

The Influence of Business Risk Assessments on Audit Planning Decisions:  
A Descriptive Model with Experimental Evidence

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## ABSTRACT

We present a descriptive model of the influence that business risk assessment has on judgment about the likelihood of misstatement that auditors develop through planning analytical procedures. We propose that (1) auditor judgment will be moderated by business risk assessment, (2) business risk assessments will moderate the influence that client knowledge has on auditor judgment, and (3) task structure imposed by firm-mandated audit procedures will moderate the influence that business risk has on auditor judgment. We present supporting evidence from four experiments where experienced auditors performed analytical procedures to assess the risk of financial misstatement and decide whether to target accounts for extended audit testing.

# The Influence of Business Risk Assessments on Audit Planning Decisions: A Descriptive Model with Experimental Evidence

## I. INTRODUCTION

Auditors perform analytical procedures while planning assurance engagements to identify accounts with a high potential for misstatement that should be targeted for extended auditing testing (Hylas and Ashton 1982). During analytical procedures, auditors use their knowledge of client business activities to evaluate patterns of changes in accounts and identify inconsistent fluctuations that could be evidence of financial misstatements (Libby 1985). The risk assessments that auditors develop during planning analytical procedures have a significant influence on decisions about the nature and extent of the substantive procedures auditors will use to form an opinion on the financial statements (Biggs, Mock, and Watkins 1988; Bedard, Mock, and Wright 1999; Mock and Turner 2005).

Professional standards now direct auditors to assess and integrate business risks into the knowledge they use to assess misstatement risk when they make audit planning decisions (IAASB 2005). Business risks are conditions that could impair an organization's ability to execute business processes effectively. Auditors must identify business risks, evaluate whether and how those conditions increase the likelihood of financial misstatement, and use this knowledge to help them identify inconsistent fluctuations in accounts when they perform planning analytical procedures (Eilifsen, Knechel, and Wallage 2001; Bell, Marrs, Solomon and Thomas 1997).

The mandate to integrate business risk into planning decisions has only recently been added to auditing standards. Auditing firms have been searching for effective ways to integrate business risk into audit planning judgments (Curtis and Turley 2006; Kotchetova, Kozloski, and

Messier 2006), but research that examines how business risk assessments influence auditor judgment is in its infancy (Knechel 2006). Proponents argue that integrating business risk into the knowledge auditors use to perform analytical procedures increases the likelihood that auditors will recognize conditions associated with inconsistencies that could signal financial misstatements (Bell et al. 1997; Peecher, Schwartz, and Solomon 2006). However, other studies have shown that assessing business risks can reduce the likelihood auditors will recognize evidence of diminished business process performance (Ballou, Earley, and Rich 2004), and effectively respond to inconsistent fluctuations in accounts that increase the likelihood of financial misstatement (O'Donnell and Schultz 2005).

In this study, we use an approach adapted from Libby and Tan (1994) by developing a model that describes the influence of business risk assessments on auditor judgment during planning analytical procedures, using data gathered for a prior study to corroborate the model. We also conducted three additional laboratory experiments to gather evidence for testing the model. We propose that auditor judgment about the likelihood of misstatement will be influenced by interactions among three factors that are endogenous to analytical procedures tasks, including (1) knowledge auditors acquire about client business operations, (2) auditor assessments of business risk, and (3) procedures that audit firms require auditors to use for evaluating patterns of changes in accounts. Experimental evidence supports the associations specified in our descriptive model.

This study examines judgments about the likelihood of misstatement that auditors develop for individual accounts when they perform analytical procedures during the planning phase of an audit engagement. Experiments that provided data for testing our descriptive model examined auditor judgment about the likelihood of misstatement by asking auditors either to

document misstatement risk assessments for individual accounts, or to decide whether individual accounts should be targeted for extended audit testing because the likelihood of misstatement was relatively high. In an effort to make our descriptions less cumbersome, we use the label “auditor judgment” as a collective reference to these types of audit planning decisions throughout the rest of the paper.

The remainder of this paper is organized into three sections. The next section presents our descriptive model and explains the theoretical and empirical foundation on which it was built. Section three describes the experimental evidence we used to test our model. The fourth section summarizes the evidence provided by our experiments, and discusses the implications of our findings for audit research and practice.

## II. DESCRIPTIVE MODEL

When planning analytical procedures, auditors assess misstatement risk by evaluating patterns of changes in account balances. Before auditors can perform this analysis, they must integrate engagement-specific information into a mental representation of client business activities (Hylas and Ashton 1982). Knowledge assembled in the mental representation provide auditors with a basis for recognizing inconsistencies that could represent evidence of misstatement when they evaluate patterns of changes in accounts (Libby 1985). In the contemporary audit ecology, auditors must also integrate information about business risk with information about the client’s industry and business activities when they develop the mental representation they use for analytical procedures (Knechel 2006; IAASB 2005).

Auditors’ mental representations determine the extent to which they will perceive patterns of interperiod fluctuations in accounts to be consistent with client business activities,

and as a result, influence auditor judgment about the risk of misstatement in those accounts (Koonce 1993). To accommodate our objective of examining the influence of business risk assessments as a distinct factor, we distinguish knowledge about client business risk from all other knowledge about client business activities, and we refer to these two components of auditors' mental representations as (1) business risk and (2) client knowledge, respectively.

Many factors can influence how auditors use the knowledge they acquire for planning analytical procedures. Exogenous factors, which generally change very little from one engagement to the next, include variables that influence the skill and motivation that auditors bring to an analytical procedures task (see Libby and Luft 1993, and Libby and Tan 1994 for a discussion). This study focuses on endogenous factors that have significant potential to change from one engagement to the next. These variables, and our expectations about how they influence auditor judgment, are included in the descriptive model that we present in Figure 1.

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Insert Figure 1 here

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Auditors assess misstatement risk by using (1) procedures specified in their firm's audit methodology to apply their (2) knowledge of client business risk and (3) other client knowledge when they analyze interperiod fluctuations in accounts. When auditors identify patterns of fluctuations that they perceive to be inconsistent with their knowledge of client operations, the likelihood of misstatement increases. Biggs, Knechel, Walker, Wallace, and Willingham (1995) review research that supports link D in our model by providing evidence that the task structure imposed by the firm's audit methodology influences the way that auditors evaluate patterns of changes in accounts during analytical procedures. Koonce (1993) reviews research that supports link E in our model by providing evidence that client knowledge embodied in auditor's mental representations influences auditor perceptions about account-level misstatement risk by

establishing the context and benchmarks that auditors use to evaluate patterns of changes in accounts during analytical procedures.

Our study examines variables that influence how knowledge of business risks can change auditor judgment. We provide evidence that assessing client business risks before performing analytical procedures can moderate auditor judgment (link A), and also moderate the influence that other client knowledge has on auditor judgment (link B). Our study also provides evidence about how firm audit procedures can moderate the influence that business risk assessments have on auditor judgment (link C).

### **How Business Risk Affects Misstatement Risk**

We believe that knowledge of business risks can moderate auditor judgment (link A) in two ways. First, analyzing conditions that could impair the client's ability to execute strategic business processes effectively provides auditors with a more comprehensive foundation for analyzing patterns of changes in accounts (Peecher et al. 2006). Auditors with knowledge of business risks are more likely to recognize patterns of changes in accounts that are not consistent with competitive industry forces, the client's strategic alliances, and market conditions than auditors who have not analyzed business risks (Bell et al. 1997; Bell, Peecher, and Solomon 2002). Kotchetova et al. (2006) provide evidence that performing and documenting a formal business process analysis influences auditors' assessments of the business risk associated with the process, which in turn, affects their assessments of the risk of material misstatement in accounts and transactions affected by the process.

Second, knowledge of business risks could influence auditor skepticism about other evidence such that, when business risks are perceived to be relatively high, auditors will be more sensitive to evidence that could reflect potential problems, and their judgment will reflect that

increased sensitivity. However, when business risks are perceived to be relatively low, auditors will be less sensitive to evidence that could reflect potential problems and their concern will diminish (Ballou et al. 2004; O'Donnell and Schultz 2005). This study examines how business risk assessments influence auditor judgment by moderating auditor skepticism and altering their tolerance for patterns of changes in account balances that could be evidence of an increased likelihood of misstatement.

In addition to moderating auditor judgment (link A), we propose that business risk assessments can overshadow and reduce the influence that other client knowledge has on auditor judgment. Client knowledge not associated with business risk assessment influences the magnitude of fluctuation that auditors will tolerate between expected and actual changes in related accounts (Koonce 1993; Biggs et al. 1995), and evidence suggests that favorable business risk assessments reduce the influence that other audit evidence has on auditor judgment (Ballou et al. 2004; O'Donnell and Schultz 2005). Based on these findings, we expect business risk assessments to moderate the association between client knowledge and auditor judgment (link B).

We also believe that characteristics of the procedures auditing firms use for analyzing changes in accounts can moderate the influence that business risk assessments have on auditor judgment. Auditing firms develop rigorous methodologies that specify how their auditors will acquire, evaluate, and document evidence acquired during analytical procedures (Hirst and Koonce 1996; Trompeter and Wright 2006). The structure imposed on diagnostic reasoning tasks influences the judgment that auditors develop when they analyze evidence (Bonner 1994). Task structure imposed by firm-specific procedures influences auditor judgment during analytical

procedures by changing the decision weight that auditors attribute to the evidence they evaluate (Biggs et al. 1995).

Research has demonstrated that task structure influences the way auditors use their knowledge and exert cognitive effort to accomplish complex judgment tasks (Kachelmeier and Messier 1990; McDaniel 1990; Zimbleman 1997; Messier, Kachelmeier, and Jensen 2001). Given the amount of variance in firm methodologies for assessing and integrating business risk (Salterio, Knechel, and Kotchetova 2006) and performing analytical procedures (Trompeter and Wright 2006), it is reasonable to expect that task structure imposed on auditor risk assessment will vary from one firm audit methodology to the next. In other words, when firms redesign the procedures their auditors use to analyze and document evidence to increase the effort and attention they devote to specific types of evidence, the new task structure should moderate the influence that business risk assessments have on auditor judgment.

Kennedy (1995) describes how task structures that alter the amount of cognitive effort auditors devote to analyzing decision cues can influence judgment during diagnostic reasoning tasks. Her study provides evidence that two effort-based interventions alter auditor judgment in predictable ways. First, Kennedy imposed an “external data manipulation” by providing a presentation format that reduced the cognitive effort auditors needed to integrate diagnostic information about patterns of related cues. Second, she imposed an “internal data manipulation” by requiring auditors to document the evidence they considered before coming to a final judgment, which increased the cognitive effort they devoted to analyzing diagnostic information about patterns of related cues. Her findings suggest that both task structure manipulations influenced auditor judgment, the former by making it easier to recognize diagnostic patterns of

changes in accounts, and the latter by increasing the cognitive effort that auditors devoted to analyzing patterns of changes in accounts.

Consider how task structures that increase auditor effort could moderate the influence that business risk has on auditor judgment about misstatement risk. To the extent business risk assessments influence auditor tolerance for conditions that increase risk (Ballou et al. 2004; O'Donnell and Schultz 2005), they will help auditors establish a state of knowledge for evaluating decision cues. This state of knowledge would provide diagnostic benchmarks and evaluative criteria for assessing the level of risk associated with particular circumstances. When the state of knowledge includes high business risk, auditor tolerance for evidence consistent with misstatement would diminish (because evaluative criteria become more stringent), but when the state of knowledge includes low business risk, auditor tolerance would increase (because evaluative criteria become more lenient). As a result, we expect the task structure imposed by firm-mandated auditing procedures will moderate the influence of business risk on auditor judgment (link C).

In summary, we believe that three endogenous factors will influence auditor judgment. These variables include firm procedures, business risk assessments, and client knowledge. We propose that (1) firm procedures will directly moderate auditor judgment (link D) as well as moderating the influence of business risk assessments on auditor judgment (link C), (2) business risk assessments will directly moderate auditor judgment (link A), , as well as moderating the influence that other client knowledge has on auditor judgment (link B), and (3) client knowledge will moderate auditor judgment (link E). This study provides experimental evidence about the moderating influence of business risk and firm procedures on account-level risk assessments.

Associations examined in our study are represented by links A, B, and C in the model we present as Figure 1.

### III. EXPERIMENTAL EVIDENCE

We used data from four laboratory experiments to evaluate the associations between business risk assessments and auditor judgment specified by our model. Corroborating evidence was provided from data gathered during the second experiment conducted by O'Donnell and Schultz (2005), from manipulations not reported. Evidence gathered to test the model was provided by data from three additional experiments. This section describes the experiments and presents results from our analyses of the findings.

Participants in all experiments were auditors who held the rank of Senior at a single big-four firm that, at the time each experiment was conducted, used an audit methodology designed around the business risk approach. In each experiment, participants were asked to perform analytical procedures on comparative account balances. They then either documented their misstatement risk assessments for specific accounts or targeted specific accounts for extended audit testing. All experiments were administered at national training sessions conducted by the firm that provided participants for our study. Groups of about 30 auditors completed the experimental tasks in their classroom during a one-hour period that the firm had reserved for research, under the supervision of one of the co-authors or a research proctor.

Case materials for all experiments were patterned after the Loblaw Companies, Ltd. strategic auditing case for a retail grocer (Greenwood and Salterio 2002). Materials included information about business risks along with other information that participants needed to develop sufficient client knowledge for analytical procedures. With the exceptions noted below, most

cases contained an inconsistent pattern of fluctuations in accounts that should increase the likelihood of misstatement in the cost of sales account. Case materials reported that the client's unit sales prices, unit inventory costs, and product mix had not changed significantly from last year to this year, and that operating costs for regional distribution centers were allocated between inventory and selling expenses. Comparative account balances showed an increase in sales from the prior year but there had been a much smaller increase in cost of sales. In addition, selling expenses were higher than the prior year (in proportion to sales).

Given the case information, the most likely explanation for this pattern of changes in related accounts is that overhead allocations between inventory and selling expenses had changed from the prior year. Because the case provided no information that would imply a change in overhead allocations, this pattern of changes in account balances should increase the likelihood of misstatement. Participants who increased risk assessments for cost of sales, or targeted cost of sales for extended auditing tests, would be demonstrating concern about the risk associated with this inconsistent pattern of fluctuations in accounts. This seeded inconsistency provided a criterion outcome measure for evaluating the influence of business risk assessments on auditor judgment.

### **Evidence Corroborating the Model**

In their first experiment, O'Donnell and Schultz (2005) found that misstatement risk assessments differed between auditors who performed business risk assessment before analyzing changes in account balances and those who did not perform business risk assessment first. These findings support link A in Figure 1 by providing evidence that business risk assessments moderate auditor judgment. We analyzed data O'Donnell and Schultz gathered during their second experiment to search for evidence that business risk assessments moderate the association

between client knowledge and auditor judgment (link B in Figure 1), and that firm procedures moderate the association between business risk assessments and auditor judgment (link C in Figure 1).

During the experiment, participants performed analytical procedures and documented misstatement risk assessments for selected accounts on the same audit client for two consecutive years. Performing analytical procedures for the first year provided participants with an opportunity to develop client knowledge based on case materials that reported inconclusive information from business risk assessment (because the client had recently changed their strategic business model), and were free from inconsistent fluctuations in accounts. Performing analytical procedures for the second year provided a basis for evaluating how client knowledge that participants developed during the first year influenced participants' judgment during the second year.

Case materials for year one included no inconsistent patterns of account changes that should increase the risk of misstatement, and indicated that the engagement partner was unable to draw any reliable conclusions about business process performance because the client had recently changed its strategic business model. Compared to the case materials for year two, which are described below, the case materials for year one provided no diagnostic information about business risk, and no evidence of misstatement related to patterns of fluctuations in account balances. Misstatement risk assessments for cost of sales elicited during year one provided a metric for analyzing how perceptions about misstatement risk embodied in client knowledge developed during year one influenced the risk assessments participants developed during year two.

### Corroborating Links A and B from Figure 1

After documenting risk assessments for year one, participants were told to assume that they had returned to audit the same client for the next fiscal year. While all participants received identical case materials for year one, two experimental manipulations were included in the case materials for year two. First, participants were either told that the new business model was performing well and the engagement partner had rated business risk as low, or that the new business model was not performing well and the engagement partner had rated business risk as high. Second, participants either received a case with no inconsistent fluctuations in account balances, or a case with the seeded inconsistency described above. These two factors were crossed to create a 2 x 2 experimental design.

A total of 98 participants with average experience at the Senior rank of 12.3 months completed the experimental exercise (standard deviation = 11.7; range = 0 to 60 months). Cost of sales risk assessments were elicited on a scale from 0 (low) to 100 (high). Observing differences in year-two misstatement risk assessments for cost of sales suggests that participants' judgment was influenced either by the experimental manipulations included for year two, or by the client knowledge participants developed during year one, or both. We analyzed the influence of these variables by regressing cost of sales risk assessments for year one, and two dummy variables that accounted for our experimental manipulations, on cost of sales risk assessments for year two. We performed an exhaustive test for interactions among the three independent variables. Results for all significant variables are presented in Table 1

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Insert table 1 here

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The significant ( $p < .05$ ) positive parameter estimate for inconsistent pattern in accounts indicates that, after controlling for the influence of other experimental factors, auditors believed

misstatement risk was higher (lower) in the presence (absence) of the seeded inconsistency. These findings provide evidence the presence of an inconsistent fluctuation in account balances has a direct effect on auditors' assessments of misstatement risk (Figure 1). The significant ( $p < .01$ ) positive parameter estimate for cost of sales risk for year one indicates that, when business risk was high, client knowledge influenced misstatement risk assessments. However, the significant negative parameter estimate for the interaction of business risk and cost of sales risk (year 1) indicates that, when business risk was low, the association between client knowledge and misstatement risk became weaker. These findings support link B in our model by providing evidence that changes in business risk assessments moderate the influence that client knowledge has on auditor judgment about misstatement risk.

#### Corroborating Link C from Figure 1

O'Donnell and Schulz (2005) included another experimental treatment imposed on a different group of participants. That manipulation involved changing the structure of the analytical procedures task by requiring participants to document their expectations about changes in account balances. Participants in this experimental condition indicated how they expected selected accounts to change from year one to year two using a scale from one (decrease significantly) to seven (increase significantly). Participants documented their expectations after reading a description of operating activities for year two, but before they were provided information about changes in account balances for year two.

This task structure increases the cognitive effort that participants must devote to categorizing and evaluating what they have learned about their client, and alters the client knowledge they use to integrate business risk and analyze patterns of changes in accounts. McDaniel and Kinney (1995) used this technique to strengthen the salience of client knowledge

that auditors used for analytical procedures, and found that auditors who documented their ex-ante expectations were more likely to recognize and respond to patterns of changes in accounts that should increase the risk of misstatement. In other words, documenting expectations apparently helps auditors develop more rigorous client knowledge for performing analytical procedures.

All participants who documented expectations received a case that included a seeded inconsistency in year two. About half of those participants were told that the engagement partner had rated business risk as high, the others were told that the engagement partner had rated business risk as low. Combining these two groups with other participants who received a case that included a seeded inconsistency in year two but were not required to document expectations created a second 2 x 2 design (high or low business risk crossed with being required or not being required to document expectations about changes in account balances). A total of 97 participants with average experience at the Senior rank of 12.7 months (standard deviation = 12.0; range = 0 to 48 months) were distributed almost equally across these four experimental conditions.

We used analysis of variance to analyze the main and interactive influence that these experimental manipulations had on misstatement risk assessments for cost of sales, with change in cost of sales risk assessments from year one to year two as our dependent variable. We used a change score to consolidate the influence that year-one risk assessments had on year-two risk assessments into the dependent variable. Results are presented in Table 2.

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The significant ( $p < .01$ ) interaction reported by the results presented in Panel A of Table 2 indicates that altering task structure by requiring participants to document expectations about change in accounts *before* analyzing changes in accounts moderates the association between

business risk and misstatement risk (link C). The pattern of cell means presented in Panel B of Table 2 reveal the nature of this influence by providing evidence that documenting expectations increased the influence of business risk assessments.

In the experimental conditions where participants were not required to document expectations, average misstatement risk assessments for participants assigned to the low-business-risk condition were not significantly different from participants assigned to the high-business-risk condition. However, in the experimental condition where participants were required to document expectations, misstatement risk assessments were influenced more strongly by differences in business risk. Participants assigned to the low-business-risk condition increased their misstatement risk assessments, on average, less than participants assigned to the high-business-risk condition. These findings support link C in our model by providing evidence that firm procedures moderate the influence of business risk assessments on auditor judgment about misstatement risk.

### **Evidence Gathered to Test the Model**

Our analyses of data from the second experiment conducted by O'Donnell and Schultz (2005) provides evidence corroborating the three links in our descriptive model that specify associations between business risk assessments and auditor judgment. We conducted three experiments to gather additional evidence that were motivated by two research objectives. First, we wanted to learn more about how additional firm procedures could moderate the influence of business risk. Second, we wanted to replicate and extend our findings by examining audit planning decisions that auditors make during analytical procedures.

## Experiment One

Corroborating evidence presented above suggests that task structures designed to increase the salience of the mental representation auditors develop by integrating information about business risk with other client knowledge serves to increase the influence that business risk assessments have on auditor judgment. Participants who documented their expectations for the high (low) business risk case increased misstatement risk assessments significantly more (less) than participants who did not document their expectations (see Panel B of Table 2). We conducted our first experiment to examine how other task structure manipulations might moderate the influence that business risk assessments have on auditor judgment.

We used the case from the corroborating experiment that included low business risk, inconsistent fluctuations in accounts, and a requirement to document expectations as the baseline reference condition for examining the influence of alternative task structures. We chose this case as a reference condition because, in the corroborating experiment, participants who were told that business risk was low increased misstatement risk from year one to year two significantly less than participants who were told that business risk was high, even though both cases contained a seeded inconsistency that would be consistent with a higher likelihood of misstatement. In other words, misstatement risk assessments developed by auditors who performed analytical procedures on this case were influenced by information about business risk. Task structure manipulations that diminish the influence of business risk will result in higher misstatement risk assessments for the treatment case compared to the baseline case. On the other hand, task structures that strengthen the influence of business risk will result in lower misstatement risk assessments for the treatment case compared to the baseline case.

We examined the influence of three alternative task structures. First, we used Kennedy's external data manipulation as a guide for creating a task structure that should decrease the

cognitive effort required to recognize patterns of inconsistent fluctuations. Second, based on Kennedy's internal data manipulation, we created a task structure that should increase the cognitive effort devoted to applying knowledge embodied in the mental representation when analyzing changes in accounts. Third, we presented information about business risk after information about client operations instead of before information about client operations (the presentation format for the baseline case) to examine whether the influence of business risk was moderate by a primary effect.

Our external-data treatment altered the way that accounts were grouped into tables for presentation in the case materials. Audit support software used by the firm that provided participants for our experiment presents comparative account balances grouped by business process when auditors perform analytical procedures. The baseline case was organized using a similar format. That case presented accounts grouped by business process such that comparative balances for sales and selling expenses were presented in the same table, but comparative balances for cost of sales and inventory were presented in a different table. To operationalize our external-data treatment, we changed the grouping to present all comparative balances in a single table that was organized in financial statement format. The income statement portion displayed sales followed immediately by cost of sales and selling expenses so that the three accounts that were altered to seed the inconsistent pattern of fluctuations were grouped together.

Our internal-data treatment encouraged participants to devote additional effort to evaluating how the knowledge embodied in their mental representation of client business activities related to the likelihood that accounts were misstated. The baseline case simply required participants to document their risk assessment for inventory, sales, cost of sales, and selling expenses from zero (low) to 100 (high). In the treatment condition, participants were

instructed to document all information about client operations and account balances they believed to be relevant for assessing account-level misstatement risk before they documented their assessment of misstatement risk.

Our primacy-effect treatment provided a basis for examining whether the influence of business risk on auditor judgment about misstatement risk is moderated by whether auditors learn about business risk before or after they acquire information that provides them with other client knowledge. Consistent with the audit methodology participants used in the field, the baseline case provided information about business risks first, before providing information about client business processes. In the treatment condition, information about client business processes was provided first, before information about business risks. In both the baseline and the treatment condition, participants received information about business risks and business processes before they documented their misstatement risk assessments.

A total of 82 participants with an average of 6.1 months of experience at the Senior rank completed the experimental exercise (standard deviation = 7.8; range = 0 to 60 months), including 21 participants who analyzed the baseline case, 22 participants who analyzed the external-data case, 19 participants who analyzed the internal-data case, and 20 participants who analyzed the primacy-effect case. We use ordinary-least squares regression to compare the change in misstatement risk assessments for cost of sales from year one to year two for the baseline case with each of the treatment conditions. Results are presented in Table 3.

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Only our internal-data treatment has a significant effect ( $p < .10$ ) on auditor judgment about the risk of misstatement. The corroborating experiment provided evidence that auditors who evaluated the baseline case were influenced by information that business risks were low.

The negative parameter estimate for the internal-data treatment shown in Table 3 provides evidence that altering task structure to increase cognitive effort serves to increase the influence that business risk assessments have on auditor judgment, as evidenced by smaller increase in misstatement risk assessments compared with the baseline case.

### Experiment Two

Experimental evidence presented thus far supports our proposals about the influence that business risks can have on auditor judgment about the risk of misstatement. However, an important question for auditors is how business risk assessments influence audit planning decisions. While we have cited research linking misstatement risk assessments to audit planning decisions, we have not presented evidence that demonstrates an association between business risk assessments and audit planning decisions. Our second and third experiments provide that evidence.

Experiment two presented participants with case information similar to the year-two information provided in experiment one, and asked them to decide whether or not each of four accounts (inventory, sales, cost of sales, and/or selling expenses) should be targeted for further investigation because the change in the account from last year to this year was not consistent with their expectations. Participants were presented with the comparative account balances used to create the seeded-inconsistency condition from experiment one, but they were only asked to perform analytical procedures for a single year. We designed our second experiment to test link A in the model presented as Figure 1. Our objective was to examine whether learning about business risks influenced auditor planning decisions during analytical procedures in the same way that business risk information influenced auditor judgment about misstatement risk in the first experiment conducted by O'Donnell and Schultz 2005.

One group of participants was provided narrative with information about business processes and accounting practices, and also with information about business risks, which included a description of the client's business strategy and metrics for key performance indicators. Another group was only provided with information about business processes and accounting practices, and did not receive any information about business risk. Information about business risk included metrics for key performance indicators that suggested business strategy was meeting management's performance objectives and other details that suggested business risk was relatively low.

A total of 102 auditors with average experience at the Senior rank of 18.2 months participated in experiment two (standard deviation = 14.6; range = 0 to 84 months), including 50 (52) who analyzed the case that provided (did not provide) information about business risk. We used logistic regression to evaluate the influence that providing information about business risk had on planning decisions that participants developed by performing analytical procedures on comparative account balances that contained inconsistent fluctuations. Results are presented in Table 4.

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The significant ( $p < .05$ ) negative parameter estimate for business risk information indicates that auditors who integrated information about business risk were less likely to target cost of sales for extended audit testing. These results replicate the findings reported by O'Donnell and Schultz (2005) using audit planning decisions as the dependent variable (rather than misstatement risk assessments). Findings suggest that auditors who evaluate business risk before they analyze changes in account balances are less likely to be concerned enough about

inconsistent fluctuations to target the affected account for substantiation though extended audit tests.

### Experiment Three

Our objective in conducting the third experiment was to replicate findings related to the internal-data treatment from experiment one, using audit planning decisions as the dependent variable. We used the case materials developed for experiment two, which provided evidence that business risk was low, as the baseline reference condition for experiment three.

Experiment three included two treatment conditions. In the list-only condition, participants were required to list all evidence presented in the case that would be relevant for assessing the risk of misstatement in each of the four accounts they were required to evaluate. Participants documented their listing for each account before they were asked whether to target the account for extended audit tests. This treatment was similar to the internal-data treatment used in experiment two. In the list-and-categorize condition, participants were required to list relevant evidence and also categorize that evidence as being consistent with either a high or a low likelihood of misstatement. This was intended to encourage auditors to more carefully consider the account balance information provided and its implications for their risk assessments.

A total of 77 auditors with an average of 21.4 months of experience at the Senior rank participated in experiment three (standard deviation = 12.6; range = 0 to 60), including 25 who were assigned to the baseline case, 26 who were assigned to the list-only condition, and 26 who were assigned to the list-and-categorize condition. Of the 77 auditors who participated, 55 chose to target cost of sales for extended audit tests. We use logistic regression to analyze how our internal-data treatments influenced that decision. Results are presented in Table 5.

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Parameter estimates presented in Table 5 indicate that participants assigned to both internal-data treatment conditions were less likely to target cost of sales for extended tests. These results replicate the findings from experiment one using audit planning decisions as the dependent variable (rather than misstatement risk assessments). When case information suggested that business risk was relatively low, task structures that encouraged auditors to devote additional effort in analyzing evidence during analytical procedures resulted in planning decisions that were more consistent with low misstatement risk. These findings suggest that altering task structure to increase cognitive effort strengthens the influence that business risk assessments have on audit planning decisions.

#### IV. DISCUSSION

In this study, we have developed a descriptive model of variables endogenous to planning analytical procedures tasks that can influence auditor judgment, which is presented as Figure 1. We also present experimental evidence supporting the associations from our model that involve business risk assessments. Findings support our predictions that (1) business risk assessments moderate auditor judgment and (2) moderate the influence that client knowledge has on auditor judgment, and that firm procedures moderate the influence that business risk assessments have on auditor judgment. Findings that provide evidence supporting our model are summarized in Table 6, which also identifies the source of the evidence and the link in the model presented as Figure 1 that the evidence supports.

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Results from this study have implications for future research. First, our findings replicate and extend previous studies that have provided evidence of an all-is-well bias attributable to business risk assessment (e.g. Ballou et al. 2004; O'Donnell and Schultz 2005). Evidence from our study suggests that, when analytical procedures reveal inconsistent account fluctuations, auditors tend to become less skeptical about evidence that should increase the likelihood of misstatement if they perceive business risk to be low. Our findings show that the *all-is-well* bias affects auditor decisions to target accounts for extended audit testing in addition to influencing their misstatement risk assessments. This study also demonstrates the all-is-well bias can reduce the extent to which auditors rely on perceptions about risk embodied in their client knowledge when they assess the risk of misstatement. Future research could make a significant contribution by describing and examining the cognitive mechanisms through which the all-is-well bias influences auditor judgment.

Second, we tested several effort-based interventions that could be used by audit firms to provide alternative task structures for performing analytical procedures. Kennedy (1995) found that these interventions served to diminish knowledge-based judgment bias during analytical procedures. However, our results suggest that using Kennedy's interventions to increase the extent to which auditors rely on the non-business-risk knowledge that they acquire only serves to make the all-is-well bias stronger. In addition to providing a better description of how the all-is-well bias influences auditor judgment, future studies could provide important insight by identifying effective debiasing techniques.

Our study is subject to several limitations. First, we are bound by the availability of participants from only one of the Big-four accounting firms. Second, we were constrained in the time and numbers of participants allotted for our experiments and hence were not able to

examine all links in our model concurrently. Third, in our experiments auditors made individual judgments about risks while in reality these judgments would be made either at the group level or would be preceded by a discussion among the engagement team members. These limitations should serve as a spring board for future studies.

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Figure 1  
Variables in Analytical Procedures that Influence  
Auditor Judgment about Misstatement Risk

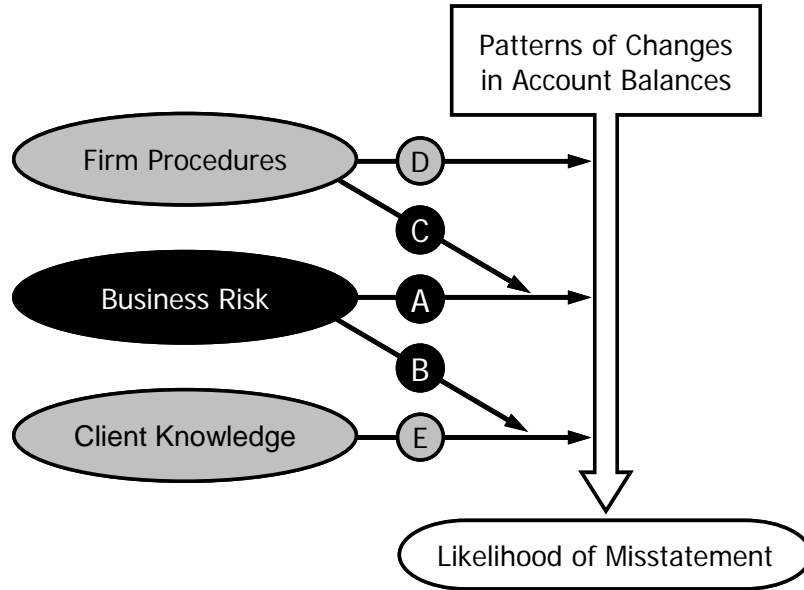


Table 1  
 Corroborating Evidence about the Moderating Influence of Business Risk on the  
 Association between Client Knowledge and Misstatement Risk

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Ordinary Least-Squares Regression  
 Dependent Variable = Misstatement risk for cost of sales in year two  
 r-square = .38; f-statistic = 14.33; p-value = .0001

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	Parameter <u>Estimate</u>	Standard <u>Error</u>	<u>T-statistic</u>	<u>P-value</u>
Intercept	9.49	4.83	1.96	.0526
Low business risk scenario	14.06	6.53	2.15	.0340
Cost of sales risk for year one	0.72	0.10	6.71	.0001
Business risk x cost of sales risk	- 0.33	0.16	1.99	.0500
Inconsistent pattern in accounts	5.91	2.65	2.23	.0280

Table 2  
Corroborating Evidence about the Moderating Influence of Firm Procedures on the  
Association between Business Risk and Misstatement Risk

Panel A: Analysis of Variance				
Dependent Variable = Change in cost of sales risk assessment from year one to year two				
	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-statistic</u>	<u>P-value</u>
Model	3	2,303.54	3.83	.0114
Error	93	18,336.95		
Business Risk	1	363.44	1.84	.1779
Document Expectations	1	11.08	0.06	.8131
Interaction	1	1,992.01	10.10	.0020

Panel B: Cell Means				
	High Business Risk Case	Low Business Risk Case	Condition Mean	
Not Required to Document Fluctuation Expectations	4.2 (n = 25)	9.4 (n = 25)	6.8 (n = 50)	t = 1.30
Required to Document Fluctuation Expectations	13.9 (n = 25)	1.0 (n = 22)	7.4 (n = 47)	t = 3.15 ***
Condition Mean	5.2 (n = 50)	9.0 (n = 47)		t = 1.36
	t = 2.37 **	t = 2.11 **	t = 0.24	

\* p < .10; \*\* p < .05; \*\*\* p < .01

Table 3  
Moderating Influence of Firm Procedures on the Association between  
Business Risk and Misstatement Risk in Experiment One

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Ordinary Least-Squares Regression  
Dependent Variable = Change in cost of sales misstatement risk from year one to year two  
r-square = .07; f-statistic = 2.02; p-value = .1178

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	<u>Parameter Estimate</u>	<u>Standard Error</u>	<u>T-statistic</u>	<u>P-value</u>
Intercept	8.00	3.17	2.52	.0137
External-data treatment	- 6.63	4.43	1.50	.1385
Internal-data treatment	- 10.81	4.60	2.37	.0204
Primacy-effect treatment	- 3.60	4.54	0.79	.4302

Table 4  
 Influence of Business Risk Assessment on Audit  
 Planning Decisions in Experiment Two

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Logistic Regression  
 Dependent Variable = Targeted cost of sales for extended testing  
 pseudo r-square = .38; chi-square with 1 df = 5.66; p-value = .0173

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	<u>Parameter Estimate</u>	<u>Standard Error</u>	<u>Chi-square</u>	<u>P-value</u>
Intercept	0.63	0.29	4.75	.0291
Business risk assessment	- 0.95	0.40	5.50	.0190

Table 5  
Moderating Influence of Firm Procedures on the Association between  
Business Risk and Audit Planning Decisions in Experiment Three

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Logistic Regression  
Dependent Variable = Targeted cost of sales for extended testing  
pseudo r-square = .52; chi-square with 2 df = 8.46; p-value = .0145

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	Parameter <u>Estimate</u>	Standard <u>Error</u>	<u>Chi-square</u>	<u>P-value</u>
Intercept	2.44	0.73	10.97	.0009
List important evidence	- 1.80	0.84	4.57	.0325
List and categorize important evidence	- 2.03	0.83	5.84	.0156

Table 6  
Summary of Evidence about How Business Risk Influences  
Auditor Judgment During Analytical Procedures

Finding	Evidence Provided By
Link A: Business risk moderates misstatement risk assessments when auditors perform analytical procedures to evaluate patterns of changes in account balances	O'Donnell and Schultz (2005)
Link A: Business risk moderates audit planning decisions when auditors perform analytical procedures to evaluate patterns of changes in account balances	Experiment Two
Link B: Business risk assessment moderates the influence that other client knowledge has on misstatement risk assessments when auditors perform analytical procedures to evaluate patterns of changes in account balances	Corroborating Experiment
Link C: Task structure imposed by firm procedures moderates the influence that business risk assessment has on misstatement risk assessments when auditors perform analytical procedures to evaluate patterns of changes in account balances	Experiment One
Link C: Task structure imposed by firm procedures moderates the influence that business risk assessment has on audit planning decisions when auditors perform analytical procedures to evaluate patterns of changes in account balances	Experiment Three