

## Determinants of the Perceived Quality of Audit Teams' Judgments

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**ABSTRACT:** This paper examines auditors' judgments about how three audit team characteristics influence three dimensions of audit teams' judgments: bias, noise, and justifiability. While extant research does not address how auditors believe audit team characteristics affect such dimensions, it documents that audit firms incur significant costs to manage characteristics of audit teams in order to improve audit team judgment. We use both a mathematical model of bias and noise propagation as well as audit and psychology research to derive expectations.

When audit team supervisors have directional instead of accuracy goals, judged bias and noise both increase, whereas judged justifiability decreases. When supervisors have greater instead of equal technical knowledge compared to subordinates, judged bias and noise decrease and judged justifiability increases. Interestingly, superior supervisor technical knowledge constrains judged bias even when supervisors have directional goals. When supervisors intervene during subordinates' judgment process instead of letting subordinates formulate an independent judgment, justifiability generally increases despite no significant change in bias or noise. Finally, we observe judged noise to flow from a complex interaction among supervisors' goals, their technical knowledge relative to subordinates, and whether they pre-emptively intervene with subordinates.

The theory and findings suggest at least two key implications. One, when auditors modify characteristics of audit teams and the audit review process, they may do so in anticipation of trading off different dimensions of audit team judgments. Two, while auditors' beliefs of how bias, noise, and justifiability are complex, they may well diverge from how bias and noise actually propagate.

**Key Words:** bias, noise, justifiability, motivated reasoning, review process, error propagation

**Data Availability:** The data are available upon request

## I. INTRODUCTION

This paper reports an experimental investigation of how auditors believe three audit team characteristics affect three dimensions of audit teams' judgments: bias, noise, and justifiability. Bias and noise refer to systematic error and non-systematic error within audit teams' judgments, respectively. Justifiability refers to the defensibility of audit teams' judgments against potential criticisms by those to whom auditors are held accountable (Peecher 1996; Kennedy, Kleinmuntz, and Peecher 1997). Holding all else constant, audit team judgments improve when bias or noise decrease or when justifiability increases.

Audit firms incur costs to improve audit team judgments by managing characteristics of audit teams, such as their competency, incentives, and review processes. For example, at a macro-level, audit firms recently incurred costs by shifting from sequential, hierarchical reviews of subordinates' judgments to real-time, pre-emptive reviews of their judgments (Rich, Solomon, and Trotman 1997b). At a micro-level, audit supervisors incur costs when they purposely modify the nature and extent of their review depending on factors such as the judged technical competence of subordinates and features of the client (e.g., Bamber, Bamber, and Bylinski 1988; Kennedy and Peecher 1997; Phillips 1999; Gibbins and Trotman 2001; Tan and Jamal 2001). An interesting implication of strategic modifications to the review process and other audit team characteristics is that auditors likely have beliefs about how such modifications improve audit team judgments.

Unfortunately, extant research provides little evidence about the nature of these beliefs. Several fundamental questions exist. One question is whether auditors believe

audit team characteristics affect the degree of bias, noise and justifiability to the same degree. Another question is whether auditors' beliefs allow for trade-offs across these three judgment dimensions. Do they believe that some configurations of audit team characteristics cause some judgments dimensions to improve and others to worsen? To illustrate, audit supervisors believe that (but may underestimate how much) real-time, pre-emptive reviews increase bias in subordinates' judgments (Wilks 2001). While generally undesirable, increased bias may be preferable if its antecedents contemporaneously improve other dimensions of audit teams' judgments (Einhorn 1986).

The theory and experimental findings of this study contribute to the literature in three basic ways. One, they provide initial evidence as to how auditors believe audit team characteristics jointly affect the bias, noise, and justifiability associated with audit team judgments and how they believe these three dimensions inter-relate. Such evidence is important because auditor beliefs influence their decisions. Two, it provides a descriptive model of how bias and noise actually propagate within audit team judgments. Three, by contrasting evidence regarding auditors' beliefs with our descriptive model, the study provides an initial means of identifying potential areas of divergence between believed and actual propagation of bias, noise, and (hence) justifiability.

In our experiment, audit seniors judged the extent to which different audit team characteristics would affect the bias, noise, and justifiability of a hypothetical audit teams' fair-value estimates. We manipulated three audit team characteristics. One, given recent assertions that auditor motivational biases influence financial reporting quality (e.g., Levitt 1998; Whitehead et. al 1999), we manipulated hypothetical supervisors' motivational goals

at three levels by indicating a preference for either aggressive, neutral, or conservative accounting. Two, because of the recent intensification and attendant technical knowledge requirements of industry specialization (e.g., Solomon, Shields and Whittington 1999), we also manipulated whether or not supervisors had superior technical knowledge relative to subordinates. Three, because of the aforementioned modifications to the audit review process (e.g., Rich et. al 1997b), we manipulated whether supervisors pre-emptively interacted with subordinates or retrospectively reviewed their judgments. While these independent variables are interesting to examine in isolation, they are particularly interesting to examine jointly because knowledgeable supervisors can strategically exploit their knowledge or their interactions with subordinates to further their own biases (e.g., Paul and Bainbridge 1991; Kerr, MacCoun, and Kramer 1996).

Our main experimental findings are that when supervisors have directional motivational goals, judged bias and noise both increase, whereas judged justifiability decreases. Independent of the nature of supervisors' motivational goals, superior supervisor technical knowledge decreases judged bias and noise and increases judged justifiability. We had expected auditors to believe that supervisors with directional motivational goals would exploit their knowledge advantage over the subordinate to increase, not decrease, bias. Instead, participants appear to view technical knowledge as a universal constraint on bias propagation in audit team judgments.

We also find that, in auditors' judgment, pre-emptive intervention with subordinates *generally* decreases neither judged bias nor judged noise, but it does generally increase judged justifiability. This finding suggests that auditors believe interaction

between supervisors and subordinates increases judgment defensibility even if no discernable improvement is expected on traditional accuracy-oriented benchmarks.

Judged noise flows from a complex interaction among supervisors' motivational goals, technical knowledge relative to subordinates, and degree of pre-emptive intervention with subordinates. The nature of the interaction diverges from our model of noise propagation in audit team judgments. Specifically, the nature of the two-way interaction between relative technical knowledge and pre-emptive intervention differs across the three levels of motivational goals. Given neutral motivational goals, the prediction of a positive interaction between relative technical knowledge and pre-emptive intervention is supported. Conversely, given conservative or aggressive motivational goals, no interaction between pre-emptive intervention and relative technical knowledge is observed.

In other main findings, we observe that judged bias increases judged noise, after controlling for the influence of our manipulated independent variables on judged noise. Since our model and other models of noise propagation in human judgment assume that bias does not affect noise, future research is warranted to understand the full implications of auditors' belief that bias increases noise. Finally, both judged bias and noise decrease justifiability, after controlling for the influence our manipulated variables on justifiability.

## II. THEORY AND HYPOTHESES

We used different approaches to develop our research expectations for auditors' judgments of audit team bias and noise, on the one hand, and their judgments of justifiability, on the other. As a point of departure, we applied statistical decision theory to a simple audit team consisting of a supervisor and a subordinate in developing expectations

as to how bias and noise actually propagate in audit team judgments (e.g., Pratt et al. 1996). Unless existing audit or psychology research provides a basis to hypothesize otherwise, our central research expectation is convergence between auditors' beliefs and our model of how bias and noise actually propagate (Simon 1987).<sup>1</sup> Of course, when existing research provides a basis, we hypothesize auditors' beliefs to systematically diverge from the model. We present the model in Appendix A, we present theory, findings, and intuition behind our hypotheses below, and we summarize our hypotheses in Exhibit 1.

### **Bias (i.e., Systematic Error)**

Consistent with the model, we expected auditors would believe that audit supervisors with non-neutral motivational goals (aggressive, conservative) would introduce bias into audit team's judgments (row 1 of Exhibit 1). We also expected that auditors would believe that audit supervisors' motivational goals moderate whether other audit team characteristics generate further bias. Specifically, we anticipated that auditors would believe that supervisors with directional goals exploit their technical knowledge advantage and use pre-emptive interventions with subordinates to bias the audit-team's judgments (rows 2-5 of Exhibit 1). These predictions also are consistent with audit and psychology experimental research. A number of studies suggest that people expect motivational goals to cause others to search for and assign greater weight to evidence that supports their conclusions (e.g., Birnbaum and Stegner 1979; Thompson, Fong, and Rosenhan 1981; Wilks 2001). In addition, auditors have access to professional guidance that reminds them to consider

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<sup>1</sup> Reliance on the model provides structure to our investigation and serves as a useful benchmark against which to compare auditors' beliefs (e.g., Waller and Jiambalvo 1984). Explicitly distinguishing between the how noise and bias propagate and how auditors judge noise and bias to propagate is reasonable because auditor's possess bounded rationality (Simon 1986).

whether estimates provided by third parties could lack objectivity due to motivational goals (e.g., Ramos and Delahanty 1998).

Finally, our default presumption of convergence between auditors' beliefs and our model's predictions led us to hypothesize that, given directional goals, bias increases due to the combination of greater supervisor technical knowledge and pre-emptive interventions would be less than additive (row 6-7 of Exhibit 1). To summarize, we expected auditors would believe that supervisor's motivational goals directly generate bias and dictate whether supervisors' technical knowledge advantage over subordinates or interactions with subordinates generates incremental bias in audit team judgments.

#### **Noise (i.e., Nonsystematic Error)**

We expected that, consistent with our model, auditors would believe superior supervisor technical knowledge and pre-emptive interventions with subordinates each decrease judged noise (rows 2-3 of Exhibit 1). The former expectation is also consistent with psychology research in which participants place greater weight on estimates and predictions provided by persons who have task-relevant knowledge than by those do not have such knowledge (e.g., Birnbaum and Stegner 1979; Birnbaum and Mellers 1983). The latter expectation is consistent with interactions increasing supervisors' awareness and remediation of subordinates' knowledge deficiencies (Ismail and Trotman 1995; Rich, Solomon and Trotman 1997b). The latter expectation also is consistent with psychology research suggesting that people often (and arguably mistakenly) believe that noise decreases more when redundant (as opposed to independent) sources are consulted (Soll 1999).

That is, pre-emptive interventions, which increase redundancy among supervisor and subordinate judgments, likely would decrease judged noise in audit-team judgments.

In contrast to our model's predictions about noise propagation in audit team judgments, experimental psychology research suggests a relation likely exists between motivational goals and judged noise. Specifically, people place more weight on the opinions of neutral information sources than on the opinions of biased information sources, holding source expertise constant (Birnbaum and Mellers 1983). If auditors' beliefs of noise propagation are similar to those of participants in Birnbaum and Mellers, then auditors will believe directional goals increase noise (row 1 of Exhibit 1).

It is unclear, however, why participants in Birnbaum and Mellers believed source bias merited a decreased weight. At least two plausible explanations exist. One explanation relates to participant confidence. That is, participants may have decreased the weight ascribed to biased information sources because of second-order uncertainty (confidence) about how large of a scale adjustment was needed to eliminate source bias from the estimate. Decreased confidence about the appropriate scale adjustment could result in less willingness to ascribe weight to the source's estimate.

A second plausible explanation relates to participants' beliefs about how source bias can introduce noise into information processing. Specifically, participants may have believed that unbiased information sources strive to reliably search for, interpret, and aggregate information irrespective of the position the information supports. In contrast, participants may have reasoned that biased sources of information introduce noise into their judgments by virtue of less reliably searching for, interpreting, and aggregating certain

types of information (Koriat, Lichtenstein, and Fischhoff 1980; Gettys, Mehle, Fisher 1986; Dukerich and Nichols 1991; Hsee 1995). The motivated reasoning literature in accounting and psychology suggests people tend to be more critical of information that supports a preference-inconsistent position than of information that supports a preference-consistent position (Kunda 1990, 1999; Ditto and Lopez 1992; Ditto, Scepansky, Munro, Apanovitch, and Lockhart 1998; Kadous, Kennedy, and Peecher 2001). Because we ask participants directly about noise in audit-team judgments instead of inferring the weight that they ascribe to audit-team judgments, our experimental approach allows us to test the information processing explanation while minimizing the applicability of the participant confidence explanation (row 1 of Exhibit 1).

Finally, consistent with our model, we expected our participants would believe that the overall decrease in noise due to the joint effects of greater supervisor technical knowledge and greater supervisor intervention with subordinates to be less than additive (row 6 of Exhibit 1). Intervention likely enables supervisors to provide information with subordinates, and the extent to which supervisors provide new information during intervention likely increases when supervisors possess a technical knowledge advantage. Past research suggests that sharing information fails to achieve optimal noise reduction because of dependent errors (Clemen and Winkler 1985). In fact, the sub-additivity prediction is consistent with decision analysis models that predict diminishing decreases in noise reduction when one co-mingles multiple interventions that, in isolation, decrease noise (Kleinmuntz 1990; Ravinder, Kleinmuntz, and Dyer 1988). As for *judged* noise,

however, we are unaware of any experimental research that directly supports this sub-additivity prediction.

### **Justifiability**

Our expectations regarding justifiability are less mathematically oriented as the defensibility of a judgment against potential justifiees' criticisms is a subjective indicator of expert performance (Solomon and Shields 1995; Peecher 1996). Though subjective, justifiability is a reasonable performance measure in ill-structured audit tasks, which require significant professional judgment and lack unambiguous external referents (Kennedy, et al., 1997). For such tasks, auditing becomes a mix of a searching for the truth and marshalling evidence to defend a preferred conclusion (see, e.g., Gibbins 1984; Waller and Felix 1984; Davis and Solomon 1989; Messier and Quilliam 1992; Gibbins and Newton 1994). Typically, when an audit team develops their own estimate to help them assess the reasonableness of an auditee's estimate, the audit team completes an ill-structured task.

By virtue of being a relevant albeit subjective measure of task performance, auditors' judgments of justifiability have important social and economic consequences. These consequences arise because auditors' beliefs about the determinants of judgement defensibility affect how they adapt their decision behavior across contexts, including how they purposefully modify the review process (Rich, Solomon and Trotman 1997a). While the literature on determinants of auditors' justifiability judgments is still formative, some hypotheses can be advanced.

For one, justifiability likely varies with the judged quality of the inputs and processes used to arrive at judgments, especially judgments on ill-structured tasks (Kennedy, Kleinmuntz, and Peecher 1997). Thus, we expected that, holding noise and bias constant, auditors would believe that audit teams with supervisors motivated to reach directional conclusions would render less justifiable judgments than those with supervisors motivated to reach neutral conclusions (row 1 of Exhibit 1). Relatedly, we expected that auditors would believe that supervisors with aggressive motivational goals would impair justifiability more than supervisors with conservative motivational goals (e.g., Hoffman and Patton 1997; see row 1 of Exhibit 1).

Further, we expected that auditors would ascribe greater justifiability to the judgments of audit teams whose supervisors possessed superior technical knowledge (row 2 of Exhibit 1). This expectation follows from the concept of due professional care (AICPA 2000; AU§230). That is, holding constant bias and noise, justifiability likely decreases as the probability increases that a prudent person would have done more to support or improve audit team judgment (e.g., Does the audit team have sufficient specialized technical knowledge?). It also is consistent with research showing that auditors believe that the informativeness of evidence decreases in source reliability, which likely increases as the source's technical knowledge increases (e.g., Bamber 1983, Hirst 1994). Finally, we expected auditors would believe that justifiability increases when supervisors pre-emptively interact with subordinates (row 3 of Exhibit 1). Of course, auditors may be motivated to maintain such a belief in order to ratify the recent change to real-time review. Such a belief, however, also would be consistent with the psychology finding that interactions with

others increases confidence even when it does not improve accuracy (Heath and Gonzalez 1995).

### **Relations Among Bias, Noise, and Justifiability**

We also hypothesized several relations would exist among the three dimensions of audit team judgments after controlling for the influence of our manipulated variables on each dimension. To the extent determinable, accuracy likely increases justifiability (Kruglanski 1989). Consequently, we expected that judged bias and noise each would decrease the justifiability of the audit team's estimate, even though they affect the accuracy of the estimate in different ways (Einhorn, Hogarth, and Klempner 1977, see rows 8-9 of Exhibit 1). Two, although our model predicts noise to be unaffected by bias (also see Soll 1999), the "self-serving" information processing explanation for the Birnbaum and Mellers (1983) finding that participants ascribe less weight to biased than to unbiased sources suggests auditors' judgments of bias will increase their judgments of noise (row 8 of Exhibit 1).

## **III. THE EXPERIMENT**

### **Participants**

One hundred five Big 5 auditors volunteered to participate in the study. On average, the participants had approximately three years of experience with the firm and 16 months of experience reviewing the work of subordinates. Six participants were eliminated because they failed to complete the experimental instrument resulting in 99 usable responses. About 43% of participants were supervising seniors, 35% were seniors, and 19% were staff auditors. Only 2% were managers.

## Independent Variables

Supervisor motivational goals (conservative accounting, neutral accounting, aggressive accounting), relative knowledge (supervisor's greater than or equal to subordinate's technical knowledge) and pre-emptive intervention (present, absent) were manipulated within subjects in a 3x2x2 balanced, incomplete-block design. Each subject was presented with a block of six of the 12 possible cases. Six different blocks are necessary to obtain information on all factorial effects.<sup>2</sup> This design is presented in Table 8.12-2 of Winer (1971, 662).

We define supervisor motivational goals with respect to whether supervisors encourage clients to use conservative, neutral, or aggressive accounting practices. We manipulated supervisor motivational goals by providing participants with a description of the audit manager's preferences. The "aggressive accounting" condition described the manager as encouraging clients to use aggressive accounting practices and providing advice to clients on novel ways to exploit ambiguities in GAAP. In the "neutral accounting" condition, the audit manager was described as encouraging the client to use only the highest quality, or most appropriate, accounting practices and discouraging use of less appropriate methods even if arguably allowable under GAAP. Finally, the "conservative accounting" condition described the manager as encouraging clients to use conservative accounting practices and to disclose more information with greater transparency than is required by GAAP.

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<sup>2</sup> Cases were presented to each subject in one of four random orders. Subsequently reported results are not sensitive to order of presentation.

We define relative knowledge as the degree to which supervisors' technical knowledge exceeds subordinates' technical knowledge. Relative knowledge was manipulated by describing the manager and senior's knowledge of technical accounting issues and of the financial reporting for asset securitizations. Asset securitization was chosen because it requires a complex, relatively subjective estimate of the fair value of the retained interest, which some experts fear firms routinely exploit for earnings management purposes (Shakespeare 2001).<sup>3</sup> In the "higher" condition the manager was described as possessing a *tremendous* amount of technical accounting expertise and as *quite knowledgeable* about professional guidance that is relevant to asset securitizations. The senior was described as possessing a *moderate* amount of technical accounting expertise and as *somewhat knowledgeable* about professional guidance that is relevant to asset securitizations. In the "lower" relative knowledge gap condition both the manager and senior were described as possessing a *moderate* amount of technical accounting expertise and as *somewhat knowledgeable* about professional guidance that is relevant to asset securitizations.

We define pre-emptive intervention as the degree to which supervisors' interact with subordinates prior to subordinate's formation of a judgment. Pre-emptive intervention was manipulated by describing the roles of the manager and senior in reaching the audit team's estimate of the fair value of the client's retained interest in the asset securitization. In the "high" intervention condition the senior approached the manager to discuss the securitization transaction. The manager explained his expectation

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<sup>3</sup> Market prices are not readily available to estimate the fair value of retained interest. Estimating the fair value of retained interest requires assumptions about future interest rates, prepayment rates, and credit risks. Uncertainty in these areas creates earnings management opportunities in fair valuing retained interest, enabling management to distort reported gains on asset securitizations (Shakespeare 2001).

regarding the estimate to the senior. After this discussion, the senior developed a preliminary estimate and then met again with the manager to further discuss the issue. The senior then documented the underlying reasons and assumptions in support of his judgment and forwarded them to the manager. The manager reviewed the senior's memo and finalized the audit team's estimate of fair value by making any adjustment deemed necessary to the senior's estimate. In the "low" intervention condition the senior evaluated the appropriateness of the client's fair value estimate without input from the manager. The senior then documented the reasons and assumptions in support of the judgment and forwarded them to the manager. The manager reviewed the senior's memo and finalized the audit team's estimate of fair value by making any adjustment deemed necessary to the senior's estimate.

### **Overview of Materials and Procedures**

After completing a voluntary consent form, participants read a one-page explanation of bias and noise (see Appendix B for instrument details). At this time they also completed two fill-in-the-blank questions designed to test their understanding of the meaning of bias (the instrument used systematic error) and noise (the instrument used non-systematic error). The participants were told that they would be asked about their judgments of bias and noise in an audit team's estimate. Again, the specific context was asset securitizations, and the estimate concerned the fair value of an audit client's residual interest in an asset securitization transaction. Participants then read a brief description of a fictional audit client's asset securitization transaction and answered a fill-in-the-blank

question designed to test their understanding of the effects of estimates of the fair value of residual interest on income.

Each participant evaluated eight cases in which auditors estimated the fair value of the client's residual interest. The first two cases were used to familiarize the participants with the instrument and were not analyzed (Winer 1971). Each case described the audit team manager and senior as discussed in the independent variable section. For each case, participants were asked to what extent systematic and non-systematic error cause the audit team's estimate of fair value to deviate from the best possible estimate. Additionally, participants were asked how justifiable the audit team's proposed estimate was as well as to what extent the client's fair value estimate reported in the financial statements would ultimately deviate from the best possible estimate. Upon completing the eight cases, the participants placed their answers in an envelope and sealed the envelope. They then completed a post-experimental questionnaire, which included manipulation checks and demographic questions.

## IV. RESULTS

### **Pre-Test Manipulation Checks**

We used pre-test, fill-in-the-blank questions to ensure participants differentiated between bias and noise. The bias question asked participants to identify the type of error a scale exhibits if it consistently adds 3 pounds to one's true weight (i.e., bias). The noise question asked participants to identify the type of error that a scale exhibits if it randomly adds or subtracts up to 3 pounds from one's true weight (i.e., noise). Of the ninety-nine

participants who provided usable responses, 95 successfully answered a fill-in-the-blank, pre-test question designed to ensure they understood bias, and 93 successfully answered a similar pre-test question for noise. We concluded the participants differentiated bias from noise.

We also used a pre-test, fill-in-the blank question to ensure participants understood the financial accounting implications of mis-estimating the fair value of residual interest in a securitization transaction. Specifically, we asked participants to identify whether the gain recognized in financial statements increases or decreases when the estimated fair value in the retained interest increases. Eighty-eight of the participants answered the question correctly (increases), seven participants answered with the wrong direction (decreases) and three participants provided nonsensical responses. We concluded that participants generally understood the financial reporting implications of mis-estimating the gain.

### **Post-Test Manipulation Checks**

In a post-test questionnaire, we replicated the language used in our within-subjects manipulations and asked participants to evaluate the language along a series of five -point scales. For the aggressive directional motivational goal manipulation, for example, we noted, "The manager encourages clients to use aggressive accounting practices. He frequently provides advice to clients consisting of novel ways to exploit ambiguities in GAAP. This advice frequently enables clients to achieve their earnings management objectives." Following this language, a five-point scale appeared with endpoints, (1) "The manager's preferences are highly biased towards conservative accounting estimates" and (5) "The manager's preferences are highly biased towards aggressive accounting estimates." The

midpoint was labeled, (3) "The manager's preferences are for the most appropriate accounting estimates. The means (standard deviations) observed for the conservative, neutral, and aggressive motivational goals languages are 1.36 (0.55), 2.76 (0.64), and 4.78 (0.56), respectively. The differences across the three levels represent significant monotonic increases in the predicted direction ( $p < 0.0001$ ).

In a similar fashion, we replicated the language used to effect the supervisor technical knowledge manipulation. The endpoints were (1) "The senior's technical accounting knowledge much greater than the manager's" and (5) "The manager's technical knowledge much greater than the senior's. The midpoint was (3) "The senior and manager possess equivalent degrees of technical accounting knowledge." The mean (standard deviation) of responses for the equal technical knowledge level of our manipulation is 3.54 (0.54), and the mean (standard deviation) of responses for the superior supervisor technical knowledge level is 4.13 (0.80). The difference in means across our two levels is statistically significant ( $p < 0.0001$ ).

Last, we used the same approach to test the language we used to effect the manipulation of supervisor-subordinate interaction. Participants were asked to assess the degree to which the manager intervened in the senior's process of assessing the reasonableness of the client's estimate. The endpoints were (1) "There was no manager intervention" and (5) "There was an extreme amount of manager intervention." The midpoint was (3) "There was a moderate amount of manager intervention." The means (standard deviations) for our lower-interaction and higher-interaction conditions are 2.49 (0.97) and 4.13 (0.80), and the difference in these means is significant ( $p < 0.0001$ ).

Overall, the data from the pre-test and post-test manipulation checks provide evidence consistent with effective manipulation of our three independent variables and with our participants understanding the differences between bias and noise as well as the financial-statement implications of mis-estimating fair value of residual interest.

### **Results for bias**

Our bias measure is the square of participants' response on a seven-point (-3 to +3) scale that asked: "To what extent does systematic error in the audit team's estimate of fair value potentially cause their estimate to deviate from the best possible estimate (i.e., the highest quality estimate; the most appropriate estimate)?" The seven-points were labeled. The labels corresponding to numbers from -3 to -1 were "audit team estimate likely is {extremely, moderately, somewhat} low." The labels corresponding to numbers +1 to +3 were "audit team estimate likely is {somewhat, moderately, extremely} high." The midpoint, 0, was labeled "audit team estimate undoubtedly is the best possible estimate."

Table 1 provides cell means related to participants' judgments of bias, and table 3 provides the accompanying ANOVA table. Two main effects obtain statistical significance, supervisor's motivational goals (SG), and relative knowledge (RK). The nature of the SG main effect is consistent with our expectations as the average judged bias in the two directional goal conditions (conservative and aggressive) is significantly greater than the judged bias in the neutral motivational goal condition ( $t=11.61$ ,  $p=.0001$ ). The RK main effect was not expected, but the obtained result is that judged bias is universally lower for higher supervisor technical knowledge than for lower supervisor technical knowledge (2.16 vs. 1.70;  $F=8.26$ ,  $p=.0042$ ).

## Results for noise

Our noise measure is participants' response to an eleven-point scale asking, "To what extent does random, non-systematic error in the audit team's proposed estimate of fair value potentially cause their estimate to deviate from the best possible estimate (i.e., the highest quality estimate; the most appropriate estimate)?" The endpoints were "extremely low concern exists" and "extremely high concern exists."

Table 1 provides cell means, and table 4 provides an ANCOVA for noise.<sup>4</sup> As shown, two main effects (SG and RK) and one interaction (SGxRKxI) obtain. In addition, bias is a significant covariate, consistent with judged bias increasing judged noise. We also had expected the relative knowledge main effect. As anticipated, less judged noise exists when supervisors have superior technical knowledge relative to subordinates than when they do not (4.89 vs. 4.46,  $t=3.52$ ,  $p=0.0003$ ). The main effect for intervention is in the predicted direction but insignificant ( $p=.1987$ ), while the RKxI interaction is in the predicted direction (see figure 1) but insignificant ( $p=0.1696$ ).

Inconsistent with the model, a significant SGxRKxI interaction obtains ( $p=0.0121$ ). A post-hoc examination of the three-way interaction (including a graph of the RKxI interaction within each supervisor goal condition in figure 1) is informative. Given conservative motivational goals, the RKxI interaction is in the predicted direction (see figure 1) but insignificant ( $F=0.0742$ ,  $p=0.7854$ ). Given neutral motivational goals, the

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<sup>4</sup> We tested the assumption of homogeneity of within-group regression coefficients required by ANCOVA (see, for e.g., Kirk 1982, 731-734) by comparing the statistical model in Table 4 (i.e., the reduced model) with a similar model that also included interactions between BIAS and all within-subjects effects (i.e., the full model). Since the error sum of squares (SSE) of the reduced model is significantly greater than the SSE of the full model ( $F=2.7833$ ,  $p=.0035$ ), this homogeneity assumption is rejected. However, the tests of hypotheses regarding NOISE are insensitive qualitatively (at  $\alpha=.05$ ) to whether the full or reduced model is employed. Therefore, we report the reduced model for simplicity of presentation.

RKxI interaction is in the predicted direction (see figure 1) and significant ( $F=7.899$ ,  $p=0.0051$ ). Finally, given aggressive motivational goals, the RKxI interaction is neither in the predicted direction nor significant ( $F=2.8522$ ,  $p=0.0919$ ). Thus, the three-way interaction reflects mixed support for the predicted two-way RK\*I interaction, as it attains significance only when supervisors have neutral motivational goals.

### **Results for justifiability and interrelations among bias, noise and justifiability**

Our justifiability measure is participants' response to an eleven-point scale asking, "Overall, how justifiable is the audit team's proposed estimate, considering the extent to which the audit team is accountable to various important constituencies?" The endpoints were "completely unjustifiable " and "completely justifiable."

Table 2 provides cell means, and table 5 provides an ANCOVA for justifiability. As shown, two main effects (SG and RK) and two covariates (Bias and Noise) are significant. In addition, the (I) main effect is marginally significant. More importantly, all three of these main effects and covariate effects are consistent with our hypotheses. Specifically, auditors judge audit teams to reach more justifiable judgments in the neutral-goal condition than across the two directional-goal conditions (6.421 vs. 5.764,  $t=4.759$ ,  $p=0.0001$ ), and, given a directional goal, aggressive goals impair justifiability more than do conservative goals ( $t=5.486$ ,  $p=0.0001$ ). Further, the RK main effect reflects higher justifiability when supervisors have higher rather than lower technical knowledge (6.143 vs. 5.823,  $t=2.808$ ,  $p=0.0026$ ), and when the supervisor interacts with subordinates than

when they do not (6.079 vs. 5.887,  $t=1.716$ ,  $p=0.0434$ ). Last, both bias and noise decrease justifiability.<sup>5</sup>

## V. CONCLUSION

In our experiment, audit seniors judged the extent to which bias and noise affect a hypothetical audit teams' fair-value estimates, as well as the extent to which the estimates were justifiable. We observe auditors' judgments of bias, noise, and justifiability to vary with three audit team characteristics ~ supervisors' motivational goals, their specialized technical knowledge relative to subordinates, and their pre-emptive interaction with subordinates. The findings collectively suggest that auditors view these three dimensions of audit team judgments as related, but distinct (see Exhibit 1).

In particular, when supervisors have directional motivational goals, judged bias and noise both increase, whereas justifiability decreases. Superior supervisor technical knowledge decreases judged bias and noise and increases justifiability. Interestingly, participants treat technical knowledge as a universal constraint on bias propagation in audit team judgments ~ even if supervisors have non-neutral, directional goals. Further, they believe that pre-emptive intervention with subordinates generally increases justifiability but that it generally decreases neither bias nor noise. Diverging from our model of noise propagation in audit team judgments, judged noise flows from a complex interaction among supervisors' motivational goals, technical knowledge advantage over

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<sup>5</sup> You may recall that the instrument also asked auditors about the extent to which the fair value estimate ultimately reported by the client would deviate from the best possible (i.e., highest quality) estimate. While it is an interesting dependent variable, we do not focus on it since it does not relate directly to auditors' beliefs of how audit team characteristics affect dimensions of audit teams' judgments. Nevertheless, it is noteworthy that participants' response to this question, when included as a covariate in our models, does not affect the significance of reported results. There is, however, a negative correlation between participants' judgments of

subordinates, and degree of pre-emptive intervention with subordinates. Specifically, only when supervisors have neutral motivational goals is the hypothesized positive interaction between pre-emptive intervention and relative technical knowledge observed. Finally, participants judge bias to increase noise, and they judge bias and noise each to decrease justifiability.

One fundamental implication of these findings is that when audit firms and auditors incur costs to purposefully modify the audit review process, they may anticipate trading off among dimensions of bias, noise, and justifiability. As one post-hoc example, when supervisors with aggressive motivational goals pre-emptively intervene in the subordinate's judgment process, participants indicate the audit team's judgment might become more biased (cf., Wilks 2001). Contemporaneously, however, participants also believe that supervisor intervention given the same circumstances sometimes reduces noise (i.e., if supervisors have greater technical knowledge) and generally increases justifiability.

Another fundamental implication of these findings is that while auditors' beliefs of how bias, noise, and justifiability are complex, they do not necessarily converge with how bias and noise actually propagate (or at least with our model of bias and noise propagation). Of course, future researchers may find it profitable to empirical evidence about how the audit team characteristics we manipulate actually affect these dimensions of audit team judgments. To the extent that auditors' beliefs diverge from real-world propagation of bias and noise, research opportunities may exist for methods of improving auditors' beliefs. To the extent we understand and improve deficiencies in auditors' beliefs

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the justifiability of the audit team's judgment and the quality of the estimate ultimately reported by the audit client ( $r = -0.1245$ ,  $t = -1.94$ ,  $p = .0524$ ).

about bias and noise propagation, we will have opportunities to improve auditor judgment, including their judgments about justifiability.

At least one caveat accompanies our experimental approach. We relied on audit seniors (most of whom had over a year of review experience) instead of auditors with many years of review experience. While we are unaware of a theoretical basis for predicting specific experience effects, our reliance on audit seniors proscribes us from empirically investigating whether supervisors evolve fundamentally different beliefs concerning the propagation of bias, noise, and justifiability as they become increasingly experienced with the review process.

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Exhibit 1: Summary of Hypotheses<sup>1</sup>

		Bias	Noise	Justifiability
1	Supervisor Motivational Goals (SG)	Increase bias given directional motivational goals.	Model predicts no effect.  Psychology research predicts directional motivational goals to increase noise.	Directional goals decrease justifiability.  Aggressive directional goal less justifiable than conservative directional goal.
	<b>Findings</b>	<b>Supported</b>	<b>Psych. Supported</b>	<b>Supported</b>
2	Superior's technical knowledge relative to that of the subordinate (RK)	No main effect predicted (see SG by RK interaction below).	Decreases noise.	Increases justifiability.
	<b>Findings</b>	<b>Unpredicted main effect</b>	<b>Supported</b>	<b>Supported</b>
3	Pre-emptive Intervention (I)	No main effect predicted (see SG by I interaction below).	Decreases noise.	Increases justifiability.
	<b>Findings</b>	<b>Supported</b>	<b>Not Supported</b>	<b>Supported</b>
4	SG by RK	Superior supervisor technical knowledge increases bias when supervisors have directional goals, but does not influence bias otherwise.	No interaction predicted.	No interaction predicted.
	<b>Findings</b>	<b>Not Supported</b>	<b>Supported</b>	<b>Supported</b>
5	SG by I	Interaction increases bias when supervisors have directional goals, but does not influence bias otherwise.	No interaction predicted.	No interaction predicted.
	<b>Findings</b>	<b>Not Supported</b>	<b>Supported</b>	<b>Supported</b>
6	RK by I	No interaction predicted (see SG by RK by I interaction below).	Sub-additive interaction with diminishing returns to noise reduction.	No interaction predicted.
	<b>Findings</b>	<b>Supported</b>	<b>Mixed Support</b>	<b>Supported</b>
7	SG by RK by I	Model predicts increased bias due to combined effects RK and I to be sub-additive given directional goals.	No interaction predicted.	No interaction predicted.
	<b>Findings</b>	<b>Not Supported</b>	<b>Unpredicted interaction</b>	<b>Supported</b>
8	Bias	-	Psych. literature predicts bias increases noise.	Decreases justifiability.
	<b>Findings</b>	-	<b>Psych. Supported</b>	<b>Supported</b>
9	Noise	-	-	Decreases justifiability.
	<b>Findings</b>	-	-	<b>Supported</b>

<sup>1</sup>Note that the model does not apply to predictions for justifiability. For exposition, we summarize the findings by loosely using the term "supported" to refer both to observed statistical significance for predicted effects and an observed statistical insignificance for unpredicted effects.

Figure 1: The (RK x I) interactions within each Supervisor Motivational Goal (SG) condition and collapsed across all three SG conditions

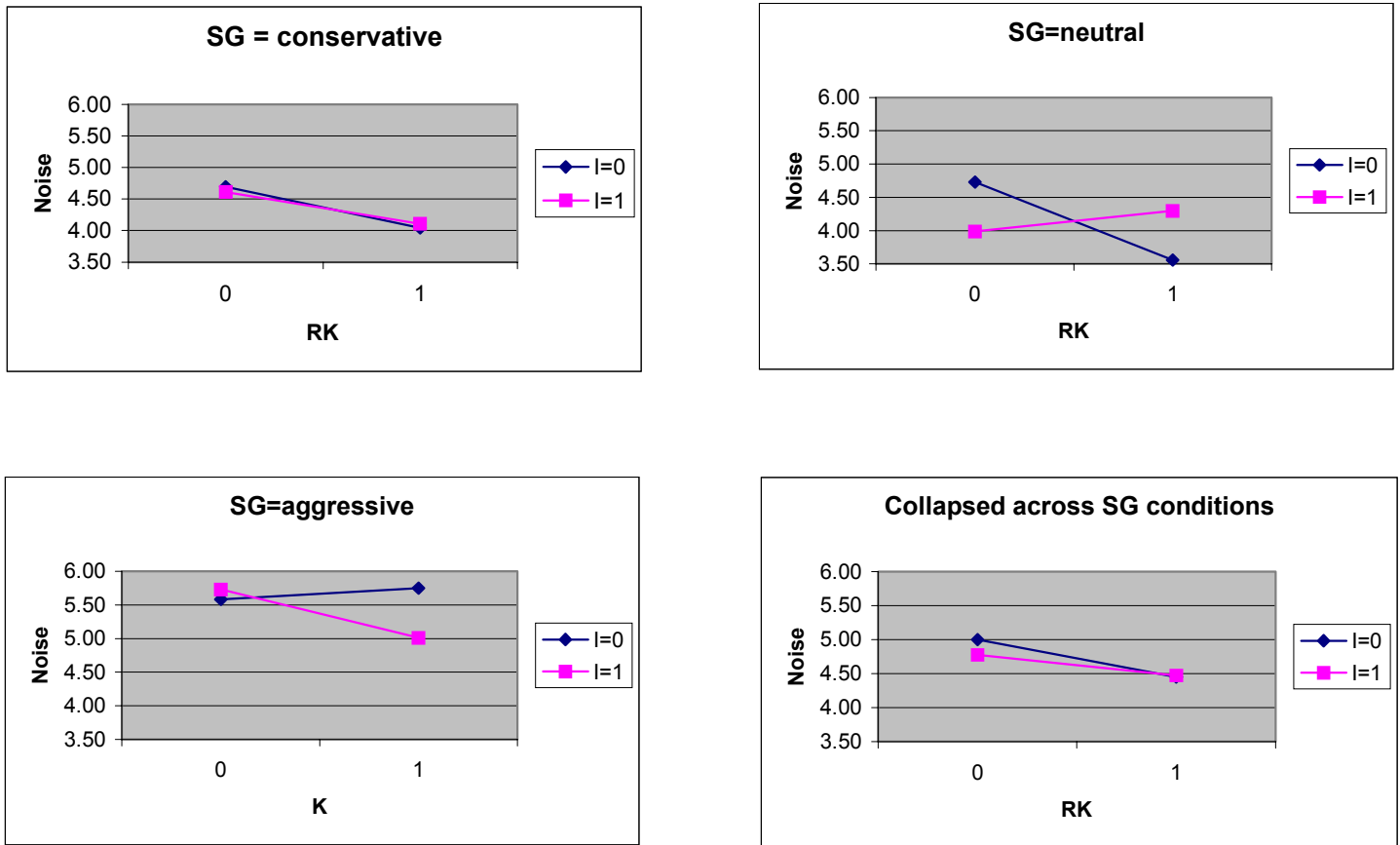


Table 1: BIAS and NOISE Least-squares Means

## BIAS

RK	LOW HIGH	SG			
		CON.	NEUTRAL	AGGRESS.	
	LOW	1.9559	0.8192	3.5723	2.1158
	HIGH	1.7678	0.6052	2.7191	1.6974
		1.8619	0.7122	3.1457	

I	LOW HIGH	SG			
		CON.	NEUTRAL	AGGRESS.	
	LOW	1.8351	0.6819	2.9891	1.8354
	HIGH	1.8886	0.7425	3.3023	1.9778

I	LOW HIGH	RK	
		LOW	HIGH
	LOW	2.0342	1.6366
	HIGH	2.1974	1.7582

LOW RK HIGH RK	LOW I HIGH I	SG		
		CON.	NEUTRAL	AGGRESS.
	LOW I	1.9962	0.6805	3.4258
	HIGH I	1.9157	0.9578	3.7188
	LOW I	1.6740	0.6833	2.5525
	HIGH I	1.8615	0.5272	2.8858

## NOISE

RK	LOW HIGH	SG			
		CON.	NEUTRAL	AGGRESS.	
	LOW	4.6531	4.3584	5.6565	4.8893
	HIGH	4.0751	3.9260	5.3790	4.4601
		4.3641	4.1422	5.5177	

I	LOW HIGH	SG			
		CON.	NEUTRAL	AGGRESS.	
	LOW	4.3689	4.1434	5.6657	4.7260
	HIGH	4.3593	4.1411	5.3698	4.6234

I	LOW HIGH	RK	
		LOW	HIGH
	LOW	5.0019	4.4500
	HIGH	4.7767	4.4701

LOW RK HIGH RK	LOW I HIGH I	SG		
		CON.	NEUTRAL	AGGRESS.
	LOW I	4.6937	4.7294	5.5826
	HIGH I	4.6125	3.9874	5.7303
	LOW I	4.0441	3.5573	5.7488
	HIGH I	4.1062	4.2948	5.0093

Table 2: JUSTIFIABILITY Least-squares Means

		SG			
		CON.	NEUTRAL	AGGRESS.	
RK	LOW	5.9212	6.2279	5.3187	5.8226
	HIGH	6.1704	6.6135	5.6453	6.1430
		6.0458	6.4207	5.4820	
		SG			
		CON.	NEUTRAL	AGGRESS.	
I	LOW	6.0261	6.2955	5.3386	5.8867
	HIGH	6.0655	6.5459	5.6253	6.0789
		RK			
		LOW	HIGH		
I	LOW	5.7093	6.0641		
	HIGH	5.9359	6.2219		
		SG			
		CON.	NEUTRAL	AGGRESS.	
LOW RK	LOW I	5.8534	6.0456	5.2288	
	HIGH I	5.9890	6.4101	5.4085	
HIGH RK	LOW I	6.1987	6.5453	5.4484	
	HIGH I	6.1420	6.6816	5.8422	

Table 3: ANOVA on BIAS

<i>Source of Variation</i>	SS	<i>df</i>	MS	<i>F</i> <sup>a</sup>	<i>p&gt;F</i>
<i>Between Subjects</i>					
Block	31.3811	5	6.2762	0.80	.5538
Subjects(Block)	842.2310	93	9.0562		
<i>Within Subjects</i>					
SG	584.4937	2	292.2469	93.27	.0001
RK	25.8815	1	25.8815	8.26	.0042
I	2.9989	1	2.9989	0.96	.3284
SG*RK	13.9727	2	6.9864	2.23	.1087
SG*I	2.1539	2	1.0770	0.34	.7093
RK*I	0.0572	1	0.0572	0.02	.8925
SG*RK*I	1.7323	2	0.8662	0.28	.7586
Residual	1510.3274	482	3.1335		

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<sup>a</sup> The appropriate error term for Block is a linear combination of the Subject(Block) mean square and the Residual mean square. The Residual mean square is the appropriate error term for the within-subjects effects.

Table 4: ANCOVA on NOISE

<i>Source of Variation</i>	SS	<i>df</i>	MS	<i>F</i> <sup>a</sup>	<i>p</i> > <i>F</i>
<i>Between Subjects</i>					
Block	83.2584	5	16.6517	1.80	.1202
Subjects(Block)	1027.1493	93	11.0446		
<i>Within Subjects</i>					
SG	161.6115	2	80.8057	37.38	.0001
RK	26.7783	1	26.7783	12.39	.0005
I	1.5514	1	1.5514	0.72	.3973
SG *RK	2.2057	2	1.1028	0.51	.6007
SG *I	2.7567	2	1.3783	0.64	.5290
RK*I	1.9791	1	1.9791	0.92	.3391
SG *RK*I	19.2508	2	9.6254	4.45	.0121
BIAS	127.2630	1	127.2630	58.88	.0001
Residual	1039.6578	481	2.1615		

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<sup>a</sup> The appropriate error term for Block is a linear combination of the Subject(Block) mean square and the Residual mean square. The Residual mean square is the appropriate error term for the within-subjects effects.

Table 5: ANCOVA on JUSTIFIABILITY

<i>Source of Variation</i>	SS	<i>df</i>	MS	<i>F</i> <sup>a</sup>	<i>p</i> > <i>F</i>
<i>Between Subjects</i>					
Block	61.6992	5	12.3398	1.46	.2088
Subjects(Block)	947.4187	93	10.1873		
<i>Within Subjects</i>					
SG	55.7821	2	27.8910	15.14	.0001
RK	14.5262	1	14.5262	7.88	.0052
I	5.4246	1	5.4246	2.94	.0868
SG *RK	0.4602	2	0.2301	0.12	.8826
SG *I	1.7471	2	.8735	0.47	.6227
RK*I	0.1555	1	0.1555	0.08	.7716
SG *RK*I	0.8187	2	0.4093	0.22	.8009
BIAS	90.9479	1	90.9479	49.36	.0001
NOISE	134.4039	1	134.4039	72.94	.0001
Residual	882.5917	479	1.8426		

<sup>a</sup> The appropriate error term for Block is a linear combination of the Subject(Block) mean square and the Residual mean square. The Residual mean square is the appropriate error term for the within-subjects effects.

## APPENDIX A: Theoretical Model

The model of audit team judgment features a simple audit team consisting of a single supervisor-reviewer (hereafter supervisor,  $\bullet_R$ ) and subordinate-preparer (hereafter subordinate,  $\bullet_P$ ). Consistent with prior research (e.g., Trotman and Yetton 1985, Solomon 1987, Messier and Tubbs 1994), the model holds that the mean belief (R) of the audit team ( $R_T$ ) is a weighted average of the audit supervisor's mean belief ( $R_R$ ) and the audit subordinate's mean belief ( $R_P$ ).<sup>6</sup> Since an unbiased belief is represented by  $R_{\bullet}=0$ ,  $R_R$  can be considered a surrogate for Supervisor Motivational Goals in which  $R_R < 0$  represents a conservative goal,  $R_R = 0$  represents a neutral goal, and  $R_R > 0$  represents an aggressive goal. Similarly,  $R_P$  can be considered a surrogate for Subordinate Motivational Goals. As in statistical decision theory (e.g., Pratt et al. 1996), the weights are the reciprocals of the noise (E) in the supervisors' belief ( $E_R$ ) and the noise in the subordinate's belief ( $E_P$ ).<sup>7</sup>

$$R_T = \frac{\frac{R_R}{E_R} + \frac{R_P}{E_P}}{\frac{1}{E_R} + \frac{1}{E_P}} \quad (1)$$

Also consistent with statistical decision theory, the noise in the audit team's belief is a function of the noise in the supervisor's belief and the noise in the subordinate's belief.

$$E_T = \frac{1}{\frac{1}{E_R} + \frac{1}{E_P}} \quad (2)$$

The simple model represented by equations 1 and 2 was modified by considering the following intuitive assumptions regarding the manner that supervisors' motivational

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<sup>6</sup> The subordinate reports  $R_P$  to the supervisor.

goals, knowledge relative to the subordinate, and degree of intervention with the subordinate likely would affect the bias and noise in the supervisor's and subordinate's judgments. First, increased relative knowledge ( $K$ ) decreases the supervisor's noise (relative to the subordinate). Second, supervisor noise is independent of supervisor belief. Third, the degree of intervention ( $I$ ) affects neither supervisor belief nor noise. Fourth, increased intervention decreases subordinate noise. Finally, increased intervention causes subordinate belief to be closer to supervisor belief.

The preceding assumptions are articulated in the enhanced form of the model and related hypotheses, as represented by equations (3) and (4) below and the ensuing partial derivatives.

$$R_T = \frac{\frac{R_R}{E_R/K} + \frac{R_P + \left(\frac{I-1}{I}\right)(R_R - R_P)}{E_P/I}}{\frac{1}{E_R/K} + \frac{1}{E_P/I}} \quad (3)$$

$$E_T = \frac{1}{\frac{1}{E_R/K} + \frac{1}{E_P/I}} \quad (4)$$

$R_T$ : Audit team's belief after receiving message from subordinate.

$E_T$ : Audit team's posterior noise after receiving message from subordinate.

$R_R$ : Supervisor prior belief.

$E_R$ : Supervisor prior noise.

$R_P + ((I-1)/I)(R_R - R_P)$ : Message from subordinate. Notice that this equals  $R_P$  if  $I=1$  (i.e., intervention is absent).

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<sup>7</sup> The supervisor estimates  $E_P$ .

$E_p/I$ : Noise in message from subordinate. Notice that this equals  $E_p$  if  $I=1$ . Assumed to be estimated by supervisor.

$K$ : Relative Knowledge where  $1 \leq K < \infty$   
 $K=1$  when subordinate and supervisor technical knowledge equal.  
 $K>1$  when subordinate knowledge is less than supervisor's knowledge.

$I$ : Degree of Intervention where  $1 \leq I < \infty$   
 $I=1$  when intervention absent.  
 $I>1$  when intervention present.

### Hypotheses Based Upon Differentiation of Model<sup>8</sup>

Bias ( $R_T^2$ in the model) <sup>9</sup>	Noise ( $E_T$ in the model)
$\frac{\partial R_T^2}{\partial R_R}$	$\frac{\partial E_T}{\partial R_R} = 0$
>0 if $R_R > 0$ , =0 if $R_R = 0$ , <0 if $R_R < 0$	
$\frac{\partial R_T^2}{\partial K}$	$\frac{\partial E_T}{\partial K} < 0$
>0 if $R_R > 0$ , =0 if $R_R = 0$ , >0 if $R_R < 0$	
$\frac{\partial R_T^2}{\partial I}$	$\frac{\partial E_T}{\partial I} < 0$
>0 if $R_R > 0$ , =0 if $R_R = 0$ , <0 if $R_R < 0$	
$\frac{\partial \partial R_T^2}{\partial R_R \partial K}$	$\frac{\partial \partial E_T}{\partial R_R \partial K} = 0$
>0 if $R_R > 0$ , =0 if $R_R = 0$ , <0 if $R_R < 0$	
$\frac{\partial \partial R_T^2}{\partial R_R \partial I}$	$\frac{\partial \partial E_T}{\partial R_R \partial I} = 0$
>0 if $R_R > 0$ , =0 if $R_R = 0$ , <0 if $R_R < 0$	
$\frac{\partial \partial R_T^2}{\partial K \partial I}$	$\frac{\partial \partial E_T}{\partial K \partial I} > 0$
<0 if $R_R > 0$ , =0 if $R_R = 0$ , <0 if $R_R < 0$	
$\frac{\partial \partial \partial R_T^2}{\partial R_R \partial K \partial I}$	$\frac{\partial \partial \partial E_T}{\partial R_R \partial K \partial I} = 0$
<0 if $R_R > 0$ , =0 if $R_R = 0$ , >0 if $R_R < 0$	

<sup>8</sup> Partial derivatives are based upon the simplifying assumption that the subordinate has neutral motivational goals (i.e.,  $R_p=0$ ).

<sup>9</sup>  $R_T^2$  is employed as the surrogate for bias because it is (1) monotonic in the magnitude of bias and (2) differentiable.

## APPENDIX B: Instrument Excerpts

### Directions and Pre-test Questions from the Instrument

#### Systematic and Non-systematic Error

We are interested in your perceptions about systematic and non-systematic judgment error in accounting estimates. To illustrate what we mean by systematic and non-systematic judgment error, please consider the following example.

Consider two scales, Scale 1 and Scale 2, that you could use to measure your weight.

Scale 1 always has systematic error, but never has non-systematic error. Scale 1 systematically weighs people as 5 pounds less than their true weight. It obtains a reading of 175 pounds for persons who actually weigh 180, a reading of 220 for persons who actually weigh 225, and so on. As a result, if you knew about Scale 1's systematic error, you could determine your true weight after just one measurement by adding 5 pounds to its reading.

Scale 2 never has systematic error, but is subject to non-systematic error. On average, it accurately measures weight, but its measurements randomly fluctuate by as much as 3 pounds on either side of a person's true weight. So, a person who actually weighs 180 could step on Scale 2 five times and receive readings of 183, 178, 180, 177, 182. As a result, even if you knew about Scale 2's non-systematic error, you could not determine your true weight after one measurement. You could, however, measure yourself on Scale 2 several times and the expected average reading would converge to your true weight.

Before continuing, please fill in the blanks to complete the following statement:

**As scale that consistently adds 3 pounds to one's true weight exhibits \_\_\_\_\_ error; whereas a scale that randomly adds or subtracts up to 3 pounds to one's true weight exhibits \_\_\_\_\_ error.**

We want you to think about systematic and non-systematic error within the context of accounting estimates. Specifically, we ask that you think about the estimated fair value of the residual interest in a securitization transaction. We describe this estimate for Retail Credit, Inc. (RCI), an organization that serves as the financing arm of Retail Clothes Land, Inc.

#### Securitization at Retail Credit, Inc. (RCI)

RCI is a non-bank organization that securitizes credit card debt. That is, after pooling similar classes of credit card receivables, they sell, for example, 90% of the underlying cash flows while retaining 10% of the underlying cash flows (i.e., retained interest). Importantly, they retain the risk for 100% of the underlying cash flows. As individual customers default on credit card payments, RCI is in a 1st loss position. As losses occur, RCI always covers the losses by forfeiting its rights to the cash flows related to its retained interest. Plus, if losses occur in excess of the realized cash flow from RCI's retained interest, RCI is morally, but not legally, obligated to cover the losses. Consequently, if collectibility problems were to arise, holders of the securitized portion of the credit card receivables would face far less risk than would RCI.

Historically, RCI has made money on securitization by investing the proceeds of the securitized portion in financial instruments that earn returns greater than would have been earned from the underlying credit card cash flows alone.

Per GAAP, RCI carries its retained interest at fair value in its financial statements. As this fair value becomes larger, RCI records a larger "Gain on Securitization" in their financial statements. The fair value of retained interests, though, is not easily determinable and comes down to a complex, subjective judgment process. Unlike the securitized cash flows, the retained-interest portion of cash flows is **not** publicly traded. Three main factors affect the estimated fair value of retained interest: (1) the discount rate, (2) prepayment rate, and (3) credit risk.

Because of the subjectivity involved in estimating the fair value of retained interest, some experts fear that firms routinely exploit securitization for earnings management purposes.

Imagine that the accounting estimate in question for the following pages concerns the fair value of the residual interest in a RCI securitization transaction. **Recall that higher estimates of this fair value generate larger "Gains on Securitization" in RCI's financial statements.** RCI prefers recognizing higher gains on securitization.

Before continuing, please fill in the blank to complete the following statement:

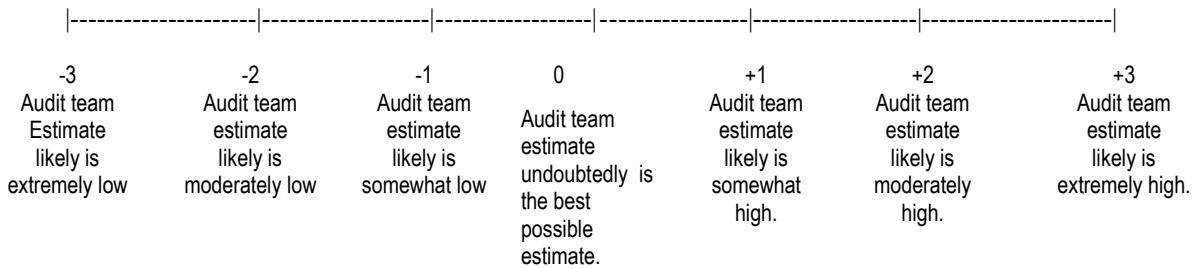
**As the estimated fair value of RCI's retained interest increases, the gain that RCI records in its financial statements \_\_\_\_\_.**

The rest of this document provides eight cases in which auditors estimate fair value of RCI's retained interest. Due to the nature of the research project some of you may see the same case twice. Please consider each case and provide us with assessments of the potential for systematic and non-systematic errors in the auditors' fair value estimates. We also ask you to assess the justifiability of the auditors' estimates and about the extent to which the fair value ultimately reported by the client would depart from the best possible estimate.

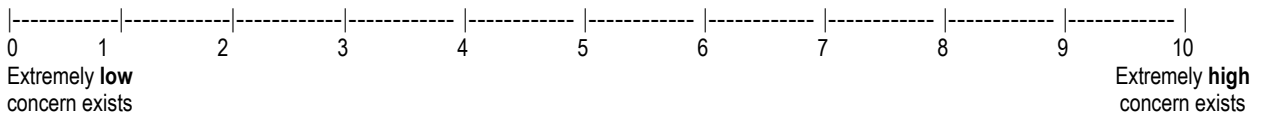
**Stimuli example (other levels of manipulated variables appears on next page).**

- The manager encourages clients to use conservative accounting practices. He believes that it is far better to understate than overstate income. He often encourages clients to disclose more information and with greater transparency than is required by GAAP. He believes such disclosure quality reduces the cost of capital.
- The manager possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.
- The senior possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.
- The senior evaluated the appropriateness of the client's fair value estimate without input from the manager. He then documented the underlying reasons and assumptions in support of his judgment and forwarded them to the manager in a memorandum. The manager reviewed the senior's memorandum and finalized the "audit team's" estimate of fair value by making any adjustments deemed necessary to the senior's estimate of fair value.

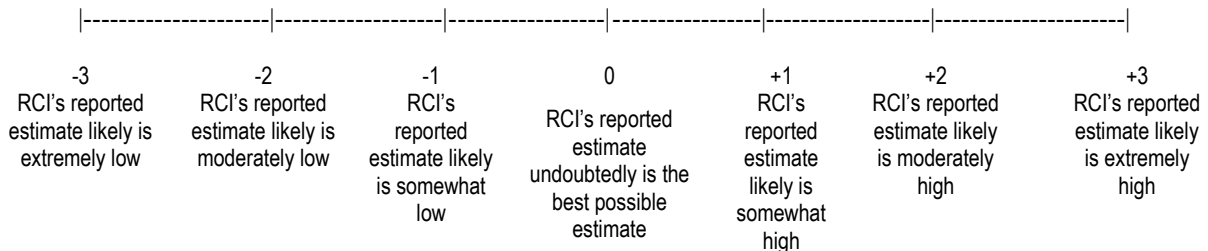
To what extent does systematic error in the audit team's proposed estimate of fair value potentially cause their estimate to deviate from the best possible estimate (i.e., the highest quality estimate; the most appropriate estimate)?



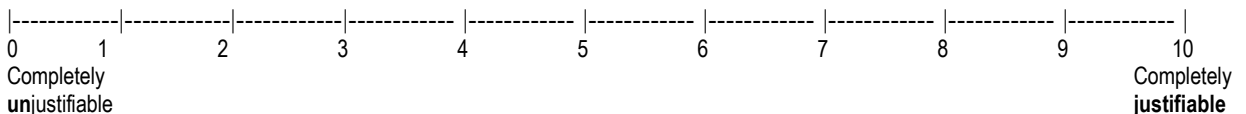
To what extent does random, non-systematic error in the audit team's proposed estimate of fair value potentially cause their estimate to deviate from the best possible estimate (i.e., the highest quality estimate; the most appropriate estimate)?



To what extent will RCI ultimately report a fair value estimate that deviates from the best possible estimate (i.e., the highest quality estimate; the most appropriate estimate)?



Overall, how justifiable is the audit team's proposed estimate, considering the extent to which the audit team is accountable to various important constituencies?



## Language used in levels of manipulated variables other than those appearing in example

### *Supervisor Motivational Goals*

- The manager encourages clients to use only the highest quality, or most appropriate, accounting practices. He discourages use of less appropriate methods, even those arguably allowable under GAAP. He does not believe accounting practices should be influenced by the extent to which they facilitate the client's earnings management objectives.
- The manager encourages clients to use aggressive accounting practices. He frequently provides advice to clients consisting of novel ways to exploit ambiguities in GAAP. This advice frequently enables clients to achieve their earnings management objectives.

### *Relative Technical Knowledge of Supervisor*

- The manager possesses a tremendous amount of technical accounting expertise and is quite knowledgeable about professional guidance that is relevant to all facets of asset securitizations.
- The senior possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.

### *Degree of Pre-emptive Intervention*

- The senior approached the manager to discuss the client's securitization transaction. The manager explained his expectations to the senior regarding the client's fair value estimate. After this discussion, the senior developed a preliminary estimate and then met again with the manager to further discuss the issue. The senior then documented the underlying reasons and assumptions in support of his judgment and forwarded them to the manager in a memorandum. The manager reviewed the senior's memorandum and finalized the "audit team's" estimate of fair value by making any adjustments deemed necessary to the senior's estimate of fair value.
-

## Post-test questions in instrument

Part 2: Please answer the following questions concerning your interpretation of the materials in Envelope 1.

1. Please assess the degree of the manager's motivational bias in the following instances:

- a) The manager encourages clients to use aggressive accounting practices. He frequently provides advice to clients consisting of novel ways to exploit ambiguities in GAAP. This advice frequently enables clients to achieve their earnings management objectives.

1	2	3	4	5
The manager's preferences are highly biased towards conservative accounting estimates		The manager's preferences are for the most appropriate accounting estimates		The manager's preferences are highly biased towards aggressive accounting estimates

- b) The manager encourages clients to use only the highest quality, or most appropriate, accounting practices. He discourages use of less appropriate methods, even those arguably allowable under GAAP. He does not believe accounting practices should be influenced by the extent to which they facilitate the client's earnings management objectives.

1	2	3	4	5
The manager's preferences are highly biased towards conservative accounting estimates		The manager's preferences are for the most appropriate accounting estimates		The manager's preferences are highly biased towards aggressive accounting estimates

- c) The manager encourages clients to use conservative accounting practices. He believes that it is far better to understate than overstate income. He often encourages clients to disclose more information and with greater transparency than is required by GAAP. He believes such disclosure quality reduces the cost of capital.

1	2	3	4	5
The manager's preferences are highly biased towards conservative accounting estimates		The manager's preferences are for the most appropriate accounting estimates		The manager's preferences are highly biased towards aggressive accounting estimates

2. Please assess the senior's technical accounting knowledge relative to the manager's technical accounting knowledge.

- a) The manager possesses a tremendous amount of technical accounting expertise and is quite knowledgeable about professional guidance that relevant to all facets of asset securitizations.

The senior possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.

1	2	3	4	5
The senior's technical accounting knowledge much greater than the manager's		The senior and manager possess equivalent degrees of technical accounting knowledge		The manager's technical accounting knowledge much greater than the senior's

- b) The manager possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.

The senior possesses a moderate amount of technical accounting expertise and is somewhat knowledgeable about the professional guidance that is relevant to all facets of asset securitizations.

1	2	3	4	5
The senior's technical accounting knowledge much greater than the manager's		The senior and manager possess equivalent degrees of technical accounting knowledge		The manager's technical accounting knowledge much greater than the senior's

3. Please assess the degree to which the manager intervened in the senior's process of assessing the reasonableness of the client's estimate.

- a) The senior evaluated the appropriateness of the client's fair value estimate without input from the manager. He then documented the underlying reasons and assumptions in support of his judgment and forwarded them to the manager in a memorandum. The manager reviewed the senior's memorandum and finalized the "audit team's" estimate of fair value by making any adjustments deemed necessary to the senior's estimate of fair value.

1	2	3	4	5
There was no manager intervention. The senior was allowed to make an independent decision		There was a moderate amount of manager intervention. The senior's decision was partially influenced by the manager		There was an extreme amount of manager intervention. The senior was not allowed to make an independent decision

- b) The senior approached the manager to discuss the client's securitization transaction. The manager explained his expectations to the senior regarding the client's fair value estimate. After this discussion, the senior developed a preliminary estimate and then met again with the manager to further discuss the issue. The senior then documented the underlying reasons and assumptions in support of his judgment and forwarded them to the manager in a memorandum. The manager reviewed the senior's memorandum and finalized the "audit team's" estimate of fair value by making any adjustments deemed necessary to the senior's estimate of fair value.

1	2	3	4	5
There was no manager intervention. The senior was allowed to make an independent decision		There was a moderate amount of manager intervention. The senior's decision was partially influenced by the manager		There was an extreme amount of manager intervention. The senior was not allowed to make an independent decision

4. During an audit, how aware are you of the preferences of your superiors (e.g., support the client's position, extremely conservative, etc.)

1	2	3	4	5
I am never aware of such preferences		I am somewhat aware of such preferences		I am extremely aware of such preferences

5. Suppose an auditor prefers to allow clients to use aggressive accounting practices to manage earnings. In this case, the greater technical accounting possessed by the auditor results in

1	2	3	4	5
significantly less aggressive financial reporting		Has no influence on financial reporting		significantly more aggressive financial reporting

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**PARTICIPANT INFORMATION**

Please answer the following questions regarding your background and experience.

1. Please indicate your current level at XXXXX (circle one):<sup>10</sup>
  - a) Partner
  - b) Senior Manager
  - c) Manager
  - d) Supervising Senior
  - e) Senior
  - f) Staff
  - g) Assistant/First Year
  
2. Which department do you work in (if other than audit, skip to question 5)
  - a) Audit
  - b) Tax
  - c) Consulting
  - d) Other (please indicate \_\_\_\_\_)
  
3. How many months have you worked as an auditor for XXXXX ? \_\_\_\_\_
  
4. How many months have you worked as an auditor for another public accounting firm? \_\_\_\_\_

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<sup>10</sup> In actual instrument, we used a different font (Times New Roman) than we use here (Arial here denotes language from the instrument), and the firm's name appeared in the instrument where XXXXX appears here.

5. How many months of professional accounting experience do you have? \_\_\_\_\_

6. For how many months have you reviewed the work of subordinates? \_\_\_\_\_

7. How familiar are you with asset securitizations?

1  
extremely  
unfamiliar

2

3  
somewhat  
familiar

4

5  
extremely  
familiar