

**Effects of Procedure Frame, Procedure Verifiability, and Audit Efficiency Pressure on
Planning Audits of Fair Values**

By

Eldar Maksymov
PhD Student
Johnson Graduate School of Management
Cornell University

Mark W. Nelson
Eleanora and George Landew Professor of Accounting
Johnson Graduate School of Management
Cornell University

and

William R. Kinney, Jr.
Charles & Elizabeth Prothro Regents Chair in Business and
Price Waterhouse Fellow in Auditing
McCombs School of Business
University of Texas at Austin

July 4, 2012

We thank Rob Bloomfield, Devon Erickson, Max Hewitt, Pat Hopkins, Bob Libby, Hun Tong Tan, and workshop participants at Case Western Reserve University, Indiana University, and Northwestern University for comments on this paper. Funding for the research project described in this article was provided by the Center for Audit Quality. However, the views expressed in this article and its content are those of the authors alone and not those of the Center for Audit Quality.

Effects of Procedure Frame, Procedure Verifiability, and Audit Efficiency Pressure on Planning Audits of Fair Values

Abstract

We report the results of an experiment that examines auditors' planning judgments relevant to determining the accuracy of fair values reported in financial statements. In the experiment, 49 experienced audit managers budget time for 15 procedures relevant to auditing a level 3 asset in the fair value hierarchy. We test the effects of three features present in the typical fair value auditing context: the frame of the audit procedure (e.g., varying whether auditors assess whether management's assumptions *are vs. are not* appropriate), the pressure for audit efficiency communicated to the auditor (high vs. low), and the extent to which the audit quality of a procedure can be verified *ex post* (rated by each participant for each procedure). Results indicate significant main effects of frame and efficiency pressure on auditors' planning judgments, and a significant interaction between frame and procedure verifiability, with a negative frame increasing auditors' planned effort more with respect to procedures for which audit quality is less verifiable. Results also indicate that frame and efficiency pressure do not affect auditors' estimates of achieved audit risk and that auditors are not aware how frame affects their judgments. Overall, the results suggest the importance of all three factors in audit planning and the importance of procedure frame in auditing standards and audit firm guidance.

Effects of Procedure Frame, Procedure Verifiability, and Audit Efficiency Pressure on Planning Audits of Fair Values

1. Introduction

Auditing fair values presents particular challenges to auditors, and prior research and PCAOB inspections indicate that audits of fair values are susceptible to judgment problems.¹ However, despite the importance of fair values in today's financial reporting environment, relatively little research has addressed auditing fair values.² In this paper, we examine the extent to which three contextual features – procedure frame, procedure verifiability, and pressure for audit efficiency – interact to affect audit planning judgments for fair values, thereby ultimately affecting audit efficiency, audit effectiveness, and the potential for materially misstated audited fair values.

Consider an audit manager planning an audit to assess the accuracy of a level-3 fair value given a client's pre-audit book value and a supporting model/spreadsheet that shows how the fair value was calculated.³ The auditor must allocate audit effort to various procedures designed to evaluate the reasonableness of the client's estimate of fair value. The auditor follows the typical "process audit" approach of reviewing and testing management's process for determining fair value.⁴ Some process audit procedures test whether management chose an appropriate valuation model and appropriate underlying assumptions (hereafter, "auditing assumptions"). Other

¹ For commentary highlighting the challenges of auditing fair values, see Bell and Griffin [2012] and Christensen, Glover and Wood [2012]. For evidence from PCAOB inspections indicating deficiencies in audits of fair values, see Griffith, Hammersley and Kadous [2012].

² For reviews of relevant research, see Martin, Rich and Wilks [2006] and Bratten, Gaynor, McDaniel, Montague, and Sierra [2012].

³ SFAS No. 157 (FASB [2006]) defines a three-level hierarchy of the subjectivity of inputs to a fair-value determination. Level 3 fair values involve circumstances in which "relevant observable inputs are not available, thereby allowing for situations in which there is little, if any, market activity for the asset or liability at the measurement date" (paragraph 30) and are the most challenging fair values to audit (PCAOB [2003a], AU Sec. 328).

⁴ The process audit approach is sanctioned in audit standards (PCAOB [2003]) and practical application guidance (IAASB [2011]), and is the dominant approach in audit practice (Griffith et al. [2012] and IAASB [2011]).

procedures test whether management applied the model correctly by vouching model inputs to supporting documentation and determining whether the model's calculations are accurate (hereafter, "auditing implementation").⁵ Interviews with experienced auditors and evaluations of PCAOB inspection reports suggest that a primary reason for audit deficiencies with respect to audits of fair values and other financial estimates is that auditors tend to devote relatively too little effort to auditing management's assumptions relative to the effort they exert auditing implementation (Griffith, et al. [2012]). Our research sheds light on factors that contribute to that tendency.

One important element of this context is that audit procedures differ in the extent to which the quality of audit work is verifiable *ex post* by audit supervisors and independent inspectors. Auditing assumptions involves more subjectivity than does auditing implementation and therefore is less verifiable by other auditors. In contrast, auditing implementation consists mostly of recalculation and mechanical tracing of amounts, and therefore is less subjective and more verifiable by other auditors. Prior research on the effect of subjectivity and verifiability on auditors' decisions typically focuses on proposed audit adjustments, and provides evidence that auditors' incentives affect decisions about whether to require corrections when judgment latitude is available (see, e.g., Libby and Kinney [2000]; Nelson, Elliott and Tarpley [2002]), and that reducing latitude appears to constrain auditors' decisions under some circumstances (Ng and Tan [2003]). Prior work investigating subjectivity and verifiability has not focused on audit planning.

A second important element of this context is that audit procedures typically are framed positively, both in professional standards⁵ and in the audit guidance implemented by auditing

⁵ For simplicity, we assume that the client chose the correct model. Particularly on new engagements or with new investments, model choice could be considered a separate and important stage, but with characteristics similar to assumption choice.

firms. The audit is planned to determine whether recorded fair value is *reasonable*, rather than *not reasonable* (PCAOB [2003c], AU342.4; IAASB [2008], ISA 540.6). The positive frame is pervasive in standards for auditing estimates and it is not clear whether standards setters have considered whether a negative frame would produce different audit judgments. Prior accounting research on framing effects is somewhat mixed (see, e.g., Kida [1984]; Trotman and Sng [1989]; Emby [1994], and Fukukawa and Mock [2011]), perhaps because aspects of the contexts operationalized in prior research affect the extent to which a framing effect could be observed. We expect the effects of frame to be evident in fair value audit planning, particularly with respect to less verifiable audit procedures (e.g., auditing assumptions) that require more judgment and provide more latitude for framing effects to operate.

A third important element is that audit planning occurs in the context of the audit firm's goals for both audit effectiveness (achieving an acceptable level of risk that the financial statements are free of material misstatement) and efficiency (expending the least audit effort to achieve a given level of effectiveness). Subordinate auditors face pressure from their superiors, and partners face pressure from clients, for the audit to be done as efficiently as possible while still meeting audit effectiveness goals. Auditors may respond to efficiency pressure by budgeting less audit effort and jeopardizing attainment of effectiveness goals (see, e.g., McDaniel [1990]; Turner [2001]). As with frame, we expect the effects of pressure for audit efficiency to be evident in fair value audit planning, particularly with respect to less verifiable audit procedures, because it is difficult for the audit manager or a third party reviewer to know how much effort is appropriate for those subjective assessments.

From an experimental design perspective we face the difficulty of not knowing *ex ante* what amount of effort auditors *should* allocate to a particular audit procedure in a particular

circumstance. Therefore, we do not attempt to determine whether the correct amount of audit effort is allocated to auditing more- or less-verifiable procedures in our experimental setting. Rather, we vary procedure frame and efficiency pressure and assess the effects of those variables individually and in interaction with procedure verifiability (i.e., we test for interactions between verifiability and frame and between verifiability and efficiency pressure).

To test these predictions, we perform an experiment in which experienced auditors plan the audit of management's process for determining the fair value of an asset that is classified as level 3 in the fair value hierarchy. Participants are 49 audit managers from two Big-4 firms who are experienced in auditing fair values. Their primary task is to determine hours of audit effort to be expended on fifteen audit procedures typically used to audit management's process for determining fair values. We manipulate procedure frame (positive/negative) between participants and pressure for audit efficiency (low/high) within participants. Procedure verifiability differs naturally across the fifteen audit procedures and participants rate the verifiability of the quality of audit work for each audit procedure to provide a participant-specific assessment of which procedures are relatively more or less verifiable.

Results indicate significant main effects of procedure frame and efficiency pressure on auditors' planning judgments, with auditors planning the least audit effort (mean of 26.25 hours) given the combination of positive frame and high efficiency pressure, and the most audit effort (mean of 41.55 hours, or 58% more hours) given the opposite combination of negative frame and low efficiency pressure. Frame interacts significantly with procedure verifiability, such that the effect of frame is approximately three times stronger for procedures that auditors rate as less verifiable than for procedures that auditors rate as more verifiable.

Results also indicate that auditors appear to lack self-insight concerning the effects of these variables on their planning judgments. Auditors' assessments of the post-audit risk of material misstatement *are not* influenced by these variables. Also, in response to supplemental questions a majority of auditors (27 of 49) indicate that frame would not affect their planning judgments, and when analyses are based on only those participants, we observe the same significant interaction between frame and verifiability that we observe in the overall analyses. A minority of auditors (22 of 49) indicate that frame would affect their planning judgments, but disagree regarding the direction of the effect, with twice as many indicating they would plan more hours under a positive frame than under a negative frame, which is opposite the effect of frame on planning judgments that we observe.

This study contributes to the research literature and to accounting practice. From a research perspective, our study is the first to examine how procedure frame, procedure verifiability, and efficiency pressure combine to affect audit planning judgments in the important fair value setting. We provide evidence of main effects of frame and efficiency pressure, as well as evidence of an interaction between frame and procedure verifiability that has not been documented previously, thus contributing both to the accounting and psychology literatures. Our findings also contribute to the literature examining justification in the audit review process (see, e.g., Peecher [1996]; Rich, Solomon and Trotman [1997]; Gibbins and Trotman [2002]) by identifying how the verifiability of the quality of audit work for a procedure interacts with frame to affect audit planning with respect to that procedure. We also contribute to the literature investigating the potential for misstated fair values and other high-uncertainty estimates in audited financial statements (see, e.g., Martin, Rich and Wilks [2006]; Griffith, et al. [2012]) by

identifying circumstances in which variables typically observed in the fair-value context affect audit planning.

From a practice perspective, the current audit environment can be characterized as utilizing a positive frame for wording audit procedures in both auditing standards and firm practice manuals, and often subjects auditors to relatively high efficiency pressure. We provide evidence that this combination is most problematic for audit effectiveness in the sense that it produces the lowest amount of planned audit effort. We also provide evidence that vulnerability to framing effects is greatest when the quality of audit work is least verifiable, which is troubling since more subjective, less verifiable procedures (e.g., auditing client assumptions) are fundamental to the typical approach of auditing management's process for developing fair value estimates. The accuracy with which a model has been implemented is of minimal importance when the assumptions underlying the model are not appropriate.

As to auditing standards, the PCAOB and IAASB standards emphasize positive frames. Our results suggest that doing so may expose financial statement users to unintentional "under auditing" by auditors, particularly with respect to procedures for which sufficient audit effort is most crucial. More generally, we provide insight about how factors within the control of audit firms and audit standard setters could affect audit efficiency and effectiveness in the important context of fair value auditing, and our results should generalize to similar contexts, such as assessing goodwill impairment or post-retirement benefits, that require auditing high-uncertainty estimates. We also shed light on potential interventions, such as reframing audit procedures and relaxing efficiency pressure in key areas, that could improve audit effectiveness.

The remainder of this paper proceeds as follows. Section II provides background and hypotheses. Section III describes our experimental method. Section IV provides results and analyses. Section V provides conclusions, implications, and directions for future research.

2. Background and Hypotheses

2.1 STANDARDS RELEVANT TO AUDITING FAIR VALUES

Current US and international auditing standards relevant to the auditing of estimates, including fair values, require auditors to determine whether management's estimates are "reasonable" rather than whether they are "not reasonable" (PCAOB [2003c], AU342.4; IAASB [2008], ISA 540.6). Both U.S. and international standards allow three approaches for auditing fair value estimates: (1) auditing management process, (2) developing independent estimates, and (3) auditing subsequent events (PCAOB [2003a], AU328; IAASB [2008], ISA 540). Recent research (Griffith, Hammersley, and Kadous [2012]) indicates that auditors typically focus primarily on auditing management's process. Likewise, recent international auditing guidance (IAASB [2011]) focuses primarily on auditing management's process. That approach involves the auditor developing an understanding of the entity's process for determining fair value amounts and disclosures (PCAOB [2003a], AUD 328.9). Auditors assess the reasonableness of management's key assumptions underlying the fair value amount, rather than assessing the unreasonableness of those assumptions (PCAOB [2003b], AUD 332.5,-.40; PCAOB [2003a], AUD 328.26,-35-36; IAASB [2008], ISA 540.6).

2.2 RESEARCH RELEVANT TO AUDITING FAIR VALUES

Despite a relatively large literature assessing the benefits and drawbacks of fair-value accounting,⁶ only limited research has addressed *auditing* fair values. Some studies use archival methods to relate audit fees to fair value. Ettredge et al. [2011] analyze publicly traded bank holding company data from 2006 and 2008 and provide evidence that auditors charge a premium for auditing assets whose fair values are less verifiable (Level 3 on SFAS No. 157's fair value hierarchy). Chen et al. [2010] analyze a sample of commercial banks for the period of 2007 and 2008 and provide evidence that banks with higher amounts of Level 3 assets and liabilities have higher amounts of discretionary loan loss provisions and greater audit fees. Griffin [2011] examines factors that affect whether auditors decide to require their clients to adjust fair value measurements, and finds that auditors are most likely to require adjustments under conditions of high uncertainty (when fair values are more subjectively determined *and* there exists a large range of potential misstatements). Overall, these studies provide evidence that auditors recognize that there is heightened risk of misstatement with respect to fair values that are less verifiable, and that auditors respond to that heightened risk with larger loss provisions, audit adjustments and audit fees. To the extent that higher fees compensate auditors for greater audit effort, rather than only compensating auditors for assuming greater risk, these results also imply that auditors respond to less verifiable fair values by requiring greater audit effort.

Martin, Rich and Wilks [2006] draw on psychological studies of judgment and decision making to highlight various potential audit judgment difficulties that could occur when auditing fair values, but also indicate that little research has directly examined psychological factors affecting fair value auditing. They point out that the specific knowledge for auditing fair value measurements will be difficult for auditors to obtain and maintain, due to its complexity,

⁶ For reviews of this literature, see AAA FASC [1998, 2000, 2005].

changing nature, and the lack of training and education in this area. Yet, prior research in other contexts suggests auditors may be overconfident in their own ability to audit fair values and weight insufficiently the views of outside experts (e.g., Hunton, Wright and Wright [2004]). Current standards require that auditors not completely rely on outside experts and focus some of their own effort on auditing fair values (PCAOB [2003a]).⁷ Therefore, while auditing fair values is a challenging task, audit practice requires that auditors be able to perform that task effectively.

Martin et al. make two points that are particularly germane to our research. First, they note that "... auditors must be able to identify key assumptions and inputs in the FVM ('fair value measurement') process. The lack of existing guidance on what would constitute a significant assumption suggests that auditing standard setters will likely need to specify principles to identify such assumptions. Identifying key assumptions and testing their reasonableness is a major concern among auditors of FVMs." (p. 290). Though in recent years some guidance has been provided on identifying key assumptions (e.g., IAASB [2008]), the unstructured nature of auditing assumptions likely continues to be problematic. Second, Martin et al. note that "...auditors must be careful not to simply search for evidence that corroborates management's assertions, even though current audit guidance specifies that very approach (e.g., PCAOB [2003b], AU Sec. 332.35). Finding such evidence is far too easy if this is all the auditor is pursuing." (p. 289).⁸

⁷ Per AU 328, the auditor needs to consider whether to use a specialist or whether the auditor has sufficient skills (PCAOB [2003a], AU 328, par. 20). However, even if a specialist is used, "... while the reasonableness of assumptions and the appropriateness of the methods used and their application are the responsibility of the specialist, the auditor obtains an understanding of the assumptions and methods used. However, if the auditor believes the findings are unreasonable, he or she applies additional procedures as required in section 336" (PCAOB [2003a], AU 328, par. 22).

⁸ Martin et al. [2006] go on to state "Instead, auditors must also consider evidence that could potentially disconfirm management's assertions. Although no prior research directly examines this issue in relation to auditing FVMs, prior research has examined the issue generally and suggests a number of useful steps in avoiding the confirmation bias and other motivated reasoning effects in audit settings (e.g., Koonce [1992]; Kennedy [1995]; Anderson and Koonce [1998])." (p. 289). While we agree that prior research has identified important ways to reduce confirmation bias and

Griffith et al. [2012] provide interview evidence consistent with Martin et. al's [2006] concern. Griffith et al. interview 24 experienced auditors and examine PCAOB inspection reports from 2008 and 2009 to understand the process used to audit estimates and the sorts of problems that occur. They identify as a critical issue that: "audits of estimates tend to be too focused on verifying aspects of management's model rather than on critically evaluating the reasonableness of the estimate" (pp. 4-5), and assert that this tendency may stem from auditors "framing the task of auditing estimates as one of verification rather than evaluation" (p. 5).

The concerns expressed by Martin et al. [2006] and Griffith et al [2012] are consistent with the potential for procedure verifiability and procedure frame to affect audit judgment. We discuss each of these points further in the next two sections.

2.3 PROCEDURE VERIFIABILITY

The subjectivity, structure and verifiability of audit procedures covary in ways that can affect audit effectiveness and efficiency.⁹ For example, at one extreme are procedures that assess whether the client's assumptions are appropriate in light of the client's circumstances. These procedures require that the auditor consider whether other assumptions would be more appropriate, but current standards lack specific guidance about what constitutes significant assumptions, such that the auditor faces an unstructured task and must make a subjective

motivated reasoning, those results do not preclude the effects of procedure verifiability, procedure framing and time pressure that we investigate.

⁹ According to Bonner [1994, 2007], a task is more structured if relevant information cues are clearly specified and if the relations between cues and outcomes are well specified. Task structure reduces task complexity and thereby improves performance by increasing the clarity of inputs and processing that is required in a judgment task. Also, prior auditing research provides evidence that task structure typically improves consensus of auditor judgments (Boritz [1985]; Abdolomohammadi and Wright [1987]), suggesting that it is easier for auditors to verify each other's judgments when judgment tasks are more structured.

assessment that is difficult for other auditors to verify.¹⁰ Also, prior research provides evidence that auditors have difficulty generating alternative assumptions when provided the prompt of the client's assumptions (Libby [1985]; McDaniel and Kinney [1995]; Earley, Hoffman and Joe [2008]), suggesting that auditors struggle with this judgment task. Therefore, we view auditing assumptions as requiring relatively subjective, less structured, and less verifiable audit procedures that should challenge auditors' judgment capabilities. We refer to such procedures as "less verifiable."

At the other extreme are audit procedures devoted to auditing the mathematical accuracy of the client's fair value calculations. Whereas auditing assumptions faces an absence of underlying data, auditing this sort of model implementation faces the opposite problem. Clients support their valuations with underlying calculations, often performed in voluminous spreadsheets. Auditing the mechanical accuracy of these calculations necessarily is based on the numerical relations embedded in the spreadsheet. Therefore, we view auditing implementation as requiring relatively objective, more structured, and more verifiable audit procedures that, while potentially quite effortful, are straightforward to accomplish. We refer to such procedures as "more verifiable."

From the perspective of prior psychology research, procedures that are less verifiable have more ambiguity associated with them. People generally prefer precision over ambiguity, and prior research provides evidence of such "ambiguity aversion" in a variety of contexts,

¹⁰ Professional standards essentially require that the auditor first consider management's assumptions and then consider whether alternative assumptions are necessary. More specifically, AU 328.28 indicates that auditors are explicitly not substituting their judgment for that of management (PCAOB [2003a]). If management has determined that different valuation methods result in a range of different measurements, the auditor evaluates how management has considered this fact (.18). Management identifies significant assumptions, and the auditor considers sensitivity of the valuation to those assumptions. If management doesn't identify significant assumptions, the auditor considers whether the auditor should do so (.34 - .36). The auditor may develop an independent model or assumptions, but is not required to do so (.40). Thus, management is the first mover, and the auditor examines what management provides and then determines whether the auditor should consider alternative models/assumptions further.

including auditing (Ellsberg [1961], Fox and Weber [2002], Nelson and Kinney [1997]). Prior research also highlights that auditors struggle with judgments made under ambiguity (Luippold and Kida [2012]).

Prior research also suggests that auditors may respond to the latitude provided by less verifiable procedures in a manner favored by their incentives, and that reducing that latitude would constrain their judgment. For example, auditors' interpret imprecise accounting rules in a manner favored by their incentives (Hackenbrack and Nelson [1996]; Libby and Kinney [2000]; Kadous, Kennedy and Peecher [2003]), but their decisions about whether or not to require audit adjustments are constrained by precise thresholds that offer less room for interpretation (Ng and Tan [2003]; Nelson, Elliott and Tarpley [2002]) or by precise materiality criteria (Nelson, Smith and Palmrose [2005]). Similarly, auditors are likely to perceive more latitude with respect to planning decisions for audit procedures that are less verifiable.

Procedures that are less verifiable also expose auditors to less risk that their judgments will be challenged in the audit review or PCAOB inspection processes. Auditors respond to the ongoing requirement that they justify their decisions to other auditors in the review process by considering reviewer preferences (Tan [1995]; Peecher [1996]; Wilks [2002]), increasing judgment quality by devoting additional effort (Kennedy [1993]), being more careful to justify their positions (Koonce et al. [1995]), and in general by conducting and documenting audit work in a manner that avoids having their judgments questioned (Rich, Solomon and Trotman [1997]; Gibbins and Trotman [2002]). Auditors also face more exposure from juries when they allow aggressive accounting with respect to precise standards (Kadous and Mercer [2012]). Consistent with these studies, we anticipate that auditors perceive less exposure to being identified as

having performed low quality work with respect to procedures that are less verifiable, and thus may be more willing to compromise on the amount of time devoted to those procedures.

In combination, the ambiguity, inherent latitude and lack of exposure in the review process to demonstrated incorrectness may leave less verifiable procedures more vulnerable to reductions in planned audit effort. However, we do not test hypotheses about a main effect of procedure verifiability, because other task characteristics likely co-vary with procedure verifiability and affect how many hours of effort are necessary to complete procedures effectively.¹¹ Also, we do not make hypotheses about whether the correct level of audit effectiveness is achieved for audit procedures of different levels of verifiability, because we have no way of determining *ex ante* what level of audit effort is correct for our particular experimental context, given the loss functions faced by auditors in practice. Rather, as noted below, we test specific hypotheses regarding how procedure verifiability *interacts* with other task variables.

2.4 PROCEDURE FRAME

Framing refers to alternative ways of describing aspects of the same decision task, with alternative frames typically differing according to whether they evoke positive or negative connotations (Tversky and Kahneman [1981]). Levin et al. [1998] discuss “valence framing,” wherein the wording of the task can portray the judgment or decision either in positive or negative terms, and argue that there are three distinct valence framing types: (1) risky choice framing, (2) attribute framing, and (3) goal framing. Bonner [2007] notes that attribute framing is the type most closely associated with the framing effects in auditing, as only one attribute

¹¹ For example, the amount of audit effort necessary to conduct more verifiable procedures like testing the mechanical accuracy of a valuation model would be expected to vary with the size of the spreadsheet that operationalizes the model, with small spreadsheets requiring little time but large spreadsheets requiring more time. Those differences in audit effort would be driven by the number of calculations necessary to perform the audit procedure, rather than by the verifiability of the audit procedure.

(e.g., fairness of presentation, reasonableness of an assumption, accuracy of a calculation, etc.) is usually being evaluated by a particular procedure. Levin et al. [1998] review research in psychology showing that attribute framing effects occur through memory retrieval, such as retrieving positive or negative associations, and information search, wherein the participants tend to be affected by confirmation bias and seek out evidence consistent with the outcome implied by the frame.

Multiple studies in auditing examine the effect of framing on auditors' judgments, but results are somewhat mixed. One set of studies consider the going-concern context. Kida [1984] investigates whether auditors use confirmatory strategies based on their initial hypothesis. He finds that hypothesis framing has a significant effect on the type of information the auditors listed as relevant to their judgments, but does not result in a significant difference in going concern judgments. Trotman and Sng [1989] find that preferences for failure cues compared to viable cues are affected by hypothesis framing when prior information indicates non-failure of the going concern, but not when it indicates going-concern failure. They do not find a significant effect of framing on the final probability judgments in either scenario. Asare [1992] manipulates frame in a sequential belief revision task, and likewise finds no effect of frame on auditors' going-concern judgments.¹²

One potential reason for a lack of results of frame ongoing concern judgments is that the relatively low base-rate of going concern problems reduces auditors' sensitivity to a framing effect. Since going-concern judgments typically favor concluding that the firm will continue as a going concern in practice, these judgments may not give significant latitude in judgment for an effect to be identifiable. Emby [1994] tests the effects of framing in a different context –

¹² A related sequential belief revision literature examines updating of beliefs, but does not manipulate frame while holding constant underlying information (i.e., McMillan and White [1993]; Bamber, Ramsay and Tubbs [1997]). In general, that literature provides evidence of confirmation proneness in belief updating.

assessing the quality of an internal control system. Emby manipulates frame (requiring auditors to assess *strengths* of the control system vs. assess the *risk* of the internal control system) and information presentation mode (simultaneous vs. sequential), and finds significant effects of framing on the amount of substantive testing the auditors assessed to be necessary. Emby and Finley [1997] replicate this finding and also show that the framing effect is reduced when auditors use a framing-mitigation technique (rating the relevance and sign of each item of evidence).

Most recently, Fukukawa and Mock [2011] examine whether frame affects audit risk assessments and effort allocations with respect to valuation, existence and accuracy assertions in an accounts receivable context. Japanese auditors made risk assessments both before and after being exposed to evidence, with assertion frame manipulated between auditors.¹³ Fukukawa and Mock find significant effects of their frame manipulation for the existence and accuracy assertions, but mostly insignificant effects for the valuation assertion, and speculate that the lack of results for the valuation assertion may have been caused by weak evidence being provided with respect to the valuation assertion. However, Fukukawa and Mock's framing manipulations for the existence and accuracy assertions introduced materiality of misstatement for the negative frame but not the positive frame, which may have affected their results.¹⁴

¹³ Fukukawa and Mock [2011] examine four risk-related measures, with some based on the belief-function framework (Shafer [1976]; Srivastava and Shafer [1992]; Srivastava and Mock [2002]). In general they find similar results for their probability-based risk measure and another risk measure transformed from belief assessments.

¹⁴ For example, Fukukawa and Mock's [2011] frame manipulations for the existence assertions are:

[positive frame] – "Accounts receivable on the 2004 balance sheet exist."

[negative frame] – "A material amount of accounts receivable that does not exist is included in the 2004 balance sheet."

The wording of the negative frame introduces materiality, and so confounds frame with misstatement materiality. The frame manipulation for the accuracy assertion has a similar problem, but the frame manipulation for the valuation assertion does not. Therefore, the effect of frame that Fukukawa and Mock find for the existence and accuracy assertions may be attributable to their negative frame emphasizing materiality while their positive frame does not.

Overall, while the results of these studies are mixed, on balance they suggest that framing could have an effect on auditor judgments. Nelson [2009] likewise suggests that framing could affect professional skepticism. Further, the wording of auditing standards suggest that the fair value auditing context may be particularly vulnerable to framing effects. AU 328, Auditing Fair Value Measurements and Disclosures, emphasizes that the auditor assesses whether the client's model, assumptions, and resulting book value "are reasonable" (see, e.g., paragraphs .19-.40). Consistent with the psychology literature on framing, we suspect that auditors provided the typical positive frame will tend to focus too much on supporting the reasonableness of management's fair value estimate, as opposed to focusing on supporting the possible "unreasonableness" of that estimate by seeking out evidence that potentially invalidates it. A positive frame can encourage auditors to fail to sufficiently consider alternative assumptions, to place too much credence in management's indication of low assumption significance or sensitivity, and to overstate the importance of evidence supporting the reasonableness of management's valuation. Consistent with this view, Griffith et al. [2012] suggest that a more general focus on verification as opposed to evaluation affects auditors' professional skepticism in the fair value context.

Given a general tendency towards confirmation bias, whereby auditors pursue a focal hypothesis first rather than considering focal and alternative hypotheses together, we anticipate that procedure frame affects audit effort allocations.¹⁵

H1: Auditors allocate more audit effort when audit procedures are framed negatively than when procedures are framed positively.

We also predict an interaction between frame and procedure verifiability. Prior research in psychology has not addressed this issue directly. A few prior studies examine whether frame

¹⁵ See Nickerson [1998] for a review of psychological research on confirmation bias. See Brown, Peecher and Solomon [1999] and Bamber et al. [1997] for research supporting the existence of confirmation bias in auditing.

interacts with the level of ambiguity with which probabilities are defined, which is somewhat related to our topic since more subjective, less verifiable procedures might be viewed as having more ambiguity associated with them. However, these studies tend to compare responses to ambiguity between framing conditions, rather than examining whether the effect of frame differs depending on levels of ambiguity. Also, the studies provide somewhat conflicting results (Levin et al. [1986]; Bier and Connell [1994]) that depend on the manner in which ambiguity is operationalized (Kuhn 1997). More generally, the psychology literature has not comprehensively examined moderators of framing effects (Levin et al. [1998]), and we are not aware of any studies that have investigated the extent to which framing effects are mitigated by the verifiability of judgment quality.

We predict that the effect of frame increases as procedure verifiability decreases. More verifiable procedures involve judgments that are more objective and more structured, and therefore offer relatively less latitude for a framing effect to occur. On the other hand, less verifiable procedures like assessing the reasonableness of assumptions require relatively more hypothesis generation and evaluation, and so should provide more latitude for a framing effect to occur. Note that this interaction hypothesis contradicts the findings of Fukukawa and Mock [2011], which is the prior study closest to our own. While they find an effect of frame with respect to the accuracy assertion, which maps most directly into auditing implementation, they find no significant effects of frame for the valuation assertion, which maps most directly into auditing assumptions. We anticipate a *stronger* effect of frame on auditing assumptions than for auditing implementation.

H2: Auditors' effort allocations are more affected by framing as the verifiability of audit procedures decreases.

2.5 AUDIT EFFICIENCY PRESSURE

Prior research indicates that efficiency pressure affects audit judgment in important ways. McDaniel [1990] finds in an inventory-auditing context that increasing time pressure results in decreased audit effectiveness (in terms of fewer auditor errors and higher sample sizes) but increased audit efficiency (in terms of amount of time spent achieving a given level of effectiveness). Glover [1997] finds that auditors under time pressure try to improve audit efficiency without harming effectiveness by focusing on information they judge to be most important and disregarding others, thus leaving them less vulnerable to dilution effects. Brown, Peecher and Solomon [1999] find that auditors who are concerned about efficiency are more likely to view evidence as highly diagnostic when the evidence would support an auditee-provided explanation. Asare, Trompeter and Wright [2000] find that auditors who are provided a list of five potential causes of a gross margin fluctuation respond to a restrictive time budget by continuing to test for each cause (maintaining “breadth” of testing) but reducing the number of different tests conducted for each cause (reducing “extent” of testing). Turner [2001] finds that auditors who are informed that their reviewer is concerned that too much effort is expended trying to disprove client-provided explanations responded by examining less evidence in an accounts receivable valuation task. Finally, a long-standing literature indicates that some auditors respond to restrictive time budgets by prematurely signing off on uncompleted audit procedures.¹⁶ In general, this research suggests that auditors are likely to respond to efficiency pressure by reducing audit effort.

Similar to prior research, we anticipate that efficiency pressure affects auditors’ planning judgments by reducing the amount of time that auditors budget to audit fair values. In addition,

¹⁶ See, e.g., Rhode [1978]; Alderman and Deitrick [1982]; Lightner, Leisenring and Winters [1983]; Ponemon [1992]; Otley and Pierce [1996]; Shapeero, Koh, and Killough [2003]; and Hyatt and Prawitt [2010].

we predict an *interaction* between efficiency pressure and procedure verifiability. Prior research offers mixed evidence concerning this potential interaction. McDaniel [1990] previously tested for an interaction between task structure (manipulated as amount of detail specified in the audit program) and efficiency pressure, but the interaction is not significant. Yet, one way to interpret Asare et al.'s [2000] result that auditors respond to efficiency pressure by maintaining testing breadth while reducing testing extent is that the structure that they provided auditors (in the form of five alternative hypotheses of the cause of a gross margin fluctuation) might have constrained auditors from ignoring some hypotheses (i.e., auditors might have reduced breadth of testing as well as extent if they had not been provided a structured set of hypotheses to test).

We anticipate less aggressive responses to efficiency pressure as the verifiability of audit procedures increases, because mistakes or premature sign-off of audit procedures are detectable and the inherent structure of these tasks constrains the amount of time that can reasonably be trimmed from their execution. On the other hand, audit procedures that are less verifiable, like determining the reasonableness of assumptions, lack clear criteria to determine sufficiency of audit effort and so offer more latitude for shortcuts that allow a tighter time budget to be achieved. Therefore, we expect that efficiency pressure will affect auditors' effort allocations to a greater extent with respect to audit procedures that are less verifiable.

H3: Auditors' effort allocations are more affected by efficiency pressure as the verifiability of audit procedures decreases.

3. Method

3.1 DESIGN, OVERVIEW OF EXPERIMENT, AND PARTICIPANTS

We conduct an experiment in which audit procedure frame (positive/negative) is manipulated between participants and efficiency pressure (low/high) is manipulated within

participants. Participants first assign audit effort to the 15 procedures and assess achieved audit risk assuming relatively low efficiency pressure on the audit, and then perform the same tasks assuming relatively high efficiency pressure. Participants next rate the extent to which the quality of each of the fifteen procedures can be verified in the review process (those verifiability ratings are the basis for a participant-specific classification of procedures as low or high verifiability for our hypothesis tests). Participants finish the experiment by answering supplemental questions and providing demographic data.

Participants are 49 auditors from two Big-four firms (21 from one firm, 28 from the other, assigned evenly to the between-participants frame manipulation) with an average of 10.7 years of experience and a median title of audit manager (29 managers, 20 senior managers).¹⁷ Participants had worked on an average of 10.3 audits in which they examined the valuation model underlying the fair value of an asset or liability, and 2 audits of real estate investment companies.¹⁸ Participants were recruited by a senior representative of their firm and completed the experiment by accessing the experimental materials online.

3.2 DEPENDENT VARIABLES

Participants determine the number of *audit hours* that they budget for each of fifteen audit procedures by assigning hours of audit effort in fifteen-minute increments. Participants also estimate *achieved audit risk* by assessing the probability that no material misstatement exist within ABC's financial statements if the audit is performed within their time budget and no material misstatement is found. That assessment is made on a 0-100 percentage scale (with 0%

¹⁷ Fifty auditors initially completed the experimental materials, but one auditor assigned the maximum verifiability score to all fifteen audit procedures, which required that s/he be dropped from the analyses.

¹⁸ Audit firm affiliation, years of experience, title, number of fair-value audits and number of real-estate audits did not interact with any manipulated variables in any analyses, so will not be discussed further.

= certain that material misstatement is present, 50% = 50/50 chance of material misstatement, and 100% = certain that material misstatement is NOT present).^{19, 20}

3.3 INDEPENDENT VARIABLES

Procedure Verifiability is measured within participants by including in the audit program the fifteen procedures shown in Appendix A and asking each participant to assess the verifiability of each procedure. Specifically, for each procedure participants rated the extent to which the quality with which the senior performed the procedure could be verified in the audit review process, with a rating of 1 (7) indicating no (complete) ability to verify in the review process that the procedure was performed well. Procedures with a verifiability rating above the mean rating for that participant are classified as *high verifiability* for that participant, and procedures with a verifiability rating below the mean rating for that participant are classified as *low verifiability* for that participant.²¹

Procedure Frame is manipulated between participants by wording procedures using a positive or negative frame. An example of a positive-framed procedure is “*Assess whether management’s forecasts and projections have been accurate historically.*” An example of the same procedure under a negative frame is “*Assess whether management’s forecasts and*

¹⁹ After pilot testing we changed how the achieved audit risk measure is scaled. We originally wrote the scale such that 100% indicated certainty that material misstatement is present, but pilot participants were confused by that presentation, with some spontaneously reversing the scale and rating the likelihood that the account was free of material misstatement, so we used that format for the main experiment.

²⁰ Estimated achieved audit risk should be a target that auditors use to determine the appropriate amount of audit effort. It should be influenced by such factors as the nature and extent of the reliance by outside stakeholders on the audited financial statements (Messier et. al [2010]), and should not depend on frame or efficiency pressure. Therefore, we make no hypotheses with respect to effects of our manipulated variables on achieved audit risk, but we elicit risk assessments to determine whether any unanticipated effects occur.

²¹ We exclude 28 (1.9%) out of a total of 1470 (= 2 levels of time pressure x 15 procedures x 49 participants) responses because the verifiability rating for a particular procedure equals that participants’ mean verifiability rating. Those responses belong to two participants. Including those responses as either high verifiability or low verifiability produces similar results in all analyses.

projections have **not** been accurate historically.”²² This manipulation is intended to produce alternative frames that are complements of each other (e.g., $P(\text{assumptions are reasonable}) = 1 - P(\text{assumptions are not reasonable})$), and holds constant that the audit will provide positive assurance rather than negative assurance about the financial statements. As discussed in section 4.3.2, we support that our framing manipulation meets those conditions by testing whether auditors believe they would make the same planning judgment regardless of procedure frame.

Efficiency Pressure is manipulated within participants by first having participants budget time and assess achieved audit risk under conditions indicating relatively unconstrained time, and then under conditions indicating relatively more constrained time. Participants received the following instruction for the low efficiency-pressure condition:

Sometimes auditors experience relatively less time pressure on a client engagement due to matters unrelated to the client, such as scheduling, time of year, etc. Imagine you now are in such a situation for the ABC audit, such that cost and time budget are not a concern and you can design a time budget that is significantly less constrained by time pressure.

After completing their time budget and assessing achieved audit risk in the low efficiency-pressure condition, participants received the following instruction for the high efficiency-pressure condition:

Now assume that after you have submitted the time budget to the audit partner, the partner responded that the firm is very concerned about audit efficiency and asks that you consider how you can decrease the budget. The partner notes that other audit managers have successfully reduced similar budgets by significant amounts while still being able to meet audit objectives. The partner asks that you carefully consider each step and determine the **minimum** amount of time that could be allocated to each procedure while still providing appropriate assurance that audit objectives have been met. All other

²² Our frame manipulation is intended to hold constant that the audit provides positive assurance that the financial statements are free of material misstatements, and to produce alternative frames that are complements of each other (e.g., $P(\text{assumptions are reasonable}) = 1 - P(\text{assumptions are not reasonable})$), such that affects of frame on participants' judgments are unintentional. However, it is possible that participants could extract information from a framing manipulation e.g., inferring that different frames imply different levels of assurance about whether the financial statements are materially misstated, and intentionally respond to frame in their planning decisions. As discussed in the results section, responses to supplemental questions indicate that our results are not explained by participants intentionally modifying their planning decisions in light of procedure frame.

assumptions in the case still hold (for example, the same risk characteristics are present and the same audit personnel will be assigned to the audit).

Participants are provided with the budget they prepared under low efficiency pressure and can adjust that time budget upwards or downwards as they believe appropriate given the high efficiency-pressure instruction.

3.4 TASK AND PROCEDURE

The task is adapted from training materials used at a Big-Four accounting firm. Experimental materials first were pilot-tested with two senior partners specializing in auditing fair values, modified based on their comments, and then pilot tested with 12 audit managers from the audit firms providing participants and modified again. The task requires auditors to assume the role of an audit manager who is responsible for planning the audit of the fair value of a rental property that is the largest asset on ABC Investment Corporation's balance sheet. The audit manager is provided the client's discounted cash flow model used to value the property (calculating a present value of \$10.6 million) and a list of audit procedures used by their firm in the past for similar types of audits. Participants are informed that audits of similar properties average 30-40 preparer hours (excluding manager and partner review) but vary considerably between clients, that inherent and control risks are assessed as sufficiently high to not allow significant modifications to substantive procedures, that the partner concluded that no specialist was needed for this work, and that the person performing the procedures and reporting to the manager would be an audit senior experienced on this audit. Participants also are informed that misstatements totaling \$250,000 would be considered material.

After reviewing the client's schedule of prospective cash flows and DCF calculation (see Appendix B), participants are given the low efficiency pressure manipulation and assign audit effort to audit procedures, with the procedures framed positively or negatively depending on the

framing condition to which the participant is assigned. All participants receive procedures in the same order that is used in the audit firm's materials from which the case is adapted. Participants estimate achieved audit risk under the assumption that the procedures were performed within their time budget and no material misstatement was found.

Participants then are given the high efficiency-pressure manipulation and repeat the process of assigning audit effort (by adjusting the hours assigned under low efficiency pressure) and estimating achieved audit risk.

Each participant then rates the extent to which he or she believes that the quality with which the senior performed each of the 15 procedures can be verified during the audit review process. The experiment concludes with participants answering some supplemental and demographic questions.

4. Results

4.1 MANIPULATION CHECKS

To assess whether participants attended to the framing manipulation, a supplemental question asked them to indicate whether audit procedures were written in terms of whether a particular objective had been satisfied (for example, "Assess whether management's forecasts and projections have been accurate historically."), not satisfied (for example, "Assess whether management's forecasts and projections have not been accurate historically."), or they did not recall. Forty-two (86%) of participants answered the manipulation check correctly (with one participant not answering the question), indicating that the frame manipulation was successful. Results are similar if based on only those participants who answered the framing manipulation check correctly, so analyses are based on all 49 participants.

To assess whether participants attended to the efficiency pressure manipulation, we examined whether participants reduced their time budgets when moving from low to high efficiency pressure. Forty-five (92%) of participants reduced their time budgets (the remaining four (8%) did not change their time budgets). Auditors allocate significantly less time overall given high efficiency pressure than they allocate given low efficiency pressure (one-sided $p < 0.001$), with auditors allocating a mean of 2.00 hours per procedure given high efficiency pressure and 2.55 hours per procedure (28% more) given low efficiency pressure. These results indicate that the efficiency pressure manipulation was successful. Results are similar if based on only those participants who did not change their time budgets between efficiency pressure conditions, so analyses are based on all 49 participants.

4.2 TESTS OF HYPOTHESES

Table 1, Panel A includes descriptive statistics of auditors' effort allocations, broken out by procedure frame (positive, negative), efficiency pressure (high, low), and procedure verifiability (high, low).²³ Panel B includes the results of a repeated-measures ANOVA.²⁴ Additional descriptive data is included in Table 2.

²³ Analyses include procedure verifiability as a binary variable in which a procedure is classified as high (low) verifiability for each participant if the procedure has a verifiability rating that is higher (lower) than the mean verifiability rating for that participant. Similar but less significant results are obtained when this binary variable is based on the median (rather than mean) rating for each participant (but power is lower in this analysis because the median split requires excluding 41% of observations due to tie scores) or split into high/medium/low verifiability levels with the medium level omitted for each participant (but power is lower because we drop the middle third of observations). Results of raw verifiability scores are insignificant when included in place of the binary verifiability score in an ANCOVA (which we attribute to low power due to the noisiness of raw verifiability scores).

²⁴ Results are similar if based on non-parametric analysis with ranked data, and if dependent variables are log transformed.

4.2.1 Frame

H1 predicts that auditors' effort allocations are affected by framing. Consistent with H1, auditors allocate significantly more effort given a negative frame than they allocate given a positive frame (one-sided $p < 0.017$). On average auditors allocate 2.03 hours per procedure given a positive frame, and 2.50 hours per procedure (23% more) given a negative frame.

H2 predicts that the effect of frame on auditors' effort allocations is more severe when auditors are considering procedures that are less verifiable. Consistent with H2, the effect of frame is significantly greater when auditors consider procedures that are less verifiable (one-sided $p < 0.018$). On average, moving from a positive to a negative frame of a more-verifiable procedure increases effort allocations by $2.02 - 1.76 = 0.26$ hours, while moving from a positive to a negative frame of a less-verifiable procedure increases effort allocations by $3.06 - 2.31 = 0.75$ hours (an increase of almost 200% over the change that occurs when procedures are more verifiable).

4.2.2 Efficiency Pressure

H3 predicts that the effect of efficiency pressure on auditors' effort allocations is greater when auditors are considering procedures that are less verifiable. H3 is not supported (one-sided $p < 0.337$). The effect of efficiency pressure on auditors' effort allocations to a procedure is not influenced significantly by the verifiability of the procedure.

4.2.3 Combined Effects

These effects combine to create relatively large differences in time budgets between experimental conditions. Participants in the positive frame/high efficiency-pressure setting budget an average of 1.75 hours per procedure, or 26.25 ($= 1.75 \times 15$ procedures) for the entire audit program devoted to auditing fair value of this asset. Participants in the negative frame/low efficiency-pressure setting budget an average of 2.77 hours per procedure, or 41.55 ($= 2.77 \times 15$ procedures) for the entire audit program, which is an increase of over 15 hours (58%). The frame \times verifiability interaction indicates that this difference occurs disproportionately more for procedures that are less verifiable. While it is important not to over-interpret effect sizes in experimental data, given the abstraction necessary to operationalize an experimental context, these differences do seem substantial and likely to be economically meaningful, both in terms of audit efficiency (audit effort expended) and audit effectiveness (likelihood that material misstatements are detected).

4.3 ADDITIONAL ANALYSES

4.3.1 Achieved Audit Risk

During the experiment participants estimated *achieved audit risk* under both low and high efficiency pressure by assessing the probability that, under the assumption the audit was performed within their time budget and no material misstatement was found, no material misstatement exists within ABC's financial statements with regard to the asset. Participants made these estimates on a 0-100 percentage scale (with 0% = certain that material misstatement is present, 50% = 50/50 chance of material misstatement, and 100% = certain that material misstatement is NOT present). Table 3, Panel A presents descriptive statistics of auditors'

estimates of achieved audit risk, broken out by procedure frame (positive, negative) and efficiency pressure (high, low). Panel B shows the results of a repeated-measures ANOVA that indicates no significant main effects of frame or efficiency pressure, and no interaction.²⁵ Thus, while participants modify their audit programs significantly in response to efficiency pressure and frame, their judgments of achieved audit risk are not significantly different, implying either that they are not aware of the effects of these variables on their planning judgments or that they don't believe their planning judgments affect achieved audit risk.

4.3.2 Self-Insight Regarding Framing Effects

Our frame manipulation is designed to hold constant that the audit provides positive assurance that the financial statements are free of material misstatements, and to produce alternative frames that are complements of each other (e.g., $P(\text{assumptions are reasonable}) = 1 - P(\text{assumptions are not reasonable})$). Evidence that auditors believe they would make the same planning judgment regardless of procedure frame would indicate that our framing condition meets those conditions, as well as shedding light on the extent to which auditors have self-insight concerning the effect of frame on their planning decisions.

Therefore, at the end of the experiment participants are asked two questions to assess their beliefs about the effect of frame on their decisions (see Libby, Bloomfield and Nelson 2002 for a discussion of this experimental technique). Each question asked participants "Would the audit procedures you design and the time budget you develop differ between these two steps?" The "two steps" are two versions of the same excerpt from a sample audit program, with one version framed positively and one framed negatively. One question regards an audit procedure

²⁵ Results are similar if based on non-parametric analysis with ranked data, or if the dependent variable is log transformed.

that we view as typifying low verifiability (positive frame: “Review the valuation method and assumptions used to develop the fair value measures to determine whether they **are appropriate** considering the nature of the asset being valued”; negative frame: “Review the valuation method and assumptions used to develop the fair value measures to determine whether they **are not appropriate** considering the nature of the asset being valued”). The other question regards an audit procedure that we view as typifying high verifiability (positive frame: “Mathematically recalculate the terminal value based on the method employed to assess whether the calculation **is accurate**”; negative frame: “Mathematically recalculate the terminal value based on the method employed to assess whether the calculation **is not accurate.**”).²⁶ For each question, participants respond “yes” or “no” that the audit procedures they design and the time budget they develop would differ between the two versions, and then briefly explain their answer.

Twenty-seven participants indicate for both questions that they believe frame would not influence their planning decisions. Twenty-two participants indicate they believe frame would influence their audit planning decisions in response to at least one of the two questions,²⁷ but disagree as to the *direction* of that effect. Eleven indicate more audit work would be necessary in the positive frame,²⁸ five indicate more audit work would be necessary in the negative frame,²⁹ and the other six participants do not provide an indication one way or the other.

²⁶ The order with which these questions appeared was fixed, with the low verifiability question always preceding the high verifiability question.

²⁷ Twenty of 49 participants indicate that belief for the question regarding the less-verifiable procedure; eight of 49 participants indicate that belief for the question regarding the more-verifiable procedure (six of the eight indicated that belief for both procedures).

²⁸ A typical explanation supporting an answer that more hours should be devoted to the positively framed version: “It is easier to determine if methods and assumptions are not appropriate than to evaluate how appropriate/reasonable a method and assumptions are.” Even though the experiment was set in the context of a financial audit, which requires positive assurance, some of the eleven indicated that the negative frame implied the auditor is providing a negative assurance which required less effort than a positive assurance. For example, one participant wrote: “Positive assurance [version] 1 needs to be more precise than negative assurance [version] 2. I would perform more procedures in order to positively confirm that the measurements are appropriate. There would be more leeway in [version] 2.”

We coded an indicator variable, *frame-relevance perception* (“FRP”) as 1 for the 22 participants who indicated they believe frame would influence their audit planning under some circumstance, and as 0 for the other 27 participants. As shown in Table 4, Panel A, when FRP is included in the analysis of auditors’ effort allocations, significant effects still are observed for frame, verifiability, efficiency pressure, and the interaction between frame and verifiability. In addition, there is a marginally significant interaction between frame, verifiability and FRP ($p < 0.057$). Table 4, Panels B and C report descriptive statistics and an ANOVA including only the 27 participants who do *not* view frame as relevant (i.e., FRP = 0), and indicates results for those participants that are similar to the overall results, with a significant interaction between frame and verifiability as well as significant main effects for verifiability, efficiency pressure and (marginally) frame. Table 4, Panels D and E report descriptive statistics and an ANOVA including only the 22 participants who view frame as relevant (i.e., FRP = 1), and indicates significant main effects of frame, verifiability and efficiency pressure, but an insignificant interaction between frame and verifiability.³⁰

In general, these responses indicate a lack of self-insight concerning the effect of frame on audit planning decisions. Over half of participants indicate that frame would not affect planning decisions, yet display the main effect of frame and the interaction between frame and verifiability that we predict. Of the participants who indicate that frame would influence their audit planning decisions, half indicated that the positive frame would require more hours, which biases away from the result we predict and find (i.e., a main effect of frame in which participants assign more audit effort when procedures are framed negatively).

²⁹ A typical explanation supporting an answer that more hours should be devoted to the negatively framed version: “Validating that something is appropriate generally would seem to be a reasonableness test, whereas evaluating that it is not appropriate seems like it would require a standalone assessment.”

³⁰ In analyses of auditors’ estimates of achieved audit risk, FRP is not significant as a main effect or in an interaction with other variables.

5. Conclusion

This paper reports the results of an experiment in which 49 audit managers with an average of over ten years of audit experience plan the audit of an investment classified as level 3 of the FASB's fair-value hierarchy. Audit procedure frame (positive, negative) is manipulated between participants, and audit procedure verifiability (measured across 15 procedures) and efficiency pressure (high, low) are varied within participants. Results indicate significant main effects of procedure frame and efficiency pressure, with time budgets significantly higher when efficiency pressure is low and when procedures are framed negatively. Results also indicate a significant interaction between procedure frame and procedure verifiability, such that framing effects are stronger with respect to procedures that participants view as less verifiable.

Despite the effect of our manipulated variables on budgeted hours, participants' estimates of achieved audit risk (and presumably audit quality) are unaffected. Supplemental questions provide further evidence that participants lack self-insight regarding the effect of the frame manipulation on their decisions. Most participants indicate a belief that frame would not influence their planning decisions, and when analyses include only those participants, results are very similar to those of analyses that include all participants. Also, the participants who indicate a belief that frame would influence their planning decisions disagree as to the direction of that influence, with half of participants indicating a belief that they would budget more hours given a *positive* frame, but analyses indicating a main effect of frame in which participants budgeted more hours given a *negative* frame.

These results make contributions to the research literature and have implications for audit practice and audit standards setting. Regarding procedure frame, our finding of a main effect of

frame and an interaction between frame and procedure verifiability adds to the literature investigating the effect of frame in other contexts (e.g., Kida [1984]; Trotman and Sng [1989]; Asare [1992]; Emby [1994]; Emby and Finley [1997]; Fukukawa and Mock [2011]). Most notably, we find that frame has a larger effect when procedures are less verifiable (more subjective), while Fukukawa and Mock [2011] find framing effects relevant to the existence and accuracy assertions (which typically utilize procedures that are relatively more objective and verifiable, like determining mechanical accuracy) but not for the valuation objective (which typically utilizes some procedures that are relatively more subjective and less verifiable, like those included in our context). Unlike Fukukawa and Mock [2011], our study was designed specifically to test a hypothesized interaction between procedure frame and procedure verifiability, and provides strong evidence that such an interaction can occur in circumstances like the fair value setting that we operationalize.

From a practice perspective, the interaction between procedure frame and procedure verifiability is of concern since it suggests that the most vulnerable audit procedures are those that are perhaps the most important – procedures that address the appropriateness of the fundamental assumptions and judgments that drive fair value estimates. The mechanical accuracy of a model’s computations doesn’t matter much if the assumptions underlying a model are unsound, but an audit of that model can look like much work was done even when it focuses on the relatively more verifiable procedures.

The lack of self-insight concerning the effect of frame on audit planning judgments compounds this concern, as it suggests that auditors are unlikely to anticipate framing effects and take steps to counteract them. However, rather than necessarily being a problem, framing effects potentially could be used by audit firms to enhance audit effectiveness, similar to “choice

architecture” interventions recommended in other contexts (Thaler and Sunstein [2008]). Specifically, firms that understand auditors’ tendency to be influenced by procedure frame can design their audit programs to frame procedures negatively, thus “nudging” auditors to plan more audit effort and minimizing the level of audit risk that actually is achieved.

Regarding efficiency pressure, our finding of a main effect of efficiency pressure on audit planning judgments adds to the literature documenting effects of efficiency pressure on effort allocations (see, e.g., McDaniel [1990]; Glover [1997]; Brown, Peecher and Solomon [1999]). Perhaps more surprising is the lack of a significant interaction between efficiency pressure and procedure verifiability on auditors’ planning judgments. One possible explanation for this finding is that auditors view the total time budget as somewhat fungible when actually conducting audit tests, such that the interaction between efficiency pressure and procedure frame would be observed more in where the audit senior spends their time than in where the audit manager allocates that time in audit planning. Also surprising is that the large effect of efficiency pressure on auditors’ effort allocations is not mirrored in auditors’ assessments of achieved audit risk. This result might be explained by noise in the risk estimate, to auditors believing that they are only trimming inefficiency when moving from low to high efficiency pressure, or to auditors being unwilling to indicate relatively high achieved audit risk in any circumstance.

Our research is subject to three important limitations. First, we cannot determine what amount of audit effort *should* be planned in our experimental setting, and therefore cannot characterize whether a particular time budget is likely to be ineffective or inefficient. Thus, for example, it could be that a time budget of 26.25 hours is appropriate in this setting, such that relaxing efficiency pressure and using a negative frame creates inefficiency by increasing the

average time budget to 41.55 hours. On the other hand, it could be that a time budget of 41.55 hours is appropriate, such that increasing efficiency pressure and using a positive frame encourages ineffectiveness by reducing average time budgets to 26.25 hours. Both effectiveness and efficiency may be affected by the variables we manipulate to a degree that is economically significant, but we limit generalizing these results to the directional effects that we observe.

Second, we do not incorporate auditors' use of specialists in our experimental setting. Auditors sometimes employ specialists to assess reasonableness of management's fair values or to develop independent estimates of fair value. For either case, auditors are required by professional standards to evaluate the specialists' work and perform additional procedures if they deem it necessary to do so. Moreover, given the pervasiveness of fair values in current financial accounting, extending to such areas as financial instruments and impairment testing, as well as the broader use of estimates in accounting practice, our results may have implications for a variety of audit settings.

Third, we do not directly observe audit outcomes in terms of the fair values that auditors ultimately are willing to accept in the financial statements, but rather examine effects on audit planning decisions and estimated achieved audit risk. Planning decisions are important, affecting the time auditors have for performing procedures and therefore likely affect audit effectiveness and efficiency. However, it could be that auditors respond to tighter budgets by doing the same amount of work they would have done otherwise and either reporting budget over-runs or under-reporting time.

TABLE 1
Descriptive Statistics and Analysis of Audit Planning Decisions

Panel A: Hours Budgeted by Procedure Verifiability, Frame, and Efficiency Pressure (hrs mean, [median], <standard deviation>)

	Positive Frame (N=24)			Negative Frame (N=25)		
	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure
Low Verifiability	2.61 [2.00] <2.34>	2.01 [1.50] <1.86>	2.31 [2.00] <2.13>	3.36 [2.00] <3.16>	2.76 [2.00] <2.72>	3.06 [2.00] <2.96>
High Verifiability	2.03 [1.00] <2.01>	1.49 [1.00] <1.54>	1.76 [1.00] <1.81>	2.25 [1.38] <2.43>	1.78 [1.00] <2.13>	2.02 [1.00] <2.29>
Average	2.31 [2.00] <2.20>	1.75 [1.00] <1.72>	2.03 [1.50] <1.99>	2.77 [2.00] <2.84>	2.24 [1.25] <2.47>	2.50 [2.00] <2.67>

Panel B: Results of ANOVA Examining Effects of Frame, Efficiency Pressure, and Verifiability on Hours Budgeted

	F	P <	Hypothesis
<i>FRAME</i>	4.753	0.017†	H1 (supported)
<i>VERIFIABILITY</i>	43.378	0.001	
<i>TIME PRESSURE</i>	21.906	0.001†	
<i>FRAME * VERIFIABILITY</i>	4.452	0.018†	H2 (supported)
<i>TIME PRESSURE * VERIFIABILITY</i>	0.169	0.341†	H3 (not supported)
<i>FRAME * EFFICIENCY PRESSURE</i>	0.019	0.892	
<i>FRAME * EFFICIENCY PRESSURE * VERIFIABILITY</i>	0.019	0.891	

† equivalent one-tailed test given our directional predictions

Table 1 reports descriptive statistics and the results of an ANOVA of auditors' effort allocations (budgeted hours). Panel A presents descriptive data of auditors' effort allocations, by procedure verifiability level (high v. low), procedure frame, efficiency pressure. Auditors assigned hours to fifteen audit procedures in .25 hour increments in the context of auditing the fair value of a real estate investment. Auditors completed the task first assuming a relatively unconstrained time budget (low efficiency pressure) and then assuming a more constrained time budget (high efficiency pressure). Procedure frame was manipulated between auditors as either positive or negative (e.g., "Assess whether the significant assumptions used by management in measuring fair value, taken individually and as a whole, provide (*do not provide*) a reasonable basis for the fair value measurements and disclosures"). Auditors also rated the verifiability of each audit procedure on a scale of 1 to 7 (1="no ability to verify in the review process that the procedure was performed well, 7="complete ability to verify in the review process that the procedure was performed well"). Verifiability level dichotomizes verifiability scores for each auditor based on the mean verifiability score across all procedures for that auditor (Low<Mean<High).

TABLE 2
Additional Descriptive Statistics

Panel A: Hours Budgeted, by Procedure, Frame, and Efficiency Pressure (hrs mean, [median], <standard deviation>), Ordered by Mean Low Efficiency Pressure

Positive Frame (N = 24)			Negative Frame (N =25)		
Procedure	Low Efficiency Pressure	High Efficiency Pressure	Procedure	Low Efficiency Pressure	High Efficiency Pressure
8	5.32 [5] <2.51>	4.39 [3.5] <2.46>	8	6.74 [8] <3.61>	5.94 [5] <3.2>
3	3.89 [3.5] <2.94>	2.92 [2.5] <1.81>	3	5.42 [4] <5.01>	4.15 [3] <3.71>
6	3.85 [4] <2.62>	2.68 [2] <1.68>	6	4.8 [4] <2.82>	3.94 [3] <2.51>
4	3.84 [3] <2.67>	2.84 [2.5] <1.66>	1	3.63 [3] <3.22>	2.91 [2] <3.13>
5	3.08 [2] <2.8>	2.49 [1.5] <2.82>	5	3.41 [3] <2.12>	2.93 [2] <2.04>
1	2.63 [2] <1.87>	1.78 [1] <1.25>	4	3.11 [2] <2.71>	2.61 [2] <2.48>
13	2.28 [2] <1.89>	1.59 [1.5] <0.97>	15	2.16 [2] <1.18>	1.72 [2] <1.03>
9	1.77 [2] <1.2>	1.27 [1] <0.82>	13	2.15 [2] <2.09>	1.71 [1] <1.94>
10	1.63 [1.5] <0.95>	1.21 [1] <0.7>	10	1.73 [2] <0.91>	1.2 [1] <0.91>
14	1.3 [1] <1.1>	1.07 [1] <1.07>	14	1.66 [1] <1.18>	1.39 [1] <1.13>
15	1.26 [1] <0.95>	1.01 [1] <0.74>	9	1.6 [2] <1.06>	1.23 [1] <0.87>
7	1.25 [1] <0.9>	0.82 [1] <0.56>	12	1.58 [1] <1.52>	1.25 [1] <1.55>
11	1.24 [1] <0.91>	0.96 [0.88] <0.85>	11	1.35 [1] <1.02>	1.01 [1] <0.89>
12	1.07 [1] <0.61>	0.81 [0.88] <0.52>	7	1.27 [1] <0.88>	1.02 [1] <0.84>
2	0.63 [0.5] <0.58>	0.67 [0.5] <1>	2	0.9 [0.5] <0.97>	0.57 [0.25] <0.58>
Average	2.34 [2.03] <1.63>	1.77 [1.45] <1.26>	Average	2.77 [2.43] <2.02>	2.24 [1.75] <1.79>

Panel A presents descriptive data of auditors' effort allocations, by procedure, procedure frame, and efficiency pressure. See Table 1 for descriptions of variables.

TABLE 2
Additional Descriptive Statistics (continued)

Panel B: Verifiability Scores, by Procedure and Frame (score mean, [median], <standard deviation>), Ordered by Overall.

Procedure	Overall (N=49)	Positive Frame (N=24)	Negative Frame (N=25)
2	6.76 [7] <0.59>	6.71 [7] <0.62>	6.8 [7] <0.58>
7	6.45 [7] <1.11>	6.33 [7] <1.23>	6.56 [7] <0.99>
14	6.17 [6.5] <0.99>	6.22 [7] <0.94>	6.12 [6] <1.04>
15	6.17 [6] <0.78>	6.3 [7] <0.81>	6.04 [6] <0.73>
9	6.15 [7] <1.1>	6 [7] <1.30>	6.28 [7] <0.88>
1	6.1 [6] <0.9>	6.43 [7] <0.73>	5.8 [6] <0.96>
8	5.26 [6] <1.3>	5.45 [6] <1.25>	5.08 [6] <1.34>
3	5.19 [5] <1.27>	5.27 [5] <1.45>	5.12 [5] <1.13>
11	5.18 [5] <1.25>	5.29 [5] <1.22>	5.08 [5] <1.28>
6	5.16 [5] <1.69>	5.42 [6] <1.42>	4.92 [5] <1.74>
5	4.94 [5] <1.27>	5.3 [5] <1.24>	4.6 [5] <1.21>
12	4.94 [5] <1.53>	5.23 [5] <1.33>	4.68 [5] <1.66>
10	4.82 [5] <1.39>	4.71 [5] <1.38>	4.92 [5] <1.40>
4	4.66 [5] <1.33>	5.05 [5] <1.12>	4.32 [5] <1.42>
13	4.5 [4] <1.31>	4.7 [5] <1.05>	4.32 [4] <1.50>
Average	5.5 [5.6] <1.40>	5.63 [5.93] <1.14>	5.38 [5.60] <1.19>

Panel B presents descriptive data of auditors' ratings of the extent to which fifteen audit procedures are verifiable, by procedure frame. The data excludes the 58 observations for which the verifiability rating was equal to the mean verifiability for that procedure. These 58 observations were not used in the statistical analyses, but including these observations in the analyses produces similar results. See Table 1 for descriptions of variables, and Appendix A for listing of procedures.

TABLE 3

Descriptive Statistics and Analysis of Auditor’s Assessed Post-Audit Probability of No Material Misstatement (“Achieved Audit Risk”)

Panel A: Assessed Probability of No Material Misstatement Post Audit, by Procedure Frame, and Efficiency Pressure (hrs mean, [median], <standard deviation>)

		Frame		
		Positive (N=24)	Negative (N=25)	Average
Efficiency Pressure	Low	69.5 [80] <27.4>	77.04 [90] <22.84>	73.35 [80] <25.2>
	High	66.92 [74.5] <26.28>	75.68 [85] <21.29>	71.39 [76] <24.02>
	Average	68.21 [75] <26.59>	76.36 [85] <21.86>	72.37 [80] <24.51>

Panel A presents descriptive data of auditors’ assessed probability that no material misstatement exists within the company’s financial statements with regard to the FV audit, by procedure frame, and efficiency pressure. See Table 1 for descriptions of variables.

Panel B: Results of ANOVA Examining Effects of Procedure Frame and Efficiency Pressure, and Verifiability on Assessed Probability of No Material Misstatement Post Audit

	F	P <
<i>FRAME</i>	1.508	.226
<i>TIME PRESSURE</i>	0.776	.385
<i>FRAME * TIME PRESSURE</i>	0.074	.787

Panel B reports the results of an ANOVA of auditors assessments of the post-audit probability that no material misstatement exists in the financial statements with regards to the fair value of the property being audited assuming the work was done within the assigned budget without detecting a material misstatement. See Table 1 for descriptions of variables.

TABLE 4
Analysis of Audit Planning Decisions, Conditioned on Auditors' Beliefs About Whether Those Decisions Should Be Affected by Procedure Frame

Panel A: Results of ANOVA Examining Effects of Frame, Efficiency Pressure, Verifiability, and Frame Relevance Perception (“FRP”) on Hours Budgeted

	F	P <	Hypothesis
<i>FRAME</i>	4.825	0.017†	H1 (supported)
<i>VERIFIABILITY</i>	39.293	0.001	
<i>TIME PRESSURE</i>	21.928	0.001†	
<i>FRAME * VERIFIABILITY</i>	3.291	0.035†	H2 (supported)
<i>TIME PRESSURE * VERIFIABILITY</i>	.169	0.341†	H3 (not supported)
<i>FRAME * EFFICIENCY PRESSURE</i>	.019	0.892	
<i>FRAME * EFFICIENCY PRESSURE * VERIFIABILITY</i>	.019	0.891	
<i>FRP</i>	.437	.512	
<i>FRAME * FRP</i>	.015	.902	
<i>VERIFIABILITY * FRP</i>	.337	.561	
<i>FRAME * VERIFIABILITY * FRP</i>	3.616	.057	

† equivalent one-tailed test given our directional predictions

Table 4 repeats the analyses included in Table 1 for auditors’ effort allocations, but also includes a “frequency relevance perception” (“FRP”) indicator variable set to a value of 1 if auditors indicated that procedure frame would affect their audit planning decisions, and set to 0 otherwise. Panels A reports results of an ANOVA that includes FRP. Panels B and C report descriptive statistics and an ANOVA for the 27 participants for whom FRP = 0. Panels D and E report descriptive statistics and an ANOVA for the 22 participants for whom FRP = 1. See Table 1 for descriptions of other variables.

TABLE 4 (continued)

Panel B: Audit Planning Decisions of 27 Participants Indicating Frame is Not Relevant (FRP = 0), by Procedure Verifiability, Frame, and Efficiency Pressure (hrs mean, [median], <standard deviation>)

	Positive Frame (N=12)			Negative Frame (N=15)		
	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure
Low Verifiability	2.5 [2] <2.32>	1.91 [1] <2.02>	2.2 [1.75] <2.19>	3.39 [2] <2.92>	2.91 [2] <2.7>	3.15 [2] <2.82>
High Verifiability	2.03 [1] <2.11>	1.47 [1] <1.63>	1.75 [1] <1.9>	1.97 [1] <1.89>	1.58 [1] <1.77>	1.77 [1] <1.83>
Average	2.25 [2] <2.22>	1.68 [1] <1.83>	1.97 [1] <2.05>	2.65 [2] <2.54>	2.22 [1.5] <2.36>	2.44 [2] <2.46>

Panel C: Results of ANOVA Examining Effects of Frame, Efficiency Pressure, and Verifiability on Hours Budgeted, Based on Data from 27 Participants Indicating Frame is Not Relevant (FRP = 0)

	F	P <	Hypothesis
<i>FRAME</i>	1.766	0.098†	H1 (marginally supported)
<i>VERIFIABILITY</i>	30.148	0.001	
<i>TIME PRESSURE</i>	11.940	0.001†	
<i>FRAME * VERIFIABILITY</i>	9.054	0.002†	H2 (supported)
<i>TIME PRESSURE * VERIFIABILITY</i>	0.042	0.419†	H3 (not supported)
<i>FRAME * EFFICIENCY PRESSURE</i>	0.241	0.623	
<i>FRAME * EFFICIENCY PRESSURE * VERIFIABILITY</i>	0.012	0.913	

† equivalent one-tailed test given our directional predictions

TABLE 4 (continued)

Panel D: Audit Planning Decisions of 22 Participants Indicating Frame is Relevant (FRP = 1), by Procedure Verifiability, Frame, and Efficiency Pressure (hrs mean, [median], <standard deviation>)

	Positive Frame (N=12)			Negative Frame (N=10)		
	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure	Low Efficiency Pressure	High Efficiency Pressure	Average across efficiency pressure
Low Verifiability	2.72 [2] <2.37>	2.12 [2] <1.68>	2.42 [2] <2.07>	3.31 [2] <3.55>	2.52 [1.5] <2.76>	2.92 [2] <3.19>
High Verifiability	2.02 [2] <1.9>	1.52 [1] <1.43>	1.77 [1] <1.7>	2.64 [1.75] <2.98>	2.06 [1] <2.53>	2.35 [1] <2.77>
Average	2.38 [2] <2.18>	1.82 [1.25] <1.59>	2.1 [2] <1.92>	2.94 [2] <3.25>	2.26 [1] <2.63>	2.6 [2] <2.97>

Panel E: Results of ANOVA Examining Effects of Frame, Efficiency Pressure, and Verifiability on Hours Budgeted, Based on Data from 22 Participants Indicating Frame is Relevant (FRP = 1)

	F	P <	Hypothesis
<i>FRAME</i>	4.510	0.023†	H1 (supported)
<i>VERIFIABILITY</i>	11.156	0.001	
<i>TIME PRESSURE</i>	10.277	0.001†	
<i>FRAME * VERIFIABILITY</i>	0.017	0.449†	H2 (not supported)
<i>TIME PRESSURE * VERIFIABILITY</i>	0.168	0.341†	H3 (not supported)
<i>FRAME * EFFICIENCY PRESSURE</i>	0.124	0.725	
<i>FRAME * EFFICIENCY PRESSURE * VERIFIABILITY</i>	0.019	0.891	

† equivalent one-tailed test given our directional predictions

APPENDIX A
Audit Procedures and Auditor Agreement on Verifiability Level

#	Procedure [positive (negative) frame]	Verifiability Level (% participants)	
		High	Low
1	Assess whether management’s forecasts and projections have (not) been accurate historically.	75%	25%
2	Assess whether the fair value measurement reconciles (does not reconcile) to the financial statements.	94%	6%
3	Review the valuation method and assumptions used to develop the fair value measures to assess whether they are (not) appropriate considering the nature of the asset being valued (Required by AU328.18).	34%	66%
4	Determine whether all (any) significant assumptions underlying the fair value measurement have (not) been included in management’s calculation of fair value. Significant assumptions are those that are: a) Sensitive to variation or uncertainty in amount or nature (for example, assumptions about short-term interest rates are less susceptible to variation than long-term rates b) Susceptible to misapplication or bias c) A small change in the assumption may result in large changes in the value of the asset or liability being measured	17%	83%
5	Assess whether the significant assumptions used by management in measuring fair value, taken individually and as a whole, provide (do not provide) a reasonable basis for the fair value measurements and disclosures. (As required by AU 328.28).	23%	77%
6	Review the related contractual agreements to assess whether all (there are any) relevant contractual terms have (that have not) been incorporated into the model.	51%	49%
7	Mathematically recalculate the terminal value based on the method employed to assess whether the calculation is (not) accurate.	86%	14%
8	Test the inputs used to develop the fair value measurements and disclosures to assess whether all (any) such inputs have (do not have) sufficient evidence to support them.	43%	57%
9	Evaluate whether the fair value measurement has (not) been correctly calculated from such inputs and management’s assumptions. (AU 328.39)	79%	21%
10	Assess whether the evidence regarding this fair value amount is (not) consistent with other evidence obtained and evaluated during the audit (Required by AU 328.47).	33%	67%
11	Conclude whether audit evidence to reduce the risk of significant misstatement in the financial statements to an appropriately low level is (not both) sufficient and competent. (Required by AU 328.03 and 328.15).	39%	61%

APPENDIX A (continued)

12	Conclude whether management has (not) appropriately applied the highest and best use concept within Statement 157 (ASC Section 820-10-55).	32%	68%
13	Determine whether the fair value measurement reflects (does not reflect) the value that would be received or paid, in an orderly transaction between market participants, to sell the asset or transfer the liability at the measurement date.	15%	85%
14	Assess whether Level 3 disclosures required by Statement 157 are (not) complete (ASC Section 820-10-50).	77%	23%
15	Evaluate whether the fair value measurement and all related disclosures in the financial statements are (not) in conformity with GAAP. (AU 328.15)	83%	17%

Appendix A lists the fifteen procedures used in the experimental materials. Procedure numbers correspond to Table 2. For a given participant, a procedure is assigned a verifiability level of high (low) if that procedure is above (below) the average of the verifiability score assigned to all procedures by that participant. Thus, e.g., 94% of participants assigned a verifiability score to procedure number 2 (“Assess whether the fair value measurement reconciles **(does not reconcile)** to the financial statements”) that is above the average score they assigned to all procedures.

APPENDIX B

Client's Schedule of Prospective Cash Flows and Present Value Calculation

ABC Company Fiscal year ending April 30, 2011	Schedule Of Prospective Cash Flow In Inflated Dollars for the Fiscal Year Beginning 5/1/2011 and Onward									
For the Years Ending	Year 1 Apr-2012	Year 2 Apr-2013	Year 3 Apr-2014	Year 4 Apr-2015	Year 5 Apr-2016	Year 6 Apr-2017	Year 7 Apr-2018	Year 8 Apr-2019	Year 9 Apr-2020	Year 10 Apr-2021
Potential Gross Revenue										
Base Rental Revenue	\$1,060,900	\$1,092,727	\$1,125,509	\$1,102,877	\$1,115,948	\$1,132,687	\$1,149,678	\$1,166,923	\$1,242,628	\$1,301,607
Absorption & Turnover Vacancy				(457,554)					(537,004)	
Scheduled Base Rental Revenue	1,060,900	1,092,727	1,125,509	645,323	1,115,948	1,132,687	1,149,678	1,166,923	705,624	1,301,607
Expense Reimbursement Revenue										
Real Estate Taxes	75,015	77,265	79,583	48,154	84,430	86,962	89,571	92,258	55,354	97,877
Insurance	17,503	18,028	18,569	11,236	19,700	20,291	20,900	21,527	12,916	22,838
Management Fee	39,343	40,526	35,740	20,297	42,481	42,752	43,538	40,819	21,101	43,708
Common Area Maintenance	187,536	193,162	198,957	120,386	211,074	217,406	223,928	230,646	138,384	244,692
Total Reimbursement Revenue	319,397	328,981	332,849	200,073	357,685	367,411	377,937	385,250	227,755	409,115
Total Potential Gross Revenue	1,380,297	1,421,708	1,458,358	845,396	1,473,633	1,500,098	1,527,615	1,552,173	933,379	1,710,722
General Vacancy	(69,015)	(71,085)	(72,918)		(73,682)	(75,005)	(76,381)	(77,609)		(85,536)
Effective Gross Revenue	1,311,282	1,350,623	1,385,440	845,396	1,399,951	1,425,093	1,451,234	1,474,564	933,379	1,625,186
Operating Expenses										
Real Estate Taxes	75,000	77,250	79,568	81,955	84,413	86,946	89,554	92,241	95,008	97,858
Insurance	17,500	18,025	18,566	19,123	19,696	20,287	20,896	21,523	22,168	22,834
Management Fee	39,338	40,519	41,563	25,362	41,999	42,753	43,537	44,237	28,001	48,756
CAM	187,500	193,125	198,919	204,886	211,033	217,364	223,885	230,601	237,519	244,645
Total Operating Expenses	319,338	328,919	338,616	331,326	357,141	367,350	377,872	388,602	382,696	414,093
Net Operating Income	991,944	1,021,704	1,046,824	514,070	1,042,810	1,057,743	1,073,362	1,085,962	550,683	1,211,093
Leasing & Capital Costs										
Tenant Improvements				245,864					285,023	
Leasing Commissions				239,391					280,959	
Reserve	25,000	25,750	26,523	27,318	28,138	28,982	29,851	30,747	31,669	32,619
Total Leasing & Capital Costs	25,000	25,750	26,523	512,573	28,138	28,982	29,851	30,747	597,651	32,619
Resale Amount										
Gross Proceeds from Sale										\$14,515,753
Commissions & Adjustments										(290,315)
Net Proceeds From Sale										\$14,225,438
Cash Flow Before Debt Service & Taxes	\$966,944	\$995,954	\$1,020,301	\$1,497	\$1,014,672	\$1,028,761	\$1,043,511	\$1,055,215	(\$46,968)	\$15,403,912

ABC Company
 Fiscal year ending April 30, 2011

Prospective Present Value
 Cash Flow Before Debt Service plus Property Resale
 Discounted Annually (Endpoint on Cash Flow & Resale) over a 10-Year Period

Analysis Period	For the Year Ending	Annual Cash Flow	P.V. of Cash Flow @ 10.00%
Year 1	Apr-2012	\$966,944	\$879,040
Year 2	Apr-2013	995,954	823,102
Year 3	Apr-2014	1,020,301	766,568
Year 4	Apr-2015	1,497	1,022
Year 5	Apr-2016	1,014,672	630,032
Year 6	Apr-2017	1,028,761	580,708
Year 7	Apr-2018	1,043,511	535,487
Year 8	Apr-2019	1,055,215	492,265
Year 9	Apr-2020	(46,968)	(19,919)
Year 10	Apr-2021	15,403,912	5,938,875
Total Cash Flow		22,483,799	10,627,180
Total Property Present Value			\$10,627,180 =====
Rounded to Thousands			\$10,627,000 =====

REFERENCES

- ABDOLMOHAMMADI, M., and A. WRIGHT. "An Examination of the Effects of Experience and Task Complexity on Audit Judgments." *The Accounting Review* 62(1) (1987): 1-13.
- ALDERMAN, C. W., and J. W. DEITRICK. "Auditors' Perceptions of Time Budget Pressures and Premature Sign-Offs: A Replication and Extension." *Auditing: A Journal of Practice and Theory* 1 (1982): 54-68.
- AMERICAN ACCOUNTING ASSOCIATION (AAA), Financial Accounting Standards Committee (FASC). "Response to a Discussion Paper Issued by the IASC/CICA Steering Committee on Financial Instruments: Accounting for Financial Assets and Financial Liabilities." *Accounting Horizons* 12 (3) (1998): 304-311.
- _____. "Response to the FASB Preliminary Views: Reporting Financial Instruments and Certain Related Assets and Liabilities at Fair Value." *Accounting Horizons* 14 (4) (2000): 501-508.
- _____. "Response to the FASB's Exposure Draft: Fair Value Measurements." *Accounting Horizons* 19 (3) (2005): 187-196.
- ANDERSON, U., and L. KOONCE. "Evaluating the Sufficiency of Causes in Audit Analytical Procedures." *Auditing: A Journal of Practice and Theory* 17 (1) (1998): 1-12.
- ASARE, S. K. "The Auditor's Going-Concern Decision: Interaction of Task Variables and the Sequential Processing of Evidence." *Accounting Review* 67 (1992): 379-393.
- _____, TROMPETER, G. M., WRIGHT, A. M., and B. COLLEGE. "The Effect of Accountability and Time Budgets on Auditors' Testing Strategies." *Contemporary Accounting Research* 17(4) (2000): 539-560.
- BAMBER, E. M, R. J RAMSAY, and R. M TUBBS. "An Examination of the Descriptive Validity of the Belief-Adjustment Model and Alternative Attitudes to Evidence in Auditing." *Accounting, Organizations and Society* 22 (1997): 249-268.
- BELL, T. B., and J. B. GRIFFIN. "Commentary on Auditing High-Uncertainty Fair Value Estimates." *Auditing: A Journal of Practice & Theory* 31(1) (2012): 147-155.
- BIER, V. M., and B. L. CONNELL. "Ambiguity Seeking in Multi-attribute Decisions: Effects of Optimism and Message Framing." *Journal of Behavioral Decision Making* 7 (1994): 169-182.
- BONNER, S. E. "A Model of the Effects of Audit Task Complexity." *Accounting, Organizations and Society* 19 (1994): 213-234.
- _____. *Judgment and Decision Making in Accounting*. 1st ed. Prentice Hall, 2007.

- BORITZ, J. E. “The Effect of Information Presentation Structures on Audit Planning and Review Judgments.” *Contemporary Accounting Research* 1(2) (1985): 193–218.
- BRATTEN, B., L. M. GAYNOR, L. MCDANIEL, N. R. MONTAGUE, and G. E. SIERRA. “The Audit of Fair Values and Other Estimates: The Effects of Underlying Environmental, Task, and Auditor-Specific Factors.” Working Paper, University of Kentucky, 2012.
- BROWN, C. E, M. E PEECHER, and I. SOLOMON. “Auditors' Hypothesis Testing in Diagnostic Inference Tasks.” *Journal of Accounting Research* 37 (1999): 1–26.
- CHEN, F., K. LAM, W. SMIELIAUSKAS, and M. YE. “Auditor Conservatism and Fair Value Measurements: Evidence from the Banking Industry.” Working Paper, University of Toronto, 2010.
- CHRISTENSEN, B. E., S. M. GLOVER, and D. A. WOOD. “Estimation Uncertainty in Fair Value Estimates: Implications for Audit Assurance.” *Auditing: A Journal of Practice & Theory* 31(1) (2012): 127-146.
- EARLEY, C. E, V. B HOFFMAN, and J. R JOE. “Reducing Management’s Influence on Auditors’ Judgments: An Experimental Investigation of SOX 404 Assessments.” *The Accounting Review* 83 (2008): 1461.
- ELLSBERG, D. “Risk, Ambiguity, and the Savage Axioms.” *Quarterly Journal of Economics* 75 (1961): 643-669.
- EMBY, C. “Framing and Presentation Mode Effects in Professional Judgment: Auditors' Internal Control Judgments and Substantive Testing Decisions.” *Auditing: A Journal of Practice and Theory* 13 (1994): 102–102.
- _____, and D. FINLEY. “Debiasing Framing Effects in Auditors' Internal Control Judgments and Testing Decisions.” *Contemporary Accounting Research* 14 (1997): 55–77.
- ETTREDGE, M., XU, Y., and H. YI. “Fair Value Measurements, Auditor Industry Expertise, and Audit Fees: Evidence from the Banking Industry.” Working paper, University of Kansas, 2011.
- FINANCIAL ACCOUNTING STANDARDS BOARD (FASB). Fair Value Measurement. SFAS 157. Norwalk, CT.: FASB, 2007
- FOX, C. R., and M. WEBER. “Ambiguity aversion, comparative ignorance, and decision context. *Organizational Behavior and Human Decision Processes* 88(1) (2002):476-498.

- FUKUKAWA, H., and T. J. MOCK. "Audit Risk Assessments Using Belief versus Probability." *Auditing: A Journal of Practice and Theory* 30(1) (2011):75–99.
- GIBBINS, M., and K. T. TROTMAN. "Audit Review: Managers' Interpersonal Expectations and Conduct of the Review." *Contemporary Accounting Research* 19 (Fall) (2002): 411-444.
- GLOVER, S. M. "The Influence of Time Pressure and Accountability on Auditors' Processing of Nondiagnostic Information." *Journal of Accounting Research* 35 (1997): 213–226.
- GRIFFIN, J. "The Effects of Uncertainty and Disclosure on Auditors' Fair Value Materiality Decisions." Working Paper. University of Georgia, 2011.
- GRIFFITH, E. E., J. S. HAMMERSLEY, and K. KADOUS. "Auditing Complex Estimates: Understanding the Process Used and Problems Encountered." Working Paper. University of Georgia, 2012.
- HACKENBRACK, K., and M. NELSON. "Auditors' Incentives and Their Application of Financial Accounting Standards." *The Accounting Review* 71 (January) (1996): 43-59.
- HUNTON, J. E., WRIGHT, A. M., and S. WRIGHT. "Are Financial Auditors Overconfident in Their Ability to Assess Risks Associated with Enterprise Resource Planning Systems?" *Journal of Information Systems*, 18(2) (2004): 7-28.
- HYATT, T. A., and D. F. PRAWITT. "The Organizational Response to the Discovery of False Sign-Off." *International Journal of Disclosure and Governance* 8(1) (2010): 43–61.
- INTERNATIONAL AUDITING AND ASSURANCE STANDARDS BOARD (IAASB). *Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures*. ISA 540. New York, NY: IAASB, 2008.
- _____. International Practice Note 1000 – Special Considerations in Auditing Financial Instruments, IAPN 1000. December 16, 2011. New York, NY: IAASB, 2011.
- KADOUS, K., and M. MERCER. "Can Reporting Norms Create a Safe Harbor? Jury Verdicts Against Auditors under Precise and Imprecise Accounting Standards." *The Accounting Review* (2012): forthcoming.
- _____, S. J. KENNEDY, and M. E. PEECHER. "The Effect of Quality Assessment and Directional Goal Commitment on Auditors' Acceptance of Client-Preferred Accounting Methods." *The Accounting Review* 78 (3) (2003): 759-778.
- KENNEDY, J. "Debiasing Audit Judgment with Accountability: A Framework and Experimental Results." *Journal of Accounting Research* 31 (2) (1993): 231.245.
- _____. "Debiasing the Curse of Knowledge in Audit Judgment." *Accounting Review* 70(2) (1995): 249–273.

- KIDA, T. "The Impact of Hypothesis-Testing Strategies on Auditors' Use of Judgment Data." *Journal of Accounting Research* 22 (1984): 332-340.
- KOONCE, L. "Explanation and Counterexplanation during Audit Analytical Review." *The Accounting Review* 67(1) (1992): 59-76.
- _____, U. ANDERSON, and G. MARCHANT. "Justification of Decisions in Auditing." *Journal of Accounting Research* 33 (2) (1995): 369-384.
- KUHN, K. M. "Communicating Uncertainty: Framing effects on responses to vague probabilities." *Organizational Behavior and Human Decision Processes* 71(1) (1997): 55-83.
- LEVIN, I. P., R. D. JOHNSON, P. J. DELDIN, L. M. CARSTENS, L. J. CRESSEY, and C. R. DAVIS. "Framing effects in decisions with completely and incompletely described alternatives." *Organizational Behavior and Human Decision Processes* 38 (1986): 48-64.
- _____, S. L. SCHNEIDER, and G. J. GAETH. "All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects." *Organizational Behavior and Human Decision Processes* 76(2) (1998): 149-188.
- LIBBY, R. "Availability and the Generation of Hypotheses in Analytical Review." *Journal of Accounting Research* 23 (Autumn) (1985): 648-667.
- _____, R. BLOOMFIELD, AND M. NELSON. "Experimental Research in Financial Accounting." *Accounting, Organizations and Society* 27 (8) (2002): 775-810.
- _____, and W. R. KINNEY, JR. "Does Mandated Audit Communication Reduce Opportunistic Corrections to Manage Earnings to Forecasts?" *The Accounting Review* 75 (2000): 383.
- LIGHTNER, S. M., J. J. LEISENRING, and A. J. WINTERS. "Underreporting Chargeable Time." *Journal of Accountancy* 155 (1983): 52-57.
- LUIPPOLD, B. L., and T. E. KIDA. "The Impact of Initial Information Ambiguity on the Accuracy of Analytical Review Judgments." *Auditing: A Journal of Practice and Theory* 31(2) (2012): 113-129.
- MARTIN, R. D., RICH, J. S., and T. J. WILKS. "Auditing Fair Value Measurements: A Synthesis of Relevant Research." *Accounting Horizons* 20(3) (2006): 287-303.
- MCDANIEL, L. S. "The Effects of Time Pressure and Audit Program Structure on Audit Performance." *Journal of Accounting Research* 28(2) (1990): 267-285.

- _____, and W. R. KINNEY JR. "Expectation-Formation Guidance in the Auditor's Review of Interim Financial Information." *Journal of Accounting Research* 33 (1995): 59–76.
- MCMILLAN, J. J., and R. A. WHITE. "Auditors' Belief Revisions and Evidence Search: The Effect of Hypothesis Frame, Confirmation Bias, and Professional Skepticism." *The Accounting Review* 66(3) (1993): 443–465.
- MESSIER, W. F., S. M. GLOVER, and D. F. PRAWITT. *Auditing & Assurance Services: A Systematic Approach*. McGraw-Hill Irwin, 2010.
- NELSON, M. W. "A Model and Literature Review of Professional Skepticism in Auditing." *Auditing: A Journal of Practice and Theory* 28(2) (2009): 1–34.
- _____, J. A. ELLIOTT, and R. L. TARPLEY. "Evidence from Auditors About Managers' and Auditors' Earnings Management Decisions." *The Accounting Review* 77 (Supplement) (2002): 175-202.
- _____, and W. R. KINNEY, JR. "The Effect of Ambiguity on Auditors' Loss Contingency Reporting Judgments." *The Accounting Review* 72(2) (1997): 257-274.
- _____, S. D. SMITH, and Z-V. PALMROSE. "Quantitative Materiality Perspectives and Auditors' Disposition of Detected Misstatements." *The Accounting Review* 80 (2005) (2005): 897-920.
- NG, T. B-P., and H.-T. TAN. "Effects of Authoritative Guidance Availability and Audit Committee Effectiveness on Auditors' Judgments in an Auditor-Client Negotiation Context." *The Accounting Review* 78(3) (2003): 801-818.
- NICKERSON, R. S. "Confirmation Bias: A Ubiquitous Phenomenon in Many Guises." *Review of General Psychology* 2 (1998): 175–220.
- OTLEY, D. T., and B. J. PIERCE. "Auditor Time Budget Pressure: Consequences and Antecedents." *Accounting, Auditing and Accountability Journal* 9(1) (1996): 31–58.
- PEECHER, M. E. "The Influence of Auditors' Justification Processes on Their Decisions: A Cognitive Model and Experimental Evidence." *Journal of Accounting Research* 34 (Spring) (1996): 125-140.
- PONEMON, L. A. "Ethical Reasoning and Selection-Socialization in Accounting." *Accounting, Organizations and Society* 17(3-4) (1992): 239–258.
- PUBLIC COMPANY ACCOUNTING OVERSIGHT BOARD (PCAOB). AU 328, Auditing Fair Value Measurements and Disclosures. Washington, D.C.: PCAOB, 2003a.
- _____. AU 332, Auditing Derivative Instruments, Hedging Activities, and Investments in Securities. Washington, D.C.: PCAOB, 2003b.

- _____. AU 342, Auditing Accounting Estimates. Washington, D.C.: PCAOB, 2003c.
- RHODE, J. G. “Survey on the Influence of Selected Aspects of the Auditor's Work Environment on Professional Performance of Certified Public Accountants.” Summarized in The Commission on Auditors' Responsibilities: Report of Tentative Conclusions. New York: AICPA, 1978.
- RICH, J. S., I. SOLOMON, and K. T. TROTMAN. “The Audit Review Process: A Characterization from the Persuasion Perspective.” *Accounting, Organizations and Society* 22 (1997): 481–505.
- SHAFER, G. A. *Mathematical Theory of Evidence*. Princeton University press Princeton, NJ, 1976.
- SHAPEERO, M., KOH, H. C., and L. N. KILLOUGH. “Underreporting and Premature Sign-Off in Public Accounting.” *Managerial Auditing Journal* 18(6/7) (2003): 478–489.
- SRIVASTAVA, R. P., and G. SHAFER. “Belief-Function Formulas for Audit Risk.” *The Accounting Review* 67 (April) (1992): 249 – 283.
- _____, and T. J. MOCK. *Belief Functions in Business Decisions*. Springer, 2002.
- TAN, H-T. “Effects of Expectations, Prior Involvement, and Review Awareness on Memory for Audit Evidence and Judgment.” *Journal of Accounting Research* 33 (1) (1995): 113-135.
- THALER, R. H., and C. R. SUNSTEIN. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press, 2008.
- TROTMAN, K. T., and J. SNG. “The Effect of Hypothesis Framing, Prior Expectations and Cue Diagnosticity on Auditors’ Information Choice.” *Accounting, Organizations and Society* 14 (1989): 565-576.
- TURNER, C. W. “Accountability Demands and the Auditor’s Evidence Search Strategy: The Influence of Reviewer Preferences and the Nature of the Response (Belief vs. Action).” *Journal of Accounting Research* 39 (3) (2001): 683-706.
- TVERSKY, A., and D. KAHNEMAN. “The Framing of Decisions and the Psychology of Choice.” *Science* 211 (1981): 453-458.