Does Willful Intent Modify Risk-Based Auditing?

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**Abstract:** Participants in a compensated experiment specify the maximum amounts they would be willing to pay to verify reports and hence protect themselves from different levels of reporting risk that arise either from the willful decisions of human counterparties (intentional risk condition) or from a computer program that mimics the same risks and reports, but without explicit human intent (unintentional risk condition). At the highest risk level of exposure to potential misreporting, auditor-participants submit similar maximum verification fees, suggesting that the source of risk is secondary to the level of risk when risk is high enough. As the level of exposure declines, participants in the unintentional risk condition specify significantly lower verification fees, consistent with the logic of risk-based auditing. Conversely, participants in the intentional risk condition continue to pay relatively large verification fees even when risk levels decline, generating a significant interaction between the level of risk and the source of that risk that has important implications for the theory and practice of risk-based auditing.

**Keywords:** risk-based auditing, fraud, intent, risk aversion, scale insensitivity, experimental economics.
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I. INTRODUCTION

Weil (2004) tracks how risk-based auditing developed into one of the most fundamental principles characterizing audit strategies in recent decades. Even in the heightened regulatory audit environment of the post-Sarbanes-Oxley era, risk-based auditing appears to be widely embraced. As recently reaffirmed in PCAOB Auditing Standard No. 15, the cornerstone of risk-based auditing is the logic that, “as the risk increases, the amount of evidence that the auditor should obtain also increases” (PCAOB 2010c, ¶5). The logical converse of this statement is that auditors invest fewer audit resources as risks decrease.

At the same time, recent events have placed unprecedented emphasis on auditors’ responsibility to detect intentional misstatements, or fraud. In approving the PCAOB’s recent set of risk-assessment standards, the SEC (2010, 3) highlighted that a key change over existing auditing standards is the “increased emphasis on fraud risks.” Underscoring this emphasis, PCAOB Auditing Standard No. 12 asserts that, by its very nature, “a fraud risk is a significant risk” (PCAOB 2010a, ¶71). When combined with the PCAOB’s risk-based auditing guidance that “more evidence is needed to respond to significant risks” (PCAOB 2010c, ¶5), one might logically infer that, because fraud risks are significant by definition, auditors should not be as willing to “back off” when fraud risks decrease but still exist. Should one expect a dampened mapping from the levels of risks faced to the levels of audit resources directed to those risks when risks arise from willful intent of reporters, ceteris paribus? Our study uses an incentive-compatible laboratory experiment to help answer this question.

Investigating how willful human intent moderates the mapping from the levels of risks auditors face to the resources devoted to those risks is important because criticisms of a
risk-based auditing approach tend to focus on intentional misstatements (e.g., Weil 2004). More fundamentally, the market reacts more strongly to audit failures stemming from managerial intent (Palmrose et al. 2004; Hennes et al. 2008), whereas newspaper headlines rarely expose audits that fail to detect unintentional errors. Archival evidence, however, rarely if ever establishes true ceteris paribus conditions, thereby potentially confounding the source of risk with the magnitude and severity of that risk. The tools of experimental economics allow us to test a more subtle question by isolating how sensitivity to varying degrees of risk exposure from willful human intent differs from sensitivity to the same degrees of risk exposure from unintentional sources.

Another complexity of audit practice is that intentional and unintentional sources of risk do not occur independently, but rather exert concurrent pressures to which auditors respond in planning tests of various accounts. The laboratory allows us to disentangle these sources of risk by constructing an environment in which auditor-participants face only intentional or only unintentional risks. While artificial, the advantage of such a setting is that it isolates a key construct (willful human intent) that cannot be readily extracted from archival data.

Finally, Bowlin (2011) provides experimental evidence of how reporters can exploit a risk-based auditing strategy by redirecting fraudulent misrepresentations to ostensibly “low risk” areas. Consistent with our efforts to establish ceteris paribus conditions, we do not present participants in our intentional-risk condition with any incremental strategic risks of this nature. Nevertheless, to the extent that we observe less willingness to “back off” as risks decline when those risks reflect willful human actions, even under ceteris paribus conditions, our study suggests a natural heuristic defense that could help to protect auditors from the strategic exploitation potential identified by Bowlin (2011).
We design a 2 × 4 experiment with risk source as a between-participants factor (two levels) and risk magnitude as a within-participants factor (four levels). In the “intentional” risk source condition, auditor-participants verify the assertions of human reporters who decide on levels of misrepresentation, with the knowledge that the auditor has the option to devote greater resources to bigger potential misrepresentations. We use neutral terminology to avoid prompting participants’ behavior with vivid words such as “fraud” (Haynes and Kachelmeier 1998), but it is clear in this condition that risks arise from other participants’ decisions. We then structure an “unintentional” risk source condition in which a computer program determines the extent of misrepresentation. We program reports in the unintentional risk sessions to mimic those of the intentional risk sessions, such that auditors face the same monetary risks in both conditions, by design. More importantly, we provide auditor-participants in both conditions with the same ex ante probability distributions of misrepresentations that we obtain from a pilot experiment, establishing the same expectation benchmarks regarding the magnitude and likelihood of the potential misrepresentations auditors face. In short, we use the tools of experimental economics to establish ceteris paribus risks, thereby isolating the qualitative construct of whether risks arise from the decisions of another participant or from a yoked computer program.

To operationalize risk levels, the experiment presents auditor-participants in both the intentional and unintentional conditions with four discrete magnitudes of potential losses from misreporting, a simple proxy for risk exposure, designing the experiment to hold ex ante probabilities constant across conditions at each level. Auditors can protect themselves from this exposure by investing to verify the reported amount, where greater investments lower the probability of a loss at the stated level of risk. We elicit the maximum investments auditors are willing to make at each risk level, thereby obtaining a mapping for each participant from
different levels of risk to different audit resources. This design enables us to compare risk-to-investment mappings when risks reflect willful human intent to the mappings that occur when the same risks arise from an unintentional source.

Our primary finding is a significant interaction between risk source and risk levels. Specifically, at the highest levels of *ex ante* risk, auditor-participants’ investments do not significantly differ between the intentional and unintentional risk conditions. But as the level of risk decreases, the mappings from risk levels to invested resources diverge. Specifically, participants in the unintentional risk condition reduce their investments substantially at lower risk levels, whereas participants in the intentional risk condition are less willing to cut back on resources for lower risks. In other words, the slope of the line associating resource levels with risk levels is significantly flatter in the intentional risk condition than in the yoked unintentional risk condition, *ceteris paribus*. This finding is consistent with the theoretical premise that unintentional risk evokes what Hsee and Rottenstreich (2004) refer to as “valuation by calculation,” whereas intentional risk prompts a more emotion-laden “valuation by feeling” that is less sensitive to scale.

Our findings contribute to both the auditing and behavioral economics literatures. For auditing, our evidence suggests that individuals’ heightened sensitivity to risks of an intentional nature, even when the level of risk is low, could serve to protect auditors from some of the limitations of risk-based auditing, including auditors’ exposure to exploitation from strategic managerial responses to risk-based audit strategies (Bowlin 2011). For behavioral economics, our study extends recent related work on different reactions to intentional vs. unintentional sources of loss exposure (e.g., Bohnet and Zeckhauser 2004; Houser et al. 2010). These behavioral economics studies are similar to ours in the sense that they manipulate whether risks
arise from a human or mechanical source, but a key difference is that prior studies examine the main effect of this source rather than the interaction between the source of risk and the level of risk. In addition to extending this literature to a report verification task that more directly captures an auditing setting, our primary incremental contribution lies in showing that the effect of intentional vs. unintentional risks depends on whether those risks are large or small.

Specifically, we find that people tend to invest in similar levels of protection for large risks, irrespective of source, whereas participants are more willing to back off such investments for smaller risks when those risks arise from an unintentional source than when the same levels and probabilities of loss arise from an intentional source.

Section II discusses the literature in greater detail as the basis for our key hypothesized interaction between risk source and risk level. Section III describes the incentivized experiment we design to test our hypothesis. Section IV presents our results and supplemental analyses to validate our key findings, and Section V concludes.

II. THEORY AND HYPOTHESIS

Risk-Based Auditing

In simple terms, risk-based auditing implies that auditors do more work in riskier areas and less work in less risky areas (Bell et al. 2005; Knechel 2007; PCAOB 2010c). At a basic level, the logic behind risk-based auditing is difficult to criticize, as a simple cost-benefit analysis suggests that auditors should indeed direct their resources to the areas in which they are likely to gain the greatest benefits. Still, the widespread adoption of risk-based auditing has not been without concern. For starters, risk-based auditing requires auditors to be relatively adept in

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1 Of course, auditors can also do different kinds of work, directing different types of tests to risks characterized by risks of an intentional versus unintentional nature (Hoffman and Zimbelman 2009). For simplicity in an experimental economics setting, we restrict this study to considering the total cost of audit resources rather than different kinds of resources, while acknowledging that this restriction limits the inferences we can draw.
assessing risks, a presumption that is open to debate (Weil 2004), especially in strategic environments (Bloomfield 1997). Auditor risk assessments can also be subject to various behavioral biases, such as the halo effect (O’Donnell and Schultz 2005). Finally, Bowlin et al. (2009) and especially Bowlin (2011) examine how managers can exploit risk-based auditing. That is, if managers strategically respond to the anticipation that auditors will do less testing of low-risk areas, those areas might not stay low risk.

All of these potential limitations of risk-based auditing are important, but we set these arguments aside to examine a more basic construct: intentionality. Namely, as discussed below, there is reason to believe that the mapping from assessed risks to corresponding resources could depend on whether or not risks arise from willful human intent, ceteris paribus. If so, any incremental sensitivity to intentionality could serve as a natural heuristic to (partially) protect auditors from the various limitations of risk-based auditing. Below we develop this premise from both the academic and regulatory literatures.

**Does Intent Matter?**

Auditors face the risk of monetary loss from undetected errors and irregularities, prompting costly audit effort to guard against such risks. However, there is reason to believe that money alone does not capture the full extent of aversion to risk. Rather, recent research in behavioral economics posits an incremental aversion to risks that reflect willful human intent. In simple terms, the disutility associated with a potential monetary loss can be compounded by feelings of being cheated when a human party willfully imposes the loss. Baumgartner et al. (2008) assert that being cheated by another human triggers a visceral, “hard-wired” aversion.

To test the incremental aversion associated with intent-based risks, Bohnet and Zeckhauser (2004) elicit the minimum acceptable probability of success at which their
experimental participants would be willing to accept an uncertain lottery in lieu of a certain payoff, manipulating whether or not lottery outcomes are controlled by a different participant. They find a significant risk premium for human-induced risks. Bohnet et al. (2008) test a similar task and find similar results in an international study across five countries. Houser et al. (2010) find more mixed results, with greater variability in a “trust game” (Berg et al. 1995) involving human counterparts than in a mechanical version of the same game, but with no discernable shift in average investments. Overall, these studies suggest some sensitivity to human intent, but their findings are not conclusive, and their settings do not capture or necessarily extend to the defining auditing characteristic of verifying reports.

There is also some evidence in the accounting literature of an incremental aversion to risks reflecting human intent. Of particular relevance to our study, Houston et al. (1999) design a judgment-oriented experiment in which audit partners assign risk premiums to a hypothetical audit engagement. They find that auditors demand a greater risk fee premium in the presence of an intentional irregularity than in the presence of an equivalent unintentional error. However, the authors do not vary risk magnitudes to examine the mapping from different levels of risk to different levels of resources. Also, while Houston et al.’s (1999) judgment task confers the advantage of examining the assessments of experienced professionals, we believe that an incentive-compatible laboratory experiment using the tools of experimental economics offers different benefits that can complement their findings. For instance, Houston et al.’s (1999) auditor participants might have inferred other problems associated with a detected intentional irregularity. Our more abstract setting affords the ability to separate the incremental effect of

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2 Houston et al. (1999) find that auditors respond to fraud risk primarily by raising fees (i.e., increasing revenues) rather than expanding effort (i.e., increasing expenditures). Our study is silent on this tradeoff, as we hold audit revenues constant to keep the interactive task tractable.
willful intent from other factors or implications that could be associated with intentional misstatements in practice.

Finally, in the management accounting literature, experiments by Evans et al. (1994), Birnberg et al. (2008), and Birnberg and Zhang (2011) find that participants are willing to pay a premium for human accountability in designing control systems, *ceteris paribus*. That is, people seem to care not just about their exposure to risk, but also about whether that risk reflects vulnerability to human intent. While not within the auditing domain *per se*, the primary construct examined in these studies is similar to ours: in risky environments, risks that reflect human intent appear to demand a premium.

**Combining Willful Intent with Risk-Based Auditing**

While the studies surveyed above examine various facets of the incremental aversion people have to intent-based risks, they do not examine how any such aversion interacts with the level of risk. Insofar as the mapping from different levels of audit resources to different levels of reporting risk is the cornerstone of risk-based auditing, our primary incremental contribution lies in examining how willful human intent influences this mapping. That is, we go beyond the literature testing the main effect of human intent by examining the interaction between human intent and the level of risk in a report verification task.

For unintentional misstatements, the mapping from audit resources to different levels of risk is likely to reflect a simple cost-benefit tradeoff: higher (lower) risks command higher (lower) resources. While some level of auditing is prudent even when risks are low, risk-based logic clearly embraces the efficient use of resources, justifying greater audit costs when risks are high and lower costs when risks are low.
Conversely, cost-benefit logic is likely to be less pronounced when human intent is involved. Importantly, the literature surveyed above suggests that willful human intent triggers an emotion-laden, visceral response; people do not like to be cheated by others. Extending this notion to the consideration of different levels of such a reaction, a broader literature holds that a wide array of emotional, visceral responses are characterized by scale insensitivity (Kahneman et al. 1999; Hsee and Rottenstreich 2004; Pham 2007). Hsee and Rottenstrich (2004) differentiate between “valuations by calculation” that are logically based on the magnitude of the object being valued, as opposed to emotional responses that prompt “valuations by feeling.” As the authors put it, “under valuation by feeling, value is highly sensitive to the presence or absence of a stimulus (i.e., a change from zero to some scope) but is largely insensitive to further variations in scope” (2004, 23). Similarly, Pham (2007, 163) concludes from his review of several studies that “when integral affective [i.e., emotional or visceral] responses are used as proxies for value, these responses are not scaled properly for either magnitude or probability.”

Extended to our setting, if willful misreporting risk triggers a “valuation by feeling,” both high and low levels of that risk are likely to command similarly high levels of audit resources. Curiously, recent PCAOB standards appear to reflect such an expectation. Within the same body of risk-assessment guidance that directs auditors to devote more resources to more significant areas of risk (and presumably, by logical implication, less resources to less significant risks), the PCAOB (2010a, ¶71) is also fairly direct in stating that “a fraud risk is a significant risk” by definition. Indeed, in listing the criteria an auditor should consider in gauging the significance of identified risks, the PCAOB’s (2010a, ¶71) first criterion involves the “likelihood and potential magnitude” of misstatement, whereas the second criterion involves “whether the risk is a fraud risk.” The separation of these two criteria could be taken to imply that fraudulent intent is a
construct that is qualitatively independent of “likelihood and magnitude.” Such a characterization would be consistent with the PCAOB’s guidance on qualitative materiality, in which the PCAOB (2010b, ¶17) observes that an intentional misstatement “could be material for qualitative reasons, even if relatively small in amount.”

If fraud risks are significant by definition, a literal interpretation of this statement seems to imply that a high level of fraud risk is significant and a low (but nonzero) level of fraud risk is also significant. This reasoning is seemingly consistent with a judgment study conducted by Zimbelman (1997), who finds that experienced auditors in a condition that requires a separate consideration of fraud risks increase the hours they budget for a hypothetical audit client, irrespective of whether the fraud risks they consider are relatively high or low. A subsequent replication of Zimbelman (1997) by Glover et al. (2003) shows more sensitivity of audit hours to the level of fraud risk, but we believe that the original Zimbelman (1997) finding is also noteworthy. Indeed, one possible interpretation of the PCAOB’s recent regulatory guidance on auditor risk assessment is that the general logic of tailoring the level of audit resources to the level of risk takes a back seat to the nature of risk when fraudulent intent is involved.

To be sure, fraud risks can subject auditors to greater overall exposure than would be the case for unintentional errors. Fraud can suggest the “tip of an iceberg” that implies other problems with greater potential consequences. In short, intentional and unintentional reporting risks likely do not occur under ceteris paribus conditions in practice. While we certainly do not deny such differences, the tools of experimentation allow us to investigate the more subtle and fundamental question of whether scale insensitivity could lead auditors to devote similar resources across different levels of intentional reporting risk, relative to the actions taken for unintentional risks that, by design, present the same magnitudes, probabilities, and consequences.
of potential loss. This premise underlies our primary hypothesis of an interaction between the source of risk (intentional vs. unintentional) and the level of that risk:

**Hypothesis:** *Ceteris paribus,* the mapping from different levels of risk to different levels of audit resources will be less pronounced for risks arising from willful human intent than for the same risks arising from an unintentional source.

In addition to testing this core hypothesis, we also test the main effects of risk level and risk source, although we do not formally hypothesize these effects in view of the difficulty inherent in interpreting main effects when one expects an interaction. In follow-up tests, we examine the simple effects of intentional vs. unintentional risk sources within each risk-level condition to examine our underlying premise that source sensitivity will be more pronounced at low risk levels than at high levels.

**III. METHOD AND DESIGN**

**Task**

Using the “Z-tree” architecture for computerized interactive experiments (Fischbacher 2007), we operationalize a one-shot game in which undergraduate business student volunteers (n = 55) in a role analogous to that of an auditor use the “strategy” method to specify the maximum amounts they are willing to pay to protect against various levels of misreporting risk they might face. Throughout, the experimental instructions avoid contextually rich terms such as “auditor” or “fraud” to minimize any unintended influences of role playing (Haynes and Kachelmeier 1998). Also, a one-shot game implies that we are unable to examine any moderating effects of reputations or learning, but similar to our efforts to minimize role playing, this feature is consistent with our core objective to isolate the incremental effect of intentionality in a simple, *ceteris paribus* setting with meaningful incentives.
Auditor-participants start the game with a monetary endowment of $30.00, with the understanding that they will subsequently learn one of five reported values from a human counterparty (intentional risk condition) or from a computerized prompt (unintentional risk condition). The five potential reported values are $10.00, $17.50, $25.00, $32.50, or $40.00, and these are also the five possible actual values underlying the reports. However, the reported value can be less than the actual value.³ Auditor-participants face loss exposure equal to 75 percent of the difference between the actual and reported values.

To protect themselves against their loss exposure, auditor-participants can invest any amount of their $30.00 endowment (in whole-dollar increments) as a maximum verification fee. This elicited fee serves as our proxy for audit resources. Under the strategy method, participants specify a different maximum verification fee for each potential reported value (i.e., each level of potential risk), before the outcomes are realized. To elicit (theoretically) unbiased reservation prices, we adapt the “willingness-to-pay” elicitation mechanism proposed by Becker et al. (1964), whereby the participant either pays a randomly drawn fee, if the random fee is less than or equal to the participant’s maximum fee, or pays nothing and does not verify the report otherwise. We structure the mechanism such that an auditor-participant verifies the report and protects himself/herself from all other loss with probability X/30, where X is the participant’s maximum acceptable fee ($0 \leq X \leq 30). Accordingly, auditor-participants end the game with one of two possible real cash payoffs, as follows:

³ Accordingly, our participants face understatement risk, which differs from the overstatement risks characterizing many earnings manipulations in practice. The reason for this design choice is that there are no “investors” in our experimental setting, meaning that auditors directly bear the risk of loss. This simplification enables us to conduct a tractable experiment while maintaining the fundamental nature of misreporting risk.
Auditor payoff = $30 – random verification fee, if the random verification fee is less than or equal to the participant’s maximum acceptable fee (meaning that a verification occurs).

Auditor payoff = $30 – [0.75 × (actual value – reported value)], otherwise.

All participants must correctly answer a series of computerized pre-experimental questions to confirm their understanding of the instructions before continuing to the actual experiment.\(^4\)

**Intentional Risk Condition**

We randomly assign 28 of the 55 auditor-participants to an intentional risk condition, in which each participant faces a human counterparty who decides on which value to report. Similar to the process for auditor-participants, we use the strategy method for the 28 additional (and different) reporter-participants in this condition, also business student volunteers recruited from the same subject pool, eliciting the value each such participant wishes to report for each equally probable actual value that might obtain ($10.00, $17.50, $25.00, $32.50, or $40.00). We randomly determine the actual values at the end of the session. Like auditor-participants, reporter-participants earn one of two possible cash payoffs at the end of the session, depending on whether or not the auditor-participant verifies the report:

Reporter payoff = actual value – [0.50 × (actual value – reported value)], if the random verification fee is less than or equal to the corresponding auditor-participant’s maximum acceptable fee (meaning that a verification occurs).

Reporter payoff = actual value + (actual value – reported value), otherwise.

Note from this structure that truthful reporting maximizes the reporter-participant’s payoff if the auditor-participant verifies the report, thereby avoiding an underreporting penalty, but underreporting maximizes the reporter’s payoff otherwise. Thus, auditor-participants can hold reporter-participants “accountable” (Evans et al. 1994) in the intentional risk condition by increasing their maximum acceptable verification fees to increase the probability of verification.

\(^4\) Incorrect answers direct the participant to a tutorial screen, followed by repeating the same question.
**Unintentional Risk Condition**

A primary challenge for our experiment is that of establishing *ceteris paribus* conditions. Thus, the instructional materials and operationalization of the unintentional risk condition follow the same wording and steps as in the intentional risk condition, with the exception that there are no reporter-participants in the unintentional condition, in which the instructions refer to determinations from a computer instead of referring to a paired human counterpart. As in the intentional condition, auditor participants in the unintentional condition face the same levels of potential loss exposure. Similarly, after providing maximum verification fees for each possible computer-generated report, auditors realize end-of-session cash payoffs in the exact same manner. To establish a *ceteris paribus* environment, we yoke each unintentional session to the same reported values for each potential actual value realization that occurred in an intentional session. Thus, participants in both conditions literally face the exact same risks.

**Establishing Equivalent Prior Probabilities**

Risk levels hinge on both magnitudes and probabilities. We simplify the task by manipulating only the magnitude of potential loss, but this feature requires us to hold probabilities constant across the intentional and unintentional conditions. A potential problem is that, even though we present participants with the same structural features and (yoked) reported values, it is plausible that auditor-participants’ perceived prior probabilities might differ between the intentional and unintentional risk conditions, thereby confounding the effects of the source of risk with the perceived probabilities of loss.

To control for this potential problem, we conduct a pilot experiment using the materials for the intentional risk condition, although we do not include the pilot results in our primary

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5 In both conditions, a random draw determines the equally probable actual value realizations. Under the strategy method, each such actual value corresponds to a prespecified reported value chosen by one of the reporter-participants in the intentional risk condition that we yoke to a session in the unintentional risk condition.
analyses. Rather, the purpose of the pilot is to extract (truthful) prior probabilities of various reported vs. actual values that we communicate to auditor-participants in both the intentional and unintentional conditions of the actual experiment as part of the experimental instructions. We use the following wording to communicate these probabilities in the intentional risk condition:

For each possible Actual Value, the table below lists the distribution of the values reported in an earlier session of this experiment. While we cannot tell you the distribution of how the people in the other room will report in today’s session, we recruited the people in the other room from the same population (i.e., the same set of classes) as the earlier session. Thus, you can expect the distribution of Reported Values in today’s session to be similar to that of the earlier session.

The unintentional risk condition precludes us from referring to reports from “people,” but we otherwise use the same wording as much as possible, as follows:

For each possible Actual Value, the table below lists the distribution of the values reported in an earlier session of this experiment. While we cannot tell you the distribution of the values that will actually be randomly drawn in today’s session, these values will be drawn from the same population as in the earlier session. Thus, you can expect the distribution of Reported Values in today’s session to be similar to that of the earlier session.

The instructional materials in each condition then follow with the same table of probabilities for each combination of reported and actual values, extracted from the results of the pilot experiment. Importantly, we do not communicate the pilot data to reporter-participants in the intentional risk condition of the actual experimental sessions, as doing so might have influenced their behavior relative to the pilot, thereby weakening the credibility of the pilot reports as a truthful representation to auditor-participants of what to expect. Fortunately, as we discuss later in a supplemental analysis, the distributions of reporter-participants’ reporting decisions are reasonably similar in the pilot and actual experimental sessions, with no statistically significant differences. Thus, we provide all auditor-participants with the same pilot-generated baseline of prior probabilities that align with the probabilities they actually face, in
addition to yoking the reporting outcomes in the intentional and unintentional risk sessions to ensure equivalent actual risk levels.

IV. RESULTS

Primary Analysis

As an overall summary of our primary findings, Figure 1, Panel A plots auditor-participants’ maximum verification fees at each reporting level from $10.00 (highest risk) to $32.50 (lowest risk). A $10.00 report implies the highest risk because the actual value determining the auditor’s exposure could be $17.50, $25.00, $32.50, or $40.00. Conversely, a reported value of $32.50 exposes the auditor only to the possibility that the actual value could be $7.50 higher, or $40.00. We do not elicit verification fees or plot outcomes for $40.00 reports, as such a report can only arise if the actual value is also $40.00. Figure 1, Panel B documents the means plotted in Panel A, in addition to showing the standard deviation of responses within each experimental cell.

As Figure 1 indicates, auditor-participants’ maximum verification fees decrease as the auditor’s risk decreases, although this pattern is distinctly more pronounced within the unintentional risk condition than in the intentional risk condition. The increased spreading of verification fees between the intentional and unintentional risk conditions as risk levels decline is consistent with our core hypothesis, as we corroborate statistically next.

To test the pattern in Figure 1, we construct a generalized regression model that takes into account the ordinal nature of our risk-level factor. Essentially, we regress each auditor-participant’s vector of verification fees across the four risk levels, from highest to lowest, testing the average slope as the main effect of risk level, the average difference across risk levels as the main effect of risk source (intentional vs. unintentional), and the difference in risk-level slopes
between the two risk-source conditions as the interaction test of our core hypothesis. To account for the repeated measures of the risk-level factor, we cluster standard errors by participant, analogous to the clustering by firm that characterizes much recent cross-sectional archival research (Petersen 2009; Gow et al. 2010).

Table 1, Panel A shows the results. On average, verification fees are higher in the intentional risk condition than in the unintentional risk condition, supporting a main effect of risk source ($t = 2.00$; one-tailed $p = 0.026$). On average, verification fees also decline as risk declines, supporting a main effect of risk level ($t = -4.50$; one-tailed $p < 0.001$). More importantly, however, the decline in verification fees is significantly less pronounced (i.e., flatter) in the intentional risk condition than in unintentional risk condition, supporting our core hypothesis of an interaction between risk levels and the source of that risk ($t = 2.00$; one-tailed $p = 0.024$).

Panels B and C of Table 1 follow up on the overall regression by testing the individual risk-level slopes within each intentionality condition (Panel B) as well as the simple effects of intentionality at each risk level (Panel C). Panel B shows a statistically significant downward slope of verification fees as risks decline within both the intentional and unintentional risk conditions, although the -1.79 slope ($t = -4.55$; $p < 0.001$) within the unintentional condition is 2.6 times the magnitude of the -0.69 slope ($t = -1.78$; $p = 0.039$) within the intentional condition.

Panel C shows why the slopes differ. Namely, average verification fees do not differ significantly between the intentional and unintentional risk conditions at the two highest risk

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6 Although not formally hypothesized, we apply one-tailed tests to the main effects of risk level and risk source, under the rationale that it would be implausible to posit that resources would increase as risks decrease or that unintentional risks would command a premium over intentional risks. That said, the primary statistical inferences in Table 1, Panel A do not depend on whether we halve the $p$-values in one-tailed tests.

7 We favor a generalized regression approach with a single, four-level independent variable for risk levels because “risk level” is not a categorical factor so much as it is a linear progression from highest to lowest risks. Nevertheless, if we instead apply a contrast-coded ANOVA model (Buckless and Ravenscroft 1990), with contrast weights that reflect our ex ante expectation of a flat line across risk levels within the intentional risk condition and a downward sloping line in the unintentional risk condition, the hypothesized contrast is highly significant ($t = 3.28$; $p < 0.01$).
levels of $10.00 and $17.50 reported values (one-tailed $p = 0.304$ and $p = 0.295$, respectively).
The similar verification fees at higher risk levels do not simply reflect a ceiling artifact, as the $12.21$ average maximum verification fee at the highest ($10.00$) risk level within the intentional risk condition lies well below the maximum fee allowed ($30.00$). The maximum exposure an auditor-participant faces at the $10.00$ risk level is $0.75 \times (\$40.00$ actual value - $10.00$ reported value) = $22.50$, which again is well above the $12.21$ actual average investment at the highest risk level within the intentional risk condition. Thus, participants are not simply investing at the maximum for the highest risk levels, but rather appear to be making concerted cost-benefit trade-offs that converge between the intentional and unintentional risk conditions as risks increase.

Conversely, Table 1, Panel C indicates statistically significant differences in maximum verification fees between the intentional and unintentional risk conditions at the two lowest risk levels of $25.00$ and $32.50$ reported values (one-tailed $p = 0.032$ and $p = 0.007$, respectively). Thus, as Figure 1 depicts, verification fees diverge as risks decline, with auditor-participants facing unintentional risks significantly “backing off” with lower verification fees, while those facing \textit{ceteris paribus} intentional risks from a human counterparty retain a willingness to pay fees almost as large as they specify for the highest risk levels.

We interpret this pattern as follows. When risks are high, the level of risk is itself enough to command relatively high audit resources, whether those risks arise from intentional or unintentional misreporting. By contrast, when risks are low, participants in the unintentional risk condition likely reason that fewer costly resources are necessary, whereas participants in the intentional risk condition remain sensitive to the threat of harm caused by the willful intent of others. Because intent-based risk is likely to elicit more of what Hsee and Rottenstreich (2004) term a “valuation by feeling” than a “valuation by calculation,” scale becomes less important and
verification fees remain high, at least relative to the fees observed for risks from a source without explicit intent, *ceteris paribus*.

Below we report supplemental analyses that follow up on this overall interaction by examining (1) post-experimental evidence to validate our interpretation of intentionality as a construct that influences feelings of being cheated, and (2) an analysis of reporter behavior that enables us to comment in greater detail on how our findings compare to economic benchmarks.

**Supplemental Analyses**

**Construct Validation**

We interpret our manipulation of intentional vs. unintentional risk in terms of the presence or absence of willful human intent, which in turn evokes feelings of being cheated by another person. We acknowledge, however, that other interpretations are possible, and we present evidence in this subsection to address that possibility. First, it is plausible that our intentional and unintentional risk conditions might have differed in perceived *ambiguity*, thereby reflecting any incremental aversion to uncertain probabilities governing uncertain outcomes (Ellsberg 1961; Zimbelman and Waller 1999). We minimize this potential by using the same instructional wording as much as possible across conditions, presenting the pilot probabilities not as known probabilities, but rather as reflecting a similar distribution from a broader population. Thus, ambiguity is present in *both* the intentional and unintentional risk conditions. Still, notwithstanding the similar wording, it is possible that the intentional risk condition could have seemed more ambiguous than the unintentional risk condition.

A second possibility is that participants might have been reacting more to the “human” part of the intentional risk condition than to the “willful intent” part. That is, strictly speaking, the intentional and unintentional risk conditions differ not only in the presence of willful intent,
but also in the more fundamental sense that human counterparties exist in the intentional risk condition but not in the unintentional risk condition. Ideally, one would conduct the unintentional risk condition with human counterparties who would make unintentional errors at the same magnitudes and frequencies as those arising intentionally in the other condition, but it would be very difficult to ensure such a matching under *ceteris paribus* conditions. Accordingly, we favor the more controllable approach of yoking the unintentional risk condition to the decisions of reporter-participants in the intentional risk condition. We believe that this yoking comes as close as possible to true *ceteris paribus* risks, while we recognize that a limitation of this control is that human reporters exist only in the intentional risk condition.

We appeal to two points in addressing these limitations. First, while it is plausible that our primary manipulation could have elements of ambiguity and/or sensitivity to a human counterparty (as opposed to human intent), it is difficult to surmise how any such interpretations would result in an *interaction* between the source of risk and the *level* of risk, *ceteris paribus*. That is, it would seem that any alternative interpretations would be manifested more as a main effect of those interpretations than as an interaction with risk level.

Our second point draws on evidence from a post-experimental questionnaire that we administered after all decisions had been recorded but before revealing the final outcomes of those decisions. The questionnaire includes two seven-point Likert-scale questions eliciting the extent to which participants would feel cheated by the possibility of the maximum amount of potential misreporting at both the highest risk level of a $10 report (i.e., potential misreporting of $30) and at the lowest-risk level of a $32.50 report (i.e., potential misreporting of $7.50). It is likely that even unintentional risk would lead to some sense of being “cheated” by the loss of

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8 Specifically, the exact question is worded, “If I did not validate the report, I would feel cheated if $10 (or $32.50 for the second question) was the Reported Value when $40 was the Actual Value.”
money. However, if our manipulation is as we theorize, the intentional risk condition should prompt greater feelings of being (potentially) cheated relative to any such feelings in the unintentional risk condition, particularly at the lowest risk level. This is the pattern we observe. At the highest risk level, the mean “feel cheated” scores are 5.0 and 4.3 in the intentional and unintentional risk conditions, respectively, for a difference of 0.7 that is marginally significant ($t = 1.54$; one-tailed $p = 0.065$). At the lowest risk level, the respective mean scores are 4.1 and 2.8, nearly doubling the difference to 1.3 ($t = 3.39$; one-tailed $p < 0.001$). Thus, lower risks appear to lessen the potential for feeling cheated by a greater degree when risks are unintentional than when the same risks reflect willful human intent, consistent with the premise that intent prompts a “valuation by feeling” that is less sensitive to scale. Supporting this conclusion, we find statistical significance ($t = 5.74$; $p < 0.001$) for a contrast-coded model weighted to test the expectation that lower risk would lead participants to feel less cheated in the unintentional risk condition, but that participants in the intentional risk condition would feel similarly cheated under high or low risk.\(^9\)

**Reporter Behavior and Economic Baselines**

Reporters in this study serve as a control rather than as a focus of theoretical interest, insofar as our experiment ensures by design that the intentional and unintentional risk conditions generate the same reported values for each potential actual value. Thus, the most important economic baseline our study offers is the designed control that auditor-participants face the same magnitudes and probabilities of monetary risks in both the intentional and unintentional risk conditions, such that from the pure perspective of economic risk aversion, verification fees should not differ between these conditions and should not interact with risk levels. The fact that

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\(^9\) Contrast coding enhances our statistical power to test the predicted pattern (Buckless and Ravenscroft 1990), although even an omnibus ANOVA detects a risk-source × risk-level interaction term on the post-experimental “feel cheated” scores that is at least marginally significant ($F = 1.68$; one-tailed $p = 0.10$).
we observe an interaction that widens as risks decrease is evidence of an incremental behavioral aversion to intentionality, "ceteris paribus," apart from any economic aversion to losses "per se." We acknowledge that intentional and unintentional risks generally do not occur under "ceteris paribus" conditions in practice, but we see this fact as the principal advantage of an abstract, incentive-compatible experiment for our research question, enabling us to separate the psychological construct of intentionality from the more basic forces of wealth maximization.

Notwithstanding the designed equivalence in reporting across the intentional and unintentional risk conditions, the distribution of such reports sheds insight on how auditor verification fees compare to economic fundamentals, such as expected values. Accordingly, Table 2, Panel A documents the distribution of the actual values associated with each reported value, both for the pilot session and for the actual experimental sessions. The pilot distribution is relevant because the instructions included that distribution as an "ex ante" indicator to auditor-participants in both the intentional and unintentional risk conditions of the reporting distribution they could expect, on average, as explained earlier in Section III. As discussed earlier, reporter-participants within the intentional risk condition did not have the pilot data, thereby maintaining "ceteris paribus" reporting conditions in the main experiment relative to the pilot. Chi-squared tests (untabulated) fail to reject the null hypothesis of equivalent reporting distributions between the pilot and actual experimental sessions for each reported value (lowest p = 0.20), supporting our representation to auditor-participants that the data provided are representative of the reported and actual values they could expect to observe.

Table 2, Panel B reports the expected values and standard deviations of the losses auditor-participants could expect from the reported vs. actual distributions in Panel A. Although auditor-participants could have calculated this information from the distributional data they were
given, the instructions did not include the summary statistics in Panel B, insofar as we did not wish to unduly prompt auditor behavior with quasi-normative cues such as expected loss values. Nevertheless, these statistics facilitate interpretation of the maximum verification fees. Specifically, comparing the expected loss values in Table 2, Panel B to the average maximum verification fees plotted and tallied in Figure 1 indicates that auditor-participants were willing to pay a verification premium well above the expected values of the losses they would face without verification. This premium implies risk aversion, as the Becker et al. (1964) mechanism we use to elicit maximum verification fees is designed such that a risk-neutral auditor should indicate a maximum verification fee equal to the expected loss value s/he would otherwise face.\(^\text{10}\)

Dividing the average maximum verification fees by the expected loss values from the instructional pilot distributions provides a metric of the degree of risk aversion. Within the intentional risk condition, the multiple above expected value increases as risks decline, from a fee of 1.94 × expected loss value (i.e., $12.21/$6.30) at the highest risk level of a $10.00 reported value to a premium of 2.36 × expected loss value (i.e., $9.96/$4.22) at the lowest risk level of a $32.50 reported value. Conversely, within the unintentional risk condition, auditors’ maximum verification fees decline from 1.65 × expected loss value (i.e., $10.37/$6.30) at the highest risk level to 1.20 × expected loss value (i.e., $5.07/$4.22) at the lowest risk level, suggesting that auditor-participants facing risks from a computerized source are converging towards the risk-neutral benchmark of covering only their expected exposure as risks decrease.

Of course, expected loss values tell only part of the story in an environment such as ours in which the variance of potential losses differs widely across risk levels. That is, the standard deviation of $7.07 for potential losses from the pilot distribution at the highest risk level is nearly

\(^{10}\) For a maximum verification fee of X, an auditor-participant pays an expected actual fee of X/2 with probability X/30, and incurs an expected loss of L from the difference between the reported and actual values with probability (30 − X)/30. The loss function [(X/2) × (X/30)] + [L × (30 − X)/30] is minimized when X = L.
three times the standard deviation of $2.45 at the lowest risk level, consistent with a downward-sloping mapping from lower risks to lower resources for a risk-averse auditor. This pattern especially characterizes verification fees in the unintentional risk condition, which decline markedly as variance decreases and which never exceed the maximum potential losses those auditors face. Conversely, within the intentional risk condition, the average verification fee of $9.96 at the lowest risk level actually exceeds the maximum possible loss of $5.63 at that risk level (= 75 percent of a $7.50 difference between a reported value of $32.50 and the maximum actual value of $40.00). Thus, especially for low risks, it seems clear that auditor-participants in the intentional risk condition are reacting to more than just their potential monetary losses.

Finally, we should acknowledge an apparent anomaly in the reporting data in Table 2. Specifically, although expected loss values generally decline as the risk levels decline, an exception to this pattern is that the expected loss of $5.23 from the realized reporting distribution in the actual experimental sessions at the highest risk level of a $10.00 report is less than that of the expected loss values of $6.53 and $6.02 for a $17.50 or $25.00 report, respectively. We are not overly concerned by this anomaly, for four reasons. First, auditor-participants did not observe the reported or actual value realizations until after they provided their maximum verification fees. Rather, at the time they made their decisions, auditor-participants were only aware of the reporting distributions from the pilot data, which follow a monotonic pattern in expected loss values. Second, notwithstanding the nonmonotonic pattern of expected values from reports in the actual experimental sessions, the variances of those values are monotone, with the highest risk condition having the highest standard deviation of potential losses (and the highest maximum potential loss). Thus, even with its slightly lower expected loss value, we would still characterize a $10.00 report as having the highest risk. Third, even if we delete the highest ($10.00) risk level
from our analyses, the same basic results continue to hold across the other three risk levels that are monotone decreasing in both expected values and standard deviations (see Figure 1). Fourth, the central design feature of our experiment is that whatever reporting variations characterize reporters’ decisions in the intentional risk condition also characterize the computer-generated reports in the unintentional risk condition, maintaining a *ceteris paribus* environment.

**V. CONCLUSIONS, LIMITATIONS, AND FUTURE DIRECTIONS**

Both audit practice and audit regulations embrace a “risk-based” logic of higher audit resources at higher levels of risk. At the same time, the contemporary audit environment appears to elevate risks arising from willful human intent to a priority level, such as in the PCAOB’s (2010a) blanket assertion that “a fraud risk is a significant risk.” An interesting question arising from these two forces is whether willful intent trumps risk-based logic, such that both high and low fraud risks are “significant,” so long as the risk is nonzero.

Consistent with the regulatory implication that auditors should take extra precautions against risks arising from the willful intent of a human counterparty, we find from an incentivized experiment that willful human intent significantly elevates the resources auditor-participants are willing to pay to protect themselves from reporting risks, *ceteris paribus*. Our primary experimental design advantage is that we hold constant both *ex ante* expectations (as communicated to all auditor-participants from a pilot study) and *ex post* reporting outcomes, thereby isolating the qualitative characteristic of intentional risks relative to the exact same risks arising from a yoked computer distribution. We then go beyond prior studies of the main effect of intentionality by varying risk levels, detecting an interaction in which intentionality results in an increasingly large spread in audit verification fees as risk levels decline. That is, auditor-participants in our study protect themselves similarly from high levels of risk, but are willing to
significantly back off those investments at lower risk levels only when those risks arise from a computerized source that lacks explicit human intent. Conversely, verification fees remain relatively high even at low risk levels when risks reflect the intentional actions of other participants, consistent with the theoretical premise that such actions elicit a more visceral response that is relatively insensitive to scale.

One contribution from our study is that auditors could be less sensitive to the level of risk when willful intent is involved, suggesting an important qualification to the more general logic of risk-based auditing. Another contribution from our study is that, if people are naturally more sensitive to even low levels of risk from the intentional actions of a reporting counterparty, that propensity could help to mitigate any exposure auditors face from the exploitation of risk-based auditing by strategic managers (Weil 2004; Bowlin et al. 2009; Bowlin 2011). For example, Bowlin (2011) finds that manager-participants in his experiment elevate their propensity to misstate an account when managers infer that the auditor views that account as being “low risk.” Given our desire to maintain *ceteris paribus* conditions, our experiment does not allow reporter-participants to exercise any strategic reporting decisions that are not also present in the yoked unintentional risk condition, but nevertheless, the findings we detect suggest a natural heuristic that could serve to protect auditors in more strategic settings. That is, even though the incremental influence of willful intent could be considered “irrational” in our setting, due to the fact that we hold monetary incentives and consequences constant across conditions, this same behavior could plausibly be prudent and beneficial in real-world environments that do not present *ceteris paribus* risks.

To be sure, the same features we use to enable a *ceteris paribus* comparison also limit our ability to generalize findings. As a prominent example, risks in our experiment arise *entirely*
from willful human actions (intentional risk condition) or entirely from a yoked computer program (unintentional risk condition). In practice, the accounts auditors test combine elements of both potential unintentional errors and intentional irregularities, requiring more complex judgments of audit risk. We see our setting not as a realistic reflection of audit practice, but rather as using the tools of experimentation to create an environment that isolates a theoretical construct that is relevant to practice.11 At the same time, we acknowledge that our design precludes the ability to examine the interrelationships between intentional and unintentional audit risks, such as the strategic managerial responses to auditor risk assessments that Bowlin (2011) investigates.

A second important limitation is that the abstract nature of our experimental economics design does not generalize beyond a basic sense of the total resources devoted by an auditor. Accordingly, we cannot speak to the richer questions of which specific tests auditors employ to address various risks of a fraudulent and nonfraudulent nature. Hoffman and Zimbelman (2009) conduct a more contextually rich experiment in the traditions of auditor judgment and decision-making research to test behavioral interventions that affect how auditors modify their procedures to address different degrees of fraud risk. Conversely, our more abstract experimental economics design with a relatively simple monetary incentive structure and student participants helps us to isolate the influence of willful intent as a theoretical construct, apart from the other incentives and complexities that real-world auditors face. Merging our more abstract insights on the amount of audit resources with the more detailed evidence from Hoffman and Zimbelman (2009) and others on the nature of audit resources could be a fruitful avenue for future research.

11 See related comments by Swieringa and Weick (1982) on “intentional experimental artificiality” and by Libby et al. (2002, 798) on the ability of an experiment to isolate theoretical drivers of behavior by constructing “unrealistically extreme” settings.
Finally, and most fundamentally, it is surely the case that risks of an intentional and unintentional nature do not occur under *ceteris paribus* conditions in practice, such that a major reason why real-world auditors might be more sensitive to fraud risks is simply that misstatements arising from fraud typically subject auditors to greater exposure than do misstatements arising from other sources. We see our experiment as demonstrating the more subtle point that *even if* intentional and unintentional misstatements subjected auditors to the *same* magnitudes and probabilities of monetary exposure, a natural predisposition to protect against harm of an intentional nature could still influence auditor behavior at the margin.

We believe that the theory and practice of risk-based auditing is a ripe area for future research. Future studies could attempt to integrate any natural aversion to intent-based risks with other risk-based auditing phenomena, such as the strategic interdependence and managerial responses to auditor risk assessments investigated by Bloomfield (1997), Bowlin et al. (2009), and Bowlin (2011), or the halo effect investigated by O’Donnell and Schultz (2005), to name two examples. More generally, we see research in this area as communicating to researchers, policymakers, and practitioners that the logic underlying “risk-based auditing” is more subtle than it might first appear. That is, the risks auditors face are not like the risks of bad weather. Weather risks can be effectively estimated and addressed through the use of scientific forecasting models, and weather does not derive benefit from harming its victims. Conversely, audit risks can arise from the actions of human reporters, often involving willful and exploitive intent. As our study and others in this area demonstrate, exposure arising from intentional sources can “change the game” regarding the mapping from the level of risk to the level of audit resources applied to that risk.
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FIGURE 1

Average Maximum Verification Fee at Each Risk Level

Panel A: Plot of Average Maximum Verification Fees

Panel B: Descriptive Statistics

<table>
<thead>
<tr>
<th>Average Maximum Verification Fee</th>
<th>$10.00</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$17.50</td>
</tr>
<tr>
<td></td>
<td>$25.00</td>
</tr>
<tr>
<td>$10.00 (Highest Risk Level)</td>
<td>$12.21</td>
</tr>
<tr>
<td>$17.50 (Lowest Risk Level)</td>
<td>$11.07</td>
</tr>
<tr>
<td></td>
<td>$10.93</td>
</tr>
<tr>
<td></td>
<td>$9.96</td>
</tr>
<tr>
<td></td>
<td>$11.04</td>
</tr>
</tbody>
</table>

Reported Value

<table>
<thead>
<tr>
<th>Intentional Risk Condition</th>
<th>Mean</th>
<th>$12.21</th>
<th>$11.07</th>
<th>$10.93</th>
<th>$9.96</th>
<th>$11.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard Deviation)</td>
<td>($ 8.62)</td>
<td>($ 5.77)</td>
<td>($ 6.96)</td>
<td>($ 7.24)</td>
<td>($ 5.75)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unintentional Risk Condition</th>
<th>Mean</th>
<th>$10.37</th>
<th>$9.67</th>
<th>$7.63</th>
<th>$5.07</th>
<th>$8.19</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard Deviation)</td>
<td>($ 7.93)</td>
<td>($ 6.25)</td>
<td>($ 4.50)</td>
<td>($ 4.65)</td>
<td>($ 4.81)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall</th>
<th>Mean</th>
<th>$11.31</th>
<th>$10.38</th>
<th>$9.31</th>
<th>$7.56</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard Deviation)</td>
<td>($8.26)</td>
<td>($ 6.00)</td>
<td>($ 6.06)</td>
<td>($ 6.53)</td>
<td></td>
</tr>
</tbody>
</table>
**TABLE 1**

Generalized Regression Analysis of Treatment Effects

**Panel A: Primary Analysis**

<table>
<thead>
<tr>
<th>Dependent variable = maximum verification fee</th>
<th>$t$-statistic</th>
<th>$p$-value$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk source (average effect of intentional vs. unintentional risks, manipulated between-subjects)</td>
<td>2.00</td>
<td>0.026</td>
</tr>
<tr>
<td>Risk level (average linear slope of verification fees across four possible reported values, manipulated within-subjects)</td>
<td>-4.50</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Risk source $\times$ Risk level (test of the difference in risk-level slopes between the intentional and unintentional risk-source conditions)</td>
<td>2.00</td>
<td>0.024</td>
</tr>
</tbody>
</table>

**Panel B: Simple Effects of Risk-Level Slopes**

<table>
<thead>
<tr>
<th>Slope of linear regression of maximum verification fees on risk levels:</th>
<th>Slope Estimate</th>
<th>$t$-statistic</th>
<th>$p$-value$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentional risk condition</td>
<td>-0.69</td>
<td>-1.78</td>
<td>0.039</td>
</tr>
<tr>
<td>Unintentional risk condition</td>
<td>-1.79</td>
<td>-4.55</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Difference in slopes = interaction effect</td>
<td>1.10</td>
<td>2.00</td>
<td>0.024</td>
</tr>
</tbody>
</table>

**Panel C: Simple Effects of Risk Source at Each Risk Level**

<table>
<thead>
<tr>
<th>Effect of intentional vs. unintentional risk source on maximum verification fees:</th>
<th>$t$-statistic</th>
<th>$p$-value$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest risk level ($$10.00$ reported value)</td>
<td>0.52</td>
<td>0.304</td>
</tr>
<tr>
<td>$$17.50$ reported value</td>
<td>0.54</td>
<td>0.295</td>
</tr>
<tr>
<td>$$25.00$ reported value</td>
<td>1.90</td>
<td>0.032</td>
</tr>
<tr>
<td>Lowest risk level ($$32.50$ reported value)</td>
<td>2.79</td>
<td>0.007</td>
</tr>
</tbody>
</table>

$^a$ Reported $p$-values are one-tailed, conditional on $ex$ $ante$ predictions.
## TABLE 2

### Reporter Behavior

#### Panel A: Percentage Frequency Distributions

<table>
<thead>
<tr>
<th>Reported and Actual Values</th>
<th>Distribution from Pilot Session&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Distribution from Actual Experimental Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$10.00 reported value (highest risk):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual value = $10.00</td>
<td>44%</td>
<td>50%</td>
</tr>
<tr>
<td>Actual value = $17.50</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>Actual value = $25.00</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>Actual value = $32.50</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Actual value = $40.00</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td><strong>$17.50 reported value:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual value = $17.50</td>
<td>50%</td>
<td>33%</td>
</tr>
<tr>
<td>Actual value = $25.00</td>
<td>25%</td>
<td>37%</td>
</tr>
<tr>
<td>Actual value = $32.50</td>
<td>8%</td>
<td>11%</td>
</tr>
<tr>
<td>Actual value = $40.00</td>
<td>17%</td>
<td>19%</td>
</tr>
<tr>
<td><strong>$25.00 reported value:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual value = $25.00</td>
<td>33%</td>
<td>16%</td>
</tr>
<tr>
<td>Actual value = $32.50</td>
<td>58%</td>
<td>61%</td>
</tr>
<tr>
<td>Actual value = $40.00</td>
<td>9%</td>
<td>23%</td>
</tr>
<tr>
<td><strong>$32.50 reported value (lowest risk):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual value = $32.50</td>
<td>25%</td>
<td>9%</td>
</tr>
<tr>
<td>Actual value = $40.00</td>
<td>75%</td>
<td>91%</td>
</tr>
</tbody>
</table>

#### Panel B: Expected Values and Standard Deviations of Auditor Losses

<table>
<thead>
<tr>
<th>Reported Value</th>
<th>Pilot Session</th>
<th>Actual Experimental Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expected Loss from Unverified Report&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Expected Loss From Unverified Report&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation of Potential Losses</td>
<td>Standard Deviation of Potential Losses</td>
</tr>
<tr>
<td>$10.00 (highest risk)</td>
<td>$6.30</td>
<td>$7.07</td>
</tr>
<tr>
<td>$17.50</td>
<td>$5.18</td>
<td>$6.33</td>
</tr>
<tr>
<td>$25.00</td>
<td>$4.28</td>
<td>$3.40</td>
</tr>
<tr>
<td>$32.50 (lowest risk)</td>
<td>$4.22</td>
<td>$2.45</td>
</tr>
</tbody>
</table>

<sup>a</sup> Instructions to auditor-participants (but not to reporter-participants) included the pilot distribution data from Panel A.

<sup>b</sup>To illustrate the expected loss computation, consider the $10.00 report distribution for the pilot session. In this cell, the expected loss value is 0.44(0) + 0.22[0.75×($17.50-$10.00)] + 0.19[0.75×($25.00-$10.00)] + 0.08[0.75×($32.50-$10.00)] + 0.07[0.75×($40.00-$10.00)] = $6.30. Calculations for other cells follow in a similar manner.