

Auditor Evaluation of Business Risks

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November, 2007

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This paper has benefited from the comments of workshop participants at Texas A&M University, The Florida State University, Kansas State University Mid-states Symposium, and Louisiana State University. We thank Jackie Hammersley, Rich Houston, Linda McDaniel, Jennifer Mueller, Ed O'Donnell, Tom Omer, Jon Perkins, Audrey Scarlata, Jamie Schmidt, Marjorie Shelley, Don Warren, Victor Willson, and Arnie Wright for helpful comments on earlier drafts. We also appreciate administrative assistance provided by Ryan Huston and Daniel Maranto. We sincerely thank the participating firm for providing participants as well as expert insights into the audit planning process, as well as the CFO at the sample company for providing industry insights and company information. Dr. Diaz gratefully acknowledges the Texas A&M Department of Accounting for providing funds to collect data and Mays Business School for providing financial support while completing this research.

Auditor Evaluation of Business Risks

ABSTRACT

We use two case-based experiments to investigate senior auditor identification and assessment of business risks. In the first experiment, we found that a majority of senior auditors identified either no or very few partner-determined business risks. Auditors who identified very few business risks did not use business risk to inform their assessment of financial statement risks. In a second experiment involving only risk assessment, we found that business risks were assessed lower by senior auditors than firm partners. Complementing our risk identification results, we also found that underassessment of business risks indicated that business risks were not used to inform the assessment of financial statement risk assessments. Overall, our results suggest that senior auditors experience difficulty implementing professional guidance which requires the use of client business risk to inform the risk of material misstatement of the financial statements.

Keywords: Auditing, Business risks; Risk Identification; and Risk Assessment

Auditor Evaluation of Business Risks

Introduction

This study investigates senior auditor evaluation of a client's business risks. Specifically, we study auditor ability to identify and assess business risks, and we study the use of business risks to inform financial statement risk. The importance of the evaluation of business risks is evidenced by recent auditing standards. International Standard on Auditing (ISA) 315 (IAASB, 2004), Statement on Auditing Standard (SAS) 109 (AICPA, 2006), and Assurance HB 5141 (CICA, 2005) require auditors to gain an understanding of client business risks to identify areas that create pressure on financial reporting. These standards have their roots in an audit methodology often referred to as business risk auditing (BRA) (Lemon, Tatum & Turley, 2000; Winograd, Gerson & Berlin, 2000). With the objective of producing a more effective financial audit, BRA methods focus on modeling client business risk which is then used in the establishment of financial statement risks and subsequent testing (Robson, Humphrey, Khalifa & Jones, 2007). As noted by Knechel (2007), an understanding of a client's unmitigated business risks should allow the auditor to better anticipate and uncover accounting error and fraud.¹

Given current and/or past use of BRA approaches by most of the large, international audit firms, there is literature that has focused on the use of BRA (Curtis & Turley, 2007;

¹ An example of a business risk is a firm's entrance into a new line of business that is both complicated and risky. In a recent class action lawsuit, an auditor incurred litigation, because the auditor did not link the potential financial effects of their client's entrance into a new line of business (Oakridge, 2005). The plaintiff alleged that early on, the auditor should have recognized the financial importance of overly low contract prices, the client's inexperience in their new business line, and the harsh non-monetary terms of their client's contracts – all of which eventually led to financial disaster for the auditor's client.

Knechel, 2007; Lemon et al., 2000; Winograd et al., 2000) and on the effect of business risks on auditor judgment (Ballou, Earley & Rich, 2004; O'Donnell & Schultz, 2005). However, prior research has not provided clear evidence on the basic issues of how well auditors identify and assess business risks (Ballou et al., 2004; Curtis & Turley, 2007; O'Donnell & Schultz, 2005). In a longitudinal case study, Curtis and Turley (2007) document auditor perceptions that business risks are difficult to identify, assess, and link to financial statement risks, but given the nature of their study, they neither analyze how well business risks are identified nor the ability of auditors to link business and financial statement risk as required under current professional guidance (AICPA, 2006; IAASB, 2004). This research analyzes those issues, because compliance with current audit standards are predicated on the ability of the various audit staff to identify and assess business risks with the objective of using business risk to inform financial statement risk.

To address auditor evaluation of business risks, we performed two case-based experiments in which 96 senior auditors from a Big Four accounting firm identified and/or assessed business and financial statement risks. Senior auditors on an engagement bear a significant responsibility for risk identification and assessment (Bell, Marrs, Solomon & Thomas, 1997), and Curtis and Turley (2007) indicate in their case study of audit field practices that this responsibility extends to the analysis of business risks. Industry-expert firm partners were used to benchmark senior auditor performance.

In our first experiment, we found that the senior auditors and firm partners identified a similar set of financial statement risks. On the other hand, the senior auditors had a very limited ability to identify a wide array of business risks that had been identified by our five firm partners. Additionally, senior auditors who identified few business risks had a

statistically insignificant correlation between their average business and financial statement risk assessments. In sum, our findings indicated that the majority of the study's senior auditors had difficulty identifying business risks, and those that had difficulty identifying business risks did not use business risk to inform the assessment of identified financial statement risks.

In a second experiment, we studied senior auditor assessment of risks that had been identified by firm partners. In this assessment-only task, we found that, on average, the senior auditors assessed financial statement risks higher than firm partners while business risks were assessed lower than firm partners. Additionally, we found that senior auditors who assessed business risk the lowest had no significant correlations between their assessed business and financial statement risks. Our results indicated that about one-half the senior auditors in our study appeared largely unconcerned with client business risk and this lack of concern signaled that business risk would not be used to inform financial statement risk. While the assessment of listed audit risks is an easier task than the combined identification and assessment of audit risks, we still found what appeared to be a widespread lack of focus on, and concern for, client business risk.

The senior auditors in our study evaluated audit risks for what constituted a new client setting. While this setting demands caution when extrapolating our findings to practice, at a minimum our results document the sophistication of senior auditors' knowledge and use of business risks. The implication of our findings is that new business risk issues can often remain unidentified by senior auditors and/or considered irrelevant to the assessment of financial statement risks. In summary, our results indicate that senior auditors would benefit from additional training with regard to business risks and their

linkage to financial statement risks. Additionally, our results extend the audit risk literature with our focus on senior auditor evaluation of business risks. The remainder of the paper is organized as follows. The next section develops theory and hypotheses. Methodology and results are then documented. The final section presents a discussion of our results and offers concluding comments.

Hypothesis Development

Risk identification is a key facet of audit planning (Bedard & Graham, 2002). Identified risks are assessed based upon gathered evidence, and identified risks influence the context in which auditors view evidence found later in the audit engagement. Risk identification involves sifting through evidence from a large database of facts about financial accounts, the client, and the industry to determine what constitutes a threat to the audit. Search strategies leading to identified risks rely heavily on auditor knowledge (Bedard & Graham, 2002; Moroney & Simnett, 2006).

We expect that knowledge, in the form of mental models, is well developed for the identification of financial statement risks. The identification of financial statement risks has traditionally followed financial statement captions, thereby offering a scope and a framework for the identification task (Curtis & Turley, 2007). Additionally, the bulk of auditor training and guidance focuses on risks related to financial accounts. Both academic and firm-level training concentrate on financial issues, and firm auditing guides explicitly discuss account assertions, risks related to each assertion, and how to test these assertions (Bedard & Biggs, 1991; Lin, Fraser & Hatherly, 2003). The expected result of this structure, training, and guidance is senior auditor acquisition of knowledge about financial accounts and their related audit risks (Bedard & Chi, 1993).

Based upon a series of interviews with accounting firm partners and managers, Curtis and Turley (2007) report the perception of heightened ambiguity in identifying business risks, due to the array of potential risks and the absence of an accepted categorization scheme. Additionally, there is evidence that effective identification of business risks requires mental models based in systems-thinking; which is a holistic manner of considering phenomenon that is largely untaught in academic accounting programs or accounting firm training sessions (Bell, Peecher & Solomon, 2002; Hecht, 2004; Peecher, Schwartz & Solomon, 2007).² Finally, SAS 109 and ISA 315 offer professional guidance on the identification business risks, but these promulgations offer few examples of business risk, whereas specific issues and examples of financial statement risk exist in numerous auditing standards (AICPA, 2006; IAASB, 2004). Given the unstructured nature of business risks and a lack of institutional training and guidance, we expect it difficult for senior auditors to acquire knowledge for the identification of business risks.

Our logic supports the proposition that auditors can more easily identify financial statement risks than business risks. This proposition is consistent with a strategic approach to risk identification where the cognitive cost of identifying business risk is significantly higher than the cognitive cost of identifying financial statement risks (Beach & Mitchell, 1978; Payne, Bettman & Johnson, 1993). Consequently, we expect senior auditors to focus on the identification of financial statement risks to the exclusion of business risks and propose the following hypotheses.

² Accounting students receive some coverage of business strategy topics as part of their general business curriculum. However, due to a preponderance of technical accounting classes and preparation for professional examinations, accounting students are unlikely to develop significant knowledge for the evaluation of business risk.

H1a: When analyzing a case with an equivalent number of financial statement risks and business risks, senior auditors identify more financial statement risks than business risks.

H1b: When analyzing a case with an equivalent number of financial statement risks and business risks, senior auditors have a larger difference between the number of financial statement and business risks identified than do firm partners.³

We expect that the relative number of business and financial statement risks identified is a signal of senior auditor knowledge, and we expect that a lack of knowledge in identifying business risks is reflected in the cognition that links business risk to financial statement risk. While SAS 109 (AICPA, 2006, p.1620) and ISA 315 (IAASB, 2004, p.353-354) state “Business risk is broader than the risk of material misstatement of the financial statements ... [therefore] ... the auditor does not have the responsibility to identify or assess all business risks”, SAS 109 (AICPA, 2006, p.1619) and ISA 315 (IAASB, 2004, p.353) do require the auditor to identify and assess “business risks that may result in the material misstatement of the financial statements.” If a low number of business risks identified signals a lack of business risk knowledge, then we expect that senior auditors identifying a low number of business risks do not use business risk to inform financial statement risks.⁴ Our next hypothesis follows.

H2: Assessment of identified business and financial statement risks are unrelated for senior auditors who identify a *low* number of business risks, however, assessment of identified business and financial statement risks are positively related for senior auditors who identify a *high* number of business risks.

³ Industry-expert partners have had a significant amount of time to develop their business acumen and are expected to have more well-developed mental models of client business risks. Therefore, partners serve as benchmark for senior auditor evaluation of business risks.

⁴ Business and financial statement risks are not expected to have a 1:1 relationship, but we do expect a correlation between business and financial statement risk assessment if business risks guide auditors in their assessment of financial statement risks as required in professional guidance (AICPA, 2006; IAASB, 2004).

While identification and assessment of audit risks represents an important task, senior auditors are often given lists of risks and required only to assess them (Curtis and Turley, 2007). The evaluation of a list of potential risks is a more structured task than risk identification, because the listed risks indicate a scope and framework for gathering evidence (Bedard & Chi, 1993; Bedard & Graham, 2002). Although the assessment of listed risks is more structured, knowledge of issues underlying the audit risks is still needed. As noted, structure, firm-level documentation, training, and a significant body of authoritative guidance support knowledge development for financial statement risk over the development of knowledge for business risk. When assessing listed audit risks, we again predict that senior auditors will take a strategic approach to risk evaluation.

The lower cognitive costs associated with the search and synthesis of evidence surrounding financial statement risks is expected to create a focus on the evaluation of financial statement risks. Whereas, the higher cognitive costs associated with the search and synthesis of evidence surrounding business risk is expected to pull focus away from the evaluation of business risk. Consequently, we expect that the assessment of financial statement risks engender a *more* effortful collection and evaluation of evidence which results in conservative assessments (financial statement risk overstatement), and the assessment of business risks engender a *less* effortful collection and evaluation of evidence which results in aggressive assessments (business risk understatement). We posit that low effort in the collection and evaluation of business risk evidence, as signaled by business risk understatement, leads to a low effort to link business risk to financial statement risk. Accordingly, we propose the following hypotheses.

H3a: Senior auditors assess financial statement risks higher and business risks lower than do firm partners.

H3b: Assessment of business and financial statement risks are unrelated for senior auditors who assess business risks substantially *lower* than the firm partners, however, assessment of business and financial statement risks are positively related for senior auditors who assess business risks *similar to or higher* than firm partners.

Methods

Experimental participants

Participants were 96 senior auditors employed by one Big Four accounting firm. The participants had an average 33.25 (std. dev. = 15.14) months of audit experience and were recruited at a national firm training exercise for “experienced” senior auditors. (Five additional auditors began the experiment, but these responses could not be used because the instruments were left substantially incomplete.) Demographic data for the 96 experimental participants are reported in Table 1. Firm partners indicated that the senior auditors in our study had received training in the identification and assessment of business and financial statement risks and that they were involved in audit risk evaluation. Additionally, at the time of data collection, the participating firm had used a BRA methodology for a number of years and therefore the senior auditors in our study had been involved in BRA and were expected to evaluate client business risks.

***** Insert Table 1 here *****

Materials, procedures, and design

The experimental materials centered on a case involving a first year audit client. The firm in the experimental case was modeled on an actual firm that manufactured analytical instruments for measuring chemical compounds, and selected case materials were

modeled on the firm's Security & Exchange Commission (SEC) filings. Case materials included information about the client's industry with excerpts from a trade journal and other descriptive information. In addition, there was a description of the client similar to the management, discussion and analysis (MD&A) section of a form 10-K. Finally, the client's prior year financial statements were provided. A partner from the firm that provided participants reviewed the case materials to ensure their appropriateness.

As noted, case materials were for a manufacturing industry client. We anticipated that manufacturing experience had been gained from college and firm training that had used manufacturing exercises, and we found widespread manufacturing experience. (Only 16 of the 96 participants reported that none of their time had been devoted to manufacturing clients.) We intended the manufacturing case to be understood by senior auditor participants regardless of industry specialization.

Prior to the experiment, two firm partners (partners A&B) analyzed our case materials and provided risk identification and assessment benchmarks. The two partners followed a Delphi approach by separately analyzing the case materials and then working together to produce a final set of risks and assessments. Subsequent to the experiment, we collected risk identification and assessment responses from three additional firm partners (partners C, D, and E) to insure a wide breadth of identified risks.⁵ Summarized partner responses are shown in Table 2, and they validate the existence of an equivalent number of identifiable business and financial statement risks in the case materials. As also shown

⁵ All participating partners had manufacturing expertise. Partners A&B provided pre-experiment risk assessment and identification benchmarks. Partners C, D, and E, who provided the post-experiment benchmarks, were given the case materials by their office's partner-in-charge of audit, and they worked independently to identify and assess risks.

in Table 2, one business risk was identified four-of-four possible times, seven business risks were identified two-of-four possible times, and five business risks were identified only once.⁶ In contrast, two financial risks were identified four-of-four possible times, four financial risks were identified three-of-four possible times, and seven financial risks were identified either once or twice. There was more agreement among the partners as to what constituted the most important financial statement risks than what constituted the most important business risks. This descriptive result validates the ambiguity differences inherent in business and financial statement risks that was indicated in Curtis and Turley's (2007) case study.

***** Insert Table 2 here *****

The partner-identified risks and their assessments were used as comparison points to judge senior auditor responses across two experiments.⁷ In the first experiment, the senior auditors were required to *identify and assess* the business and financial statement risks based upon the case materials. In the second experiment, the senior auditors were required to *assess* the benchmark risks determined by partners A&B based upon the case materials. Both experiments followed a 2 x 1 experimental design with budget constraint

⁶ "Environmental regulation" was the only universally agreed upon business risk by the benchmark partners. The firm in the experimental case produced analytical instruments that measured chemical compounds, and these instruments were often used for compliance with environmental regulations. See appendix 1 for sample coding responses for "environmental regulation."

⁷ Portions of our experimental case materials were based on SEC filings of a publicly traded firm. The Chief Financial Officer (CFO) of the firm that the experimental case was based upon reviewed the identified risks and the assessments of the partner benchmarks. He indicated general agreement with the partner benchmarks, and he specifically noted the firm's concern with the business risks, "environmental regulation" and "insufficient R&D." For financial risks, he noted the firm's concern with "inventory valuation" and "revenue recognition".

as the only manipulation. The budget constraint manipulation was based on actual hours to audit the company used in the experimental case.⁸ Given a prior year budget of 500 hours, participants in the tight budget constraint condition were provided a current year budget of 450 hours and those in the loose budget constraint condition were provided a budget of 600 hours.⁹ We made no hypotheses with respect to budget constraints, because auditors are required to identify and assess audit risks without regard for the audit's time budget. We include the budget constraint manipulation as a control variable in supplementary tests of our hypotheses.

Both experiments used identical case materials, and the only procedural differences between the experiments related to task requirements. Participants were randomly assigned to experiments and treatments within experiments, and participants making risk assessments were given the list of risks in random orders. Within each experiment, participants were first asked to provide demographic and professional background information. Next the participants were presented with background and financial information that comprised the case materials and asked to perform either a risk identification task and/or a risk assessment task. A debriefing questionnaire concluded both experiments.

⁸ Hours estimated for the prior two years audits were provided by the CFO of the model company.

⁹ The tight and loose budget constraints were set 50 hours below (10% decrease) and 100 hours above (20% increase) the prior year's time budget. Per discussion with firm partners and practicing auditors, dropping below a 450 hour budget for a client of this size would be unreasonable, and they indicated that a 10% reduction in hours was significant. On the other hand, the 20% increase in hours for a first time client did not appear unreasonable to the firm partners. Auditors in the tight (loose) budget constraint condition indicated an average perception of budget pressure of 4.83 (3.37) on a seven-point Likert scale (4.83 vs. 3.37; $t=5.171$; $p<.01$).

Experiment one

In this experiment, 48 senior auditors were asked to identify and assess audit risks from our set of case materials. The dependent variables in this experiment were (1) the number of risks identified that matched the benchmark risks determined by the five firm partners and (2) the average assessment of the identified risks. Identified risks provided by the senior auditors were coded and reviewed by one of the authors and an independent coder who was blind to the hypotheses. The author has five years of public accounting work experience and the independent coder is a graduate student with a year of internal audit experience. The coders agreed on classification for 95.2% of the identified risks. Calculation of the Kappa statistic indicated agreement was significantly different than chance (Kappa = .888; $p < .01$). All differences were reviewed and resolved by a third individual who had six years of public accounting experience. This third individual was also blind to the hypotheses. (Appendix 1 provides examples of coded responses.)

Experiment two

In this experiment, 48 senior auditors were asked to assess the risks identified by partners A&B.¹⁰ Responses were captured on a 7-point scale anchored by “very low risk” and “very high risk” with “moderate risk” as the midpoint. The scale categories of low, moderate, and high risk followed the participating firm’s categories for risk assessments. Additionally, firm partners reviewing our experimental materials and providing benchmarks made no indication that our risk assessment scale was foreign or inappropriate. Risk assessment scales used within the literature vary in range. O’Donnell

¹⁰ We did not use the risk assessments provide by partners C, D and E, because these were collected after the experiment was run, therefore, the senior auditor participants could not assess these sets of benchmark risks.

and Schultz (2005) used both a 7-point and 100-point scale. Low (2004) used an 11-point scale while Taylor (2000) used a 3-point scale converted to numeric values between 0 and 1.

Dependent measures for this experiment consisted of the assessments of identified risks. Additionally, we calculated relative and absolute percentage error metrics based on the difference between senior auditor risk assessments and the risk assessment benchmarks provided by partners A&B. Average relative percentage error metrics are the average percentage difference between participant assessments and benchmark assessments across the five business risks and six financial statement risks identified and assessed by partners A&B. Average absolute error metrics are calculated as the average of the absolute percentage differences. Relative error metrics show the direction of error, whereas absolute error metrics indicate the magnitude of error without regard to error direction.

Results

Our first hypotheses center on the proposition that senior auditors identify more financial statement risks than business risks. In accordance with this prediction, we found that financial statement risks identified by firm partners were much more likely to be identified by senior auditors than business risks. Table 2 reports the identification frequency of each business and financial statement risk for the 48 senior auditors in experiment one. As shown, the number of senior auditors identifying a particular financial statement risk ranged between 42 and 9, whereas the number of senior auditors identifying a particular business risk ranged between 24 and 0. Table 3 panel A reports frequency counts for business and financial statement risks. As shown, 13 (of 48) senior

auditors did not correctly identify any business risks (the highest frequency), and the mean (median) number of business risks identified was 1.96 (2.00). On the other hand, all senior auditors were able to identify at least one financial statement risk; 14 (of 48) senior auditors identified 5 financial statement risks (the highest frequency); and the mean (median) number of financial statement risks identified was 6.46 (6.50).

***** Insert Table 2 and Table 3 here *****

Formally, hypothesis H1a predicts that senior auditors will identify more financial statement risks than business risks. In support of hypothesis H1a, a paired sample *t*-test ($t = 9.391; p < .01$) and a Wilcoxon signed ranks test ($z = 5.636; p < .01$) indicated that the number of financial statement risks identified was reliably greater than the number of business risks identified.¹¹ Hypothesis H1b predicts that the difference between the number of senior auditor-identified financial statement risks and business risks is greater than the corresponding difference for partner-identified risks. As shown in Table 3 panel A, senior auditors identified an average 4.50 more financial statement risks than business risks ($6.46 - 1.96 = 4.50$). On the other hand, firm partners identified an average 1.50 (differences of 1, 1, 1, and 3) more financial statement risks than business risks (4.50 vs. 1.50: $t = 6.261; p < .01$). In support of hypothesis H1b, we found that senior auditors identified substantially more financial statement risks, as compared to business risks, than

¹¹ A supplementary repeated measures analysis of variance (ANOVA) supported the risk identification findings. The analysis contained budget constraints as a between subject variable and type of risk as a within subject variable. Only type of risk (business/financial) was significant. Additional analyses were run with covariates for demographical data, experience, and industry specialization. Only the manufacturing experience covariate was found significant ($p < .10$), and type of risk (business/financial) remained significant ($p < .01$).

did firm partners.¹² While senior auditors were able to identify a significant number of financial statement risks, they identified very few business risks.

As noted, our experimental case used a manufacturing industry setting in an attempt to neutralize industry effects. However, the task of identifying business risks was difficult for senior auditors suggesting that industry specific knowledge could have been a significant attribute in business risk identification regardless of the manufacturing industry experimental case (Bedard & Graham, 2002; Moroney & Simnett, 2006). As shown in Table 3 panel B, we found that an increase in the percentage of time spent on manufacturing clients reliably increased the number of business risks identified ($b = 0.009$; $p < .01$). While business risk identification increased with manufacturing experience, the industry experience effect was not large. An auditor who spent 100% of their time on manufacturing clients identified approximately one more business risk than an auditor who spent 0% of their time on manufacturing clients ($0.009 * 100 \approx 1$).

Our findings indicate that identification of business risks, at the senior auditor level, is a task of significant complexity, and they support the assumption that knowledge pertaining to business risks is not well developed. The consequence of a lack of knowledge for business risk, as signaled by under-identification, is that business risk is not used to inform financial statement risk as required in professional guidance (AICPA, 2006; IAASB, 2004). Hypothesis H2 predicts this consequence by stating that auditors who identify a low number of business risks do not use business risks to inform financial statement risks. Untabulated results support hypothesis H2. Based upon a median split,

¹² Considering individual partner differences provides inferentially similar results (4.50 vs. 1.00; $t = 7.304$; $p < .01$ and 4.50 vs. 3.00; $t = 3.130$; $p < .01$).

we observed a -0.326 ($p = .218$) correlation coefficient between average business and financial statement risk assessment for the 16 (of 48) auditors who identified either one or two business risks. In contrast, the 18 (of 48) auditors who identified three or more business risks had a correlation between their average business and financial statement assessment of 0.642 ($p < .01$).¹³ This result indicates that the under-identification of business risks signaled that business risks were not systematically used to inform the assessments financial statement risks.

Our second experiment had 48 senior auditors perform a risk assessment of the business and financial statement risks identified by partners A&B. As shown in Table 4, senior auditors assessed financial statement risks higher than business risks (4.916 vs. 3.338 ; $t = 9.599$; $p < .01$). While this finding suggests that auditors were more focused on and concerned with financial statement risks than business risks, it does not address the accuracy of the senior auditor risk assessments. To analyze the accuracy of the assessed risks, we compared senior auditor risk assessments to those of industry expert firm partners. Results in Table 4 indicate that the assessment differences between senior auditors and firm partners was on average negatively signed (-9.46% lower) for business risks and positively signed (15.37% higher) for financial statement risks ($t = 10.525$; $p < .01$). In support of hypothesis H3, we found that senior auditors assessed business risks lower and financial statement risks higher than did firm partners.¹⁴

¹³ Reported metrics are Pearson correlation coefficients. Spearman correlations produce inferentially similar results. Thirteen auditors failed to identify any business risks and one auditor who identified one business risk failed to assess it. These 14 auditors are not part of the correlation analyses.

¹⁴ A direct comparison of senior auditor assessments to partner C, D, and E assessments is not possible because these partners identified and assessed different sets of risks. However, as a

***** Insert Table 4 here *****

The consequence of business risk underassessment, as predicted by Hypothesis H4, is that it signals a lack of concern for business risk resulting in the failure to use business risk to inform financial statement risk. A median split of the average relative assessment differences between senior auditors and firm partners indicated that 50% of the audit seniors had business risk assessments that were more than 10% lower than the firm partner assessments. As shown in Table 5 panel A, we found no significant correlations between business risk assessments and financial risk assessments for senior auditors with business risk assessments more than 10% below those of the firm partners. On the other hand, when the average relative assessment differences exceeded -10%, senior auditors had “environmental regulation” (a business risk) assessments that were positively correlated with four of the six financial statement risk assessments and with the sum of all financial statement risk assessments (Table 5 panel B).¹⁵ The correlation results support hypothesis H4.

***** Insert Table 5 here *****

As shown in Table 2, “environmental regulation” was the most commonly identified business risk of the benchmark partners. Given the experimental firm’s heavy reliance on producing instruments used for environmental compliance, changes in environmental

supplementary test we compared the average difference between financial statement and business risk assessments for senior auditors and each partner: senior auditors = 1.498, partner A&B = 0, partner C = 1.946, partner D = 0.982, and partner E = 0.321. *t*-tests indicate that senior auditors assessed business risks relatively higher than financial statement risks as compared to all firm partners with the exception of partner C.

¹⁵ Partial correlation coefficients holding budget constraints constant produced results inferentially identical to those presented in Table 5.

regulations could have a significant effect on inventory valuation, sales and related collection of receivables, and the valuation of the joint venture investment.

Appropriately, senior auditors who assessed business risks similar to or greater than the benchmark partners had high and statistically significant correlations between environmental regulation and the aforementioned financial statement risks.

Discussion

As Peecher et al. (2007) note, the widespread use of automated transaction processing and control systems alleviates the need to detail test most transaction postings in modern audits. This reality has shifted some of the focus away from unintentional financial misstatement and brought more attention to intentional misstatement (Peecher et al., 2007). In this environment, risk identification and assessment are dominant aspects of all phases of the audit, and ostensibly a rationale for recent promulgations that auditors understand and consider client business risks. We examined the ability of senior auditors to use their judgment and intuition to evaluate business risks.

We theorize that a lack of training and standardized guidance makes the identification of ambiguous business risks a very difficult task for senior auditors and that is what we observe -- over 60% of the senior auditors in our identification study identified two or fewer business risks. More important than the widespread under-identification of business risk was that we observed no statistically significant correlation between business and financial statement risk assessments for senior auditors who identified only one or two business risks. The 13 (27%) auditors who identified zero business risks did not use business risk assessment to inform their financial statement risk assessments, and we found no systematic evidence that the 17 (35%) senior auditors who

identified only one or two business risks used business risk assessments to inform their financial statement risk assessments.

In a second experiment, we analyzed a task that involved only risk assessment. This represents an easier task than identifying and then assessing risks, because this task involved only searching for and evaluating evidence on the listed risks (Bedard & Graham, 2002). Regardless, results from the assessment-only task mirrored the risk identification and assessment results. We found that senior auditors on average under-assessed business risks as compared to firm partners -- 50% of our participants assessed business risks more than 10% lower than did firm partners. Similar to under-identification, underassessment greater than 10% signaled that business risks were not influential in the assessment of financial statement risks. These results suggest that the lack of a systematic link between business and financial risk is not simply a function of the cognitive load inherent in the difficult risk identification task.

Despite the limitations of a single study, our findings have practice implications. Our results indicate that senior auditors' would benefit from further training on business risk evaluation. Training should improve knowledge of business risk issues and help auditors make the link from business risk to financial statement risk. Additional consideration should be given to holding senior auditors accountable for linking business and financial statement risks in effort create a concern for business risk issues and to promote consistency with auditing standards. On-the-job training with audit partners using their business experience to link the business and financial risks, in an effort to improve audit senior understanding could prove to be another useful avenue for firms. Promoting this linkage corresponds with current professional guidance and will help senior auditors see

the criticality of business risk identification and assessment to the overall financial statement audit.

Limitations

Audit planning materials are rich, but they are necessarily restricted in this study due to limits on access to the experimental participants and potential maturity effects in our experiments. Our participants came from one Big Four firm, and they were all at the senior level. Therefore, our results are specific to senior auditors and potentially specific to the firm that provided the participants. Also, audits usually involve an audit team, and the ability to consult team members can affect audit judgments. In this experiment, we used individual judgments that do not capture dynamic team interactions. A final limitation is that senior auditors normally prepare risk evaluations for clients with which they are familiar.

Our materials were reviewed by partners from the firm that provided the participants and deemed acceptable for our research tasks. Additionally, the case materials were for a first-year client; so relying on prior client experience was not an option. The audit senior participants were experienced in identifying and assessing both financial statement and business risks, and firm partners indicated that they believed that the seniors were capable of identifying and assessing audit risks. Finally, our focus on individual judgments is consistent with prior research in audit judgment and decision-making. However, addressing risk identification and assessment in a team setting appears a fruitful area for future research.

Future research

Our findings indicate a need for research on how auditors acquire mental models of client business practices that lead business risk. Senior auditor focus appears to be maintained heavily on financial statement issues, and our findings support a “bottom up” demand for audit structure that is satisfied by the identification, assessment, and mitigation of financial statement risks to the exclusion of business risks (Robson et al., 2007). Peecher et al. (2007) suggest that research needs to identify methods and models that develop auditor skepticism with a particular focus towards entity-based evidence. Our results validate the need for senior auditor skepticism with respect to client business issues that can potentially lead to financial statement risks, and we view this as an area of future research.

Appendix 1
Risk identification coding

Partner-Identified Business Risk – Environment Regulation ^a

Partners A&B	The Company’s environmental policies and procedures do not adequately prevent environmental issues.
Partner C	The demand for environmental testing is highly dependent on federal legislation. Market demand may decrease due to unpredicted environmental legislation.
Partner D	Complex environmental regulations may increase operation expense and market demand.
Partner E	Environmental policies developed globally may affect product development and sales.

Example senior auditor responses coded as an *environment issues*.

- Environmental regulations will prevent company from making a profit.
- Compliance with Government Regulations over hazardous materials.
- Environmental testing & compliance/environmental regulations & compliance.
- Environmental Compliance.
- Environmental Regulations.

Partner-Identified Financial Statement Risks – Inventory Valuation ^a

Partners A&B	Inadequate inventory reserves due to obsolescence and declining market conditions.
Partner C	Inventory is not accumulated or valued properly and could lead to a misstatement of inventory.
Partner D	Impairment of inventory due to rapid changes of technology in the industry.
Partner E	Adequate inventory reserves for obsolescence.

Example senior auditor responses coded as an *inventory misstatement*.

- Inventory Valuation.
- Inventory reserve adequacy.
- There is a risk of inventory not existing, not being valued and there is a risk that obsolete inventory is being held at cost.
- Loss on obsolete inventory could be understated.
- Inventory misstatement.

^a Responses for two partner-identified risks (business and financial statement) combined with coded senior auditor participant responses related to that risk are shown. Example senior auditor responses do not represent the only coded responses given by senior auditors; however, they were the most common responses.

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TABLE 1
Profile of participants' experience and experimental perceptions

Experience ^a	Experiment 1: Risk Identification		Experiment 2: Risk Assessment	
	Number	Percent	Number	Percent
Number of Participants	48		48	
Manufacturing Experience	36	75.0	44	91.7
	Mean	Std. Dev.	Mean	Std. Dev.
Months of Audit Experience ^b	31.94	13.37	34.92	16.68
Percent Time Auditing Manufacturing Clients	35.58	34.66	40.29	34.26
Experimental Perceptions ^a	Number	Percent	Number	Percent
Desired Additional Information for Analyses:	38	79.0	39	79.6
Analyst Reports	22	45.8	19	38.8
MD&A	30	62.5	21	42.9
Risk Factors from 10K	20	41.7	23	46.9
Complete Footnotes	27	56.3	31	63.3
Other	6	12.5	6	12.2
	Mean	Std. Dev.	Mean	Std. Dev.
Usefulness of Experimental Materials: ^c				
Textual Company Description	3.45	0.93	3.57	1.05
Recent Company Developments	3.55	0.76	3.54	0.98
Description of Accounting Policies	3.77	0.91	3.91	0.76
Financial Statements	3.91	0.96	3.80	1.05
Excerpts from Industry Trade Journal	2.55	0.82	2.16	0.90

^a ANOVA and nonparametric Mann Whitney U tests indicated that reported experience metrics and experimental perceptions were not statistically significantly different across the budget constraint manipulation in either experiment ($p > .10$) with the exception of manufacturing experience in experiment 1. Tight (loose) budget means for percentage of time spent on manufacturing clients were 45.63 (25.54) in experiment 1 which produced a t-statistic 2.077 ($p = .043$).

^b In experiment 1, three auditors reported experience of 6, 10, and 13 months: excluding them produces an experience range between 17 – 72 months. In experiment two, 3 auditors reported experience of 11, 80, and 90 months of experience: excluding them produces an experience range between 16 – 69 months. Dropping these auditors from our analyses produced results inferentially similar to those reported. They are therefore left in the sample.

^c Usefulness of experimental materials is based on a 5-point scale anchored by “not useful at all” and “extremely useful”.

TABLE 2

Business and financial statement risk identification by partners and senior auditors: Experiment 1

Partner Identified Business Risks	Partner Risk Assessments ^a				Senior Auditor Identified Risks and Assessments ^b		
	Partners A&B	Partner C	Partner D	Partner E	Number Identifying Risk	Percent Identifying Risk	Average Assessment of Risk
Environmental Regulation	4	1	4	4	24	50.0	3.9
Insufficient R&D	5	--	5	--	15	31.3	3.9
Single-source Supplier	5	--	7	--	10	20.8	4.6
Technical Support Inadequacy	3	--	--	--	1	2.1	4.0
Insufficient Compensation	3	--	--	--	0	0.0	-
Legal Environment	--	7	--	4	5	10.4	4.0
Market Penetration	--	3	--	--	2	4.2	3.0
Rapid Technological Change	--	3	--	5	6	12.5	4.0
Declining Market Growth	--	3	--	--	12	25.0	4.0
Competitive Forces	--	4	6	--	12	25.0	3.8
International Markets	--	3	6	--	4	8.3	4.8
Unsuccessful Joint Venture	--	--	4	--	1	2.1	4.0
Complex Business & Strategic Goals	--	--	4	4	2	4.2	4.0
<hr/>							
Partner Identified Financial Statement Risks							
Inventory Valuation	5	7	7	5	42	87.5	5.2
Receivables Misstatement	5	--	--	5	37	77.1	4.7
Revenue Recognition	4	7	7	6	39	81.3	5.4
Warranty Reserves	5	--	7	3	25	52.1	4.6
Investment Valuation and Joint Venture	3	4	6	--	25	52.1	3.9
Valuation of Long-lived Assets	2	--	--	--	15	31.3	5.0
Discontinued Operations	--	7	6	4	19	39.6	5.0
Equity Instruments & Valuation	--	4	--	--	17	35.4	3.6
Allocation of R&D	--	6	--	4	18	37.5	4.3
Recording & Valuation of Intangibles	--	1	6	5	34	70.1	4.3
Deferred Taxes	--	--	4	--	9	18.8	4.0
Employee Stock Options	--	--	6	--	11	22.9	3.9
Reporting of Environmental Contingencies	--	7	--	--	19	39.6	4.4

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- ^a Partner identified risks are indicated by a corresponding assessment, e.g., partners A&B identified and assessed only the first five business risks. Partners from the participating firm identified and assessed business and financial statement risks based on our experimental materials. Partners A&B identified and assessed risks independently and then worked together to create a combined list. Partners C, D, and E worked independently.
- ^b Forty-eight senior auditors identified and assessed risks from the experimental materials as the primary task in experiment 1. The column titled, Percent Listing Risk, is the percentage of the 48 senior auditors who identified a partner-identified risk. The column titled, Average Assessment of Risk, is the average senior auditor assessment for the identified risk.

TABLE 3
Number of risks identified: Experiment 1

Panel A: Count frequencies

	Number of Risks Identified ^a														Mean	Difference
	0	1	2	3	4	5	6	7	8	9	10	11	12	13		
Business Risks	13	8	9	10	5	1	1	1	--	--	--	--	--	--	1.96	4.50*
Financial Risks	--	1	2	1	4	14	2	7	6	5	4	2	--	--	6.46	

Panel B: Poisson regressions on identified risks

Independent Variables	Dependent Variable = Number of risks identified ^b									
	All Partners		Partners A&B		Partner C		Partner D		Partner E	
	Business	Financial	Business	Financial	Business	Financial	Business	Financial	Business	Financial
Total Experience	-0.007 (0.83)	0.005 (1.18)	-0.001 (0.06)	0.004 (0.84)	-0.12 (1.18)	0.006 (1.20)	-0.003 (0.36)	0.004 (0.76)	-0.006 (0.49)	0.006 (1.24)
Manufacturing Experience	0.009* (3.05)	0.000 (0.05)	0.004 (1.11)	-0.000 (0.84)	0.011* (3.16)	-0.000 (0.03)	0.006*** (1.85)	0.002 (0.74)	0.008*** (1.85)	0.000 (0.12)
Chi square	9.53*	1.38	1.22	0.70	10.81*	1.46	3.42	1.24	3.52	1.58
Pseudo R ²	0.053	0.006	0.010	0.004	0.072	0.008	0.023	0.007	0.033	0.009

^a There are 13 identifiable business and financial risks, and they are listed in Table 2. A paired sample *t*-test ($t = 9.391$; $p < .01$) and a Wilcoxon signed ranks test ($z = 5.636$; $p < .01$) measure the difference in identified business and financial statement risks.

^b Regression coefficients are shown with *z*-statistics in parentheses. Poisson and zero-truncated Poisson regressions were performed for business risks and financial statement risks. Zero-truncated Poisson regressions correct for the absence of zeroes in the number of financial statement risks identified (Stata Press, 2005). Descriptive statistics for total experience and manufacturing experience are shown in Table 1.

* Significant at the 0.01 level (two-tailed).

** Significant at the 0.05 level (two-tailed).

*** Significant at the 0.10 level (two-tailed).

TABLE 4
Business and financial statement risk assessment descriptive statistics: Experiment 2

Treatment ^a		Average Assessments ^b			Average Relative Percent Difference ^b			Average Absolute Percent Difference ^b		
		Business	Financial	<i>t</i> -value	Business	Financial	<i>t</i> -value	Business	Financial	<i>t</i> -value
450 hr. Budget	n=27	3.267 (1.042)	4.862 (0.887)	7.365*	-10.48% (0.149)	14.71% (0.126)	8.145*	21.48% (0.088)	21.97% (0.063)	0.228
600 hr. Budget	n=21	3.429 (1.144)	4.986 (0.965)	6.024*	-8.16% (0.163)	16.21% (0.137)	6.539*	20.68% (0.071)	22.21% (0.081)	0.759
Total	n=48	3.338 (1.079)	4.916 (0.914)	9.599*	-9.46% (0.154)	15.37 (0.130)	10.525*	21.13% (0.080)	22.03% (0.070)	0.619

^a Two auditors assessed ten of the eleven risks. They are left in the sample and their averages adjusted accordingly. Dropping them from the analysis produced results that were inferentially identical to those reported and they are therefore left in the sample.

^b Average risk assessments were captured on a 7-point scale with seven (one) representing high (low) risk. Average *relative* percent differences are the average percentage difference between senior auditors and firm partners. Average *absolute* percent differences are the average absolute percentage difference between senior auditors and firm partners. Standard deviations are shown in parentheses.

* Significant at the 0.01 level (two-tailed).

** Significant at the 0.05 level (two-tailed).

*** Significant at the 0.10 level (two-tailed).

Table 5: Pearson Correlation Coefficients (p-value): Experiment 2

Panel A: Auditors with the *lowest* average relative percent differences^a

Business Risks	Financial Statement Risks						
	Inventory Valuation	Receivables Misstated	Revenue Recog.	Warranty Reserves	Investment Valuation	Asset Valuation	Sum Financial Risks
Environmental Regulation	-0.119 (0.580)	0.198 (0.354)	0.051 (0.819)	-0.103 (0.630)	0.146 (0.496)	0.295 (0.162)	0.150 (0.483)
Insufficient R&D	-0.014 (0.949)	0.062 (0.773)	-0.109 (0.622)	0.089 (0.678)	-0.074 (0.731)	-0.335 (0.110)	-0.113 (0.599)
Single-Source Supplier	0.244 (0.251)	0.189 (0.375)	0.268 (0.215)	0.296 (0.160)	0.145 (0.499)	0.101 (0.639)	0.338 (0.106)
Technical Support Inadequacy	0.116 (0.591)	0.107 (0.618)	-0.090 (0.682)	0.057 (0.790)	0.110 (0.607)	-0.104 (0.628)	0.059 (0.786)
Insufficient Compensation	0.179 (0.403)	0.083 (0.701)	0.190 (0.384)	0.095 (0.657)	0.124 (0.563)	0.165 (0.441)	0.222 (0.296)

Panel B: Auditors with the *highest* average relative percent differences^a

Business Risks	Financial Statement Risks						
	Inventory Valuation	Receivables Misstated	Revenue Recog.	Warranty Reserves	Investment Valuation	Asset Valuation	Sum Financial Risks
Environmental Regulation	0.360*** (0.084)	0.446** (0.029)	0.374*** (0.072)	0.113 (0.600)	0.481** (0.017)	0.326 (0.129)	0.634* (0.001)
Insufficient R&D	0.106 (0.622)	-0.089 (0.679)	0.056 (0.795)	-0.135 (0.529)	0.074 (0.730)	0.354 (0.097)	0.156 (0.466)
Single-Source Supplier	-0.111 (0.607)	0.234 (0.270)	0.501** (0.013)	-0.181 (0.398)	0.237 (0.264)	0.277 (0.201)	0.323 (0.124)
Technical Support Inadequacy	-0.164 (0.443)	-0.118 (0.583)	0.208 (0.329)	0.324 (0.123)	0.079 (0.713)	0.197 (0.369)	0.152 (0.480)
Insufficient Compensation	-0.253 (0.233)	0.029 (0.892)	0.230 (0.280)	0.198 (0.353)	0.041 (0.850)	0.073 (0.739)	0.093 (0.667)

^a Average relative percent differences measure the assessment difference between firm partners and the senior auditor participants. Lowest (Highest) average relative percent differences are based on a median split with assessments less (greater) than -10% constituting the lowest (highest) assessments. Due to two missing responses, revenue recognition in panel A has n = 23 and asset valuation in panel B has n = 23. All remaining cells have n = 24. Partial correlation coefficients were also calculated holding budget constraints constant and the results were inferentially identical.

* Significant at the 0.01 level (two-tailed).

** Significant at the 0.05 level (two-tailed).

*** Significant at the 0.10 level (two-tailed).