC 2010; Barth and Landsman 2010; Badertscher et al. 2012).

For research specific to the *auditing* of FVMs, Martin et al. (2006) cite the paucity of extant research directly related to this issue, and instead focus on the guidance

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2008; Song et al. 2010). Additionally, research examining the relevance and reliability of FVMs generally finds that FVMs using inputs from actively traded markets have a stronger relationship with stock prices than FVMs based on inputs from distressed or largely inactive markets (AAA 2005). Some have taken this analysis a step further by showing a differential positive association between the various levels of fair value assets and stock prices, with higher-classified assets (i.e. Level 1) exhibiting a stronger positive association than lower-classified assets (i.e. Level 3) (Kolev 2008; Song et al. 2010).

provided by auditing standards as well as relevant academic research in psychology and economics. They identify three issues for further research: (1) identifying and evaluating internal controls over FVMs, (2) identifying and evaluating FVMs that are likely to be higher risk, and (3) potential auditor biases due to motivated reasoning and overconfidence.[7] A few notable exceptions to the lack of research examining the auditing of FVMs noted by Martin et al. (2006) have emerged since that research synthesis. For instance, Griffin (2013) examines how the presence or absence of additional disclosures about FVM affects auditors' decisions to require fair value adjustments. He finds that auditors are most likely to require adjustments when FVMs are both more subjectively determined and more imprecise in outcomes, but this tendency disappears when the client provides additional disclosures. This suggests that auditors might be less skeptical (and/or consider litigation risk to be lower) when the client provides more information to the markets. Another recent study related to auditors' propensity to require fair value adjustment is Wang (2010). This study investigates how a fair value negotiation setting affects bargaining behavior between a manager and a verifier. He asked business graduate students in computer-mediated bargaining games to negotiate a fair value for an asset, and Wang (2010) finds that the agreement rate between parties is significantly higher when the parties are allowed to form long-term relationships. Further, in the long-term relationship condition, the verifier ultimately agrees to significantly *higher* values, while in the single-period condition, the verifier demands (and receives) a significantly

[7] Bratten et al. (2013) build on that study by reviewing empirical research related to and/or affecting the audit of FVMs and other accounting estimates using the three dimensions of the psychology-based research framework developed by Bonner (2008)—environmental factors, task structure, and auditor-specific factors. They also discuss the recent history of relevant financial reporting and auditing guidance, and detail the specific nature of recent PCAOB findings.

lower fair value assessment. In the context of auditing FVMs, these findings suggest that auditors may be more prone to acquiesce to the aggressive fair value estimates of management when concerned about preserving a long-term auditor-client relationship.[8]

Another recent stream of research spotlights the substantial risks posed by FVMs with ranges of estimation uncertainty that often far exceed the auditor's materiality threshold. Christensen et al. (2012) provide examples of public companies that exhibit "extreme estimation uncertainty" in one or more of their fair value estimates. Based on their observations, they consider "whether the convergence of events in regulation and standard setting may have outstripped auditors' ability to provide the level and nature of assurance currently required on estimates with extreme estimation uncertainty by auditing standards and regulators." They further conclude that "no amount of auditing can remove the extreme uncertainty inherent in reported values derived from management's valuation models based on unobservable inputs subject to estimation uncertainty." (Christensen et al. 2012, p. 143). Bell and Griffin (2012) also discuss the difficulties of obtaining sufficient reasonable assurance for "high-uncertainty fair value estimates" that may exceed the auditor's materiality threshold. They conclude similarly that certain risks inherent to many FVMs cannot be reduced by any amount of audit work. They also discuss potential ways to improve the current situation, including: (1) making changes to the face of the financial statements to more accurately reflect the inherent uncertainty of the underlying FVMs, (2) making changes to the auditor's report to better communicate the actual level of assurance being provided (e.g., providing only negative assurance in some instances), and (3) adding several additional disclosures to the financial statements.

[8] These findings have important implications given the current debate over mandatory auditor rotation. Although not specific to the fair value context, a similar study by Wang and Tuttle (2009) investigates the effects of auditor rotation on auditor-client negotiations.

Both studies discuss potential ways to address this situation, including: making changes to the face of the financial statements to more accurately reflect the inherent uncertainty of the underlying FVMs, making changes to the auditor's report to better communicate the actual level of assurance being provided (e.g., providing only negative assurance in some instances), and the addition of several additional disclosures to the financial statements.

While Bell and Griffin (2012) suggest changes to financial reporting and the level of assurance provided on FVMs, another study investigates whether changes in auditing standards might impact auditors' decision quality in this context. Particularly, Maksymov et al. (2012) note that current auditing standards imply that auditors should accept a client's valuation as "reasonable" unless it can be proved otherwise, essentially a positive framing of the auditor's task. They investigate whether negatively framing the language for fair value procedures (e.g., "assess whether assumptions are not reasonable" instead of "assess whether assumptions are reasonable") might interact with task structure (high or low verifiability) and time pressure (high or low) to affect auditors' risk assessments and time budgeted to fair value procedures. Their findings indicate that negative framing in auditing standards may be useful in ensuring that auditors plan sufficient time for performing low-structured procedures. These findings have important policy implications given that current standards are written almost entirely using positively framed language. Also investigating the wording of auditing standards, Montague (2012) varies estimation uncertainty (high or low), as well as three different types of audit guidance: (1) guidance instructing the auditor to support management's fair value estimate, (2) guidance instructing the auditor to generate his/her own fair value estimate, and (3) guidance

instructing the auditor to oppose management's fair value estimate. Her results show that auditors exhibit *increased* professional skepticism when they are directed to oppose management's fair value estimate in a setting with high estimation uncertainty. Taken together, these two studies suggest that negatively framed standards may be effective at promoting increased professional skepticism among auditors in a fair value setting.

While the above studies are behavioral experiments, Griffith et al. (2013) contribute to the literature by analyzing auditors' process of auditing complex estimates (i.e., a set of transactions with broader scope than FVMs). They compare the audit process outlined by the standards with the findings from interviews with experienced auditors and PCAOB inspection reports, with the goal of identifying current difficulties in auditing accounting estimates. Griffith et al. (2013) conclude that auditors rarely engage in critical analysis by developing independent estimates or relying on subsequent events, but instead focus almost exclusively on testing management's process. They further report that auditors "fail to understand management's process for generating the estimate, fail to adequately test the underlying data and assumptions, fail to notice inconsistencies among the estimate and other internal data or external conditions, and over-rely on specialists to identify, evaluate, and challenge critical assumptions." Furthermore, they conclude that auditors tend to lack the necessary valuation knowledge to adequately audit these estimates. Several suggestions are then provided on how auditor performance can be improved.

While the empirical approach taken by Griffith et al. (2013) is similar to ours in that both studies rely on data representing actual experiences of auditors, our research differs from theirs in several key respects. First, data for our study were captured through

a detailed instrument developed with assistance of the participating firms, while they use a semi-structured interview approach. Second, we study specific engagements selected by firm personnel as meeting our research criteria, while they asked audit partners "to identify the steps they believe are important when auditing estimates" in general. Thus, their approach asks each participating audit partner to generalize over the totality of his/her experience, while ours involves drawing inferences from statistical analysis of information on specific engagements selected for the study. Lastly, the domain studied also differs, as they focus on "complex" accounting *estimates*, whereas we focus specifically on "difficult to audit" *FVMs*.[9] Therefore, our study is set in a narrower range of transactions (FVMs vs. estimates). In addition, our interest is in a subset of FVMs based on the *auditor's* difficulty in gaining adequate evidence to support the opinion, while theirs is in a subset of estimates based on the *accounting* complexity inherent in the estimate. These concepts are no doubt related to some degree, but are distinct; e.g., an estimate/FVM can be based on a simple calculation but be difficult to audit due to inherent uncertainty in an assumption. As a result of these and other differences in scope and methods, the current study provides valuable contributions to the existing literature in this area and builds on prior work such as Griffith et al. (2013).

In the following section, we discuss our research methods, including data collection procedures, nature of the sample, and the specific survey questions used in our study.

[9] Furthermore, our sample consists primarily of managers and senior managers, rather than the mixed sample of partners and managers used in Griffith et al. (2013). See footnote 13 for a discussion of our rationale for selecting managers and senior managers as the appropriate sample scope for our study.

IV. METHOD

Data Collection

We use a field-based questionnaire to ask a sample of auditors in several large firms to describe specific engagement experiences involving the auditing of FVMs.[10] As noted by Gibbins (2002), this retrospective, case-based method of gathering experiential data has naturalistic advantages and is useful in putting people's experiences in context. While such research may be subject to some degree of self-reporting bias and judgment, we adopt techniques used by Nelson et al. (2002) to encourage accurate reporting from respondents. Particularly, we focus data collection on specific engagement experiences, and focus most questions on information that can be derived from workpapers. Participants were also assured anonymity, as data were collected by the participating firms through the Center for Audit Quality, and no identifying information was contained in the questionnaire.[11] Questions asked about recent events and were designed to avoid "leading" responses.

Participants

With the support of CAQ personnel, we collected 99 participant experiences from 80 high-level audit practitioners in December 2011 and January 2012.[12] Participants were drawn from multiple large accounting firms. We intentionally constrained our data collection efforts to three main industries: financial services, manufacturing or retail, and technology or biotech. The industries chosen—limited to three to ensure sufficient power

[10] Other auditing studies use field-based questionnaires. For example, Gibbins et al. (2001) examine real negotiations chosen by experienced audit partners to investigate factors driving auditor-client negotiations. Also, Gibbins and Trotman (2002) use a field-based analysis to investigate working paper review, in order to clarify prior experimental findings and provide descriptive evidence on the nature of the review process.
[11] Because the questionnaire was administered by the Center for Audit Quality and participating firms, we are unable to determine a response rate.
[12] Based on the preference of one of the participating firms, participants from that firm were instead asked to recall *two* specific instances. Of the 80 respondents participating in our study, 19 provided two examples.

to perform statistical analysis—are intended to be roughly representative of those industries most impacted by the move to FVMs and were selected based on feedback received during interviews and pilot testing. Casting a wider net across firms, industries, and engagements allows us to gain a more comprehensive, descriptive understanding of the actual auditing process used by practicing auditors and the specific difficulties they encounter (Gibbins 2002). To ensure that participants had sufficient experience dealing with issues related to the auditing of FVMs, we asked for participation of auditors at the manager or senior manager level.[13]

Field-Based Questionnaire

Our field-based questionnaire was developed by analyzing the process outlined by relevant auditing standards, the findings of the PCAOB inspection process, and the relevant literature described above. To ensure external validity and a close alignment with actual practice, we performed several preliminary interviews with Big 4 partners and managers to confirm our understanding of those standards and to help focus our questions on the most relevant and problematic areas. Audit partners from each of the participating firms provided extensive feedback on the instrument. After incorporating this feedback, we ran a pilot test using six senior managers from the participating firms to further refine the questionnaire.

We asked respondents in our study to recall a specific situation during a recent engagement in which auditing a FVM was among the most challenging and important

[13] During the design phase, senior audit professionals with whom we discussed our design advised us that managers and senior managers were likely to have the best working knowledge of all of the aspects of the engagement and FVM that were of interest to us. Partners, while obviously having more experience, are often further removed from the specific details of the audit engagement that we were interested in collecting. As such, we specifically targeted managers and senior managers in our collection efforts. Of the 99 instances collected, the frequency of identified roles were as follows: 58 senior managers, 35 managers, three valuation specialists, two partners, one third year senior, and one unidentified.

issues in the audit. We asked them to select specific situations involving FVMs—as opposed to the broader category of accounting estimates—from audits of continuing clients (i.e., not first year engagements). We assured respondents of their anonymity in the study, informed them that their firm approved of the research, and asked them to be as specific as possible in their response while still maintaining the confidentiality of their client. Several days prior to receiving the survey instrument, we provided participants with a letter explaining the nature of the study so that they would have ample time to gather the detailed information needed to complete the survey.

For each instance, we asked respondents to provide information about the client engagement (e.g., industry, annual net sales within ranges of values, recency of the engagement, respondent's role, etc.), the specific FVM selected (e.g., the nature of their selected example, the type of FVM, accounts affected, etc.), the control and substantive procedures used, and issues surrounding the completion of the audit (e.g., topics discussed with management, adjustments, etc.). For each of the 67 questions in the instrument, we used a format based on the nature of the information requested: open-ended, Likert scale, or choice from a list of options. The specific questions are described in the following section, along with relevant results.

V. RESULTS

We report our main results below, organized into two broad categories: (1) auditors' descriptions of the FVM situation faced on the chosen engagements; and (2) auditors' responses to the FVM situations. We then present results of supplemental regression analysis to further investigate factors associated with key audit outcome variables.

Current Challenges in Fair Value Measurements

We first examine the nature of the difficult-to-audit FVMs faced by auditors and the specific attributes driving these difficulties. It is important to note that the purpose of this research is not to investigate issues surrounding the auditing of *all* types of FVMs, but rather to focus explicitly on situations in which auditing a FVM was among the most challenging and important issues in the audit. Thus, our sample is likely constrained to those instances where the FVM is material, subjective, and inherently imprecise.

Information About the Client Engagements

Regarding the timing of selected experiences, approximately 79.8 percent occurred in the most recent engagement, 15.2 percent about two years prior, and 5.1 percent three or more years prior. Given the volatile and distressed macro-economic conditions of the last several years and the rapidly changing environment surrounding FVMs, the recency of our responses is advantageous.

The audit clients are from three primary industries: 51.5 percent financial services, 35.4 percent manufacturing or retail, and 13.1 percent technology or biotech. Sixty-eight percent of these clients are SEC registrant/issuers, and just over half are accelerated filers. To measure the relative size of each of these clients while maintaining confidentiality, we collected information about the annual net sales using broad ranges rather than specific values. Twenty-eight percent have annual net sales greater than $5 billion, 18.2 percent between $1 billion and $5 billion, 29.3 percent between $200 million and $1 billion, 14.1 percent between $25 million and $200 million, and 9.1 percent have annual net sales less than or equal to $25 million.

Information About the Specific Fair Value Measurement Selected

We asked respondents to select experiences in which the FVM was material and among the most challenging and important issues in the audit, which is reflected in the fact that 78.8 percent of the experiences collected are classified as Level 3 using the classification framework in ASC 820.[14] After a series of general questions about the client engagement, we asked respondents in an open-ended question to describe the nature of their selected example, being as specific as possible without identifying their client or firm. We analyzed responses to find common underlying themes, and developed a coding scheme based on this analysis. We then coded each as one of the following four different types of FVMs: financial instrument, asset impairment, pension plan assets, and other FVM types. Table 2.1 shows the distribution of responses across both FVM type and industry, and Table 2.2 provides examples of the types of experience included in each FVM type code.

[Insert Table 2.1 and Table 2.2 about here]

Financial instruments. Of the 99 specific experiences collected, 48 are financial instruments (48.5 percent). Not surprisingly, 37 (77.1 percent) of these experiences are from the financial services industry. As seen in Table 2.2, experiences in the financial instruments category cover a substantial range of topics. The breadth and complexity of the financial instruments listed in Table 2.2 provides a glimpse into the increasingly innovative and convoluted nature of the FVMs on which auditors are required to provide assurance.[15] Further complicating the FVM landscape—as highlighted by the partners

[14] Of the remaining experiences, 15.2 percent were classified as Level 2 assets, 5.1 percent were Level 1 assets, and one is unidentified.

[15] The difficulty of providing this assurance has increased dramatically in the last several years as the economy in the United States and abroad has reeled from the recent economic crisis. For instance, the market for auction-rate securities (ARS) has been particularly hard hit since it initially froze amid the credit

and managers we interviewed and the responses collected through our questionnaire—are situations in which the client, and therefore the auditor, does not have access to the assumptions and/or models driving the FVM. One example of this scenario cited by some participants is the fund-of-funds situation—an investment strategy of holding a portfolio of other investment funds rather than investing directly in shares, bonds or other securities. The underlying investment funds comprising the FVM may use proprietary models that are not made available even to large institutional investors. In these situations, the investor is simply given the reported fair value, stripping both the client and the auditor of the ability to perform the necessary due diligence over the calculation of the investment.

Asset impairment. We also coded 27 instances of asset impairment within our sample of FVM experiences, 15 of which specifically relate to goodwill impairment issues.[16] As noted in Table 2.2, the remaining experiences in this bucket include FVMs such as long-lived assets, R&D assets, PP&E impairment, indefinite lived trademark assets, and a customer relationship acquired in a business combination. The large majority of these experiences—11 of the 15 goodwill impairment issues, and 18 of the 27 experiences from the broader asset impairment category—occur within the manufacturing or retail industry. Although the specific standards governing each of these

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crunch in February 2008. The Wall Street Journal recently reported that approximately $100 billion of these ARS—nearly a third of this formerly active market—still remain essentially frozen (Maxey 2012). Without an active market to value many of these securities, companies have demonstrated varying degrees of forthrightness in recognizing likely losses (Johnston 2008).

[16] The high instance of FVM experiences observed outside of the obvious area of financial instruments is consistent with recent PCAOB findings. On January 23, 2012, Jay D. Hansen, a PCAOB Board Member, reported the following in a presentation at the AAA Auditing Mid-Year Meeting (http://pcaobus.org/News/Speech/Pages/01132012_HansonAAA.aspx): "PCAOB inspection findings related to valuations and fair value issues in general are not limited to financial instruments, however. Inspectors have also found deficiencies in connection with the valuation of non-financial measurements, for example in the areas of business combinations and goodwill impairment, and with other management estimates, such as allowance for loan losses and valuation of inventory and income tax valuation allowances."

areas differs slightly under current US GAAP, the common thread across each of these experiences is the need for the client and auditor to assess the potential impairment of the underlying asset. Under the recently updated standard, a qualitative assessment is performed at least annually to determine whether it is "more likely than not" (defined as having a likelihood of more than 50 percent) that the carrying amount exceeds fair value of the reporting unit (FASB 2011b). If so, the company must then perform a two-step process where the entity must first compare the fair value of the asset with its carrying amount. The second step involves measuring the actual amount of the impairment loss when the carrying amount exceeds the fair value.

Pension plan assets. We also coded 10 instances of pension plan assets in our sample. While certain aspects of this FVM area are distinct, it is important to note that many of the underlying assets contained in these pension plans are likely captured in other FVM categories. For instance, a few of the underlying assets noted by our respondents include hedge fund investments, private debt and equity securities, real estate indices, limited partnership interests, government and corporate bonds, mutual funds, and common collective trusts. Several of our respondents, however, did not detail the specific nature of the underlying assets.

Other fair value measurement types. The remaining types of FVMs provided by our respondents are shown in Table 2.1. Of the 14 FVMs coded as other, ten FVMs relate to equity investments, such as an investment in a controlled portfolio company, a portfolio of start-up and early stage companies, and an equity investment in an overseas private entity. Three other experiences relate to real estate portfolios, and one experience was not described.

Why Are Fair Value Measurements So Difficult to Audit?

After providing information about the nature of the FVM selected, we asked respondents a series of questions about what factors made the FVM challenging and/or complex to audit, the relative materiality of the FVM, and the degree of estimation uncertainty. The first of these questions asked respondents to indicate why they chose their specific FVM example by selecting items from a list of responses (including an open-ended "other" category). The categories for this question were taken directly from AU 328.24, which describes the various factors that can contribute to the complexity and uncertainty of a FVM. Responses to this question, shown in Table 2.3, indicate the specific factors respondents found to be most challenging and/or complex to audit within each of the coded FVM types. Across each of the FVM type categories, the most frequently cited areas are the "number of significant and/or complex assumptions associated with the process" (64.6 percent) and the "high degree of subjectivity associated with these assumptions and factors used in the process" (63.6 percent). Many respondents also considered the "high degree of uncertainty associated with the future occurrence or outcome of events underlying the assumptions" to be one of the prime reasons for selecting their FVM experience (42.4 percent). Although the distribution of selected factors is fairly consistent between FVM types, one difference noted is that the length of the forecast period is cited much more frequently as a reason for the asset impairment FVM type than for financial instruments (11.1 percent vs. 5.1 percent).

Many respondents also provided additional reasons for considering the FVM experience difficult by electing to use the "other" category. The most common response to this open-ended portion of the question was a concern over a lack of available data to independently value FVM determined by a third party. Respondents described third

parties who were unwilling or unable to provide the necessary detail regarding the underlying assets and assumptions used in the valuation. (The prevalence of this problem was corroborated in a later question in which 23.2 percent of respondents indicated that the valuation model used in their FVM example was proprietary.) The context for these concerns includes fund-of-funds situations, use of third-party pricing services, and limited partnership interests. Several respondents also cited the overall complexity of the arrangements and underlying models as a reason for selecting the FVM. Other reasons given include the range of estimation uncertainty, the relative size of the related balances, the length of time between the identification of the issue and the SEC reporting deadline, and disagreements that occurred with the valuation specialist from another firm. One particularly insightful response was as follows:

> There were several reasons, (1) Lack of management understanding over the valuation of certain investment categories, (2) time crunch between reporting period, deadlines and specialist resources, (3) lack of concise firm guidance and continued comments from the PCAOB and/or [Firm management] reviews that trickled down through partners, and (4) use of third-party resources by both [the Firm] and the client which makes it difficult to identify, isolate and understand pricing differences.

[Insert Table 2.3 about here]

Materiality and the Range of Estimation Uncertainty

We specifically asked respondents to provide experiences in which the FVM was material to the engagement, so observing experiences at or greater than materiality in nearly every case is expected.[17] When asked to indicate the relative materiality of the FVM in terms of the balance of the associated asset/liability, 56.6 percent of respondents

[17] Seven respondents rated the FVM balance as less than materiality, which on the surface appears to be a violation of our instructions to provide experiences material to the engagement. Based on a closer review of these responses, however, it is clear that these respondents considered the selected FVM to be material based on other important qualitative factors beyond the simply quantitative threshold. This view is consistent with auditing standards regarding assessing materiality.

reported a FVM balance of greater than five times the materiality threshold. Ten percent reported a FVM balance of four to five times materiality, while another 16.2 percent reported a FVM balance of two to three times materiality. Results are reported in Panel A of Table 2.4.

[Insert Table 2.4 about here]

Perhaps more surprising are the results of our questions regarding the degree of estimation uncertainty (i.e., the reasonably possible range of values) for the FVM relative to the amount of materiality. Results are reported in Panel B of Table 2.4. In all, 70.7 percent of our respondents assessed the degree of estimation uncertainty as approximately equal to or greater than materiality. Nearly 20 percent assessed this range of estimation uncertainty as greater than *five times* materiality. In spite of these large ranges of reasonably possible values, only a single point estimate is given in financial statements under the current reporting model. This creates the potential for users of these financial statements to be misled by what *The Economist* (2003) has called the "brittle illusion of exactitude." This places auditors in a very difficult position, as they are required to provide positive assurance against material misstatements for FVMs that often far exceed the materiality threshold—even though these situations may only feasibly allow for *negative* assurance (Christensen et al. 2012). As noted by Bell and Griffin (2012), "inherent uncertainty, although estimable, is irreducible and therefore cannot be decreased or eliminated by auditing."

Table 2.4 also shows the distribution of estimation uncertainty ranges across each of the fours FVM type codes. Although there are many more financial instrument FVMs than asset impairment FVMs in our sample, far more asset impairment instances are rated

at the highest level of estimation uncertainty ($p<0.01$). Sixty-three percent of examples from the "greater than five times materiality" bucket come from the asset impairment FVM type code. Of these 12 instances, 10 are related to goodwill impairment issues. It is interesting to note that the remaining five goodwill impairment issues contained in our sample all have ranges of estimation uncertainty greater than materiality as well. The two real estate portfolio examples within the "other FVM" type code also indicate a potential trouble area in relation to estimation uncertainty, although making generalizations based on only these two observations is likely unwarranted without further investigation.

It is important, however, to interpret these results within the context of the underlying FVM type. The area of asset impairment may appear on the surface to be the most inherently risky in terms of the observed ranges of estimation uncertainty, but this area may also be less volatile than other FVM types such as financial instruments. Although auditors are clearly struggling to appropriately audit areas such as goodwill given the reporting tools available to them (Griffith et al. 2013, Bratten et al. 2013), the underlying accounting may make these areas less likely to be abused opportunistically by management. Given the conservative nature of current U.S. GAAP, a valuation analysis of an asset such as goodwill results in either a decrease in the value of the asset or no adjustment at all. Recent research provides evidence of opportunistic discretion regarding the initial adoption of SFAS 142 for goodwill impairment and its subsequent usage (Beatty and Weber 2006; Li and Sloan 2011), but the extent to which management can use these impairments opportunistically is limited by the fact that they are permanent, and subsequent increases in the value of these assets are not allowed. In contrast, when valuing a financial instrument such as a mortgage-backed security, the determination of

its appropriate fair value may result in either a gain or a loss for the reporting entity. These valuations, and the attendant gains and losses, can be repeated each period.[18]

As discussed earlier, recent research by Christensen et al. (2012) and Bell and Griffin (2012) note the risks posed by these large ranges of estimation uncertainty. The results of our study corroborate these concerns surrounding estimation uncertainty and provide additional useful descriptive data concerning their frequency and distribution across the most common types of FVMs. Our results also provide valuable insight into the specific concerns that auditors currently have regarding these ranges of estimation uncertainty.

Auditors' Responses to Fair Value Measurement Challenges

We also investigate the actual procedures used by auditors when auditing difficult-to-value FVMs, identifying those portions of the process that auditors find to be most challenging, and highlighting the major problems encountered throughout the process. We also use the rich qualitative data collected through our open-ended questions to explore the important question of *why* auditors chose the approach they did, and to learn more about the specific nature of the problems encountered.

Gaining an Understanding of the Client's Process

We asked respondents in an open-ended question to indicate what steps were taken to obtain an understanding of the client's process for determining FVM for their chosen example. Responses range across the variety of recommended approaches

[18] As detailed by Benston and Hartgraves (2002), one of the major ways in which Enron engaged in its infamous fraud was through the aggressive and opportunistic use of fair value accounting to manipulate the worth of its energy contracts, resulting in substantially (and fraudulently) inflated net income. As evidenced by the recent financial crisis, the same fair value accounting principles can also lead to massive *decreases* in net income. Both of these scenarios involve substantial incentives and opportunities for opportunistic management of earnings to occur.

outlined in the standards. Several respondents describe relying on their previous knowledge of the entity as a guide (recall that respondents were specifically asked not to provide examples from first year engagements), combined with reviewing historical evidence and making inquiries about changes made to the model from previous periods. A large number of respondents also mention using valuation specialists to help them gain an understanding of the client's valuation processes. Internal auditing firm specialists, in-house client specialists, and outside third-party specialists are all mentioned in this capacity, and respondents frequently used a combination of these parties—both independently and working in conjunction with one another—to aid them.[19] One of the most frequent responses, however, is using inquiry and walkthrough procedures to gain an understanding of the client's processes. Respondents describe meeting with the client, performing extensive interviews with relevant firm personnel and key outside parties, and performing walkthrough procedures using actual examples to understand the underlying FVM calculations. Related to each of these steps is also the extensive review of supporting documentation mentioned by respondents. The types of documentation described in these responses include detailed flowcharts, "SOX narratives," board of directors' minutes, formal valuation reports from outside valuation specialists, and detailed statements regarding the underlying investments.

Respondents also describe reviewing and testing the design and operating efficiency of internal controls as part of the process of gaining an understanding of the FVM process. Although auditors of accelerated filers are required to perform an audit of internal control over financial reporting each year, auditors may still make the strategic

[19] A more detailed discussion of the use of specialists on the engagement is included in the following section.

decision to not rely on these controls for a variety of reasons. To better understand this decision process, we asked respondents whether any controls surrounding the FVM process were relied upon for purposes of altering the nature, timing or extent of substantive audit procedures. We also collected open-ended responses asking respondents to identify what controls they relied on, or to explain their rationale for not relying on controls. In over half of our responses (52.5 percent), controls were *not* relied upon.[20] Auditors of issuer clients, however, chose to rely on controls more frequently (60.6 percent of the time), while auditors of non-issuer clients only relied on controls in 16.1 percent of our cases.[21] Controls were also much more likely to be relied upon for FVM experiences involving financial instruments (59.6 percent) and pension plan assets (70.0 percent) than they were for FVM experiences involving asset impairment (29.6 percent) and other FVMs (21.4 percent).

In those cases where controls were relied upon, 13.1 percent of these respondents reported encountering significant challenges in performing the control testing (with no significant differences in this frequency noted between the three main FVM types; p=0.53). When asked about the nature of these challenges, the most common response was that the inherently subjective and uncertain nature of the assumptions resulted in controls that were not sufficiently precise to address specific risks. According to one respondent:

> The precision of the control was difficult to validate, as the uncertainty of the inputs was very high. Due to the high estimation uncertainty, it was difficult to

[20] Griffith et al. (2013) report an even lower percentage of control reliance. From their small sample of interviews, only two auditors (9.5 percent) specifically described understanding and evaluating the controls related to the estimation process. See the "Information about Substantive Procedures" section below for a further comparison and discussion of the findings from Griffith et al. (2013).

[21] Given that auditors are required to perform control testing for issuer clients, this difference is expected. What *is* interesting, however, is that 39.4 percent of issuer client auditors chose not rely on client controls over the FVM even after performing the required testing.

> place a high level of comfort from the controls because the inputs were very subjective and there was not credible third-party evidence and/or proper audit support available for management's analyses. They were more put together based on management's opinions and thus the control was verifying that top management agreed with each other on the future projections. As it was difficult to corroborate, we took partial reliance.

Other respondents noted a lack of necessary observability, such as when the majority of the key controls that needed to be tested for reliance resided at a third-party custodian: "Management did not fully own the process, and a lot of areas were those that they did not have insight/transparency into how the funds were calculated." In another experience, the auditor relied on a control in which senior management and the Board of Directors approve the projections prepared by management. During a review by their regulator, however, the auditors were told that they must be physically present in all such meetings where approvals are obtained. According to the respondent: "Being present at such meetings presents a tremendous challenge for the auditor, as senior management is not always willing to allow auditors to attend these meetings." The remaining challenges cited related to lack of in-house expertise, insufficient documentation, and the overall complexity of the controls being tested.

As noted previously, in 52.5 percent of the experiences in our sample, auditors did not rely on controls for the purpose of altering the nature, timing, or extent of substantive audit procedures. Although the reasons given for not opting to rely on controls were varied, several consistent themes are apparent. Perhaps not surprisingly, many of these themes are very similar in nature to the challenges noted above by those who chose to rely on controls. For instance, the most frequently mentioned reason given for not relying on controls was an acute concern over the lack of precision caused by the high degree of subjectivity associated with the FVM. Stated simply: "Due to the subjective nature of the

assumptions, we felt our testing could not be reduced by controls." Even though many of these respondents were still required to test the controls in order to issue the required internal control opinion (for issuers), little to no reliance was gained in the process:

> Although we did test internal controls, and the Company's internal controls were deemed to be effective, due to the subjective nature and significance of the judgments, we determined that we should audit the impairment analysis without much (if any) reliance on controls. We deemed the Company's judgments with respect to the significant assumptions in the impairment analysis as a significant risk and therefore designed additional substantive procedures to test the analysis.

Also:

> Controls were in place, but due to the high degree of estimation uncertainty associated with the fair value estimate for this estimate, the nature, timing, and extent of the substantive audit procedures were not altered. Additionally, the valuation of this investment was identified as a key estimate (requiring additional attention during the audit), resulting in an inability to reduce our extent of testing by relying on controls.

Controls were relied upon in only 16.1 percent of our reported experiences among non-issuer clients. The high degree of subjectivity in these FVMs, in combination with the fact that control testing is optional among non-issuer clients, led auditors to cite a non-reliance approach as much more efficient: "The client is not public, and the underlying investment values were highly subjective, so the most efficient approach was deemed to be substantive testing." Even among issuer clients, auditors frequently cited that it was "[e]asier to test the balance versus gaining assurance on some of these controls." In other circumstances, internal controls could not be relied upon because (1) controls existed but were either designed poorly or operating ineffectively, and/or (2) sufficient controls were not in place at the company. Other miscellaneous reasons cited for not relying on internal controls include insufficient client experience and the unique, non-recurring nature of some FVMs.

How Valuation Specialists Are Used

Given the complex and subjective nature of FVMs, specialists have become an increasingly essential part of the valuation and audit processes. To better understand these processes, we asked our respondents a series of questions about how and when both clients and their auditors use these specialists. Results show that 82.8 percent of engagement teams consulted a firm valuation specialist, only 5.1 percent consulted a third-party specialist, and 16.2 percent did not consult any specialists. Among audit clients, 12.1 percent consulted an internal specialist, 54.5 percent consulted a third-party specialist, and 39.4 percent did not consult any specialists. When the client did consult a specialist (internal or third-party), the specialist helped the client develop its valuation model/method in 81.1 percent of these cases. One noteworthy observation here is that the frequency of *not* consulting any specialist is significantly higher for clients than for auditors. Of the 39 experiences where the client did not consult a specialist, the auditor still decided to consult a specialist in 26 (66.7 percent) of these cases. This raises several interesting questions. For instance, if the auditor feels the nature of the FVM is sufficiently complex to warrant consultation with a specialist, why does the client not come to the same conclusion? Does this indicate overconfidence on the part of the client, or a lack of awareness regarding the need for more expertise in valuing these FVMs? Or perhaps third-party specialist consultation is not necessary because the client simply has sufficient competence and expertise in-house.

In four of the collected examples, the respondent indicates that both internal and third-party specialists were consulted during the audit. Even more common is the situation in which both the client and the auditor consult their own specialists (57.6 percent of the sample). This is expected given the subjective and complex nature of the

FVMs targeted for investigation in this study, but it also opens up the possibility that these separate specialists may disagree as to the appropriate method for performing the valuation. One of respondents describes exactly this scenario:

> The guidance around [valuing FVMs] is not very specific and leaves a significant amount of judgment for management to decide which valuation methodology to use. In performing their analysis, the Company engaged one of the Big 4 firms to assist them with the valuation. Upon our valuation specialists reviewing the analysis performed, they disagreed with the methodology used by the other firm. This was a fundamental difference that caused a lot of issues and either methodology is acceptable under the guidance; however, our firm would not support the analysis performed by the other firm.

When two competent, qualified specialists disagree as to which of two commonly used methodologies is most appropriate, conflict will arise. Furthermore, a recent study by Carpentier et al. (2008) suggests that such discrepancies between valuation experts may be fairly common. In their study, Carpentier et al. (2008) examine the consistency and quality of valuations completed by a sample of 43 business valuation experts who were each provided with the same set of guidelines. They found significant variations in the valuations provided by the experts as a result of different methods and multiples being used. Such discrepancies can result in considerable time being spent by both audit firm and client personnel in resolving the issue.

Information about Substantive Procedures

When auditing FVMs, the auditing standards in AU 328 allow for three main types of substantive tests to be used alone or in combination with one another. We asked respondents a series of questions to better understand (1) how often each of these approaches is used; (2) what specific steps were taken to perform each substantive test; (3) who performed these audit procedures; (4) the nature of any significant challenges encountered by the auditor in performing the audit procedure; and (5) the nature of any

significant problems identified as a result of the procedure. Since the first substantive approach outlined in AU 328 involves three distinct audit procedures, we asked respondents about each procedure separately.

Table 2.5 shows results regarding the frequency of each audit approach, whether challenges were encountered, whether problems were identified as a result of the procedures, and who performed the step. The reported frequencies of each audit approach are as follows: management model tested (87.9 percent), model assumptions tested (85.9 percent), underlying data tested (84.8 percent), independent estimate developed (51.5 percent), and subsequent events reviewed (59.6 percent). Respondents report a much higher percentage of challenges encountered and problems identified when testing the model and testing the assumptions, as compared to testing the underlying data ($p<0.01$, in both instances). This is not surprising given the subjective nature of the models and assumptions used. The underlying data, in contrast, are often easier for auditors to verify.

[Insert Table 2.5 about here]

Results on the frequency of audit approaches differ from those of the recent Griffith et al. (2013) interview-based study, who report the following frequencies: management model tested (19.0 percent), model assumptions tested (80.1 percent), underlying data tested (57.1 percent), independent estimate developed (38.1 percent), and subsequent events reviewed (9.5 percent). Based on these frequencies, Griffith et al. (2013) conclude that "auditors overwhelmingly choose to audit the details of management's estimate. They rarely choose to create an independent expectation or rely on subsequent events." Although we also observe that auditors frequently test underlying data, auditors formulate independent estimates and review subsequent events in over 50

percent of our sample. Another difference between our findings and those of Griffith et al. (2013) is the reported percentage of auditors testing management's model: 87.9 percent in our sample versus 19.0 percent in theirs.

The results reported in Table 2.5 also provide useful information regarding the frequency with which specialists help to perform each of the audit steps outlined in AU 328. As reported previously, it is clear from these results that auditors rarely use third-party specialists to perform these audit steps. Given the risk management aspects of performing an audit, this result is perhaps not surprising. We also find that internal firm specialists are most active in testing the model (71.3 percent), testing the model assumptions (74.1 percent), and developing independent estimates (82.4 percent); these specialists are used much less frequently for testing the underlying data (31.0 percent) and for testing subsequent events (15.3 percent). This pattern roughly mirrors the frequency with which challenges were encountered and problems were identified in each step. The one notable exception is developing independent estimates, which has the highest percentage of firm specialist participation (82.4 percent) and yet had one of the lowest percentages of challenges encountered (15.6 percent). This may be explained at least in part by the fact that the core engagement team participated in performing this step in only 31.4 percent of our sample—a much lower rate than any of the other steps.

Problems Identified Through the Audit Process

When asked to select from a list of 16 types of problems encountered during the course of the audit, the three most frequent responses—documentation supporting management assumptions (46.5 percent), significant management assumptions (42.4 percent), process used to develop and apply management assumptions (25.3 percent)—

were all related to management assumptions.[22] One respondent summed up the nature of the problem as follows:

> It was very difficult to substantiate and corroborate management's assumptions of what future growth would be within each of the regions/businesses. Due to the economic recession and poor results in the last few years and the uncertainty if in future years the business would improve, we were unable to obtain support for management's assumptions. It was more their opinion. In their defense, no one really knew what was going to happen and they took their best shot based on their level of experience in the industry.

This quote captures the general tenor of the frustration expressed by many of the auditors in our sample. Assumptions are a major driver determining the ultimate valuation of a FVM, and yet these assumptions may be little more than an educated guess based on the client's experience—or as one respondent put it, management's "gut feeling." This situation creates serious challenges for the auditor, since the subjectivity and ambiguity inherent in these assumptions is generally the key driver behind the wide ranges of estimation uncertainty that often exceed the materiality threshold. The lack of objective evidence often leaves the auditor with few options, as noted by another respondent: "The assumptions could not be supportable by third-party, independent evidence. Further, management's assumptions were based on their opinion of what would occur within the market, which is unknown… but other than their opinion it was very difficult to corroborate and audit their assumption."

Other areas identified as problematic during the audit were the appropriateness of management's method/model (23.2 percent) and the expertise and experience of client personnel determining FVMs (23.2 percent). This latter concern may partially explain the results shared earlier regarding lower rates of specialist consultation among audit clients

[22] As with all the questions in our instrument, this list of 16 types of problems was developed with the help of extensive feedback from audit partners from each of the participating firms. Participants were also given the option to provide additional feedback using an open-ended "other" option.

than among the auditors. Clients without sufficient experience may not have enough expertise to know when and where they ought to consult a specialist. Or the causality here may be reversed—the lack of specialist consultation among audit clients may be the driving force behind the concern among auditors regarding the expertise and experience of those determining FVMs. Most of the remaining areas identified as problematic relate to specific controls at the client. These include controls over the process used to determine FVMs (17.2 percent), monitoring controls over FVMs (13.1 percent), and controls over the consistency, timeliness, and reliability of model inputs (9.1 percent).

The Relationship Between Substantive Procedures and Inherent Risk

As noted above, over 70 percent of our respondents assess the degree of estimation uncertainty as approximately equal to or greater than materiality. Nearly 20 percent assess this range of estimation uncertainty as greater than *five times* materiality. Furthermore, recent PCAOB reports indicate that 31.5 percent of the deficiencies identified by PCAOB inspectors in 2008-09 were related to the valuation of FVMs, with auditor over-reliance and lack of skepticism identified as contributory causes (Bratten et al. 2013; Griffith et al. 2013). In his review of the professional skepticism literature, Nelson (2009) explains:

> For auditors to be able to exercise professional skepticism in response to a given set of evidence, they must understand the directional implications of evidence for audit risk, and also must be able to apply their knowledge of evidential patterns and error / non-error frequencies to determine whether a given set of evidence suggests heightened risk.

Certain elements of our data, however, suggest that auditors' understanding of this relationship between audit evidence and audit risk may need improvement. As noted by Bell and Griffin (2012), "inherent uncertainty, although estimable, is irreducible and

therefore cannot be decreased or eliminated by auditing." Surprisingly, however, even when the range of estimation uncertainty exceeded five times materiality, over 70 percent of our respondents still rated inherent risk for the FVM as less than the maximum. Among FVMs with ranges of estimation uncertainty greater than materiality, over 33.3 percent of our respondents still rated this risk within the low/moderate range. This may suggest a lack of understanding and/or sufficient professional skepticism on the part of auditors when dealing with particularly difficult FVMs. Inherent risk in this instance is the susceptibility of the FVM to material misstatement, yet inherent risk is assessed as less than the maximum even when measurement uncertainty is a multiple of materiality.

Combined, these findings suggest that there is room for improvement in helping auditors to understand the linkage between estimation uncertainty, their audit work over FVMs, and the inherent risk brought on by the high degree of estimation uncertainty. Strengthening this linkage should result in less over-reliance and greater amounts of professional skepticism. It is also clear from our data, however, that there are some circumstances in which no amount of audit work is going to address the inherent difficulty of high estimation uncertainty.

Completing the Audit

In the final section of our questionnaire, we asked respondents a series of detailed questions about the nature and extent of their discussions with management regarding the FVM. We also asked whether an audit adjustment was proposed; the effect of the proposed adjustment on the FVM's value; and whether the adjustment was ultimately fully booked, partially booked, or waived. When asked about the extent of discussions with management regarding the FVM, the mean response on an 11-point scale is 9.39.

Not surprisingly, this mean increases nearly monotonically along with the range of the estimation uncertainty.[23] The highest means for the various FVM types occurred among the asset impairment (10.00) and other FVM (9.79) types, and the lowest mean is observed among the pension plan assets (8.10).

Further inquiries were also made using the following question: "Please indicate which of the following topics were discussed with management regarding this fair value measurement (*please mark all that apply)*." Respondents were then presented with a list of eight topics in addition to an open-ended "other" category. The most common responses from the options provided are the valuation process (92.9 percent), management's assumptions (90.9 percent), management's inputs (81.8 percent), documentation surrounding the valuation process (81.8 percent), and models used in the valuation process (76.8 percent). Open-ended responses include general topics such as the accounting ramifications associated with the FVM, potential entity-level controls useful for reliance, review of current purchases for pricing information, and determining fair value when the volume of transactions has significantly decreased.

Although we asked survey participants to select instances where auditing the FVM was among the most challenging and important issues in the audit, our data show that potential adjustments to the FVM were discussed with the client in only 35.4 percent of the engagements.[24] When a potential adjustment is discussed, an actual adjustment is proposed in only 51.4 percent of these cases. Of the 18 proposed adjustments, 14 were fully booked, two were partially booked, and the remaining two were waived. Qualitative

[23] The means for the extent of discussions with management regarding the FVM for each estimation uncertainty bucket are as follows: less than materiality (8.64), approximately equal to materiality (9.04), 2-3 times materiality (9.63), 4-5 times materiality (10.67), greater than 5 times materiality (10.11).
[24] Note that this question only measures whether a *potential adjustment* was discussed with the client, not whether the FVM issue itself was discussed with management.

data collected from our participants suggests that these low rates are often due to at least two key related problems mentioned above: the subjective nature of management assumptions and the broad range of estimation uncertainty. One example (from a respondent whose experience involved a FVM with a degree of estimation uncertainty exceeding five times materiality):

> No audit adjustment was proposed and no impairment was recorded, but it could have very easily resulted in an impairment by adjusting the assumptions slightly. The main reason the adjustment was not recorded was the level of uncertainty of management's assumptions (i.e. inputs into the model). Neither the audit firm nor management had firm evidence that could support one assumption was better than another.

Several responses similar to this one suggest that the complexity and uncertainty underlying their respective FVMs made it difficult to fully justify a proposed adjustment. It is important to note, however, that both management and their auditors face the same difficulty in trying to appropriately value FVMs. The problem suggested by our data is not that management's FVMs are necessarily valued incorrectly, but rather that the range of reasonably possible values can be alarmingly large. Some respondents described FVM situations where there are numerous widely accepted valuation techniques, all of which provide different valuation point estimates.

> I think often, when you have a scenario like this there are several valuation techniques that are appropriate but will give slightly different answers and it is a challenge to bridge valuation differences between methods. For example, is a difference in valuation then actually an error/audit difference? If so why is one method better than the other when both are widely accepted in practice?

In these scenarios, how is the auditor to know which model is the most reasonable and appropriate? The guidance provided in AU 328.38 suggests that the methodology used by the client (and their specialist) should be given preference when these reasonable differences arise:

> For items valued by the entity using a valuation model, the auditor does not function as an appraiser and is not expected to substitute his or her judgment for that of the entity's management. Rather, the auditor reviews the model and evaluates whether the assumptions used are reasonable and the model is appropriate considering the entity's circumstances.

The difficulty of applying this standard, however, lies in determining what is considered "reasonable" and "appropriate." The materiality threshold is often used by auditors in making this determination, but the inherent subjectivity of many FVMs and the existence of multiple acceptable valuation methods often creates ranges of estimation uncertainty that are many multiples of this materiality threshold. With regard to these situations, PCAOB Auditing Standard No. 14 (PCAOB 2010b, ¶13) indicates the following:[25]

> If a range of reasonable estimates is supported by sufficient appropriate audit evidence and the recorded estimate is outside of the range of reasonable estimates, the auditor should treat the difference between the recorded accounting estimate and the closest reasonable estimate as a misstatement… If an accounting estimate is determined in conformity with the relevant requirements of the applicable financial reporting framework and the amount of the estimate is reasonable, a difference between an estimated amount best supported by the audit evidence and the recorded amount of the accounting estimate ordinarily would not be considered to be a misstatement.

Thus, misstatements appear to be defined only as those differences that fall materially *outside* of the range of reasonable estimates, even if that range is many multiples of the auditors' materiality threshold. This creates situations where clients are ostensibly given the latitude to determine the value of their FVMs anywhere within this range. Without objective evidence to the contrary, auditors can have difficulty proving that their assumptions and estimates are any better than the client's. Such situations may only feasibly allow for negative assurance on the part of auditors, and yet they are required to

[25] Similar guidance for determining likely misstatements for accounting estimates is provided in AU 312.36.

provide positive assurance against any material misstatements in the financial statements (Bell and Griffin 2012). One participant sums up the difficulty of this position as follows:

> During 60+ hours of discussions and analyzing the assumptions by the audit team and ensuring the assumptions and information within the models did not contradict themselves, we determined management's assumptions/model held together and was their best estimate at the fair value of the reporting units. The audit firm did not have objective evidence or enough information to be certain that our estimate was any better than management's estimate.

Supplemental Analysis

In this section, we build on the descriptive results reported in the main results section above, by presenting supplementary analyses using regression models to further investigate factors associated with two key outcome variables: inherent risk assessments and proposal of an audit adjustment that decreases income.[26]

Variables and Models

Inherent risk assessments. First, we examine the relationship between auditors' inherent risk assessments and various FVM and client characteristics using a regression model. In the main analysis section above, we noted concerns regarding auditors' inherent risk assessments; for instance, their relationship with the estimation uncertainty of the FVM. We use regression analysis to further investigate these assessments. All dependent and independent variables discussed in the following paragraphs are defined in the notes to Table 2.6.

[Insert Table 2.6 about here]

The regression model explains inherent risk assessments as a function of characteristics of the FVM being audited (*LEVEL3*, *MATERIALITY*, *UNCERTAINTY*,

[26] Each model is a function of the prior model plus control variables, so an important feature of this analysis is the order in which each of these outcome variables occur. The inherent risk assessment occurs first during an audit, followed by the decision to engage a valuation specialist. Audit adjustment proposals occur last during the completion phase of the audit.

TYPE_FININST, and *TYPE_IMPAIR*) as well as characteristics of the client (*SPEC_CLIENT*, size as measured by *SALES*, and regulatory risk as measured by *SEC*). We expect *LEVEL3*, *MATERIALITY*, and *UNCERTAINTY* to be positively associated with inherent risk assessments due to increased complexity, increased magnitude of potential audit adjustments, and reduced availability of objective audit evidence. No directional predictions are made for either of the FVM type variables (*TYPE_FININST* or *TYPE_IMPAIR)*. *SPEC_CLIENT* could be positive due to features that led the client to engage a specialist (i.e., lack of client personnel expertise, any of the FVM characteristics noted above, or other known issues) or negative because the client specialist brings valuation expertise. *SALES* could be positive due to greater complexity, or negative because larger firms are generally more stable, have better controls, and have greater in-house valuation expertise. *SEC* is expected to be positive due to greater regulatory risk.

Model (1) is specified as follows. The dependent variable is *IR,* participants' rating of the risk of material misstatement, measured on a scale of 1 ("Low") to 11 ("High").

$$IR = \beta_0 + \beta_1 LEVEL3 + \beta_2 MATERIALITY + \beta_3 UNCERTAINTY + \beta_4 TYPE\_FININST + \beta_5 TYPE\_IMPAIR + \beta_6 SPEC\_CLIENT + \beta_7 SALES + \beta_8 SEC + \varepsilon \quad (1)$$

Proposal of an audit adjustment. Model (2) explains the auditor's decision to propose a downward audit adjustment. Nearly all proposed adjustments in our sample are at least partially booked, so proposing an adjustment is clearly an important step. Furthermore, we are primarily interested in downward adjustments because these are generally the most likely to counteract any potential earnings management and least likely to be supported by management. In addition to the factors in Model (1), this logistic regression model also includes *IR* and the type of evidence obtained by the

auditor; i.e., *PROC_IND_EST* and *PROC_SUB_EVENT*.[27,28] Potential errors noted during the course of the audit grow in importance along with the materiality of the underlying asset or liability, and thus are more likely to be proposed; as such, *MATERIALITY* is expected to be positive. *UNCERTAINTY* could be positive in that it contributes to risk, as predicted in Model (1), or negative in that auditors will have more difficulty justifying that the client's valuation is incorrect given the increased amount of uncertainty. No predictions are made for the two FVM type variables (*TYPE_FININST* and *TYPE_IMPAIR)*. Client valuation specialists bring additional valuation knowledge to the client, so proposed audit adjustment are less likely under these circumstances; thus, *SPEC_CLIENT* is expected to be negative. *SALES* could be negative due to larger clients having more power, or because larger firms are likely to have greater in-house expertise. *SEC* is expected to be positive due to increased regulatory complexity and scrutiny. Increased *IR,* by definition, leads to a higher risk of material misstatement, so we expect *IR* to be positively associated with proposed adjustments. Proposed adjustments also require sufficient audit evidence, so we expect positive associations for *PROC_IND_EST* and *PROC_SUB_EVENT*.[29]

[27] We are unable to include *LEVEL3* and *SPEC_AUD* in Model (2) because both variables perfectly predict a proposed adjustment. No adjustments are proposed when the auditor does not use a specialist or when estimate is not Level 3. So when these factors are considered, the explanatory power of our variables is higher than it appears from the model.

[28] The proportion of engagements testing the model, assumptions, and data is very high (approximately 85 percent for each), so we do not include these tests as evidence variables in the model.

[29] Because each model is a function of the prior model plus additional variables, an important decision in performing this analysis is the order in which the models are estimated examined. Inherent risk assessments are made first during the planning stage of the audit, followed later by the decision of whether or not to propose an audit adjustment during the completion phase of the audit. Therefore, this is the order in which we estimate the two models.

Model (2), specified as follows, is a logistic regression model whose dependent variable is the indicator variable *DEC_AUD_ADJ,* which equals 1 if the auditor proposed an adjusting entry that would decrease client income if booked; 0 otherwise.

$$DEC\_AUD\_ADJ = \beta_0 + \beta_1 MATERIALITY + \beta_2 UNCERTAINTY + \beta_3 TYPE\_FININST + \beta_4 TYPE\_IMPAIR + \beta_5 SPEC\_CLIENT + \beta_6 SALES + \beta_7 SEC + \beta_8 IR + \beta_9 PROC\_IND\_EST + \beta_{10} PROC\_SUB\_EVENT + \varepsilon \quad (2)$$

Results of Supplemental Analysis

In Table 2.6, results of Model (1) show that inherent risk is higher for *LEVEL3* FVMs ($p<0.01$, one-tailed) and those with greater *UNCERTAINTY* ($p=0.045$, one-tailed), implying, as expected, that inherent risk assessments are calibrated with characteristics of the estimate. Somewhat surprisingly, however, we find no significance for *MATERIALITY*. However, a significant positive association for *MATERIALITY* ($p=0.04$, one-tailed) is found when *UNCERTAINTY* is removed from the model. While variance inflation factors are all below 2.0, *MATERIALITY* and *UNCERTAINTY* are highly correlated (0.53) and the sample size is fairly small. Thus, some degree of multicollinearity may be preventing computation of independent estimates for these variables. Results also show that inherent risk assessments are not affected by *SPEC_CLIENT*. Inherent risk is also higher for *SEC* clients ($p=0.014$, one-tailed) and lower for larger clients (*SALES;* $p=0.027$, two-tailed).

In Model (2), the most interesting result is the positive effect of *PROC_IND_EST* on proposing a decreasing audit adjustment ($p=0.027$, one-tailed). This finding has important implications for practice, as it suggests that auditors are more likely to take the important step of proposing a decreasing audit adjustment if they have developed an

independent estimate as part of their audit procedures.[30] No such effect is noted for *PROC_SUB_EVENT*. Also of interest is the negative association of *TYPE_FININST* (p=0.039, two-tailed), suggesting that auditors are less likely to propose decreasing audit adjustments for financial instruments, as compared to other types of FVMs.[31] Other results of the model show that decreasing audit adjustments are more likely to be proposed when the client is a SEC registrant (*SEC;* p=0.03, one-tailed), and are less likely for larger clients (*SALES;* p<0.01, one-tailed).

In combination with the descriptive statistics provided in our main analysis, these supplemental analysis findings provide valuable insight regarding the factors associated with key decisions made by auditors during the audit. In Model (1), we find that inherent risk assessments are fairly well calibrated to the expected estimate and client characteristics. And in Model (2), we find that auditors are more likely to propose a decreasing audit adjustment when they have developed their own independent estimate (*PROC_IND_EST).*

VI: CONCLUSION AND LIMITATIONS

The increasingly complex and dynamic nature of FVMs presents considerable challenges to both preparers and auditors. Our research provides insight into the nature and extent of these challenges and should prove valuable to both practitioners and researchers seeking to address these issues. This paper contains findings from our analysis of 99 difficult-to-audit FVM participant experiences collected from 80 high-level audit practitioners. We highlight here several important results.

[30] Recall from our descriptive results in Table 2.5 that an independent estimate was developed in 51.5 percent of our sample.
[31] Decreasing audit adjustments were proposed for 6.2 percent of financial instrument FVMs in our sample, as compared to 13.7 percent for all other FVM types.

First, when asked about challenges faced in auditing FVMs, respondents cited most frequently the difficulties inherent in auditing management assumptions. The number of significant and/or complex assumptions, the high degree of subjectivity, and high degree of uncertainty with regard to future events were all cited as contributing to this difficulty. Respondents noted that this challenge can be further compounded by a lack of available data to independently value FVM determined by a third party. They noted situations where third parties used by clients were unwilling or unable to provide the necessary detail regarding the underlying assets and assumptions used in the valuation. Such situations create difficulty for auditors in obtaining the information necessary to perform the required due diligence over the calculation of the FVM.

Second, over 70 percent of our respondents identified a range of estimation uncertainty inherent in the FVM that is approximately equal to or greater than the auditors' materiality threshold. This wide range of measurement uncertainty is itself a result of a number of factors, including the nature of the model, the lack of verifiability of key assumptions underlying the valuation, and the subjective nature of the model inputs, including the difficulty of forecasting future values. The prevalence of these instances of extreme estimation uncertainty is particularly important given that current audit guidance defines misstatements as only those differences that fall materially *outside* of the range of reasonable estimates (AS5, paragraph 13; AU 312.36). Thus, auditors appear to lack the regulatory backing to challenge recorded FVMs that may far exceed the auditors' materiality threshold, so long as they fall somewhere within the range of reasonable estimates. These results suggest that one of the largest challenges facing the auditing profession with regards to auditing FVMs may not be a lack of professional skepticism

on the part of audit professionals—although recent PCAOB findings do highlight need for improvement here—but rather the existence of situations in which the auditor is required to provide positive assurance on irreducible inherent risks that by their nature might allow only for negative assurance.

Third, we find that in these challenging instances, engagement teams frequently perform multiple procedures listed in auditing standards relevant to FVMs. This finding contrasts with Griffith et al. (2013), who conclude that auditors focus on testing model assumptions and underlying data tested, and very infrequently test management's model, develop an independent estimate, or review subsequent events. Because there are several differences in methods between our study and theirs, it is difficult to identify a single feature that might have caused the discrepancies in results. For instance, it may be the scope of the study; i.e., that these procedures are used more frequently in practice when auditing FVMs is difficult, rather than in their more general case of complex estimates. The average audit partner may see few situations of difficult-to-audit FVMs relative to complex estimates, and thus have less experience to draw on when answering a general question about procedures used. Another key methodological difference relates to use of open-ended interviews versus a structured questionnaire eliciting information from the workpapers on specific engagements. Griffith et al. (2013) infer that if a partner does not mention a specific procedure in the interview, then that step is not routinely performed. Our specific questions required engagement team personnel to seek archival data on whether or not specific procedures were performed, which could have resulted in higher reporting frequencies. Due to the important implications of this issue for audit practice,

further research is indicated that would investigate how auditors plan and conduct audit tests related to FVMs, and how results of those procedures are interpreted.

Fourth, supplemental analyses provide additional insight regarding the above findings. We develop regression models to investigate factors associated with two important outcome audit outcome variables—one for inherent risk assessments, and one for proposed audit adjustments that would decrease the client's income if booked. As expected, results of our first regression model show that inherent risk assessments are strongly correlated with key FVM and client characteristics, including the range of estimation uncertainty. In our second logistic regression model, we note two key findings. First, we find that when auditors develop their own independent estimate, they are much more likely to propose an adjusting entry that would decrease client income if booked. This is particularly significant given the discrepancy noted above with Griffith et al. (2013) regarding the frequency with which this procedure is performed. Thus, we find not only that auditors *do* frequently perform this important step, but also that this step is important in providing support for proposed audit adjustments. Second, results suggest that auditors are less likely to propose decreasing audit adjustments for financial instruments, as compared to other types of FVMs. Thus, future research should be careful to consider the *type* of FVM being considered when making generalizations about FVM issues.

Lastly, our findings suggest two areas of potential concern to practice that we believe would benefit from further research. First, even when the range of estimation uncertainty was greater than materiality, 33.3 percent of our respondents still rated inherent risk for the FVM within the low/moderate range. While our supplemental

regression results show a strong positive association between inherent risk assessments and the range of estimation uncertainty, this univariate statistic reveals that this positive association does not hold in all cases. Future research investigating the factors influencing auditors' inherent risk assessments in FVM scenarios could provide a valuable contribution to the literature. Second, audit adjustments were proposed in relatively few cases, with auditors frequently citing the subjective nature of management assumptions and the broad range of estimation uncertainty as contributory causes. Respondents described FVM situations where there are numerous widely accepted valuation techniques, all of which provide different valuation point estimates. This suggests that the problem may not necessarily be that management's FVMs are valued incorrectly, but rather that the range of reasonably possible values may at times far exceed the auditor's materiality threshold. Furthermore, current auditing standards seem to suggest that the methodology and assumptions used by management should be given preference when reasonable differences exist. Without objective evidence to the contrary, auditors cited difficulty proving that their assumptions and estimates were any better than the client's.

Although drawing our respondents from a variety of firms enhances the descriptiveness of our sample, it is important to note that our results in this area should not necessarily be interpreted as reflective of the actual distribution of FVM types occurring in practice for at least two reasons. Specifically, we constrained our sample to three industries, and we intentionally focused our data collection efforts on only the most difficult-to-value FVMs. Our results are nevertheless still valuable to those looking to

better understand the nature of the FVM environment currently facing audit professionals.

CHAPTER THREE: FAIR VALUE MEASUREMENT UNDER HIGH UNCERTAINTY: THE EFFECTS OF DISCLOSURE FORMAT AND MANAGEMENT AGGRESSIVENESS ON USERS' RISK ASSESSMENTS

I. INTRODUCTION

Accounting issues involving fair value measurements (FVM) have continued to increase in importance and complexity in recent years. This is due in part to economic volatility, as was dramatically seen in the recent global financial crisis, as well as the increasing development and use of new financial instruments requiring fair value treatment. Furthermore, the progressive shift in recent years from the established historical-cost accounting paradigm to the current fair value accounting paradigm (Barlev and Haddad 2004) has also increased the importance and complexity of FVM issues. Prior research shows that ongoing development of complex and innovative financial instruments demanding application of new valuation models and assumptions has resulted in FVMs with ranges of estimation uncertainty that can be many multiples of auditors' materiality thresholds (Bell and Griffin 2012, Christensen et al. 2012, Cannon and Bedard 2013). Despite the existence of these large ranges, the current reporting framework requires that FVMs be reported on the face of the financial statements as a single point estimate. The confluence of these factors has presented major challenges to preparers, auditors, and users alike.

Because FVMs are used in all sectors of the economy, the problems faced by preparers in valuing these FVMs, and by users in understanding and incorporating these FVMs into their decisions, are widespread. Legitimate concerns exist regarding whether the current financial reporting framework adequately communicates the nature and magnitude of this inherent uncertainty to users relying on this information (Bell and

Griffin 2012; Christensen et al. 2012; Cannon and Bedard 2013). Copeland (2005)[32] describes this communication gap as follows:

> The readers of financial statements are too often misled by what *The Economist* (2003) referred to as the "brittle illusion of exactitude" of the current accounting model. Accounting practitioners and academics understand the approximate nature of financial reporting, but a gap exists between what financial statements represent and what many readers believe they represent. This unrealistic expectation of precision in financial reporting can lead to suspicion and disillusionment when inherent judgments in financial statements prove to be inaccurate. (Copeland 2005)

In response to feedback from users regarding the concerns noted above, recently updated accounting guidance requires financial statement preparers to augment fair value measurement (FVM) disclosures (FASB 2011a, IASB 2011). The Financial Accounting Standards Board (FASB) in the U.S. and the International Accounting Standards Board (IASB) have worked together towards the goal of achieving common FVM disclosures to address user concerns, but key differences still remain. Under both sets of standards, companies are now required to disclose additional FVM information, including (1) a description of the valuation technique(s) used for all FVMs within Level 2 and 3 of the fair value hierarchy[33]; (2) a quantitative disclosure of all significant unobservable Level 3 inputs used; and (3) a sensitivity analysis of possible changes in these significant unobservable inputs.[34]

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[32]This manuscript was adapted from a speech given by James E. Copeland, retired CEO of Deloitte, at the American Accounting Association Annual Meeting in Orlando, Florida, 2004.

[33] As defined in the glossary of FASB's *Topic 820: Fair Value Measurement*, fair value is "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." Applying this definition, however, necessitates the use of inputs and assumptions. "To increase consistency and comparability in fair value measurements and related disclosures," the FASB has established "a fair value hierarchy that categorizes into three levels the inputs to valuation techniques used to measure fair value. The fair value hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1 inputs)," the next highest priority to inputs other than quoted prices that are observable (Level 2 inputs), "and the lowest priority to unobservable inputs (Level 3 inputs)" (ASC 820-10-35-37).

[34] Numerous other related disclosure requirements are included in recent accounting guidance under both U.S. GAAP and IFRS, such as a reconciliation of opening balances to closing balances, gains and losses

The newly required quantitative disclosure of significant inputs and methodologies used by management, common to both sets of standards, is intended to allow users to assess whether those inputs are reasonable and in line with their expectations. However, while a "sensitivity disclosure" (item 3 above) is also common to both standards, the FASB and IASB differ on the specific nature and extent of this disclosure. Under U.S. GAAP, companies are only required to disclose a qualitative ("narrative") analysis of sensitivity to changes in significant unobservable inputs for each Level 3 FVM. It is important to note that this narrative disclosure, as illustrated in the example guidance provided by the FASB, only provides *directional* implications of changes to FVM inputs (e.g., "a significant increase in an input would result in a decrease in the point estimate disclosed on the balance sheet"). This disclosure lacks any indication of the potential *magnitude* of those changes.[35] International Financial Reporting Standards (IFRS), in contrast, additionally require a *quantitative* sensitivity disclosure of reasonably possible alternative FVMs based on possible changes to the FVM inputs (IASB 2005 and 2011). The FASB has indicated that it is presently considering further updating their fair value standard to instead require the more robust quantitative disclosure used under IFRS (FASB 2011a), but they have not yet done so due to concerns that the cost of such disclosures would outweigh the benefit. Thus, the situation as of January 1, 2013 (the effective date of the IFRS standard) is that U.S. and IFRS standards differ on the nature and specificity of FVM sensitivity disclosures.

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included in earnings, and qualitative descriptions of the techniques used to value the FVMs. For purposes of clarity and exposition, however, I focus only on those listed here.

[35] The standards describe this requirement as "a narrative description of the sensitivity of the fair value measurement to changes in unobservable inputs" (ASU 2011-04, paragraph 820-10-50-2(g)). However, this disclosure is not a true sensitivity analysis as traditionally construed, since only directional guidance is provided. So although the term narrative "sensitivity" disclosure may not be entirely reflective of the disclosure's actual content, I use it throughout the paper to remain consistent with the terminology used in the standards.

Both sets of standards are intended to provide useful information to users beyond the single point estimate of FVMs on the face of the financial statements. This raises an important empirical question: is the underlying uncertainty and risk inherent in these high-uncertainty FVMs effectively communicated to users through the qualitative sensitivity disclosure common to both standards, or does the additional quantitative sensitivity disclosure mandated by IFRS provide incremental benefit to users? While quantification might give users greater insight into the true sensitivity of FVM to changes in inputs, feedback sent to the FASB by preparers suggests that an additional quantitative disclosure would not communicate risk any better than the existing narrative disclosure and would not provide any useful information to users (ASU 2011-04, paragraph BC93).

I investigate this issue using an experiment with a 2X2 design in which MBA students, proxying for informed nonprofessional investors, assess the risk of a FVM with high estimation uncertainty.[36] The experimental conditions vary in sensitivity disclosure format described above, as well as the level of aggressiveness in management's choice of model inputs (high/low). It is particularly important to study management aggressiveness in this context, as the significant amounts of subjectivity involved in valuing FVMs with unobservable inputs creates ample opportunity for opportunistic behavior by management. Thus, including this variable provides valuable insight into how users respond to various disclosure formats under conditions of varying management aggressiveness. In addition to the narrative and quantitative sensitivity disclosures described above, I also propose and empirically test an "enhanced" quantitative sensitivity disclosure that includes additional columns designed to highlight potential

[36] While the primary dependent variable is users' risk perceptions, I also measure other judgments and decision metrics common to the literature on investor behavior (e.g., credibility, reliability and usefulness).

changes to net income as a result of reasonably possible changes to the FVM inputs. I develop the format of this additional condition using theory, examples from prior research (e.g., Clor-Proell et al. 2012), and examples of voluntary additional disclosures provided by actual companies.

I predict and find that this enhanced quantitative sensitivity disclosure incrementally improves (i.e., increases) the communication of risk to users above and beyond that provided by the standard quantitative sensitivity disclosure. However, under conditions of high management aggressiveness, the basic narrative sensitivity disclosure common to both U.S. GAAP and IFRS results in the highest user risk assessments. Furthermore, when management aggressiveness is high, users actually significantly *decreased* their risk assessments after viewing the standard quantitative disclosure. The unintended consequence suggested by these findings has important policy implications, particularly in light of the ongoing deliberations regarding the appropriate nature of FVM sensitivity disclosures. My findings imply that adding a requirement to disclose income effects of FVMs provides increased benefit to users at little incremental cost.

My results are consistent with expectation violations theory (EVT). EVT predicts that when expectations are violated (i.e., management chooses input values more aggressive than the industry average), users experience a heightened state of information-seeking behavior. In this agitated state, users in that condition are discontented by the paucity of information in the initial narrative disclosure and have significantly higher risk assessments relative to those whose expectations are met (i.e., low management aggressiveness). The quantitative sensitivity disclosures appear to satisfy the desire for additional information, as risk assessments significantly decrease as a result. Consistent

with this explanation, I also find that users' perceptions of trust in and competence of management, as well as reliability of financial reporting, are mediating factors in the relationship between additional disclosures and risk assessments. For instance, results suggest that increases in trustworthiness perceptions lead to a *decrease* in risk assessments despite evidence of high management aggressiveness in the standard disclosure condition. This effect does not occur in the enhanced disclosure condition.

Results suggest that the additional risk clearly communicated by the enhanced disclosure is sufficient to counteract the increases in perceptions of management and financial reporting reliability observed in the standard disclosure condition. This helps explains why user risk assessments are found to remain largely unchanged after viewing the enhanced disclosure, but decrease after viewing the standard disclosure.

As the FASB is currently deliberating whether to adopt a quantitative sensitivity disclosure requirement similar to IFRS in place of the current narrative disclosure, the results of this study have timely, relevant, and important policy implications. The stated goal of the FASB in providing these disclosures is to communicate the extent of uncertainty in Level 3 FVMs (FASB 2011a, BC98), yet results of my study suggest that the standard quantitative sensitivity currently required under IFRS may have the unintended consequence of *decreasing* users' risk assessments under conditions of high management aggressiveness. The additional columns highlighting income effects in the "enhanced" quantitative disclosure that I propose and test appears to counteract this tendency, thus providing increased benefit to users at little incremental cost to preparers. Thus, if quantitative sensitivity disclosures are to be required under U.S. GAAP and IFRS, my research suggests that such disclosures should explicitly include income

effects. The FASB and IASB should consider these implications as they further debate the appropriate nature of FVM sensitivity disclosures moving forward.

Furthermore, the enhanced quantitative sensitivity disclosure proposed and tested in this study provides an even more effective disclosure format than the standard quantitative disclosure currently used under IFRS. In a broader sense, results of this study also help inform the FASB's Disclosure Framework project, the stated goal of which is to "improve the effectiveness of disclosures in notes to financial statements by clearly communicating the information that is most important to users of each entity's financial statements" (FASB 2012). This study also contributes to the academic literature on financial statement disclosures and their usefulness in communicating information and risk to users, as well as to the presentation format literature. Lastly, this study responds to calls for additional research in the area of fair values in general (Kinney 2005; Martin et al. 2006) and more specifically on whether additional fair value disclosures can ameliorate some of the concerns currently being debated in the fair value area (Bell and Griffin 2012; Christensen et al. 2012; Bratten et al. 2013; Cannon and Bedard 2013).

The remainder of the paper is organized as follows. Section II discusses recent regulatory changes in fair value accounting and develops my hypotheses, and Section III describes my research methodology. Section IV describes the results of my experiment, and Section V presents the study's conclusions.

II. BACKGROUND AND HYPOTHESES DEVELOPMENT

Fair Value Accounting

The FASB's Statement of Financial Accounting Concepts No. 8 (2010) highlights relevance and faithful representation (previously referred to as "reliability") as the central characteristics of financial information usefulness and quality. Within this conceptual

framework, relevance is defined as the extent to which financial information is capable of making a difference in the decisions of users, whereas faithful representation is the degree to which financial information represents the underlying phenomena it purports to represent. Ideally, financial information would have both qualities, but the tradeoffs between them have long been recognized. In the past two decades, the FASB's standard setting has moved toward relevance, some would say at the expense of faithful representation and verifiability (Barley and Haddad 2004). Such a shift creates significant new challenges and opportunities for financial statement users. This is particularly true for the standards surrounding the reporting of FVMs. The shift towards the current fair value paradigm in recent years has provided users with a wealth of relevant information regarding the market value of assets and liabilities carried on the balance sheet, but the faithful representation (reliability) of this additional information has been questioned (Bell and Griffin 2012; Cannon and Bedard 2013; Christensen et al. 2012). This is made even more important given that fluctuations in fair values, previously only disclosed in the footnotes, are in many circumstances now reported directly on the face of the financial statements. As made painfully clear during the recent financial crisis of 2007-2009, these fluctuations in FVMs can directly impact net income and other key metrics relied upon by investors and users.

One particularly problematic result of this current state of affairs is the way in which FVMs with very large ranges of estimation uncertainty are currently reported using only a single point estimate on the financial statements. Financial information is supposed to faithfully represent the underlying phenomena it purports to represent, and yet the underlying ranges of estimation uncertainty inherent in these FVMs are instead

hidden behind the "brittle illusion of accounting exactitude" (*The Economist* 2003) created by using a single point estimate. The Conceptual Framework clarifies that faithful representation does not imply perfect accuracy, recognizing that such an ideal is unachievable for estimates involving subjective, unobservable inputs. Reported amounts are deemed to be "faithful" if "the amount is described clearly and accurately as being an estimate, [and] the nature and limitations of the estimating process are explained" (FASB 2010a, paragraph QC15). Such communication could help to communicate the nature and risk of the underlying phenomena being represented; however, it is not clear whether this objective is being fully achieved under the current reporting framework. Underlying the point estimates in the financial statements are generally complex valuation models with varying degrees of subjectivity and sensitivity, as well as numerous significant inputs that must also be estimated with varying degrees of uncertainty. Very large ranges of estimation uncertainty (i.e., ranges of estimates based on reasonably possible alternative assumptions) can result from the subjectivity inherent in the estimation process (Bell and Griffin 2012; Cannon and Bedard 2013; Christensen et al. 2012). Although users may be aware in a general sense that most FVMs involve a certain degree of risk and uncertainty, it remains an empirical question whether users are sufficiently aware of the differing levels of subjectivity and risk inherent in these situations. Increased disclosures have been proposed to address some of these concerns, as discussed in the following section.

Recent and Forthcoming Regulatory Changes

In response to requests from users of financial statements for additional information about the measurement uncertainty inherent in FVMs categorized within Level 3 of the fair value hierarchy, the FASB recently issued ASU 2011-04, *Fair Value*

Measurement (Topic 820): Amendments to Achieve Common Fair Value Measurement and Disclosure Requirements in U.S. GAAP and IFRSs in May 2011.[37] As the title implies, this update was issued to bring U.S. GAAP and IFRS into greater conformity with regard to reporting requirements for FVMs. Under this updated framework, U.S. GAAP and IFRS will be consistent in requiring reporting entities to disclose a description of the valuation technique(s) and the inputs used for FVMs within Level 2 and Level 3 of the fair value hierarchy. For Level 3 FVMs, information about the significant unobservable inputs used must be quantitative in nature.[38] The stated objective of this disclosure is to "provide enough information for users to assess whether the reporting entity's views about individual inputs differed from their own and, if so, to decide how to incorporate the reporting entity's fair value measurement in their decisions" (ASU 2011-04).

Although this recent update brings the two standards into greater conformity, they still differ in a few key aspects, including how a new sensitivity analysis for unobservable Level 3 inputs must be disclosed. The updated U.S. GAAP rules, which became effective for periods ending after 12/31/11, requires a *narrative* description of the directional effect on the reported FVM to changes in significant unobservable inputs and a description of any interrelationships between those unobservable inputs. ASC 820-10-55-106 provides an example of this type of disclosure:

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[37] The effective date for these amendments is for periods beginning after December 15, 2011, which means that period-end audits for these reporting entities will not take place until the first quarter of 2013. Quarterly 10-Q reports containing these required disclosures, however, were first released subsequent to the first quarter of 2012. See PwC (2012) for an extensive analysis of the content and nature of these Q1 FVM disclosures.

[38] A useful example of this type of quantitative disclosure is provided in ASU 820-10-55-103. For each class of FVM in this example, the significant unobservable inputs are listed. The range of values used by management for each unobservable input is also listed along with the weighted average—e.g., "the constant prepayment rate ranges from 3.5% - 5.5%, with a weighted average of 4.5%."

> The significant unobservable inputs used in the fair value measurement of the reporting entity's residential mortgage-backed securities are prepayment rates, probability of default, and loss severity in the event of default. Significant increases (decreases) in any of those inputs in isolation would result in a significantly lower (higher) fair value measurement. Generally, a change in the assumption used for the probability of default is accompanied by a directionally similar change in the assumption used for the loss severity and a directionally opposite change in the assumption used for prepayment rates (FASB 2011a).

While this is described by the FASB as a sensitivity analysis, it is important to note that this narrative disclosure does not communicate any quantitative information or verbal descriptions of the potential *magnitude* of such changes. The FASB concludes, however, that the disclosure is still useful because it "provides users of financial statements with information about the directional effect of a change in a significant unobservable input on a fair value measurement" (ASU 2011-04, paragraph BC97).

IFRS 13 requires a more detailed *quantitative* sensitivity analysis to be disclosed, with "the objective of providing a range of fair values (exit prices) that could reasonably have been reported in the circumstances" (ASU 2011-04, paragraph BC93; IFRS 13).[39] The FASB originally proposed a similar quantitative requirement for sensitivity disclosures. Despite strong support from user respondents, the original exposure draft proposal to require this quantitative sensitivity analysis was met with strong resistance by preparers, who stated that "the proposed disclosures would be challenging to implement and would significantly increase costs while providing little, if any, benefit to users" (ASU 2010-06, paragraph BC17). Financial statement users, however, "noted the inherent subjectivity in Level 3 measurements and stated that the proposed sensitivity

[39] This quantitative sensitivity disclosure requirement was first introduced as a part of IFRS 7 in August 2005, and has since been reissued and included with the updated IFRS 13 standard in 2010. The requirement to also include a quantitative disclosure of inputs and valuation methods used for all significant Level 3 FVMs was newly introduced with IFRS 13 and will become effective for annual periods beginning on or after 1 January 2013.

information would allow them to better evaluate the reporting entity's cash flows, earnings, capital requirements, and compliance with debt covenants." Given the significant opposition from preparer constituents, the FASB eventually elected to instead only require a narrative (directional) sensitivity disclosure, again citing preparer concerns that the additional disclosures would "not provide useful information and would be costly and operationally challenging" (ASU 2011-04, paragraph BC93). The FASB did, however, leave the matter open to further consideration: "The Boards will analyze the feasibility of incorporating information about interrelationships between unobservable inputs into a quantitative measurement uncertainty analysis disclosure. After completing that analysis, the Boards will decide whether to require such a disclosure" (FASB 2011a).

Although these additional disclosures likely would come at a nontrivial cost to preparers[40], the assertion that they "would not provide useful information" to users remains an important empirical question. The current reporting framework often places users of financial statements in the dark regarding the level of risk associated with certain FVMs that have ranges of estimation uncertainty far exceeding the auditor's materiality threshold (Christensen et al. 2012, Bell and Griffin 2012, and Cannon and Bedard 2013). The recent and forthcoming updates to the reporting framework have the potential to create a mechanism whereby management may be able to better communicate the inherent uncertainty surrounding FVM to users of the financial statements. This study helps to inform the current debate regarding these empirical questions by investigating

[40] Bell and Griffin (2012), however, make an interesting observation regarding this criticism from preparers regarding overly burdensome costs of compliance. They note that "preparers and auditors already are, or should be, developing and using such information to manage and audit issuers' FVA estimation processes and controls, point estimates, and related disclosures. Respondents' suggestions that development of such information would be challenging and costly to implement implies that, in at least some instances, such information is not currently being developed and considered by preparers."

the extent to which risk is effectively communicated to users. The theory and prior research described in the following section, combined with the results of my experiment, provide timely and relevant information to help inform this debate.

Literature Review and Development of Hypotheses

The primary purpose of this study is to investigate the effectiveness of various types of sensitivity disclosures at communicating to users the riskiness of FVMs with high estimation uncertainty. More specifically, I propose to measure the current narrative sensitivity disclosure's effectiveness, and then further measure the incremental change in user response associated with: (1) the forthcoming standard quantitative sensitivity disclosure required by IFRS; or (2) an "enhanced" quantitative sensitivity disclosure that also includes additional columns highlighting the effect of these changes on net income. Furthermore, I investigate whether the level of management's aggressiveness in estimating the FVM model inputs affects the ability of these disclosure formats to communicate risk to users. To investigate these research questions, this section discusses relevant theory and prior research and develops specific hypotheses to formalize my predictions.[41]

As discussed above, the new FVM sensitivity disclosures were due in part to numerous requests from the investor community to the FASB for more information about FVMs categorized as Level 3 in the fair value hierarchy. This implies that users believe the additional detail provided by the proposed quantitative disclosure would be more effective at communicating the measurement uncertainty inherent in the FVM. In line

[41] My research questions are primarily concerned with users' perceptions of risk, so this is the dependent variable I use to discuss the predictions made in my hypotheses. Other important user judgment variables—such as credibility, reliability, and usefulness—were collected for purposes of supplemental analysis and are discussed later in the paper, but no formal predictions are made using these variables.

with this logic, Mayorga and Sidhu (2012) examine the fair value disclosures of Australian listed firms and find that "information is not sufficiently informative to give users meaningful insights" into the underlying uncertainty of the FVM—the implication being that additional disclosures, such as quantification of uncertainty ranges, are needed. This additional detail, however, may come at a cognitive cost. Researchers and practitioners alike have expressed concern regarding the increasing length and complexity of footnote disclosures in recent years (e.g., Christensen et al. 2012; FASB 2012). Research shows that footnote disclosures are viewed by users as less reliable (Frederickson et al. 2006; Libby et al. 2006) and are weighted less than recognized information (e.g., Ahmed et al. 2006; Davis-Friday et al. 1999; Espahbodi et al. 2002). Additional detailed disclosures are only informative and effective at communicating inherent risk insofar as users are sufficiently motivated and capable of processing the additional information. This is consistent with considerable prior research demonstrating the cognitive limitations of individuals when processing information (e.g., Sweller 1988, 1989; Chandler and Sweller 2009; Hodge et al. 2010).[42] Following this logic, the additional quantity and complexity of quantitative sensitivity disclosures for FVMs may instead overwhelm the user and reduce the disclosures' effectiveness in communicating inherent risk. If so, the simplicity of the narrative disclosure may be more germane, informative, and appealing to the user.

The requirement to provide quantitative information about the significant unobservable inputs used in Level 3 FVMs is one important element of the new FVM disclosures. In mandating this disclosure, the FASB noted that "the objective of the

[42] A more in-depth discussion of this research surrounding cognitive limitations is presented at a later point, in support of H2.

disclosure is not to enable users of financial statements to replicate the reporting entity's pricing models but to provide enough information for users to assess whether the reporting entity's views about individual inputs differed from their own and, if so, to decide how to incorporate the reporting entity's fair value measurement in their decisions." One of the stated purposes of this disclosure is then to enable the user to compare the *expected* values of these individual inputs to the *actual* values used by management. When management's assumptions are inconsistent with the expectations of the user, resulting in more favorable measurements of fair value, users should perceive management as aggressive. This logic is supported by prior research and theory cited in the following section.

User Expectations and Expectancy Violations Theory

Prior research investigates the effects of missed expectations and perceived aggressiveness on individuals' judgments in the financial reporting context. For instance, Hodge et al. (2006) investigate the effects of management's accounting choices on their perceived credibility within the context of classifying a hybrid security as equity or debt. They find that users' perceptions of management's credibility are lower (higher) when the classification choice is consistent (inconsistent) with management's incentives. These findings are similar to Hirst et al. (1995), who find that users view incentive-consistent information as less credible than incentive-inconsistent information. In a stock option accounting setting, Frederickson et al. (2006) find that recognizing stock option expense, as opposed to merely disclosing this expense in the footnotes, leads to higher user assessments of reliability and firm attractiveness. Each of these studies highlights various

circumstances under which management's accounting choices affect users' assessments of attributes such as credibility, reliability, and attractiveness.

Clor-Proell (2009) synthesizes this prior research and further investigates how users' decisions are affected by the extent to which actual accounting choices meet their expectations. She uses two separate contexts: a stock-based compensation scenario involving a choice between valuation methods, and an accounting estimate scenario involving a choice of the useful life of a building. In both cases, she finds that when users' expectations are not met, assessments of management's credibility become more extreme.

Similar to Clor-Proell (2009), I use Expectancy Violations Theory (EVT) to further motivate the hypotheses in this study. EVT, which considers individuals' reactions to unexpected behavior, has its roots in the communications literature (Burgoon and Jones 1976; Burgoon 1978). Some of the core propositions of EVT are that: (1) people develop expectations primarily based on social norms; (2) violations of expectations lead to arousal and distraction, and thus to deeper information-seeking and processing to make sense of the violation; and (3) "positive violations produce more favorable outcomes and negative violations produce more unfavorable ones relative to expectancy confirmation" (Burgoon et al. 1995; Burgoon and Burgoon 2001). The basic tenets of EVT have been empirically tested and upheld in a wide range of studies using various settings (Burgoon 1978, 1983, 1988; Burgoon and Burgoon 2001; Guerrero and Burgoon 2001; Clor-Proell 2009). These studies have generally found that expectancy violations can affect assessments of the communicator's credibility, attractiveness, and influence (Burgoon and Burgoon 2001).

One of the basic tenets of EVT discussed above is that people develop expectations primarily based on social norms (Burgoon and Burgoon 2001). As such, it is reasonable to assume that all else equal, users in this study's context will form an expectation that management will make accounting choices in line with those of other similar firms. When this expectation is violated in a way favorable to the company and in line with the company's incentives, users will likely perceive this company as being relatively more aggressive than a firm meeting expectations. Further, EVT predicts that expectation violation leads to deeper information seeking and processing in an effort to make sense of the violation (Burgoon and Burgoon 2001). Thus, prior to investigating the effects of the quantitative sensitivity disclosure format, I first predict that users in the baseline narrative sensitivity disclosure condition will react to the expectancy violation and paucity of available information by increasing their risk assessments when management is perceived to be aggressive (i.e., when expectation are not met).

Based on the principles of EVT and the prior research findings discussed, I form the following hypothesis regarding differential user response to variation in management's choice of FVM inputs when a range of values is available due to high estimation uncertainty:

H1: Prior to receiving the quantitative sensitivity disclosure, users in the high aggressiveness condition will have higher risk assessments, relative to users in the low aggressiveness condition.

Presentation Format

I also investigate the effectiveness of various sensitivity disclosure formats at communicating the inherent risk of the underlying FVM. These disclosure formats include the narrative sensitivity disclosure required under both U.S. GAAP and IFRS, the

additional quantitative sensitivity disclosure required under IFRS, and my proposed enhanced quantitative sensitivity disclosure that includes the income effect of the disclosed sensitivity range.[43]

This section reviews the literature regarding the effects of presentation format on individuals' judgments and decision-making. While some of this research suggests that qualitative/narrative disclosure formats may be more effective than quantitative formats at communicating information to users, the evidence is mixed. In the following paragraphs, I first summarize research supporting higher effectiveness for qualitative formats, followed by research supporting higher effectiveness for quantitative formats.

Supporting the possibility of higher communication effectiveness for *qualitative* information, prior research in psychology contains some evidence suggesting that information presented verbally may be more salient and easier to process than numerical information due to limitations on attention and information processing capabilities (Kahneman 1973; Dickson 1982; Shen and Hue 2007). These findings are consistent with other studies in the management and accounting literatures suggesting that as part of information processing, individuals tend to convert quantitative information into qualitative assessments, resulting in higher cognitive costs associated with quantitative information (Bouwman 1983; Kida and Smith 1995; Kida et al. 1998; Frederickson and Miller 2004). Other studies in accounting suggest that presentation format does not

[43] The narrative sensitivity disclosure, as proposed by the FASB, is not only different in format, but also has less information than the quantitative sensitivity disclosure conditions. The design implications of this informational discrepancy are discussed in greater detail in the experimental design section of the paper. The discussion of theory and prior research regarding presentation format in the following section is still relevant, but the reader should keep in mind that presentation format and the effects of additional information jointly influence any changes to users' assessments. Also, as noted in this later section, it is important to note that this information discrepancy only relates to the narrative sensitivity disclosure. The experimental materials are designed so as to maintain information parity between the two quantitative sensitivity disclosure conditions (standard and enhanced).

necessarily affect the acquisition or evaluation of information of nonprofessional investors, but rather affects how they *weight* that information (Maines and McDaniel 2000). Reviewing this stream of research, Clor-Proell et al. 2012 conclude that "when presented with additional footnote disclosures, users are most likely to attend to the general verbal information that describes the fair value hierarchy, and are less likely to attend to the specific numerical information that describes how fair value changes affect the income statement." They do mention, however, that this tendency depends crucially on the decision-making context.

One similar context that provides a useful comparison is SEC Financial Reporting Release (FRR) No. 48 (FRR No. 48), which was issued in 1997 to provide qualitative and quantitative information about market risks inherent in various financial instruments.[44] In their comprehensive review of the potential behavioral implications of FRR No. 48, Hodder et al. (2001) concludes that in spite of the robust qualitative disclosures required, investors may make inappropriate risk assessments because of a lack of certain quantitative information: "Some of FRR No. 48's requirements are deficient because they provide insufficient quantitative information for users to fully understand the riskiness of companies' financial instruments, derivatives, and other positions" (Hodder et al. 2001). The implication here is that increased quantitative information would result in more accurate user risk assessments. Without this quantitative information, particularly under conditions of high uncertainty, users are prone to overconfidence through their propensity

[44] FRR No. 48 is similar to the context of this study in that it involves both qualitative and quantitative disclosures of risk, as well as a required sensitivity disclosure. It is different, however, in that "the disclosure in the FRR provides information about a reporting entity's exposure to *future* changes in *market* risks, whereas a narrative description of the sensitivity of the fair value measurement at the measurement date to changes in unobservable inputs provides information about the uncertainty *at the measurement date* related to those fair value measurements with the greatest level of subjectivity (that is, fair value measurements categorized within Level 3 of the fair value hierarchy)" (ASU 2011-04, paragraph BC98, emphasis added).

to anchor on the provided point estimate and their failure to properly consider other possible outcomes (Kahneman and Tversky 1979; Slovic et al. 1980). This narrowing of the estimated probability distribution should result in lower perceptions of risk by users (Kennedy et al. 1998).

Supporting the possibility of higher communication effectiveness for *quantitative* information, other similar research in accounting has found that investors perceive imprecise disclosures to be less credible than more precise disclosures (Hassell et al. 1988, King et al. 1990, Hirst et al. 1999; Mercer 2004). Because the qualitative sensitivity disclosure is imprecise in that it has little information and lacks quantitative rigor, it may be viewed as less credible than the quantitative sensitivity condition. If so, this reduction in credibility may instead increase users' perceptions of risk associated with the qualitative sensitivity disclosure.[45] However, other more recent research shows that under conditions of high uncertainty, investors actually prefer that financial information be presented as a range rather than a point estimate (Christensen et al. 2013). They also find that in situations with high uncertainty, investors consider ranges to be more accurate, credible, and informative than point estimates.

Although this prior research provides mixed results regarding whether additional quantitative sensitivity disclosure will increase or decrease users' perceptions of risk in the current study's context, the other possible alternative is that it may have no effect at all. As noted previously, feedback the FASB received from preparers claimed that an additional quantitative sensitivity disclosure would "not provide useful information" and would provide "little, if any, benefit to users" (ASU 2011-04; ASU 2010-06).

[45] Further discussion regarding the potential mediating effects of perceived credibility, reliability, and usefulness on user risk assessments will be investigated in a supplementary analysis.

Surprisingly, ASU 2010-06 also reports that many preparers provided feedback to the FASB claiming that "the information provided by the proposed [quantitative] sensitivity disclosures would not be decision useful because the range of reasonably possible Level 3 fair values would be extremely wide and, thus, would be meaningless." However, it is precisely *because* of these extremely wide ranges of reasonably possible values that these disclosures may be useful and important. Without these disclosures, users may not understand the varying degrees of risk inherent in FVMs with "extremely wide" ranges. These preparer assertions stand in direct contrast to the results of a recent survey of investors and analysts (PricewaterhouseCoopers 2010; 5, 9). One consistent trend they find in responses is as follows:

> Respondents voice a consistent desire for improved disclosure of fair value information. Specific improvements cited include detailed but not excessive information about portfolio composition and risk factors, valuation methods and assumptions, and sensitivity analyses for movements in key assumptions… When asked about the measurement of illiquid financial instruments, respondents stress the need for improved disclosures to help them better understand the assumptions that impact management's fair value estimates.

These findings are consistent with feedback from users reported by the FASB in ASU 2010-06 and ASU 2011-04. However, without explicit guidance regarding the specific impact of these additional quantitative sensitivity disclosures (e.g., the effect on net income), users may be unable or unwilling to calculate this impact themselves. In this scenario, it is possible that users will either be overwhelmed by the additional information (Dickson 1982; Bouwman 1983; Kahneman 1973; Kida and Smith 1995; Kida et al. 1998; Frederickson and Miller 2004; Shen and Hue 2007) and/or will interpret the additional information as a reflection of management's forthrightness, leading to increased credibility perceptions and reduced risk perceptions (Mercer 2005; Frederickson et al. 2006). Per Mercer (2005), this increase in perceived credibility is

particularly prevalent when the additional disclosure contains negative news—at least in the short term. Also, as noted above, prior research has found that investors perceive imprecise (e.g., narrative) disclosures to be less credible than more precise (e.g., quantitative) disclosures (Hassell et al. 1988, King et al. 1990, Hirst et al. 1999; Mercer 2004). This suggests that *higher* risk perceptions would be observed for narrative disclosures than for quantitative disclosures.

Furthermore, as discussed above, one of the core propositions of EVT is that expectation violations lead to distraction, arousal, and increased information-seeking behavior. While in this state, the lack of information in the narrative sensitivity disclosure will likely cause these users to increase their risk assessments—as predicted in H1. Including an additional quantitative sensitivity disclosure may then resolve the heightened feelings of arousal and distraction by providing the additional information the user was seeking. If so, providing the standard quantitative sensitivity disclosure may have the unintended consequence of *reducing* user's perceptions of risk.

In light of the mixed findings in the above literature review and theory, I predict only that a significant difference (non-directional) will exist between users' risk assessments in the standard quantitative sensitivity disclosure and in the narrative sensitivity disclosure. Thus, in a setting in which estimation uncertainty is high, I predict and test the following hypothesis:

H2: User risk assessments between the standard quantitative sensitivity disclosure and the narrative sensitivity disclosure will be significantly different.

Enhanced Quantitative Sensitivity Disclosure

In addition to testing the qualitative and quantitative sensitivity disclosures already mandated by U.S. GAAP and IFRS (respectively), I also test an enhanced quantitative sensitivity disclosure that shows potential changes to net income as a result of reasonably possible changes to the FVM inputs. This suggestion is similar in principle to the recommendations made in the FASB's Financial Statement Presentation Project (FASB 2008), as well as to related research that investigates various suggestions from that project (e.g., Clor-Proell 2012; Hodge et al. 2010). Clor-Proell et al. (2012) use an experiment to investigate changing the face of the financial statements to include a column that highlights the effect of changes in fair value on net income. They find that in this enhanced presentation format condition, participants are better able to distinguish between different levels of fair value inputs by assigning greater differences in assessments of both reliability and earnings potential. Although similar in principle, my study differs from Clor-Proell et al. (2012) in that I investigate the effect of *reasonably possible* alternative FVMs in the footnotes, as opposed to effects of *actual* changes to FVMs on the face of the financials.

Research on cognitive load theory (Sweller 1988, 1989; Chandler and Sweller 2009) finds that differences in presentation format can either help or hinder the ability of individuals to acquire and efficiently process the intended information. More specifically, Chandler and Sweller (2009) find that material must be mentally integrated before effective learning can commence, because individuals are faced with a heavy cognitive load when they must first integrate disparate sources of information. Hodge et al. (2010) find similar results, concluding that "non-professional investors are able to more quickly learn the relation between current period cash flows and accruals and future cash flow

realizations when financial statement information is presented in a single statement rather than in two separate statements." Thus, non-professional investors appear to learn more efficiently when information is presented in a single location, as opposed to being presented in disparate sources. Although these findings suggest that the enhanced quantitative sensitivity disclosure will better communicate the risk inherent in high uncertainty scenarios, it is important to also consider the interactive effect of management aggressiveness on this relationship.

Proposed Interaction of Disclosure Format and Aggressiveness

When expectations are violated (i.e., management is perceived as aggressive), EVT predicts that users will engage in deeper information searching/processing (Burgoon and Burgoon 2001, Clor-Proell 2009). Users provided with the standard quantitative sensitivity disclosure in this study have access to the same net income information as the enhanced disclosure condition; however, deeper information processing and effort is needed on their part in order to incorporate the sensitivity disclosure's effect on net income. Thus, the prior section suggests higher risk assessments among users of the enhanced disclosure. EVT further predicts that users of the standard disclosure will be more likely to engage in this increased effort when their expectations have been violated (i.e., management aggressiveness is high), resulting in higher risk assessments as the effect on net income becomes more salient. Users receiving the enhanced disclosure will already have this information synthesized and presented for them, so the incremental effort may be lower.

However, the principles of EVT also suggest another alternative explanation for users in the high aggressiveness scenario. Since users with violated expectations are

predicted to engage in deeper information searching behavior, and since additional information is not initially available, risk assessments will likely increase for users in this scenario—as predicted in H1. Once this desire for additional information has been sated through additional quantitative disclosure, however, the arousal and distraction caused by the lack of information should subside. In so doing, heightened perceptions of risk may subside as well. However, the high level of risk clearly communicated by the enhanced sensitivity disclosure may counteract this reduction in risk perceptions. Internalizing this increased level of risk when viewing the standard sensitivity disclosure requires additional effort, so the counteracting force of this risk communication may be weaker than for the enhanced disclosure.

Therefore, I predict that when management aggressiveness is high (i.e., an expectation violation), the difference in risk assessment between the standard and enhanced quantitative sensitivity disclosures will *increase*. More specifically, the post-disclosure risk assessment reduction for high management aggressiveness suggested by EVT will be counteracted by the clear communication of risk in the enhanced sensitivity disclosure, thus resulting in *higher* risk assessments for users of the enhanced sensitivity disclosure, relative to the standard sensitivity disclosure. As such, I anticipate the following predicted relationships for my final hypotheses:

H3a: When management aggressiveness is low, there will be no difference in risk assessments for users of the enhanced quantitative sensitivity disclosure, relative to the standard quantitative sensitivity disclosure.

H3b: When management aggressiveness is high, users of the enhanced quantitative sensitivity disclosure will provide higher risk assessments, relative to the standard quantitative sensitivity disclosure

Exploratory Mediation Analysis

In addition to the formal hypotheses outlined above, I also investigate potential mediating variables commonly used in similar studies. Specifically, I test whether users' perceptions of credibility, reliability, and usefulness mediate the interactive relationship between the independent variables (disclosure format and management aggressiveness) and the incremental change in user risk assessments that is predicted in H3a and H3b. In the following paragraphs, I summarize support from prior research for each of these perceptions as potential mediating variables in that relationship. Specifically, I cite research concerning the requirements for effective mediation (Baron and Kenny 1986; Kenny et al. 1998); i.e., that conditions similar to my independent variables could affect each potential mediator, and that each potential mediator could affect the outcome measure, user risk judgments.

Credibility. Mercer (2005) provides a theoretical framework and experimental evidence on how managers' disclosure decisions affect their credibility with investors. She finds that in the short term, more forthcoming disclosures—particularly those conveying negative news—have a positive effect on management's reporting credibility. Also, as noted in the hypothesis development section above, similar research has found that variation in disclosure precision affects credibility judgments (Hassell et al. 1988, King et al. 1990, Hirst et al. 1999; Mercer 2004; Christensen et al. 2013). Further, Clor-Proell (2009) finds that meeting (missing) expectations can lead to increases (decreases) in user perceptions of management credibility, which can then lead to more favorable (unfavorable) investment decisions. The additional disclosures proposed in the current study communicate significant amounts of estimation uncertainty and risk (i.e., negative news), and my management aggressiveness manipulation should lead to user expectations

being missed/met, so similar mediating effects of credibility may also be noted in this study.

Reliability. The FASB defines reliability (now referred to as "representational faithfulness") as information that faithfully represents (i.e., is complete, neutral, and free from error) the phenomena that it purports to represent (FASB 2010a, QC12). Recent research explores the effects of reliability on users' decision making (Frederickson et al. 2006; Maines and Wahlen 2006; Clor-Proell 2010; Kadous et al. 2012). For instance, Clor-Proell (2010) finds that when financial statements contain a column highlighting the effect of changes in fair value on net income, users assess greater differences in reliability between Level 1 and Level 3 fair value inputs. To the extent that management aggressiveness and/or disclosure format increase users' perceptions of reliability in the current study, lower risk may also be perceived as a result.

Usefulness. According the FASB's conceptual framework, information must be both relevant and faithfully represented (i.e., reliable) to be considered useful. "Neither a faithful representation of an irrelevant phenomenon, nor an unfaithful representation of a relevant phenomenon, helps users make good decisions" (FASB 2010a; QC17). Recent research by Christensen et al. (2013) investigates user disclosure preferences under conditions of high uncertainty, and finds that investors consider ranges to be more useful and credible than point estimates. These participants said they preferred the wide ranges because they implicitly communicate risk to the investor. Thus, in my experiment when additional sensitivity range disclosures are provided to participants, increased perceptions of usefulness may result in increased risk assessments.

III. RESEARCH METHOD

Participants

As proxies for informed nonprofessional investors, participants for this study were solicited from students enrolled in two separate M.B.A. programs.[46] As incentive for successfully completing the experiment, participants were given the chance to win one of three $100 gift cards. Using an URL link sent via email, 159 M.B.A. students were requested to participate in the experiment. From those requests, a total of 69 usable responses were obtained (a 43.3 percent response rate).[47,48] Data collection took place during December 2012 and January 2013. Participants have an average of 3.18 years of work experience and are on average 27.1 years old. Eighty-one percent are students in their second year of the program, and 97.1 percent indicate they had previously taken a valuation course.[49] Eighty percent are male. When used as covariates, none of these demographic variables are significant in the analyses performed in the following sections.

Experimental Procedures

Figure 3.1 contains a flowchart highlighting the basic overall design of the experiment and the order of steps undertaken by participants. Each step in the flowchart

[46] Prior research has shown that MBA students are a reasonable proxy for non-professional investors (Elliott et al. 2007), and using both MBA students and graduate students for this type of study is common in the literature (Kennedy et al. 1998; Hirst et al. 1995; Hirst et al. 1999; Maines and McDaniel 2000; Koonce et al. 2005; Mercer 2005; Clor-Proell 2009; Clor-Proell et al. 2012; Hodge et al. 2010; Kadous et al. 2012).

[47] Forty-six of these students (from the same university) were requested to participate on their laptops during an actual class session, thus participation for this set of participants was 100%. For the other university participating in the study, an email with the link was sent to 113 M.B.A. students. Of those who were sent the email, 26 responded (23 percent). One student completed all of the main experimental materials, but then dropped out during the post-experimental questionnaire. Thus, my main analysis uses N=69, while most post-experimental analyses uses N=68.

[48] Pilot testing with 17 MBA, Ph.D., and graduate students was also performed to test the instrument and ensure that the manipulations worked as intended.

[49] In addition to asking about work experience and whether they had previously taken a valuation course, participants also answered 11 questions designed to test their financial literacy. These questions come from a scale developed and tested in a recent paper in the Journal of Financial Economics (van Rooij et al. 2011). Each participant in my study is assigned a financial literacy score based on the number of questions they got right. The average score was 9.26 out of 11, and differences between conditions are not significant.

is numbered for ease of comprehension. In Step 1, participants all received the same background information and a simplified income statement for MC Bank, a hypothetical company.[50] Instructions explain that definitions for key terms highlighted in blue text throughout the instrument (e.g., fair value, "trading" securities, residential mortgage-backed security, etc.) could be obtained by clicking on that term, which resulted in a popup window displaying the definition. The background material describes the basic nature of MC Bank's business and also contains a brief description of one type of financial instrument held as a trading security by MC Bank—a portfolio of residential mortgage-backed securities (RMBS) classified as a Level 3 FVM.[51]

[Insert Figure 3.1 about here]

Following these background materials, all participants viewed a table containing the two significant unobservable inputs used by management in determining the value of the Level 3 RMBS (Step 2). For each significant unobservable input, the table reports the overall industry average used for that input, as well as a column showing the range of input values used by 90 percent of the companies in the industry (i.e., the column has the following label: "90 percent of companies in this industry use inputs within this range"). Next, participants recorded their expectation for each input (Step 2) before being shown the amounts actually used by MC Bank (Step 3).

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[50] A simplified income statement is provided here in the background materials so that participants in the standard quantitative sensitivity disclosure are able to calculate the effects of the sensitivity analysis on net income, thus mitigating any informational differences with the enhanced quantitative sensitivity disclosure condition. Participants were able to access this income statement at any point during the experiment by clicking on a link provided at the top of every page.

[51] Designating the financial instruments as trading securities is important because according to ASC 320, I*nvestments—Debt and Equity Securities*, changes in the fair value of trading securities must be realized in net income. In contrast, changes in fair value for available-for-sale securities can be recognized in both net income and other comprehensive income. A similar disclosure template could also be designed to reflect changes in available-for-sale securities that would flow through other comprehensive income (or could alternatively be included as a separate column in the same enhanced template) instead of the income statement, but this extends beyond the scope of this study.

In Step 3, participants were shown a simplified version of the example disclosure provided in ASC 820-10-55-103, which requires a description of the valuation technique(s) used for all FVMs within Level 3 of the fair value hierarchy, including a quantitative disclosure of all significant unobservable inputs used.[52] As part of this disclosure, participants were again shown the industry averages to enable comparison with management's actual inputs.[53] To reinforce the directional implications of any differences between their expectations and the actual assumptions used, participants were shown a column that displayed the amount of any expectation difference as well as another column explicitly stating whether their expectation difference resulted in a higher or lower income than expected (or the same). Participants in the low aggressiveness condition were shown input values that were identical to the overall industry average in the prior step; participants in the high aggressiveness condition were shown input values that were consistently *lower* than the industry range reported in the prior step.

The qualitative (narrative) sensitivity disclosure is also shown simultaneously with the tabular disclosure of Level 3 FVM inputs used by management (Step 3). In order for the aggressiveness manipulation to work properly during this step, it is important that

[52] In a review of the first of these FVM disclosures in Q1 of 2012, PwC (2012) finds that "most companies in our sample disclosed the inputs in a tabular format that was largely consistent with the example provided in the ASU." Thus, my use of this example as a template for my experimental materials appears externally valid. In the interest of internal validity and experimental control, however, I make a few simplifications to this disclosure. First, my disclosure only contains information about one security (a RMBS) within a single asset class, rather than for aggregated portfolios of similar securities across multiple asset classes. Second, and consistent with the prior simplification, I report the input values as a single point value instead of a range of values used within the portfolio as done in the example from the standard.

[53] It is important to note that providing industry averages is not currently required under the current rules. ASU 2011-04 states, however, that the purpose of this quantitative disclosure of unobservable inputs is "to provide enough information for users to assess whether the reporting entity's views about individual inputs differed from their own and, if so, to decide how to incorporate the reporting entity's fair value measurement in their decisions." I provide participants with the industry averages (meant to act as a reasonable proxy for what an actual user would likely expect) to achieve a certain level of expectation consistency across participants. This allows me to maintain experimental control and helps ensure that the aggressiveness manipulation worked as intended. See footnote 58 below for additional information regarding the rationale for this approach and results highlighting the accuracy of this assumption.

participants understand the directional implications of changes to the significant unobservable inputs. This is precisely the type of information provided by the qualitative sensitivity disclosure required by both FASB and IASB guidance (ASU 2011-04, paragraph BC97). This is particularly important because of the seemingly counterintuitive inverse relationship between the inputs in the case materials and the value of the FVM (i.e., *decreases* in any of the inputs results in a *higher* FVM). Participants then responded to the first set of dependent variable assessments (Step 4), the nature of which I describe in detail below.

Following the dependent variable assessments, participants then either received the standard quantitative sensitivity disclosure mandated by IFRS 13 or the "enhanced" quantitative disclosure that provides sensitivity of net income to changes in inputs (Step 5). Participants then rated the same set of dependent variables for a second time (Step 6).[54] This enables measurement of the incremental effect of the additional disclosure formats and increases power by enabling use of the pretest measures as a covariate in the hypothesis testing models. Participants concluded the experiment by completing a series of debriefing and demographic questions (Step 7), the nature of which are described in the results section below.

Independent Variable Manipulations

Sensitivity Disclosure Format

All participants received the narrative sensitivity disclosure along with the quantitative disclosure of management inputs, while the quantitative sensitivity disclosure format is manipulated between participants (standard or enhanced). The effective date for

[54] The advantages of using the dependent variables as repeated measures in this pretest-posttest design are described in Libby et al. (2002). For instance, the repetition can lead to a favorable demand effect by helping participants to focus on subsequent treatments.

the new FVM disclosure requirements under U.S. GAAP is for periods ending after 12/15/11, so the first of these disclosures are now available for the annual and each quarterly report of 2012. PwC (2012) issued a report in June 2012 providing observations and a detailed analysis on how these new disclosures were implemented across a sample of 37 companies. In that analysis, PwC finds that the majority of companies use the example language provided in ASC 820-10-55-106 for their qualitative (narrative) sensitivity disclosure. As such, I use this same example template for my own manipulation.

It is important to note, however, that the narrative sensitivity disclosure required by U.S. GAAP—which is essentially only a directional disclosure, rather than an actual sensitivity disclosure of potential changes to the FVM inputs—contains much less information than the quantitative sensitivity disclosure required by IFRS. This informational discrepancy creates an inherent confound between disclosure format (i.e., narrative versus quantitative) and the amount of information provided to users (i.e., are observed differences in the dependent variables due to format differences, or can they instead be attributed to differences in the amount of information provided?). I intentionally keep this design, however, to maintain external validity and to enable me to empirically test preparer criticisms found in ASU 2010-06 and ASU 2011-04—namely, that the additional quantitative sensitivity disclosure required by IFRS would not provide any benefits to users. External validity is therefore given preference over internal validity for this within-subjects variable. Information between the two between-subjects quantitative sensitivity conditions, however, remains constant.

I manipulate the narrative sensitivity disclosure as a within-participants variable for purposes of external validity and participant efficiency, which enables more powerful analysis of this condition. The disclosure requirements of IFRS 13 require both a qualitative *and* quantitative sensitivity disclosure, so maintaining a condition where participants receive only the quantitative sensitivity disclosure lacks external validity and is inefficient. This within-participants design also helps control for the informational discrepancy problem inherent in comparing the proposed qualitative sensitivity disclosure to the quantitative sensitivity disclosure conditions. The natural confound here is that the causation for any differences between these conditions cannot be disentangled between disclosure format and informational discrepancies (since the quantitative disclosure, by its proposed nature, inherently has more information). By keeping this condition as a within-participants variable, I ensure that all participants receive the same information (i.e., informational discrepancies will only occur within participants, rather than between participants).

The requirement to provide a quantitative sensitivity analysis under IFRS is already effective under the newly effective IFRS 13 standard (as well as its predecessor, IFRS 7), so examples of these disclosures are already available. I performed an informal survey of public companies using IFRS for these disclosures and found that companies vary greatly—in extent, nature, and format—in how this sensitivity analysis is disclosed. Since firms have not yet appeared to coalesce around a common "best practice" for this required disclosure, there is likely a wide range of templates that could be considered externally valid. For my experimental materials, I use a simplified quantitative sensitivity

disclosure that draws from several of these examples to show potential changes in FVMs resulting from using reasonably possible alternative Level 3 inputs.[55]

In addition to testing the qualitative and quantitative sensitivity disclosures already mandated by U.S. GAAP and IFRS, I also test an enhanced quantitative sensitivity disclosure that includes and integrates potential changes to net income as a result of reasonably possible changes to the FVM inputs. This suggestion has its roots in recommendations made in the FASB's Financial Statement Presentation Project (FASB 2008) as well as in related research that investigates various suggestions from that project (e.g., Clor-Proell 2010; Hodge et al. 2010). In order to ensure greater external validity, I have designed this enhanced condition to be similar to the quantitative sensitivity disclosure of companies who are already voluntarily reporting using a similar enhanced format (e.g., Barclays 2012).[56] Similar to the Barclays PLC disclosure, my enhanced disclosure format contains two extra columns showing the income effect of possible favorable and unfavorable changes to the FVM inputs. To help make the relative size of the change to net income more salient, I also include the percentage change in net income in parenthesis alongside the actual dollar change.

It is also worth noting that ASU 2011-04 already contains a disclosure requirement for *actual* gains and losses recognized in income during the year for Level 3

[55] Consistent with these examples, I use the phrase "Range Of Reasonably Possible Alternative Fair Value Estimates" in my experimental materials to describe the range of estimation uncertainty. Although this phrase is more typical of the language use in IFRS 13, similar language is also used in ASU 2011-04—e.g., "range of fair values (exit prices) that reasonably could have been measured in the circumstances as of the measurement date" (ASU 2011-04, BC 94). It is also important to note that the phrase "reasonably possible" is not necessarily synonymous with the phrase's more common usage for contingent liabilities in SFAS 5 or material weaknesses in AS 5. The general concept of probability implied by the phrase, however, is consistent with its usage in my experiment.

[56] A review of several large public companies reporting under IFRS (and thus subject to quantitative sensitivity disclosure requirements) revealed that some companies, such as Barclays PLC and HSBC, are already voluntarily reporting using a similar enhanced format. These voluntary disclosures were used in designing the enhanced format used in the experimental materials.

FVMs. While similar, my proposed enhanced quantitative sensitivity disclosure instead discloses the *potential* changes to the FVM and net income had reasonably possible alternative Level 3 inputs been used instead. Participants in all conditions of my experiment have access to an income statement, and thus have the information necessary to compute this income effect.[57]

Management Aggressiveness

Management aggressiveness is manipulated by varying whether or not participants' expectations regarding the Level 3 FVM inputs used by management are met. As explained in the experimental procedures section, participants' expectations are established by showing an overall industry average for each input (held constant across conditions) prior to seeing the actual input values used by management (manipulated across conditions). Prior research follows a similar approach for manipulating participant expectations and highlights the importance of setting these expectations *prior* to seeing actual results (Clor-Proell 2009). Participants in the low aggressiveness condition were shown input values that were identical to the overall industry average, while participants in the high aggressiveness condition were shown input values that were consistently below the average industry range. Because participants are asked to record their expectations prior to seeing the actual choices of management, the magnitude of the expectation mismatch is measured as a continuous variable.[58]

[57] As noted above, maintaining information parity between conditions is an essential feature of the experiment. By maintaining experimental control through information parity, I am able to attribute my results to only those variables I intentionally manipulate—i.e., management aggressiveness and presentation format.

[58] I expected that participants would use the overall industry averages in forming expectations about MC Bank's input assumptions. Requiring participants to explicitly record their expectations is designed to make their expectations more salient in their minds, and also has the added benefit of acting as a validation check for this assumption. When calculating the total difference between expected and actual inputs across both

Dependent Variables

One of the primary research questions motivating this study is which sensitivity disclosure format is most successful at communicating the high level of risk inherent in FVMs with high estimation uncertainty. As such, the primary dependent variable used for hypothesis testing is the level of risk assessed by participants. This study focuses specifically on a scenario involving high estimation uncertainty, so my experiment is designed such that significant amounts of risk exist in the scenario presented in the experimental materials. Thus, I generally make the assumption throughout the study that *higher* risk assessments are also more *accurate* assessments. Using a nine-point scale, participants are asked to assess the risk associated with MC Bank's RMBS portfolio with the endpoints of the scale labeled "Not at all Risky" and "Very Risky," with a midpoint labeled "Moderately Risky." Participants responded to the same dependent variable questions twice during the instrument—once after seeing the baseline narrative sensitivity disclosure (Step 4: *RISK_NARRATIVE*), and again after seeing the quantitative sensitivity disclosure (Step 6: *RISK_QUANT*)—so the magnitude of the change in each response is used to measure the incremental effect of each disclosure format (e.g., *RISK_DIFFERENCE*).

This repeated measure design allows me to test the above hypotheses using both the raw risk scores (e.g., by comparing mean scores across conditions), as well as by examining the *incremental* change in risk (*RISK_DIFFERENCE)*. H1 examines participants' initial risk assessments, so I test this hypothesis by performing a t-test of mean *RISK_NARRATIVE* assessments across aggressiveness conditions. I test H2 using a

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inputs, the mean difference was 5.18 (standard deviation 12.64). Thus, user expectations were slightly more conservative than the industry averages ($p<0.001$).

paired-sample t-test that compares *RISK_NARRATIVE* to *RISK_QUANT*, to test whether user risk assessments change significantly after viewing the quantitative sensitivity disclosures. Hypotheses 3a and 3b predict an interaction between my independent variables, so I use an ANOVA model of *RISK_DIFFERENCE* to test this relationship. I then use planned comparison testing to analyze the specific directional predictions of this interaction.

I also collected other important user judgments (reliability, credibility, and usefulness), consistent with prior research on investor judgments. These variables are candidate mediators of the association between management aggressiveness/disclosure and user risk judgments, considered in the supplemental analysis section of the paper. To measure the construct of perceived reliability, I followed the approach taken by Frederickson et al. (2006) and Clor-Proell (2009) by first providing participants with the FASB's definition of reliable information: "information that is verifiable, reflects a business' activities in an unbiased manner, and is measured with little uncertainty." The variable *RELIABILITY* is the participants' rating of the reliability of MC Bank's reported net income using a nine-point scale labeled with the endpoints "Not at all Reliable" and "Very Reliable," with a midpoint labeled "Moderately Reliable."

To measure credibility judgments, I once again followed the approach taken by Clor-Proell (2009) by using a six-item scale based on prior research by Tan et al. (2002) and developed by Mercer (2005). These six items complete the following phrase: "I believe MC Bank's management…" (1) is knowledgeable, (2) may *not* be competent, (3) is qualified, (4) is trustworthy, (5) is honest, and (6) may *not* be forthcoming. Each item is rated on a nine-point scale labeled "Strongly Disagree" and "Strongly Agree," with a

midpoint labeled "Neither Agree nor Disagree." I then use factor analysis to test whether all items load on a single factor or represent multiple constructs. As described in the results section, the items load onto two separate constructs, which I use to create the variables *COMPETENCE* and *TRUST*.

My final user judgment variable represents participant's perceptions of usefulness. I include this variable to directly test the assertion of preparers who commented to the FASB that an additional quantitative sensitivity disclosure would "not provide useful information" and would provide "little, if any, benefit to users" (ASU 2011-04; ASU 2010-06). User assessments of this variable, combined with the other dependent variables collected, provide direct evidence regarding this claim. The variable *USEFULNESS* is participants' response to a rating of the usefulness of the disclosure information about the RMBS portfolio provided by MC Bank, using a nine-point scale labeled with the endpoints "Not At All Useful" and "Very Useful," with a midpoint labeled "Somewhat Useful."

IV. RESULTS

Manipulation Checks

After completing the main experiment, participants completed a post-experimental questionnaire (Step 7) containing manipulation check questions designed to assess whether they understood the case and internalized the intended manipulations. Results of these manipulation check questions are discussed in this section. Additional robustness testing using the results of these manipulation check questions is discussed in the sensitivity analysis section below.

Management Aggressiveness Manipulation

To test the aggressiveness manipulation, I asked participants directly whether the FVM assumptions used by MC Bank management were aggressive, using a nine-point scale with endpoints labeled "Strongly Disagree" and "Strongly Agree." Results show that the mean response in the high aggressiveness condition is greater than in the low aggressiveness condition (6.77 vs. 4.39; $p<0.001$). I also asked: "In general, the [FVM] assumptions used by management of MC Bank met my expectations" using a nine-point scale with endpoints labeled "Strongly Disagree" and "Strongly Agree." Results show that the mean response in the low aggressiveness condition is significantly higher than in the high aggressiveness condition (5.33 vs. 3.80; $p=0.001$). I also asked participants to indicate how surprised they were after being shown the actual inputs used by management (Step 3), using a nine-point scale with endpoints labeled "Not at all surprised" and "Very Surprised" (with a midpoint labeled "Neutral"). Results show that the mean response in the low aggressiveness condition is significantly lower than in the high aggressiveness condition (3.27 vs. 6.72; $p<0.001$). These results indicate that the aggressiveness manipulation was successful.

Sensitivity Disclosure Format

I checked the manipulation of sensitivity disclosures through the following question: "In a previous screen, the Company provided a sensitivity disclosure showing the range of reasonably possible alternative fair value estimates. Did this disclosure also display the numerical effect of these alternate estimates on the Company's net income?" Only 69.1 percent answered the question correctly, based on their experimental

condition.[59] For this and other manipulation check questions discussed below, I include all participants in the reported results for my main analysis. I perform additional robustness testing based on reduced participant bases in the sensitivity analysis section below.

Other Manipulation Check Questions

Internalizing the management aggressiveness and disclosure format manipulations is a key component of the experiment, but it is also important that participants understand the directional implications of changes to the significant unobservable inputs (i.e., decreases in any of management's inputs results in a higher FVM). To test their knowledge of this inverse relationship, I asked participants to complete the following statement: "A decrease in management estimates for probability of default or loss severity would results in a _____ fair value measurement for the RMBS portfolio." Seventy-eight percent of participants correctly selected "higher" as their answer.

The experimental instrument was carefully designed so as to maintain information parity between conditions—i.e., the information necessary to calculate the additional disclosures found in the enhanced disclosure was also readily available to those in the standard disclosure condition. This assumes that participants were *capable* of calculating these disclosures, so a brief hypothetical scenario was given in the post-experimental questionnaire to explicitly test this assumption. I gave participants a very basic income statement (total income of 1000, total expenses of 600, and net income of 400) for a hypothetical Company XYZ and told them: "All of Company XYZ's investment assets are recorded at fair value on the Company's balance sheet. All changes in the fair value

[59] When examined further by experimental condition, 74.2 percent of those in the standard condition answered correctly, while only 64.9 percent in the enhanced condition answered correctly (no difference; p=0.415).

estimate are realized immediately in net income." I then asked the following question: "In the above scenario, if the recorded value of the investment assets were to increase from 100 to 140, what would be the result on net income? (For simplicity, ignore any income tax consequences of this increase.)" The four response options were 10% increase (decrease) and 4% increase (decrease). Only 50 percent of participants selected the correct answer (10% increase), although 80.9 percent answered the correct *direction*. Interestingly, of the 13 participants who answered the direction incorrectly, only four (30.8 percent) also missed the question testing their understanding of the inverse relationship discussed in the prior paragraph. This suggests that the incorrect answers here may be more related to fatigue because of the question's placement at the end of cognitively demanding instrument, rather than a fundamental misunderstanding of the nature of the inverse relationship. Furthermore, any potential random error caused by fatigue and/or lack of attention likely biases *against* supporting the research hypotheses.

Hypothesis Testing

Table 3.1 shows the main descriptive results of my experiment. Recall that participants responded to each dependent variable measure twice—once *before* receiving the quantitative sensitivity disclosure (Step 4: *RISK_NARRATIVE*), and once after (Step 6: *RISK_QUANT*). Panel A provides descriptive statistics by experimental condition for both *RISK_NARRATIVE* and *RISK_QUANT*. Panel B provides descriptive statistics by experimental condition for *RISK_DIFFERENCE*, which is calculated as the difference between *RISK_QUANT* and *RISK_NARRATIVE*.[60] Graphical results of risk assessment responses for each condition are shown in Figure 3.2, Panels A and B.

[60] *RISK_DIFFERENCE* captures the *incremental* effect of the disclosures on users' risk assessments, thus it is my primary dependent variable of interest in this study. Subtracting *RISK_ASSESSMENT* in this measure

[Insert Table 3.1 about here]

[Insert Figure 3.2 about here]

Hypothesis 1 predicts that users in the high aggressiveness condition will have higher risk assessments, relative to users in the low aggressiveness condition. As seen in Table 3.1, Panel A, *RISK_NARRATIVE* (i.e., the mean participant risk assessment in Step 4 *before* being shown the additional quantitative sensitivity disclosure) in the low aggressiveness condition is significantly lower than in the high aggressiveness condition (5.70 vs.7.06; $p<0.001$), consistent with H1.[61] This provides convincing evidence that management aggressiveness increases risk assessments when only the narrative sensitivity disclosure is provided.[62]

Hypothesis 2 predicts that user risk assessments between the narrative sensitivity disclosure (Step 4: *RISK_NARRATIVE*) and the standard quantitative sensitivity disclosure (Step 6: *RISK_QUANT*) will be significantly different. Descriptive results of this comparison are shown in the final two columns of Table 3.1, Panel A. When examining only those in the standard disclosure condition (N=31), results of a paired-sample t-test show that *RISK_NARRATIVE* is higher than *RISK_QUANT* (6.55 vs. 5.90; $p=0.054$, two-tailed), consistent with H2. Thus, the additional information provided to participants in the standard disclosure condition is associated with *reduced* risk

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also helps to eliminate statistical error in my analysis by essentially allowing the variable to act as a covariate in my statistical analysis.

[61] Although not specifically hypothesized, a comparison of RISK_QUANT (i.e., mean risk assessments in Step 6 *after* being shown the additional quantitative sensitivity disclosure) shows no difference associated with management aggressiveness (6.15 vs. 6.08; $p=0.43$, one-tailed).

[62] Although the benchmarking data not typically provided to users may have influenced the *magnitude* of this risk assessment increase, the *direction* of this tendency is unlikely to change without this additional information. Most informed users would likely have prior expectations similar to those established by the industry averages provided in the benchmarking data, so these results should maintain sufficient external validity.

assessments, indicating a potential unintended consequence of this form of disclosure.[63] As the scenario evaluated by participants has significant amounts of estimation uncertainty and risk, user risk assessments appear to be less accurate after viewing the standard sensitivity disclosure.

Hypotheses 3a and 3b predict the interaction between management aggressiveness and sensitivity disclosure format, the overall results of which are tested in the ANOVA model shown in Table 3.2, Panel A. I am primarily interested in examining the *incremental* effect of observing each disclosure format, as it controls for error created by individual participant variance, so I use *RISK_DIFFERENCE* as my dependent variable in this analysis. ANOVA results show a significant interaction ($p=0.017$) as well as significant main effects for both management aggressiveness ($p<0.01$) and disclosure format ($p=0.05$). Although the ANOVA results show a significant main effect for disclosure format, the interpretation of this main effect is useful only insofar as it relates to the significant interaction. Thus, H3a and H3b further examine the effects of disclosure format by examining each aggressiveness condition separately.

[Insert Table 3.2 about here]

Hypothesis 3a predicts that when management aggressiveness is low, there will be no difference in risk assessments for users of the enhanced quantitative sensitivity disclosure, relative to the standard quantitative sensitivity disclosure. As seen in Table 3.2, Panel B, planned comparison results show that *RISK_DIFFERENCE* is not statistically different between these conditions (0.39 vs. 0.53; $p=0.63$, two-tailed),

[63] Although not specifically hypothesized in the paper, I also apply the same paired-sample t-test to responses in the enhanced disclosure condition. The mean risk assessment before and after seeing the enhanced disclosure is exactly the same at 6.29. Thus, reduced risk assessments are not observed after viewing the enhanced sensitivity disclosure. As shown in the upcoming interaction discussion, however, the introduction of management aggressiveness provides a more nuanced understanding of this effect.

supporting H3a.[64] Thus, the enhanced sensitivity disclosure does not appear to have any incremental effect on user risk assessments when management aggressiveness is perceived as low.

In contrast, Hypothesis 3b predicts that when management aggressiveness is high, users of the enhanced quantitative sensitivity disclosure will provide *higher* risk assessments, relative to the standard quantitative sensitivity disclosure. As seen in Table 3.2, Panel B, planned comparison results show that *RISK_DIFFERENCE* is significantly higher for the enhanced disclosure than for the standard disclosure (-0.35 vs. -1.75; p=0.01, one-tailed), supporting H3b. However, even though *RISK_DIFFERENCE* is higher in the enhanced disclosure condition, it is important to note that *RISK_DIFFERENCE* is still less than zero in this condition (p=0.03, one-tailed). This suggests that even though the enhanced disclosure appears to be more effective than the standard disclosure at communicating the high level of inherent risk to users under conditions of high management aggressiveness, participants still *lowered* their risk assessments marginally after seeing the enhanced disclosure.[65] Further interpretation of this relationship is discussed in detail in the upcoming supplemental analysis section.

Sensitivity Analysis

In this section, I test the robustness of hypothesis testing results to removal of participants who failed the manipulation checks for: (1) understanding the inverse relationship between assumptions used and income; and (2) calculation of the income

[64] Graphical results of this relationship are shown in Figure 3.2, and descriptive results are shown in Table 3.1, Panel B.

[65] Although not specifically hypothesized, similar results are noted for measures of *USEFULNESS* taken during the study. Somewhat surprisingly, when management aggressiveness was high, participants considered the standard disclosure to be significantly more useful than the enhanced disclosure (5.69 vs. 4.35; p=0.05).

effect when shown a change in a fair value asset.[66,67] Of the 68 participants who answered these questions, 15 (22.1 percent) missed the inverse relationship question, 13 (19.1 percent) missed the income effect question, 24 (35.3 percent) missed at least one of the two questions, and only four (5.9 percent) missed both questions. For my robustness testing, I take the conservative approach of eliminating all 24 participants who missed either question.

Overall, hypothesis testing results are robust to removing these respondents from the analysis. For H1, I still find that *RISK_NARRATIVE* is significantly higher in the high aggressiveness condition, relative to low aggressiveness ($p<0.01$). The paired-sample t-test used to test H2 still finds that participants using the standard disclosure have lower risk assessments, relative to the initial narrative disclosure ($p=0.023$, one-tailed). I also still find a significant interaction in the ANOVA model supporting H3a and H3b ($p=0.04$). Furthermore, when management aggressiveness is low in H3a, I still find no difference in *RISK_DIFFERENCE* between disclosure conditions ($p=0.63$). And finally, when management aggressiveness is high in H3b, I still find that *RISK_DIFFERENCE* is significantly higher for the enhanced disclosure, relative to the standard disclosure ($p=0.01$). Thus, it appears that my results are robust to any concerns relating to the failed manipulation check questions.

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[66] Approximately 30 percent of participants also missed the manipulation check question asking participants whether they saw the additional column provided in the enhanced condition. As discussed above though, any error resulting from this result likely biases me *against* findings. In support of this assertion, I find that in most cases, removing these participants actually results in *increased* significance in my hypothesis testing results.

[67] For this final manipulation check question, my primary concern is whether participants were capable of calculating the *directional* implications of the income effect based on the hypothetical scenario given, and not necessarily the exact percent. As such, I only drop those participants who answered the direction wrong for the sensitivity results reported here. Sensitivity results are qualitatively similar when dropping all participants missing this question.

Supplemental Analysis

Credibility Factor Analysis

One of the supplemental user judgment variables collected during Step 4 and Step 6 of the experiment measures the construct of credibility using a six-item scale based on prior research (Mercer 2005; Clor-Proell 2009). Although this prior research uses factor analysis to test the appropriateness of collapsing the six credibility questions into a single credibility measure, my own factor analysis on these six items finds that participant responses instead load strongly on *two* separate factors with eigenvalues greater than one.[68] This result supports Mercer's (2005) intentional development of the scale as a measure of two separate constructs—management competence and management trustworthiness. Furthermore, defining credibility as comprising both competence and trustworthiness is consistent with accounting standards and prior related literature (Bamber 1983; Hirst 1994; Haynes 1999, 2002; PCAOB 2007). Thus, I separate credibility into these two distinct constructs for my analysis in this section.

Credibility questions 1 through 3 ask participants to assess management's competence, knowledge, and qualifications for providing financial disclosures. These questions comprise the construct of competence, and a reliability analysis of participant responses across these three questions yields a Cronbach's alpha of 0.71—suggesting that the scale is reliable (Nunnally 1978, 245). Credibility questions 4 through 6 focus on investors' perceptions of management's trustworthiness, honesty, and truthfulness in its financial disclosures. These questions comprise the second construct of trustworthiness,

[68] Questions two and six were negatively framed, so I reverse-code these responses for my analysis.

and a reliability analysis of participant responses on this scale yielded a Cronbach's alpha of 0.75—suggesting that this scale is reliable as well.[69]

I use factor analysis to verify the constructs represented by the six-item scale, but for purposes of further analysis I form a composite measure for each construct by averaging the responses from the underlying questions.[70] The resulting variables—*COMPETENCE* and *TRUST*—are used in the mediation analysis described in the following section.

Mediation Analysis

As described in the above review of the literature, the relationship between the detected interaction of management aggressiveness/disclosure format and *RISK_DIFFERENCE* may be mediated by other factors such as perceptions of management's credibility (now examined separately as *COMPETENCE* and *TRUST*), *RELIABILITY*, and *USEFULNESS*. To formally test this possibility, I follow the four-step procedure outlined by Baron and Kenny (1986) and Kenny et al. (1998) to test the potential mediating effect of each of the supplemental user judgment variables.[71,72] Because some of these variables contain non-integer and negative values, I use regression

[69] The six credibility questions were asked twice in my experiment – once before the additional disclosures, and once after. As such, I perform a factor analysis on each set of questions separately. For clarity of exposition, I only discuss the results of the second set here. The first set also loaded cleanly on the same two factors, and Cronbach alpha scores for each were also both above 0.7.

[70] Given the repeated measure approach employed in this study, using a composite measure (as opposed to factor scores) provides for a cleaner analysis and is methodologically preferable. Other similar studies also use composite scores based on raw responses rather than factor scores resulting from a factor analysis. For instance, the study from which the six-item scale was derived (Mercer 2005) uses a composite score of the underlying items rather than factor scores.

[71] Before proceeding with the mediation analysis, I tested for collinearity to verify that each of these variables captures a separate construct. In general, collinearity is considered an issue with VIFs greater than 10, tolerance levels lower than 0.10, and/or a condition index greater than 30. Amongst the variables used in my mediation analysis, the highest VIF was 2.35, the lowest tolerance was 0.43, and the highest condition index was 3.62. Based on these results, collinearity does not appear to be an issue in my analysis.

[72] Consistent with the approach used in my main analysis, I use the *change* in each of the variables from Step 4 to Step 6 for the mediation analysis.

models rather than ANOVA for this analysis. Results of the mediation analysis are displayed in Table 3.3.

[Insert Table 3.3 about here]

In the first step, I confirm that the interaction of management aggressiveness and disclosure format is significantly related to changes in participant's risk assessments (p=0.017).[73] In Step 2, each potential mediating variable is replaced as the dependent variable in this analysis. The interaction term is significant in the model whose dependent variable is *TRUST* (p=0.05), marginally significant for *RELIABILITY* (p=0.08) and *COMPETENCE* (p=0.10), and not significant for *USEFULNESS* (p=0.32). This indicates *USEFULNESS* is no longer a potential mediator, and thus drops out of the analysis. In Step 3, results show that changes in participants' risk assessments are significantly associated with changes in the remaining mediating variables ($p<0.01$ for each).

In Step 4 (the final column of Table 3.3), the mediating variable is added to the primary Step 1 model as a covariate. Step 4 results show that the interaction term is still significant for *COMPETENCE* and is marginally significant for *TRUST* and *RELIABILITY*, indicating that full mediation is not achieved. However, the significance of the interaction term decreases for each model, suggesting at least partial mediation. I used the SUEST procedure in STATA to measure whether the coefficients on the interaction term in Step 4 are significantly lower than those in Step 1. Chi-square test results confirm that the Step 4 interaction coefficient is significantly lower than the Step 1 interaction coefficient for *COMPETENCE* (χ^2=7.62, p=0.02), *TRUST* ((χ^2=7.71, p=0.02), and *RELIABILITY* ((χ^2=7.02, p=0.03), suggesting partial mediation. In summary, the

[73] This regression model essentially replicates the ANOVA model shown in Table 3.2, Panel A.

relationship between participant risk responses and the independent variables' interaction appears to be partially mediated by *COMPETENCE, TRUST*, and *RELIABILITY*.[74]

Mediation results were strongest for *TRUST*, and so I show graphical results of changes in *TRUST* for each experimental condition in Figure 3.3, Panel A. This graph is helpful in interpreting the mediating effect of *TRUST*, particularly when compared against the graph showing *RISK_DIFFERENCE* in Figure 3.2, Panel B. Focusing first on the *TRUST* graph, we see that participants in the enhanced disclosure condition did not significantly change their *TRUST* assessments after seeing the additional enhanced disclosure (p= 0.82). That is, they continued to give significantly lower *TRUST* assessments in the high aggressiveness condition, as compared to the low aggressiveness condition.[75] In contrast, those in the standard disclosure condition significantly *increased* their *TRUST* assessments after seeing the standard disclosure (p=0.01). When compared to the *RISK_DIFFERENCE* graph in Figure 3.2, Panel B, it appears that the *higher TRUST* perceptions lead to *lower RISK_DIFFERENCE* in the standard condition. The mediation results in Table 3.3 support this assertion.

[Insert Figure 3.3 about here]

Post-Experimental Debriefing

In this section, I analyze participant responses to the post-experimental debriefing questions (Step 7) administered after the main body of the experiment was completed.

[74] When all three of these mediating variables are simultaneously added to the primary model, the interaction term is no longer significant (p=0.15), suggesting a full mediation.

[75] Descriptive results for the *TRUST* assessments are not tabled. Prior to seeing the quantitative sensitivity disclosure (i.e., Step 4), the average *TRUST* assessment for high (low) aggressiveness was 3.80 (5.69) (p<0.01). For participants in the standard disclosure condition, the average *TRUST* assessment in Step 4 for high (low) aggressiveness was 3.52 (4.49) (p=0.05).

Expectation Violations Theory

As discussed earlier, the core propositions of EVT are that: (1) people develop expectations primarily based on social norms; (2) violations of expectations lead to arousal and distraction, leading to deeper information processing and information-seeking behavior to make sense of the violation; and (3) "positive violations produce more favorable outcomes and negative violations produce more unfavorable ones relative to expectancy confirmation" (Burgoon et al. 1995; Burgoon and Burgoon 2001). Regarding the first point, I established participants' expectations by reporting industry averages (i.e., social norms) for each management assumption used in valuing the RMBS. As evidence of the success of this manipulation, participants responded that they were less surprised and that their expectations were met more fully in the low aggressiveness condition (when industry norms were followed), relative to the aggressiveness condition (see the manipulation check section above for further analysis of these questions).

To investigate the second proposition of EVT, I asked the following question: "Given the opportunity in a real investment situation, how likely would you be to look for additional information about the details of MC Bank's RMBS fair value measurement?" On a nine-point scale ranging from "Not at all likely" to "Very likely," the average response was 6.19 (with a standard deviation of 2.42), and no significant differences were noted between any of the experimental conditions. Recall, however, that participants were predicted to exhibit heightened information searching behavior after seeing the narrative disclosure (Step 4), but then largely have this desire for additional information resolved after seeing the quantitative sensitivity disclosures. Due to concern that asking this question in Step 4 before giving the standard or enhanced disclosure could create a strong demand effect, this debriefing question was asked in the post-experimental

questionnaire (i.e., *after* seeing the additional disclosure). While this leaves the information-searching behavior component of EVT only partially tested, the results of this question are consistent with my predictions. That is, because there are no differences between conditions, any need for heightened information search appears to have been satisfied at that point.

In the third proposition of EVT, negative expectation violations are predicted to produce more unfavorable outcomes relative to expectancy confirmation. In the present context, a more unfavorable outcome is interpreted as a higher risk assessment for MC Bank. As shown in my testing of H1, risk assessments were found to be significantly higher when a negative expectation violation occurred (i.e., the high aggressiveness condition), relative to when expectations were met ($p<0.001$). In summary, each of the key propositions of EVT appears to be supported by my experimental results.

Other Debriefing Questions

After being asked if the quantitative disclosure showed the effect of the alternate estimates on net income, I asked participants the following question: "In responding to questions about the sensitivity disclosure, did *you* consider the effect of these reasonably possible alternative fair value estimates on the Company's net income?" In the standard disclosure condition, 67.7 percent answered yes compared to 75.7 percent in the enhanced condition; however, the difference is not significant ($p=0.48$, two-tailed).

For those who answered yes to the above, I then asked the following question: "In your judgment, how significant was the effect of these reasonable possible alternative fair value estimates on net income?" I expected the enhanced disclosure to better communicate the significance of this possible range on net income, but again no

significant differences between conditions are found here. On a nine-point scale ranging from "Not at all significant" to "Very significant," the average response was 6.41 (standard deviation 1.55). The average response here is somewhat surprising given that the reported reasonable range could fluctuate income by as much as 15 percent in either direction.

Even though the main results of this study suggest that the enhanced disclosure better communicates high estimation uncertainty to users under conditions of high management aggressiveness, the results of both of these debriefing questions suggest that users still may not be entirely conscious of the high inherent risk present in these situations.

V. CONCLUSION

This study investigates the effects of disclosure format and management aggressiveness on users' risk assessments when evaluating a high-uncertainty FVM. I perform a 2x2 experiment with 69 MBA student participants, acting as proxies for informed nonprofessional investors, to investigate which of three disclosure formats most effectively communicates the risk of high-uncertainty FVMs to users. The quantitative sensitivity disclosure (a standard format as mandated under IFRS, or my enhanced version that also displays the impact on net income) and management aggressiveness (high or low) were manipulated between conditions, while a narrative sensitivity disclosure format (currently required under both U.S. GAAP and IFRS) was tested as a within-participants variable. As predicted, results show that the enhanced disclosure condition was more effective than the standard condition at communicating risk to users under conditions of high management aggressiveness. Surprisingly though, the narrative

disclosure resulted in the highest user risk assessments when management was aggressive in their assumptions. Under conditions of high management aggressiveness, users actually significantly *decreased* their risk assessments after viewing the standard quantitative disclosure.

Results of my study support EVT, which provides a possible explanation for this phenomenon. This theory predicts that an expectation violation (i.e., high management aggressiveness) leads to a heightened state of information-seeking behavior; this agitated state is left unsatisfied by the paucity of information in the initial narrative disclosure. In light of the violated expectation, and without the additional information they seek, I find that users significantly increase their risk assessments at this stage, as compared to when expectations are met (i.e., low management aggressiveness). After users then receive either the standard or enhanced quantitative sensitivity disclosure, the desire for additional information is satisfied, and risk assessments then significantly decrease. Consistent with this explanation, I find that *TRUST, COMPETENCE*, and *RELIABILITY* at least partially mediate the relationship between risk assessments and the interaction of management aggressiveness and disclosure format. These results suggest that perceptions of management trustworthiness and competence, as well as financial reporting reliability, *increase* as a result of providing the standard FVM disclosures, leading to a *decrease* in risk assessments despite management's aggressive choice of input values. When provided with the enhanced FVM disclosure, results show no incremental change in perceptions of trustworthiness, competence, or reliability, and user risk assessments remain largely unchanged.

In sum, my results suggest that the additional risk associated with management's aggressive choice of inputs is more clearly communicated by the enhanced disclosure. This appears sufficient to counteract the tendency for users to increase their perceptions of trust, competence, and reliability observed in the standard disclosure condition. This explains why user risk assessments are found to remain largely unchanged after viewing the enhanced disclosure, but decrease after viewing the standard disclosure.

The appropriate nature of FVM sensitivity disclosures has been the subject of much debate in recent years. IFRS has opted for the more aggressive quantitative sensitivity disclosure, while U.S. GAAP still only requires a basic narrative "sensitivity" disclosure. Although the FASB has also proposed a quantitative sensitivity disclosure requirement, significant preparer opposition—including claims that such disclosures would provide no useful information to users—led the FASB to withdraw the proposal to allow for future consideration at a later time. Given the current discrepancy that exists between U.S. GAAP and IFRS, and the current debate on the appropriate nature of required FVM sensitivity disclosures, the results of this study have timely, relevant, and important policy implications. My results suggest that the standard quantitative sensitivity disclosure being considered by the FASB, and currently required under IFRS, may have the unintended consequence of *decreasing* users' risk assessments under conditions of high management aggressiveness. The additional columns highlighting income effects in the "enhanced" quantitative disclosure that I propose and test appears to at least partially counteract this tendency, thus providing increased benefit to users at little incremental cost. As such, the FASB and IASB should consider these results as they

further debate the best way to communicate the risk of high estimation uncertainty through FVM sensitivity disclosures moving forward.

Results of this study also contribute to the current discussion surrounding the FASB's Disclosure Framework Project, which seeks to improve disclosures by more clearly communicating information considered most important to users. Furthermore, my results extend the existing literature investigating the effectiveness of financial statement disclosures and presentation format at communicating information and risk to users. And lastly, this study responds to calls for additional research in the area of fair values in general (Kinney 2005; Martin et al. 2006; Bratten et al. 2013), and provides evidence regarding whether additional fair value disclosures can help mitigate some of the major concerns currently being debated in the fair value area (Bell and Griffin 2012; Christensen et al. 2012; Bratten et al. 2013; Cannon and Bedard 2013).

This study, like any, is subject to limitations. For instance, participants received benchmarking data not typically provided to users in order to maintain experimental control and to ensure consistency of input expectations across participants. Although the stated purpose of the input disclosures is to allow users to compare their input expectations to management's actual inputs, the increased salience of explicitly providing and highlighting expectation differences may serve to bias participant responses to a certain degree. This limitation is partially mitigated, however, by the repeated measure design of my study. I am primarily interested in comparing the enhanced and standard formats using the *incremental* change in risk assessments after seeing the additional quantitative disclosures, so any bias that may be introduced by influencing expectations using the benchmarking data should be largely controlled for in this measure.

Another limitation is that the narrative disclosure required under U.S. GAAP contains much less information than the corresponding quantitative disclosure provided under IFRS. While mirroring this situation in my experiment ensures greater external validity, a natural confound arises that makes it impossible to disentangle the simultaneous effects of *information* and *format* differences. I partially control for this threat to internal validity by making the narrative disclosure a within-participants variable; I also ensure that information parity exists in the between-subjects standard and enhanced disclosure conditions. In light of this limitation, one related suggestion for future research would be to hold the narrative format constant, while only manipulating the degree of information. In other words, the information contained in my experiment's quantitative disclosure condition could instead be communicated to users using the narrative format. Combining the additional risk information contained in the quantitative disclosure with the more cognitively accessible narrative format may be more effective at communicating risk to users. Given that the narrative condition in my study resulted in the highest user risk assessments, future research in this area is warranted.

Future research would also profit from further investigating the role of trustworthiness in mediating users' risk perceptions. Although I find significant results for trustworthiness in my mediation analysis, future research could help to further isolate the effects of this construct.

FIGURES AND TABLES

FIGURE 3.1
Experimental Design Flowchart

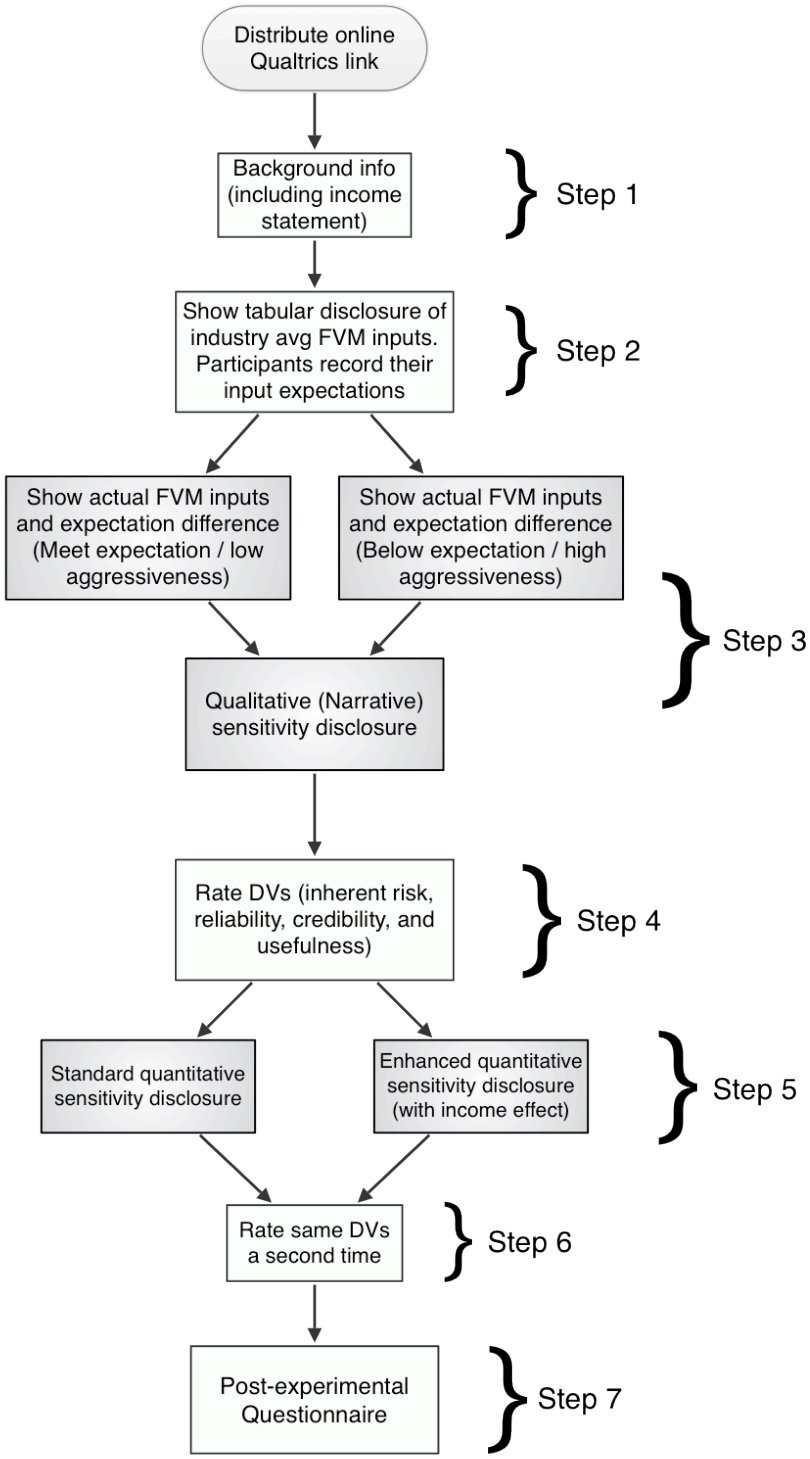
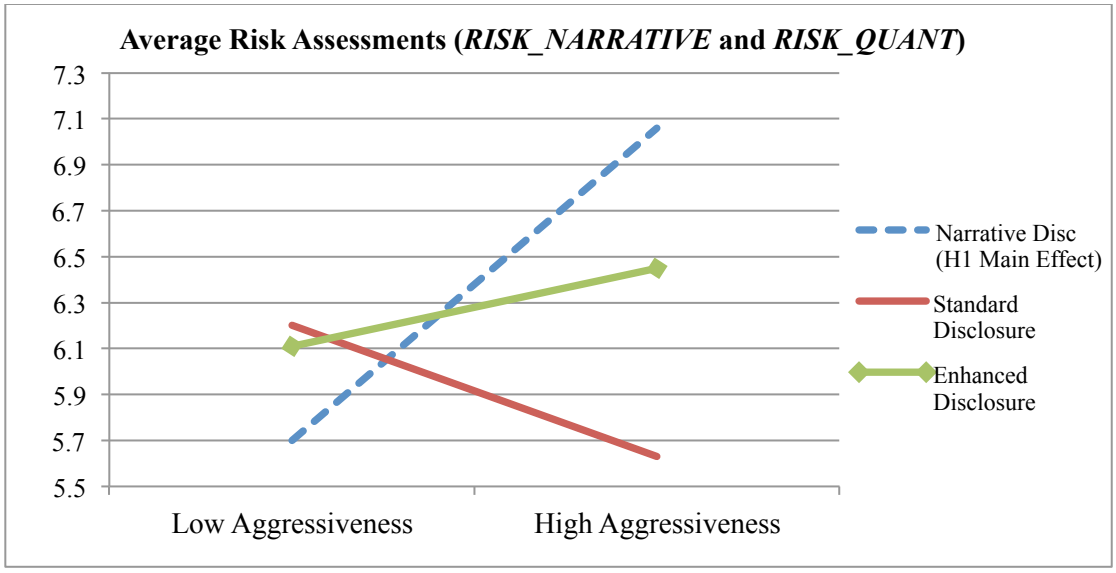
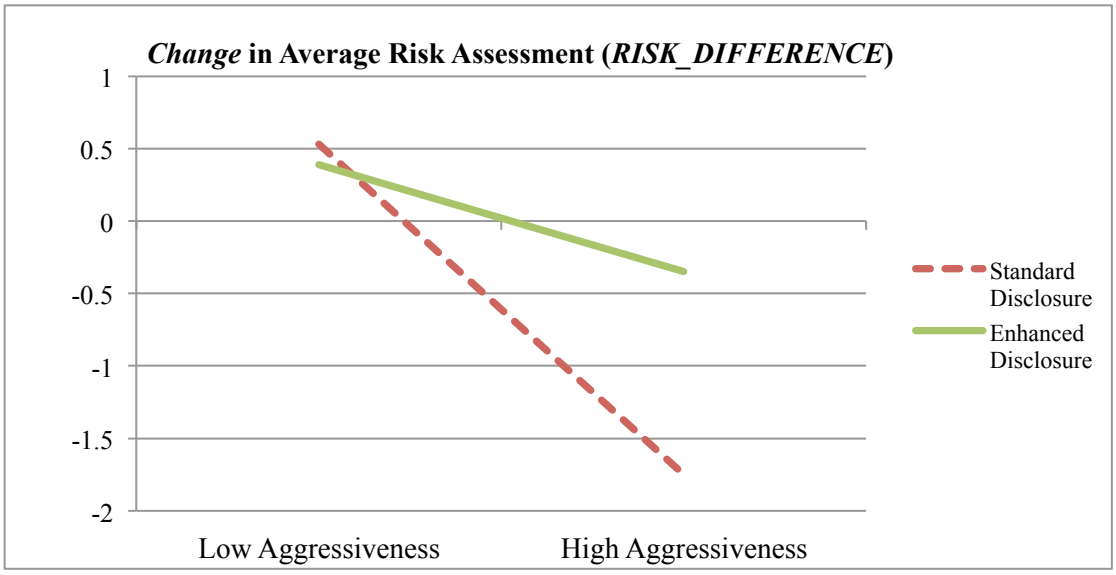


FIGURE 3.2
Illustration of Experiment Results

Panel A: Average Risk Assessments for Each Disclosure Format [a]

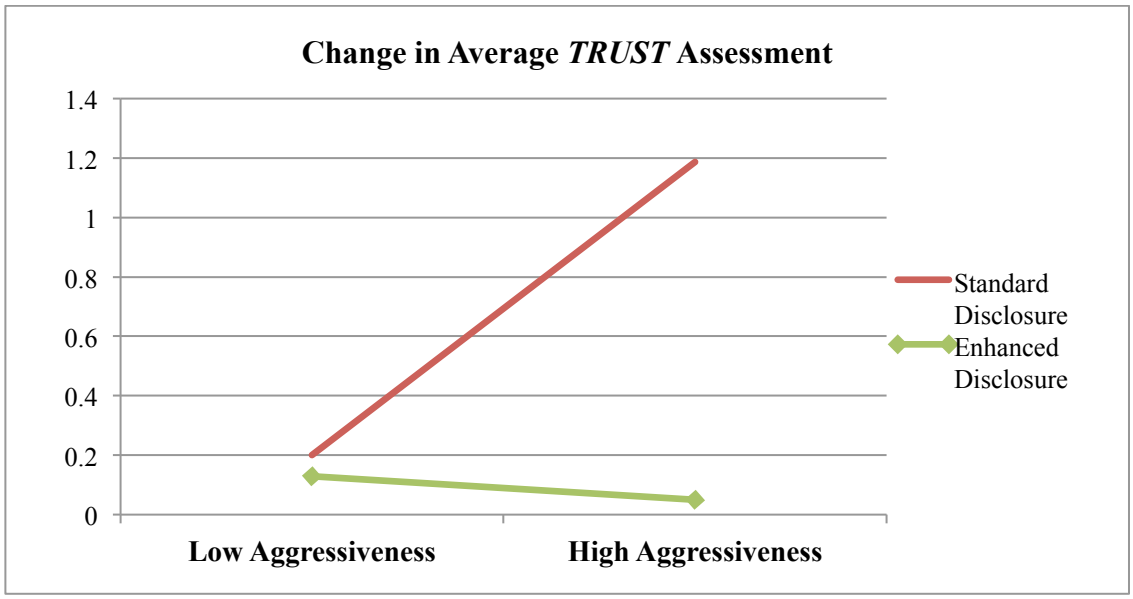


Panel B: *Change* in Average Risk Assessments [b]



[a] Panel A displays average risk assessments based on a nine-point scale for each of the three disclosure formats, with larger numbers indicating higher risk assessments. The narrative disclosure format is a within-subjects variable, so the graph shows the mean user risk assessment *prior* to seeing the additional quantitative sensitivity disclosure (Step 4: RISK_NARRATIVE). The standard and enhanced disclosure formats show the average user risk assessment *after* seeing these disclosures (Step 6: RISK_QUANT).
[b] Panel B displays the *change* in average risk assessments using RISK_DIFFERENCE – measured as the difference between RISK_QUANT and RISK_NARRATIVE – as the dependent variable. As such, RISK_DIFFERENCE measures the *incremental* effect of each disclosure format on users' risk assessments.

FIGURE 3.3
Illustration of Change in Mean *TRUST* Assessment



This illustration displays the change in mean *TRUST* assessments, with larger numbers indicating higher *TRUST* assessments. The *TRUST* measure was developed using factor scores from a factor analysis, as described in the supplemental analysis section of the paper. Results of my mediation analysis show that *TRUST* significantly mediates the relationship between *RISK_DIFFERENCE* and the interaction of management aggressiveness and disclosure format.

TABLE 2.1
FVM Type and Industry

	INDUSTRY			
FVM TYPE	Financial Services	Manufacturing or Retail	Tech or Biotech	**TOTAL**
Financial Instrument	37 (37.4%)	6 (6.1%)	5 (5.1%)	48 (48.5%)
Asset Impairment	4 (4.0%)	18 (18.2%)	5 (5.1%)	27 (27.3%)
Pension Plan Assets	0 (0.0%)	8 (8.1%)	2 (2.0%)	10 (10.1%)
Other FVM Types	10 (10.1%)	3 (3.0%)	1 (1.0%)	14 (14.1%)
TOTAL	**51 (51.5%)**	**35 (35.4%)**	**13 (13.1%)**	**99**

Notes: We asked respondents in an open-ended question to describe the nature of their selected example, being as specific as possible without identifying their client or firm. We analyzed responses to find common underlying themes, and developed a coding scheme based on this analysis. We then coded each as one of the following four different types of FVMs: financial instrument, asset impairment, pension plan assets, and other FVM types.

TABLE 2.2
Examples of Specific FVM Experiences

FVM TYPE	EXAMPLES
Financial Instrument	Auction rate securities / credit default swaps / collateralized debt obligations (including single name, tranche, and asset-backed securities) / collateralized mortgage obligations, derivative contracts (e.g., embedded gold derivative, interest rate Bermudan swaption) / available for sale securities / contingent considerations / municipal bonds / fund of funds / portfolio of reverse mortgages / interest rate swaps / structured securities / mortgage servicing rights / US agencies and treasuries / private placement securities
Asset Impairment	Goodwill / long-lived assets / R&D assets / PP&E impairment / indefinite lived trademarks assets / customer relationships acquired in a business combination
Pension Plan Assets	Hedge fund investments / private equity funds / defined benefit pension plan / OPEB plans / limited partnership interests
Other FVM Types	E.g., Equity investments (Investment in a controlled portfolio company / portfolio of start up and early stage companies / equity investment in an overseas private entity), various investments in real estate, and one type description that was left blank.

TABLE 2.3
Factors influencing the choice of FVM example

	Financial Instrument	Asset Impairment	Pension Plan Assets	Other FVM Type	**TOTAL**
Number of significant and/or complex assumptions associated with the process	31 (31.3%)	20 (20.2%)	4 (4.0%)	9 (9.1%)	64 (64.6%)
High degree of subjectivity associated w/ the assumptions and factors used in the process	30 (30.3%)	20 (20.2%)	3 (3.0%)	10 (10.1%)	63 (63.6%)
High degree of uncertainty associated with the future occurrence or outcome of events underlying the assumptions	16 (16.2%)	18 (18.2%)	1 (1.0%)	7 (7.1%)	42 (42.4%)
Lack of objective data when highly subjective factors are used	17 (17.2%)	12 (12.1%)	4 (4.0%)	7 (7.1%)	40 (40.4%)
Length of the forecast period	5 (5.1%)	11 (11.1%)	1 (1.0%)	3 (3.0%)	20 (20.2%)
TOTAL	**99**	**81**	**13**	**36**	**229**

Notes: Respondents were allowed to select as many responses as applied, so the various categories in this table are not mutually exclusive; thus, the total number of factors exceeds 99. However, all percentages are still calculated using the total number of observations (99) as the denominator.

TABLE 2.4
Materiality of FVMs and range of estimation uncertainty, by type

	FVM TYPE				
	Financial Instrument	Asset Impairment	Pension Plan Assets	Other FVM Types	**TOTAL**
Panel A: ***Relative materiality of the FVMs by type***					
< Materiality	4 (4.0%)	2 (2.0%)	1 (1.0%)	0 (0.0%)	7 (7.1%)
~ Materiality	6 (6.1%)	1 (1.0%)	2 (2.0%)	0 (0.0%)	9 (9.1%)
2-3 times Materiality	9 (9.1%)	2 (2.0%)	2 (2.0%)	3 (3.0%)	16 (16.2%)
4-5 times Materiality	4 (4.0%)	1 (1.0%)	2 (2.0%)	3 (3.0%)	10 (10.1%)
> 5 times Materiality	24 (24.2%)	21 (21.2)	3 (3.0%)	8 (8.1%)	56 (56.6%)
TOTAL	**47 (47.5%)**	**27 (27.3%)**	**10 (10.1%)**	**14 (14.1%)**	**98**
Panel B: ***Range of estimation uncertainty within each FVM type***					
< Materiality	14 (14.1%)	4 (4.0%)	7 (7.1%)	3 (3.0%)	28 (28.3%)
~ Materiality	14 (14.1%)	5 (5.1%)	2 (2.0%)	5 (5.1%)	26 (26.3%)
2-3 times Materiality	10 (10.1%)	3 (3.0%)	1 (1.0%)	2 (2.0%)	16 (16.2%)
4-5 times Materiality	4 (4.0%)	3 (3.0%)	0 (0.0%)	2 (2.0%)	9 (9.1%)
> 5 times Materiality	5 (5.1%)	12 (12.1%)	0 (0.0%)	2 (2.0%)	19 (19.2%)
TOTAL	**47 (47.5%)**	**27 (27.3%)**	**10 (10.1%)**	**14 (14.1%)**	**98**

Notes: One response was left blank in both Panel A and Panel B, thus each panel only lists 98 observations. However, all percentages are still calculated using the total number of observations (99) as the denominator.

TABLE 2.5
Usage frequency of AU 328 audit approaches, including who performed the step

	Model tested	Assumptions tested	Underlying data	Independent estimate	Subsequent events
Frequency of approach	87.9%	85.9%	84.8%	51.5%	59.6%
Challenges encountered?	55.7%	45.9%	17.6%	15.1%	5.0%
Problems identified?	13.8%	16.5%	6.0%	15.1%	5.0%
Performed by:					
Firm Specialist	71.3%	74.1%	31.0%	82.4%	15.3%
3rd party specialist	1.2%	-	2.4%	-	-
Core engagement team	63.2%	69.4%	67.9%	31.4%	89.8%

Notes: Other than for the "Frequency of approach" row, all other percentages are reported as a percentage of those experiences where the underlying audit approach was taken, not the percentage of total experiences in the sample. The various categories are also not mutually exclusive, and thus percentages in columns do not sum to 100.

TABLE 2.6
Regression Models for Outcome Variables (*IR* and *DEC_AUD_ADJ*)

(Model)		*(1)*			*(2)*	
Dependent Variable:		***IR***			***DEC_AUD_ADJ***	
Variables	**Expected sign**	**Coef.**	**t**	**Expected sign**	**Coef.**	**z**
Estimate Characteristics						
LEVEL3	+	1.94	3.61***	?		
MATERIALITY	+	0.13	0.70	+	-0.33	-0.74
UNCERTAINTY	+	0.30	1.71**	?	0.62	1.53
TYPE_FININST	?	0.56	1.11	?	-2.33	-2.07**
TYPE_IMPAIR	?	0.62	1.01	?	-1.53	-1.34
Client Characteristics						
SPEC_CLIENT	?	-0.40	-0.89	-	-0.42	-0.44
SALES	?	-0.40	-2.00**	-	-1.27	-2.41***
SEC	+	1.20	2.25**	+	2.66	1.88**
IR				+	0.38	1.32*
Audit tests performed						
PROC_IND_EST	-			+	1.85	1.93**
PROC_SUB_EVENT	-			+	-0.61	-0.72
Constant		5.8	5.74***		-3.00	-1.13
N (ROC area or R2)	96 (0.285)			96 (0.842)		

*, **, *** Significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

Variable Definitions

IR = inherent risk assessment, based on an 11-point scale ranging from 1 ("Low") to 11 ("High");

DEC_AUD_ADJ = 1 if the auditor proposed an adjusting entry that would decrease client income if booked; 0 otherwise

LEVEL3 = 1 if Level 3 asset or liability, and 0 otherwise;

MATERIALITY = relative materiality of the FVM in terms of the associated asset/liability balance, based on a five-point scale ranging from "less than materiality" to "greater than 5x materiality."

UNCERTAINTY = degree of estimation uncertainty associated with the FVM, based on a five-point scale ranging from "less than materiality" to "greater than 5x materiality";

TYPE_FININST = 1 if the FVM was a financial instrument, and 0 otherwise;

TYPE_IMPAIR = 1 if the FVM was an asset impairment issue, and 0 otherwise;

SPEC_CLIENT = 1 if the client used a valuation specialist (internal or 3rd party), and 0 otherwise;

SALES = client's annual net sales at the time of the experience, based on a five-point scale ranging from "<=$25 million" to" >$5 billion";

SEC = 1 if the client is a SEC registrant/issuer, and 0 otherwise;

(continued on next page)

TABLE 2.6 (continued)
Regression Models for Outcome Variables (*IR* and *DEC_AUD_ADJ*)

PROC_IND_EST = 1 if the auditor or specialist developed an independent estimate, and 0 otherwise;
PROC_SUB_EVENT = 1 if the auditor or specialist performed subsequent event testing, and 0 otherwise.

Notes: The above models explain two outcome variables – i.e., the auditor's risk assessment (*IR*) and whether the auditor proposed an adjusting entry that would decrease client income if booked (*DEC_AUD_ADJ*). Model (1) explains IR as a function of characteristics of the estimate being audited (Level 3, *MATERIALITY*, *UNCERTAINTY*, and FVM type) and characteristics of the client (*SPEC_CLIENT,* size measured by *SALES*, and regulatory risk as measured by *SEC* oversight). Model (2) explains *DEC_AUD_ADJ* as a function of the above, plus *IR* and the type of evidence obtained by the auditor (*PROC_IND_EST* and *PROC_SUB_EVENT*). We are unable to include *LEVEL3* and whether the auditor used a specialist in this model because both perfectly predict a proposed adjustment. No adjustments are proposed when the auditor does not use a specialist or when estimate is not Level 3. So when these factors are considered, the explanatory power of our variables is higher than it appears from the model.

TABLE 3.1
Risk Assessment Descriptive Statistics by condition

Panel A: Descriptive Statistics (*RISK_NARRATIVE* and *RISK_QUANT*) by condition—Mean (Standard Deviation)

	High Aggressiveness Risk Assessments		Low Aggressiveness Risk Assessments		Overall Disclosure Risk Assessments	
Disclosure Format	**Step 4 (*RISK_NARRATIVE*)**	**Step 6 (*RISK_QUANT*)**	**Step 4 (*RISK_NARRATIVE*)**	**Step 6 (*RISK_QUANT*)**	**Step 4 (*RISK_NARRATIVE*)**	**Step 6 (*RISK_QUANT*)**
Standard	7.38 (0.81)	5.63 (1.54)	5.67 (1.80)	6.20 (1.74)	6.55 (1.61)	5.90 (1.64)
Enhanced	6.80 (1.58)	6.45 (1.73)	5.72 (1.23)	6.11 (1.28)	6.29 (1.52)	6.29 (1.52)
Overall Aggressiveness	7.06 (6.08)	6.08 (1.68)	5.70 (1.49)	6.15 (1.48)	6.41 (1.55)	6.12 (1.58)

Panel B: Risk Assessment Change (*RISK_DIFFERENCE*)—Mean (Standard Deviation) [Sample Size]

	Aggressiveness		
Disclosure Format	**High**	**Low**	**Overall Disclosure**
Standard	–1.75 (1.73) [16]	0.53 (0.83) [15]	–0.65 (1.78) [31]
Enhanced	–0.35 (1.50) [20]	0.39 (0.85) [18]	0.00 (1.27) [38]
Overall Aggressiveness	–0.97 (1.73) [36]	0.45 (0.83) [33]	–0.29 (1.54) [69]

Notes: The variable RISK_NARRATIVE is defined as user risk assessments made after viewing the narrative sensitivity disclosure (i.e., Step 4). The variable RISK_QUANT is defined as user risk assessments made after viewing the quantitative sensitivity disclosure (i.e., Step 6). The variable *RISK_DIFFERENCE* is defined as the change in user risk assessments from Step 4 to Step 6. Panel A provides descriptive statistics by experimental condition for both *RISK_NARRATIVE* and *RISK_QUANT*. Panel B provides descriptive statistics by experimental condition for *RISK_DIFFERENCE*.

TABLE 3.2
ANOVA for *RISK_DIFFERENCE* and Planned Comparison Testing

Panel A: ANOVA for *RISK_DIFFERENCE*

Source	S.S	d.f.	M.S.	F-Ratio	p-value[b]
Aggressiveness	38.91	1	38.91	23.09	<0.01
Disclosure	6.72	1	6.72	3.98	0.05
Aggressiveness * Disclosure	10.16	1	10.16	6.03	0.017
Error	109.56	65	1.69		
Total	162.20	68	2.39		

Panel B: Planned Comparisons to Test H3a and H3b

Planned Comparison	d.f.	t statistic	p-value
Enhanced ≠ Standard (Low Aggressiveness)	31	0.49	0.63[b]
Enhanced > Standard (High Aggressiveness)	34	-2.60	0.01[c]
Enhanced < 0	34	2.03	0.03[c]

[a] This table offers the results of ANOVA model testing for *RISK_DIFFERENCE* in Panel A as well as planned comparison tests designed to support H3a and H3b in Panel B. The dependent variable *RISK_DIFFERENCE* is defined as the change in user risk assessments after seeing the additional quantitative sensitivity disclosure. Participant demographic was collected as part of the experiment, but none of these variables were significant when included as covariates in the ANOVA model.

[b] Two-tailed.

[c] One-tailed

TABLE 3.3

Mediation of the Management Aggressiveness and Disclosure Format Interaction[a]

	T Stat (p-value)			
	Step 1: IV Effect on DV[b]	**Step 2: IV Effect on Mediator[b]**	**Step 3: Mediator Effect on DV**	**Step 4: IV Effect on DV with Mediator[b]**
IV: Aggressive X Disclosure				
DV: *RISK_DIFFERENCE*	2.46	–1.65	–3.17	IV: 2.05 (0.044)
Mediator: *COMPETENCE*	(0.017)	(0.10)	(<0.01)	Mediator: –2.05 (0.045)
IV: Aggressive X Disclosure				
DV: *RISK_DIFFERENCE*	2.46	–2.01	–4.89	IV: 1.71 (0.09)
Mediator: *TRUST*	(0.017)	(0.05)	(<0.01)	Mediator: –3.72 (<0.01)
IV: Aggressive X Disclosure				
DV: *RISK_DIFFERENCE*	2.46	–1.81	–4.99	IV: 1.80 (0.08)
Mediator: *RELIABILITY*	(0.017)	(0.08)	(<0.01)	Mediator: –3.78 (<0.01)
IV: Aggressive X Disclosure				
DV: *RISK_DIFFERENCE*	2.46	–1.00	–3.12	IV: 2.22 (0.03)
Mediator: *USEFULNESS*	(0.017)	(0.32)	(<0.01)	Mediator: –2.57 (0.01)

[a] This table displays results of the mediation analysis for the management aggressiveness and disclosure format interaction, using the four-step process outlined by Baron and Kenny (1986) and Kenny et al. (1998). The variable *RISK_DIFFERENCE* is defined as the change in user risk assessments from Step 4 to Step 6. The *COMPETENCE* and *TRUST* mediators come from the factor scores derived from the factor analysis section of the paper. *RELIABILITY* and *USEFULNESS* are the result of scale questions asked of participants during the experiment. Based on the results presented here, the interaction appears to be partially mediated by *COMPETENCE*, *TRUST*, and *RELIABILITY*.

[b] The models tested in Step 1, Step 2, and Step 4 include the interaction term as well as both main effects.

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VITA

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