

**Integration of Fraud Risk in the Risk of Material Misstatement and the
Effect on Auditors' Planning Decisions***

Velina Popova
Assistant Professor
Department of Accounting and Information Systems
Virginia Polytechnic Institute and State University
3106 Pamplin Hall (0101)
Blacksburg, VA 24061
velina@vt.edu
Phone: 540-231-6359

November 14, 2008

* I want to thank the members of my dissertation committee for their guidance and support: Marlys Lipe, Kevan Jensen, Chris Knapp, Carol Knapp, and Scott Gronlund. I acknowledge the comments from Anne Magro, Tina Carpenter, Pennie Bagley, Amber Whisenhunt and workshop participants at the University of Oklahoma, University of North Texas, Virginia Tech University, University of Texas – Arlington, and George Mason University. I gratefully acknowledge all Big 4 professional participants who devoted their time to complete my study. I am especially indebted to the developer of the study's website for his dedication.

ABSTRACT: This paper examines the effects of explicit integration of fraud risk assessments into the risk of material misstatement (RMM) on auditors' risk assessments and planning judgments. Participants make risk assessments and audit planning judgments using either the traditional source view of RMM (i.e., based on inherent and control risk) or a new type view of RMM (i.e., based on error and fraud risk). The results indicate that auditors in the type-based group make more conservative risk assessments and planning judgments than do auditors in the source-based group. Further investigation of the nature of procedures chosen for varying levels of fraud risk shows that auditors in the type-based group address higher fraud risk with more "nonstandard" procedures (procedures that are perceived as particularly useful in addressing fraud risk) than do auditors in the source-based group. Both RMM groups assign more experienced staff levels to address high fraud risk compared to low fraud risk.

Keywords: *risk of material misstatement, fraud risk, audit planning judgments*

Data availability: *Contact the author*

I. INTRODUCTION

Auditors acquire, integrate, and evaluate large amounts of information throughout the audit process. Recent changes in the audit profession have increased the amount and changed the type of information auditors gather and evaluate. These changes include more risk-based audits, requirements for public clients to obtain an audit opinion not only on their financial statements but also on the effectiveness of their internal controls, and new requirements for fraud risk assessment at all stages of the audit. This has prompted the audit profession to consider and implement a number of changes in the audit process.

Although many changes to the audit process have been made, many questions about the audit process remain unanswered. Recently, the Public Company Accounting Oversight Board (PCAOB) questioned the audit risk model's usefulness in the PCAOB's examination of risk assessment practices and research (PCAOB 2005). The PCAOB task force concluded that, while the model continues to be useful as a planning tool, it should be modified to more effectively include fraud risk. They posed the following two questions for future research: "How can fraud risk be integrated into the audit risk model? How well do auditors currently combine fraud risk assessments with ARM (Audit Risk Model) elements?" (Allen et al. 2006)

Audit research and practice suggest that auditors currently address fraud risk through a separate assessment during the planning of the audit.¹ Although auditors seem to be good at assessing fraud risk, they do not appear to be as effective in changing their audit plans in response to fraud risk (Zimbelman 1997; Glover et al. 2003; Wilks and Zimbelman 2004). PCAOB (2007) inspections show that auditors are not responding to fraud risk factors with appropriate changes in procedures. One possible explanation is that risk assessments using the

¹ Personal discussions with representatives of Big 4 firms provide anecdotal evidence that the current practice is to assess fraud risk separately from other risks (inherent and control risk) throughout the audit.

traditional audit risk model do not consider the different types of misstatements an auditor might face such as those from fraud versus error. Currently, risk of material misstatement (RMM) is used as a guide for determining the extent, nature, and timing of planned audit tests. The risk of material misstatement, however, is generally assessed by considering potential *sources* of misstatement (i.e., inherent and control risks) rather than potential *types* of misstatement (i.e., errors and fraud). Although the current standards suggest that auditors should consider both source and type of the misstatement when assessing RMM the current framework of the audit risk model focuses on source of the misstatement. This focus on source rather than type of misstatement may inhibit auditors' ability to respond to fraud risk in designing their plans. In this paper I suggest that focusing on type of the misstatement can help auditors incorporate fraud risk in the risk of material misstatement.

This paper examines the effects of explicit integration of fraud risk assessment into the overall assessment of the risk of material misstatement on auditors' planning judgments. Integration of fraud risk assessment in the risk of material misstatement can affect auditors' judgments in two ways: (1) by making fraud risk more salient and (2) by decreasing cognitive effort required to process and integrate the fraud information. I test the effects of the integration of fraud risk assessments in the risk of material misstatement in an experiment with Big 4 audit seniors and managers. Participants make risk assessments and audit planning judgments using either the traditional source-based view of RMM (i.e., based on inherent and control risk) or a new type-based view of RMM (i.e., based on error and fraud risk). Fraud risk is manipulated using varying levels of fraud risk factors such as incentives and opportunities to commit fraud. These fraud risk factors are varied at high and low levels and were developed by the author based on the risk factors determined by ASB and PCAOB.

Results indicate that the auditors in the type-based RMM group assess overall risk of material misstatement to be higher than auditors in the source-based RMM group. In addition, results show that RMM assessments for the type-based group are more sensitive to the level of fraud risk than those of auditors in the source-based group. With respect to planning judgments, auditors in the type-based group create plans that are more sensitive to differing fraud risk levels compared to auditors in the source-based group. They accomplish this by changing the extent, nature and staffing of their plans in response to changes in fraud risk levels.

This study contributes to the literature in several ways. First, this study examines one way to explicitly integrate fraud risk assessments into the traditional risk assessment process, addressing standard setters' suggestions and extending prior literature. Second, this paper helps us understand how such explicit integration of fraud risk assessments impacts auditors' assessments of overall risk of material misstatement as well as their planning judgments. Third, by manipulating levels of fraud risk, this study examines the effects of integrating fraud risk assessments on auditors' sensitivity to fraud-related information. The findings contribute to the ongoing discussion of risk assessment among standard setters and could help practitioners in their attempt for more integrated audits.

The remainder of the paper is organized as follows. Section II discusses relevant background literature and develops the hypotheses. Section III describes the experiment's method, design, and participants, and Section IV presents the results. Section V concludes and suggests future research avenues.

II. BACKGROUND AND HYPOTHESES DEVELOPMENT

Audit practice has faced a number of changes in recent years. Financial statement fraud scandals triggered a major shift in the audit profession aimed at narrowing the “expectation gap”

with respect to auditors' responsibility to detect fraud. The expectation gap is the difference between the auditor's perception about his/her responsibilities and the public's perception about auditors' responsibilities. For decades, auditors argued that they were not responsible for the detection of fraud in the financial statements. This was summarized in a recent article that reported the opinion of Ellen Masterson, the global head of audit methodology at PWC at the time: "For so long we've said we are not responsible for detection of fraud. In the court of public opinion, however, that's not holding true" (Frieswick 2003). Trying to narrow the expectation gap creates one of the biggest ever changes to the audit profession: auditors now have responsibility for detecting fraud and assessing fraud risk at every stage of the audit (SAS 99).

These changes in the audit profession inspired a recent project by the Public Company Accounting Oversight Board (PCAOB) which concluded, among other things, that fraud risk should be incorporated in some form into the audit risk model for it to be descriptive for both fraud cases and error cases (PCAOB 2005). Although the PCAOB suggests an incorporation of fraud risk with the traditional risk assessments, it does not specify how this incorporation should be done.² This lack of guidance persists throughout the current audit standards. Integrating the fraud risk assessments with the traditional risk assessments can be beneficial because it will help auditors develop audit plans which are more responsive to the client's risks.

Traditional client risks and fraud risk

The audit risk model

A financial statement audit is organized into three stages: planning the audit, performing the audit, and issuing the audit opinion. Planning the audit involves gaining an understanding of the

² The PCAOB just announced "Proposed auditing standards related to auditor's risk assessment of and response to risk" on October 21, 2008. The proposed standards did not directly address the audit risk model but they did reiterate the importance of fraud risk assessment as an integral part of the audit. The PCAOB release suggested that fraud risk has been an isolated mechanical process so far and needs to become an integrated central part of the audit process.

client and assessing risks related to the client's business, processes, and financial statements. The purpose of the planning stage is to identify risks of material misstatement such that audit procedures can be designed to reduce audit risk to reasonable levels.

Achieving reasonable levels of audit risk requires auditors to consider the client's major risks and combine them into one risk assessment. Statement on Auditing Standards 47 (SAS 47)³ and Statement on Auditing Standards 107 (SAS 107) present a model (the audit risk model) for combining all major client risks. This model is a planning tool used by auditors to combine risks and determine the audit plan. Conceptually the audit risk is represented as a function of three major risks:

$$AR = IR \times CR \times DR \quad (1)$$

After setting a planned level of audit risk (AR), and assessing the inherent risk (IR) and control risk (CR) auditors derive the required level of detection risk (the risk that the auditors' procedures will not detect a material misstatement or DR). Required detection risk is then used to determine the nature, timing, and extent of audit tests. A number of studies find that the audit risk model (ARM) in its current form (i.e., equation 1) is a useful planning tool, but suggest that it should be implemented in practice with caution (Kinney 1983). A stream of accounting research focuses on the ARM's usefulness in different situations, and several studies specifically examine ARM descriptiveness in the case of fraud (Shibano 1990; Houston et al. 1999). Both Shibano (1990) and Houston et al. (1999) conclude that the audit risk model is descriptive in relation to errors but not as descriptive in relation to fraud.

³ The new standards, SAS 104 to SAS 111, were issued by ASB. However, the PCAOB did not adopt these standards. The proposed new standards by PCAOB are currently under discussion and will not be adopted by firms for at least another 120 days (the public discussion period for the new standards). PCAOB registered firms are still using SAS 47 as a guide in judging audit risk and materiality.

The audit risk model was created long before the expectation gap standards came into effect, thus it technically addresses only error risk as the focus of financial statement audits. With the expectation gap narrowed, the audit risk model's current form must be adapted to explicitly address fraud detection. Both Shibano's (1990) and Houston et al.'s (1999) findings suggest that the insufficient integration of fraud risk assessments with other risks has a detrimental effect on auditors' ability to address fraud situations. The fact that fraud risk assessments are separate from other types of risk assessments might affect the way auditors develop audit plans, especially in a potential fraud.⁴ Thus, it is an empirical question of how fraud risk assessments can be integrated with other risk assessments and what effects this integration has on auditors' planning judgments that has become especially important in this changing audit environment. To my knowledge, this question has not been addressed in prior research (see Allen et al. 2006).

Risk of material misstatement

Recent standards (e.g. SAS 107) suggest also a simplified audit risk model that combines inherent and control risks into one risk called the risk of material misstatement. The risk of material misstatement (RMM) is a function of inherent risk and control risk (Messier et al. 2006, p. 75; PCAOB Standing advisory group meeting Feb16, 2005, p. 14; SAS 109).

$$\text{RMM} = \text{IR} \times \text{CR} \quad (2)$$

SAS 110 uses a simplified version of the relation between planned audit evidence and risk assessments by suggesting a direct relation between the risk of material misstatement and planned testing. Under the traditional model, auditors should use detection risk to plan their audit procedures. As detection risk increases, auditors should plan fewer procedures. SAS 110 suggests that auditors can instead use the direct relationship of RMM to planned procedures to

⁴ PCAOB's newly proposed standards on assessment and response to risk discuss the fact that fraud risk assessments are currently separate from the remaining risk assessments and need to become integral part of the audit rather a separate assessment.

determine the nature, timing, and extent of these procedures. Higher assessed risk of material misstatement should lead to an increase in the extent of and/or a change in the nature and timing of planned audit procedures.

The risk of material misstatement as described in Equation 2 is a combination of risks that differ based on the *source* of the misstatement - either stemming inherently from the account's risk level (inherent risk) or stemming from controls not being able to prevent/detect a misstatement existing in the account (control risk). Auditors learn this organization (i.e., risks organized by source) through education and experience and assess the risks based on the source of the misstatement when planning the audit. In recent years, assessing fraud risk has become a major concern during the audit planning stage. Nevertheless, fraud risk is currently not explicitly incorporated in the RMM.

Risk of material misstatement can be used as an avenue for incorporating fraud risk in the audit risk model. The current standards (e.g., SAS 105) already indicate that risk of material misstatement can also be viewed as a combination of risks based on the *type* of misstatement – whether a misstatement is due to either error (risk of material misstatement due to error - RMME) or fraud (risk of material misstatement due to fraud - RMMF):

$$\text{RMM} \equiv f(\text{RMME}, \text{RMMF}) \quad (3)$$

If auditors focus on the type (illustrated in Equation 3) instead of the source (illustrated in Equation 2) of misstatements in their risk assessments, the assessed RMM may be able to provide an avenue for integration of fraud risk assessments into the traditional audit risk model. The standards currently do not discuss a specific formula-based representation of type RMM in the audit risk model. One way to represent the relations among the risks of error or fraud and the

risk of material misstatement is presented in the version of the traditional audit risk model provided below:⁵

$$AR = (RMME+RMMF) \times DR \quad (4)$$

This combination allows for explicit integration of fraud risk in the audit risk model through the risk of material misstatement. Hereafter, I refer to this as the Integrated Fraud Audit Risk Model, or IFARM.

Type-based versus source-based risk of material misstatement

Type-based versus source-based RMM and risk assessment

As discussed above, the risk of material misstatement can be viewed as a combination of either source-based risks (inherent and control risks) or type-based risks (error and fraud risks). This is illustrated in Figure 1. When viewing risk of material misstatement as a combination of type-based risks, the explicit consideration of fraud risk as part of the risk of material misstatement makes fraud risk more salient. Auditors using the type-based representation are asked to use a framework for assessing RMM that is forcing them to explicitly consider fraud risk as part of the RMM.

[Insert Figure 1]

Making fraud risk more salient may affect auditors' risk assessments. For example, salience can direct differential attention among existing cues (Haynes and Kachelmier 1998). Accounting research examines how directing attention can improve auditors' judgments and decisions (e.g., McDaniel and Kinney 1995; Ng and Tan 2007). These studies find that salience can help subjects overcome biases and improve conditional probability judgments by directing attention

⁵ Both inherent and control risks contain elements of fraud and error risk suggesting that the RMM is equivalent in the two representations: that is, as a combination of inherent and control risk or as a combination of error and fraud risk. Therefore, I suggest Equation 4 as one of the possible combinations to express the audit risk model through a type of misstatement representation.

to important information. Making information more salient also helps information acquisition by focusing decision-makers' attention on important aspects of information (Einhorn and Hogarth 1981; Reed 2004; Ng and Tan 2007).

Knapp and Knapp (2001) suggest that one way to improve auditors' fraud risk assessments is to focus their attention on fraud risk factors. The authors examine the effects of explicit fraud risk assessment requirements and experience on the effectiveness of such assessments. They find that an explicit requirement to assess fraud risk results in more effective assessments. Making fraud risk more salient by explicitly including it in the risk of material misstatement should therefore result in higher (more conservative) risk assessments because type-based RMM reflects both error and fraud risk considerations.⁶ This leads to the following hypothesis stated in alternative form:

H1: Auditors' RMM assessments using a type-based RMM representation will be higher than those of auditors using a source-based RMM representation.

Type-based versus source-based RMM and planning judgments

Assessing the risk of material misstatement based on type of risks may improve auditors' planning judgments as well as their risk assessments. Knapp and Knapp (2001) show that salience affects fraud risk assessments but they do not test for risk effects on auditors' planning decisions. By making fraud risk more salient, the risk of material misstatement assessment is expected to be higher as stated in hypothesis one. Higher assessed risk of material misstatement should result in more conservative planning judgments.

When discussing the link between planning judgments and risk assessments, auditing standards primarily focus on the risk of material misstatement. As the risk of material misstatement increases, auditors are expected to increase the extent of their planned audit tests.

⁶ This paper does not directly address the issue of effectiveness and efficiency of the audit.

The source-based RMM (based on inherent and control risks) does not ask auditors to consider fraud risk explicitly, and therefore auditors may not change their audit plans in response to changing levels of fraud risk. Until recently, this source-based view of RMM performed well because the major type of misstatement auditors needed to consider was misstatement due to error. SAS 99 currently requires auditors to also consider fraud risk when planning the audit even though fraud risk is not explicitly incorporated into the RMM assessment.

The RMM assessments directly influence auditors' decisions related to audit planning. The incorporation of fraud risk assessments in the auditors' RMM assessments will improve the correspondence between the auditors' assessment of fraud risk and their planning judgments. As fraud risk assessments become integrated in the risk of material misstatement, the RMM assessment becomes more conservative due to the salience of fraud risk. More conservative planning judgments include an increase in number of hours budgeted to auditing accounts receivable (relative to the baseline audit budget), as well as a decrease in tolerable misstatement allocated to accounts receivable (relative to the baseline audit budget). This leads to my second hypothesis stated in alternative form:

H2: Type-based RMM assessments will result in more conservative planning judgments compared to source-based RMM assessments.

Fraud Risk Factors and RMM Representation

Fraud risk factors and RMM assessment

Fraud research has also examined the effects of low and high fraud risk situations on auditors' fraud risk assessments, and their planning decisions in these situations. In general, auditors have been found to be more conservative when faced with high risk situations than when faced with low risk situations (Zimbelman 1997). Salience helps auditors make more conservative risk assessments and create more conservative audit plans. Integrating fraud risk

into RMM assessment could help auditors make overall RMM assessments and create audit plans that better respond to differing levels of fraud risk. This latter effect is discussed below.

Information integration is one weakness of human information processing (Libby and Libby 1989). Mathematical models perform better in integrating information than do humans (Einhorn 1972; Dawes 1979; Jiambalvo and Waller 1984; Kachelmier and Messier 1990). A number of studies show that improving subjects' ability to integrate information enhances their decision making and reduces their cognitive biases (Nelson et al. 1995; Bonner et al. 1996). For example, Bonner et al. (1996) show that enhancing auditors' aggregation or integration of information can help de-bias and improve their judgments.

Integration of fraud risk assessment into RMM can require significant cognitive effort, but cognitive effort can be reduced by changing the way information is organized. Information organization, or representation, influences the way decision makers choose and use information by changing the cognitive effort needed to acquire and process information (Bettman and Kakkar 1977; Russo 1977; Schkade and Kleinmuntz 1994; Lipe and Salterio 2002). Reducing the cognitive effort needed to process fraud-related information improves auditors' sensitivity to fraud cues and results in improved fraud risk assessments (Zimbelman 1997; Wilks and Zimbelman 2004).

IFARM can be viewed as a decision aid or a framework that will help improve auditors' judgments by allowing auditors to integrate fraud risk assessments into their overall assessments of risk of material misstatement. Better integration of fraud risk assessments into overall RMM assessments will result in improved sensitivity to fraud information and risk assessments.

Auditors are trained in the traditional representation of the RMM with a focus on inherent and

control risk (source-based RMM). Type-based RMM (combination of error and fraud risk) presents information in a different organization or format from the source-based RMM.

[Insert Figure 2]

Providing a different representation of RMM to auditors will potentially serve as a framework or decision aid at first and then, as auditors become more familiar with that framework, the type-based RMM representation will activate a different schema or mental model that includes fraud risk as an aspect of overall risk of material misstatement (type-based RMM).

Different schema activation will result in different evaluation of incoming information. Alba and Hasher (1983) suggest that if incoming new information does not match the schema activated in memory, that particular piece of information will be lost. In addition, cognitive fit theory states that people become more effective and efficient at solving a problem if their mental representation of the problem allows for a better fit with incoming information (Vessey 1991). When the new representation of RMM is activated, fraud risk factors are congruent with the activated schema (which includes fraud risk) and the memory for and incorporation of that evidence should be better than when auditors have activated the traditional RMM schema or model. The new representation will help auditor judgments be more sensitive to the fraud risk factors (including factors auditors came up with during their brainstorming session) not only because it provides a place for these factors but also because it allows for easier integration of the fraud risk factors in the risk of material misstatement assessments. The more sensitive auditors are to risk information and the better they are able to integrate that information, the more responsive their RMM assessments will be to the fraud risk factors they face. This will result in the type-based RMM assessments being more sensitive to fraud risk levels compared to auditors' risk assessments using the source-based RMM. Sensitivity of risk assessments to fraud

risk levels refers to the extent of reaction or response to the fraud risk factors. Therefore, I propose the following hypothesis in alternative form:

H3: Auditors' RMM assessments using the type-based RMM representation are more sensitive to fraud risk levels than those of auditors using the source-based RMM representation.

Fraud risk factors and planning judgments

In situations where fraud factors are present, auditing research finds that auditors' tend to increase budgeted audit hours when faced with high fraud risk but not change the nature of the tests (Zimbelman 1997; Glover et al. 2003). This is potentially problematic because fraud cannot be detected with a "more of the same procedures" approach (see Asare and Wright 2004). Fraud situations require strategic reasoning on the part of auditors to evaluate the possibility that the client is intentionally attempting to mislead them (Shibano 1990; Johnson et al. 1991; Jamal et al. 1995; Zimbelman and Waller 1999). According to SAS 99, an appropriate response to the intentional nature of fraud is to change the timing and nature of procedures to better address fraud risk, rather than increase the extent of testing. SAS 99 discusses specific ways to address fraud risk such as: a change in the nature of procedures, use of more unpredictable procedures, assigning more experienced personnel to the engagement, and consulting specialists (forensic accountants).

Auditors might not currently be able to create audit plans which are responsive to fraud risk because of the existing disconnect between auditors' fraud risk assessments and their assessments of RMM and resulting audit planning decisions. Making fraud risk assessment an integral part of RMM assessment helps connect fraud risk assessment to RMM and audit planning. In addition, providing for integration of fraud risk *assessments* into the RMM will also aid the information integration of fraud risk *factors* into auditors' assessments of the risk of

material misstatement. Such integration (as suggested by the IFARM model) should result in better correspondence between the level of existing fraud risk factors and RMM assessments, which will then directly affect planning decisions (see Figure 2).

Increasing auditors' sensitivity to risk information improves planned audit testing (Graham and Bedard 2003). Eining (1997) shows that a decision aid which helps auditors, with weighting and aggregation of information, results in improved correspondence between auditors' risk assessments and their planning judgments. As auditors become more sensitive to risk of material misstatement due to fraud, they will be more sensitive to fraud risk levels and develop plans which will respond better to fraud risk. Responsiveness of audit plans to fraud risk levels refers to both an increase in the extent of testing and including more tests designed to detect fraud when risk is high. Audit plans that are responsive to high (low) fraud risk clients include more (less) procedures such as computer assisted audit techniques, more positive confirmations, and increased propensity to consult specialists as suggested by SAS 99. Therefore, I propose the following hypothesis in alternative form:

H4: Audit plans of auditors using the type-based RMM representation will be more responsive to fraud risk levels than those of auditors using the source-based RMM representation.

III. METHOD

Design and participants

I test the above hypotheses in an experiment using a 2x2 between participants design. I manipulate the representation of the risk of material misstatement (i.e., whether auditors use a type-based RMM representation or source-based RMM representation to assess risks) and the level of fraud risk (i.e., whether auditors receive a high fraud risk case or low fraud risk case) at two levels on a between-participants basis.

The participants included in the study are 59 auditors (seniors and managers) representing all of the Big 4 audit firms.⁷ Thirty-two percent of the participants are managers, sixty-seven percent are seniors, and one percent are partners. Additional descriptive statistics are presented in Table 1. A contact person from each participating firm was asked to recruit participants within his/her firm via email. That email included a link to the web-based instrument.⁸ Participants completed the case at their own convenience.

Independent variables

RMM representation was manipulated by varying the risks auditors were asked to assess before assessing the overall risk of material misstatement. Source-based RMM participants were asked to assess inherent and control risks before assessing the overall risk of material misstatement (see Panel A of Appendix A). Type-based RMM participants were asked to assess risk of material misstatement due to error and risk of material misstatement due to fraud before assessing the overall risk of material misstatement (Panel B of Appendix A)⁹. The type-based RMM representation is designed to provide for explicit integration of fraud risk in the overall risk of material misstatement assessments.

Fraud risk levels were manipulated by varying whether participants received information which suggested high or low fraud risk. Fraud risk factors from AU Section 316 were used to

⁷ The seniors and managers are appropriate subjects for the task used in this study, as suggested by prior literature (Abdolmohammadi and Wright 1987) because of their experience at performing the risk assessment and planning tasks. There were no significant differences between seniors and managers responses in any of the dependent variables.

⁸ The study was pilot tested using 86 auditing students. In addition, five Ph.D. students with an average of 2.5 years of audit experience and a former Big 4 senior manager provided feedback on the realism of the materials.

⁹ The type-based representation could result in auditors using inherent and control risk assessments within each RMM assessment for error and fraud. The focus of the current study is not the exact process in which the auditors made the assessments; rather the purpose of the study is to examine the effect re-framing the risks as error and fraud has on auditors' judgments.

develop differing fraud risk levels.¹⁰ These fraud risk factors were included in the explanation of the client's operations, management, internal controls, etc. and suggested a client with either low fraud risk or high fraud risk. For example, the high fraud risk group received information that the client is experiencing high employee and key executives' turnover, whereas the low fraud risk group received information that the client's employee and key executives' turnover is low. For a complete list of the fraud risk factors see Appendix B.

Dependent variables

Participants were asked to indicate their assessment of risk of material misstatement for accounts receivable (the focus of the case) on a scale of 0 to 10 where 0 means very low risk, 5 means moderate risk, and 10 means very high risk. Participants were provided with the linguistic descriptors as well as the numeric scale (Reimers et al., 1993). Participants were presented with an audit budget for accounts receivable for a client of similar size and average risk. They were asked to create an audit budget for the current client by adjusting the "average" budget. The changes auditors could make to address the current client's risk levels were changes in both the extent of testing and the nature of the tests. The second dependent variable is based on these changes. In addition, auditors in the source-based RMM group were later given an opportunity to assess fraud risk separately and revise their risk assessment (RMM) and planning decisions. This was done only after the main dependent variables were gathered. The purpose of this additional step is to address the question of what cognitive effects (salience, integration, or both) are driving any differences between the two types of RMM assessments.

¹⁰ A comparison between the AICPA AU 316, AU 316A and the PCAOB interim standards shows that they each list the same fraud risk factors; therefore my fraud risk factors are consistent with both the current AICPA and PCAOB guidance. AU 316 is the PCAOB's adoption of SAS99 and that suggests consistency among the different texts in fraud detection.

Procedure

All participants began the experiment by reading and responding to an informed consent form online, followed by the general instructions for the instrument. The first page of the study provided the participants with a brief description of the task, risks they would be asked to assess, and a brief description of the risk terminology meant to provide participants with a framework while reading the client information (see Appendix C). The description of the risk terms was accessible throughout the study for the participants' reference. The terminology description was used to provide uniformity in auditor's understanding of the risks assessed and to make sure that auditors in the type-based group consider the effects of controls. The description was provided again when participants were asked to make their risk assessments. The participants also viewed a menu screen which offered them the following options to choose from: client's background, internal controls, key personnel, and client's financial information. Participants could choose which items to examine and in what order. Each of the menu items offered a submenu with more specific information within each category. Fraud risk factors were embedded within the description of operations, internal controls, and key personnel categories.¹¹

After participants read through the information, they were asked to make the risk assessments and planning judgments. For the planning judgments, both groups were asked to review a budget for an audit client of similar size and average risk and to use this budget as a base, making any needed adjustments for the current client's audit of accounts receivable (see Appendix D). Participants then were asked to recall the three most important factors influencing their risk assessment decisions. This information is used to investigate auditors' sensitivity to fraud risk

¹¹ To keep the amount of information as equal as possible for both high and low fraud risk groups, the same number of sentences were used for high and low fraud risk.

factors. All participants concluded the experiment by completing a short demographic questionnaire.

IV. RESULTS

Manipulation checks

Participants in the study answered two manipulation check questions. First, participants were asked to identify the risks they had explicitly been asked to assess in the study. Two participants in the type-based group did not answer correctly; the remaining 57 participants answered correctly.¹² The second manipulation check question asked auditors to identify whether they had seen certain pieces of information that were part of the manipulation for high/low fraud risk. Fifty-six of the fifty-nine subjects correctly identified the risk information for their condition.¹³ These results show that the manipulation of high and low fraud risk levels was successful. Descriptive data about the participants are shown in Table 1.

[Insert Table 1]

Hypotheses tests

Hypothesis 1 states that auditors using type-based RMM will make more conservative RMM assessments than auditors using source-based RMM. To test H1, I compare the overall risk of material misstatement assessments between the type-based and source-based groups using an analysis of variance (ANOVA). The results indicate that the main effect of RMM group is significant in the predicted direction thus supporting H1 ($F=33.99$, $p<0.01$, Table 2 Panel A).¹⁴ Mean RMM assessment for the type-based group is 6.83 and that for the source-based group is 4.09 (see Table 2 Panel B). The effect of RMM group is significant for both the high fraud risk

¹² Running the analyses without these two subjects does not qualitatively change the results.

¹³ Excluding the subjects who answered incorrectly does not qualitatively change the results.

¹⁴ The main effect of the fraud risk level is also significant ($F=22.96$, $p<0.01$) supporting a successful manipulation of the fraud risk level.

case ($t=-5.76$, $p<0.01$) and the low fraud risk case ($t=-2.52$, $p=0.02$). All results are showing one-tailed p values.

[Insert Table 2]

Hypothesis 2 predicts that auditors who use a type-based RMM assessment will make more conservative planning judgments than auditors who use a source-based RMM assessment. More conservative planning judgments include an increase in number of hours budgeted to auditing accounts receivable (relative to the baseline audit budget) as well as a decrease in tolerable misstatement allocated to accounts receivable (relative to the baseline audit budget). The results of a two-way ANOVA test shown in Table 3 Panel A indicate that the main effect of RMM group on the increase in total hours is significant in the predicted direction thus supporting H2 ($F=33.19$, $p<0.01$).¹⁵ The mean increase in planned hours was 22.69 hours for the type-based group and -0.13 hours for the source-based group (see Table 3 Panel B).

[Insert Table 3]

To test H2, I also compare the decrease in tolerable misstatement allocated to accounts receivable between the type-based and the source-based groups using a two-way ANOVA test. The results shown in Table 4 Panel A indicate a significant main effect of RMM group on the decrease in tolerable misstatement thus supporting H2 ($F=12.01$, $p<0.01$). The mean decrease in tolerable misstatement was -1.48 for the type-based group and 0.65 for the source-based group (see Table 4 Panel B).

[Insert Table 4]

Hypothesis 3 states that auditors' RMM assessments using the type-based RMM representation are more sensitive to fraud risk levels than those of auditors using the source-

¹⁵ In addition the results of planned comparisons of high risk and low risk cases for each RMM group show a marginally significant difference between the high and low risk groups for the source RMM ($t=-1.72$; $p=0.092$) and a statistically significant difference between the high and low risk groups for the type RMM ($t=-4.85$, $p<0.0001$)

based RMM representation. To test H3, I compare the difference in overall risk of material misstatement assessments for differing levels of fraud risk between the type-based and the source-based group. The expectation is that the difference between high and low fraud risk groups' RMM assessment is greater for the auditors using type-based RMM than for the auditors using source-based RMM. Hypothesis 3 is tested using an ANOVA and planned comparisons tests. The results show a significant interaction effect of RMM group and fraud risk level on RMM assessment ($F=5.01$, $p=0.03$, Table 2 Panel A). In addition, the results of planned comparisons of high risk and low risk cases for each RMM group show a marginally significant difference between the high and low risk for the source RMM group ($t=1.82$; $p=0.07$) and a statistically significant difference between the high and low risk cases for the type RMM group ($t=4.93$, $p<0.01$) thus supporting H3 (Table 2 Panel C).¹⁶ Results from a planned overall comparison support this conclusion as shown in Figure 3 ($F=27.31$, $p<0.01$, Table 2 Panel C)¹⁷.

[Insert Figure 3]

Hypothesis 4 predicts that audit plans of auditors using the type-based RMM representation will be more responsive to fraud risk levels than those of auditors using the source-based RMM representation. Tests of H2 already established that auditors making type-based judgments budget more audit hours in total than do those making source-based judgments. Table 3 also indicates an interaction of RMM group and fraud risk level ($F=5.11$, $p=0.03$). Planned contrasts shown in Table 3 Panel C show that the hours assigned by auditors making type-based RMM assessments are more responsive to the level of fraud risk i.e., vary more for the high versus low risk cases ($t=4.85$, $p<0.01$) than those assigned by auditors in the source-based group ($t=1.72$,

¹⁶ A planned comparison between the source and type RMM groups within low and high fraud risk show that the type RMM group's risk assessments are significantly higher than the source RMM for both high and low fraud risk.

¹⁷ An untabulated result suggests that auditors' tolerable misstatement decisions are significantly different between low and high fraud risk for both source and type RMM groups. However, the difference between mean tolerable misstatements assigned to the client is higher for the type-based than the source-based RMM group.

p=0.09). To further test H4, I compare the hours allocated to “nonstandard” procedures for high risk and low risk cases for each RMM group.¹⁸ Hypothesis 4 for nonstandard procedures is tested using an ANOVA and planned comparisons tests. The results indicate an insignificant interaction of RMM group and fraud risk level ($F=2.67$, $p=0.11$, Table 5 Panel A).

[Insert Table 5]

Since H4 has specific predictions I investigate the interaction further using planned comparisons. The results show that auditors in the source-based group did not assign significantly more hours to nonstandard procedures in response to the level of fraud risk ($t=1.25$, $p=0.22$, Table 5 Panel C). In contrast, the hours assigned to nonstandard procedures¹⁹ by auditors making type-based RMM judgments were significantly different for the high and low levels of fraud risk ($t=3.52$, $p<0.01$, Table 5 Panel C) in the expected direction. These findings provide support for H4 as shown in Figure 4.

[Insert Figure 4]

It is possible that auditors assign a different number and mix of audit hours to the various staff levels to address fraud risk rather than or in addition to changing the nature of the tests. To test this possibility, I compare the average hourly cost of the audit for the type-based and source-based groups within differing levels of fraud risk. The average cost per hour is examined using the auditors’ hour allocations in the budget for the current client’s audit to different levels of

¹⁸ “Nonstandard” procedures are procedures suggested by SAS 99 and prior research as being focused on addressing fraud risk and helping uncover fraud. These procedures include analytical procedures, computer assisted audit techniques, and use of a certified fraud examiner.

¹⁹ To gain insight into participants’ perceptions regarding “standard” and “nonstandard” procedures, participants answered a question on the usefulness of each of the presented audit procedures for addressing fraud risk on a scale of 0 to 10 (where 0 means not useful at all and 10 means extremely useful). Auditors assess positive confirmations, analytical procedures, and supervisor review as the most useful procedures for addressing fraud risk. Using the participants’ perception on procedures’ usefulness, I compare the hours allocated to “most useful” procedures and find a significant interaction between fraud risk level and RMM group ($p=0.0366$ – untabulated results). Planned comparisons show that the interaction is due to the significant difference in most useful procedures assigned to low and high fraud risk cases for the type-based RMM group and lack of significant difference for the source-based group thus providing further support for H4.

audit staff (see Appendix D). Using the estimated cost per hour for different staff levels, I calculate the total cost of the audit. The average cost per hour is calculated by dividing this total by the total hours auditors assigned to the current client's audit. Testing this hourly cost controls for the fact that the total amount of testing differs across the two RMM groups (as shown in Table 3). The results, as shown in Table 6 Panel A, indicate a significant interaction between fraud risk levels and RMM group ($F=11.51$, $p<0.01$).

[Insert Table 6]

Means are shown in Table 6 Panel B and planned comparisons show that the difference in assigning more experienced staff between low and high fraud risk cases is significant for the type RMM group (mean \$36.62 per hour difference; $t=6.75$, $p<0.01$) and significant but not as strong for the source RMM group (mean \$10.82 per hour difference; $t=2.03$, $p=0.05$) thus providing additional support for H4 as shown in Figure 5.

[Insert Figure 5]

Supplemental analyses

Effort differences

Following the risk assessments and planning judgments, auditors were asked to evaluate the overall effort they expended on the case. Since the type-based risk assessment task is relatively new to auditors, participants in the type-based group might expend greater effort than the source-based group. The results (untabulated) show that auditors perceived a significantly higher effort for the type-based RMM group (mean 6.71 on a scale of 0 to 10) than the source RMM group (mean 4.57, $F=20.83$, $p<0.01$). In addition, the high risk group's significantly higher perceived effort relative to the low fraud risk group was driven primarily by the difference between high and low fraud risk within the type RMM group ($t=3.72$, $p<0.01$, untabulated). In addition to the

perceived effort measure, I collected reading times for all groups using the online instrument. An untabulated ANOVA analysis shows no significant effects of RMM group and fraud risk levels on reading times.

Fraud assessment for the source-based RMM group

To get a better understanding of the reasons for the judgment differences for the two RMM groups, I include two additional questions at the end of the study for the source-based RMM assessment group. Auditors were asked to explicitly evaluate the risk of material misstatement due to fraud, as well as whether they would like to reassess the overall risk of material misstatement. These questions can provide some initial evidence on the underlying reason for the differences between the type-based RMM and the source-based RMM group.

If the original difference between the groups was due purely to salience, then when auditors in the source-based RMM group are asked to reassess the overall RMM, that second RMM assessment should be insignificantly different from the type-based group's overall RMM assessment. If the results were due to more than just the salience of fraud risk (due to integration or the combination of integration and salience) then the final RMM assessments for the two groups should be significantly different from each other. The results (not tabulated) show that the RMM reassessment for the source group is significantly lower (i.e., less assessed risk) than the RMM assessment of the type RMM group ($F=7.87$, $p<0.01$) suggesting that the effects of the IFARM model are not only due to salience. This suggests that integration may also play a role when auditors make RMM assessments using the new RMM representation.

A potential alternative explanation for the significant results discussed above is the fact that auditors in the source-based group could have used an anchoring and adjustment process in their RMM re-assessment. An insufficient adjustment (Tversky and Kahneman, 1974) from the

anchor (original RMM assessment) could explain the significant main effect of RMM representation. Therefore the findings of this additional analysis are suggestive but not conclusive in disentangling the effects of salience and integration.²⁰

V. CONCLUSION

This paper reports the results of an experimental study that examines how the integration of fraud risk in the risk of material misstatement affects auditors' risk assessments and planning judgments. To examine the effect of explicit integration of fraud risk in the risk of material misstatement, the study uses two representations of the risk of material misstatement: (1) source-based RMM representation – a representation which follows the traditional version of overall risk of material misstatement as a combination of inherent and control risk and (2) type-based RMM representation – a representation which explicitly integrates fraud risk in the risk of material misstatement by representing overall risk of material misstatement as a combination of error and fraud risk.

Auditors who assess overall RMM using the type-based representation make higher RMM assessments than do auditors assessing overall RMM using the source-based representation. In addition, the risk assessments of auditors in the type-based group are more sensitive to fraud risk levels than those of auditors in the source-based group. The extent of testing planned by auditors in the type-based group is greater than the testing planned by auditors in the source-based group. Further, the auditors in the type-based group show more sensitivity to levels of fraud risk in their

²⁰ Two more exploratory analyses were performed. Participants were asked to recall the three most important facts that influenced them when assessing RMM to examine whether auditors in the type-based group would pay more attention to fraud risk factors than auditors of the source-based group. The results show that there were no significant differences in recalled factors between the two groups. The second test asked auditors to identify their firms' current practices in addressing fraud task. The results show that majority of the firms use a fraud risk checklist or memo.

choice of extent, staffing, and nature of audit procedures compared to auditors in the source-based group.

The results of this study contribute to the accounting literature, standard setters and practitioners. I extend prior literature by providing evidence that auditors are capable of changing their audit plans to respond to differing fraud risk levels. An explicit integration of fraud risk in the risk of material misstatement encourages auditors to consider fraud risk and integrate it into their risk assessments. This explicit integration results in improved response to varying levels of fraud risk by causing auditors to change not only the extent but also the nature of their audit plans. The results of the current study have implications for the development of a new audit risk model and improved response to fraud risk. I provide evidence that a different representation of the risk of material misstatement, which explicitly includes fraud risk, leads to more conservative risk assessments and affects the extent and nature of audit planning. This evidence and the new representation can be useful to standard setters as they consider the creation of a different, more integrated audit risk model. Finally, the current study can help practitioners by providing them with a way to change their risk assessments to make fraud risk an integral part of the risk of material misstatement assessment and improve their planning judgments.

This study has several limitations. First, a significant number of the study's participants did not have retail client experience. Auditors with more specific industry experience might make different risk assessments and planning judgments. Second, the study does not directly examine the effect of the new representation of RMM on audit effectiveness and efficiency. Future research can compare in more detail the effectiveness and efficiency of the two forms of RMM

representation.²¹ Moving to a new model will make sense only if it better addresses fraud risk while providing a balance between the effectiveness and the efficiency of the audit.

Third, the study did not attempt to explicitly disentangle the effects of salience and integration and how each affects auditors' planning judgments. Although this is not the study's purpose, I ran an additional test that provides some insight into this question. The results suggest that explicit integration of fraud risk in RMM can improve auditor judgments not only because it makes fraud risk more salient but also because it helps auditors integrate fraud risk in the risk of material misstatement. However, anchoring and adjustment is a plausible alternative explanation for this finding. Thus, future research can further explore the separate effects of integration and salience of fraud risk on audit risk assessment.

²¹ The manipulation of high and low fraud risk could have implications for efficiency and effectiveness but it does not directly examine them because it cannot provide a "correct" answer for the risk assessments and planning judgments.

REFERENCES

- Abdolmohammadi, M., and A. Wright. 1987. An examination of the effects of experience and task complexity on audit judgments. *The Accounting Review*. (January): 1-13.
- Alba, J., and L. Hasher. 1983. Is memory schematic? *Psychological Bulletin* 93 (2): 203-231.
- Allen, R., D. Hermanson, T. Kozloski, and R. Ramsay. 2006. Auditor risk assessment: Insights from the academic literature. PCAOB task force. *Accounting Horizons* 20 (2): 157-177.
- American Institute of Certified Public Accountants (AICPA). 1983. *Audit risk and materiality in conducting an audit*. Statement on Auditing Standards No. 47. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 2002. *Consideration of Fraud in a Financial Statement Audit*. Statement on Auditing Standards No. 99. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 2006. *Amendment to Statement on Auditing Standards No. 95, Generally Accepted Auditing Standards*. Statement on Auditing Standards No. 105. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 2006. *Audit risk and Materiality in Conducting an Audit*. Statement on Auditing Standards No. 107. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 2006. *Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement*. Statement on Auditing Standards No. 109. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 2006. *Performing Audit Procedures in Response to Assessed Risks and Evaluating the Audit Evidence Obtained*. Statement on Auditing Standards No. 110. New York, NY: AICPA.
- Asare, S., and A. Wright. 2004. The effectiveness of alternative risk assessment and program planning tools in a fraud setting. *Contemporary Accounting Research* 21 (2): 325-352.
- Bettman, J., and P. Kakkar. 1977. Effects of information presentation format on consumer information acquisition strategies. *The Journal of Consumer Research* 3 (4): 233-240.
- Bonner, S., M. Nelson, and R. Libby. 1996. Using decision aids to improve auditors' conditional probability judgments. *The Accounting Review* 71 (2): 221-240.
- Dawes, R. 1979. The robust beauty of improper linear models. *American Psychologist* 34 (7): 571-582.
- Einhorn, H. 1972. Expert measurement and mechanical combination. *Organizational Behavior and Human Performance* 7 (1): 86-106.

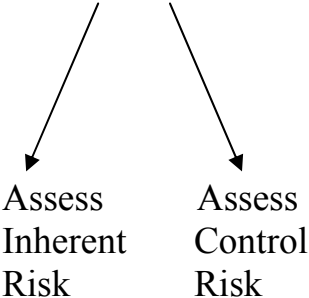
- _____, and R. Hogarth. 1981. Behavioral decision theory: Processes of judgment and choice. *Journal of Accounting Research* 19 (Spring): 1-31.
- Eining, M., D. Jones, and J. Loebbecke. 1997. Reliance on decision aids: An examination of auditors' assessment of management fraud. *Auditing: A Journal of Practice & Theory* 16 (2): 1-19.
- Frieswick, K. 2003. How audits must change. Auditors face more pressure to find fraud. *CFO Magazine* July. <http://www.cfo.com/article.cfm/3009752>.
- Glover, D. Prawitt, J. Schultz, and M. Zimbelman. 2003. A comparison of audit planning decisions in response to increased fraud risk: Before and after SAS No. 82. *Auditing: A Journal of Practice & Theory* 22 (3): 237-251.
- Graham, L., and J. Bedard. 2003. Fraud risk factors and audit planning. *International Journal of Auditing* 7 (1): 55-70.
- Haynes, C., and S. Kachelmier. 1998. The effects of accounting contexts on accounting decisions: A synthesis of cognitive and economic perspectives in accounting experimentation. *Journal of Accounting Literature* 17: 97-136.
- Houston, R., M. Peters, and J. Pratt. 1999. The audit risk model, business risk and audit planning decisions. *The Accounting Review* 74(3): 281-298.
- Jamal, K., P. Johnson, and R. Berryman. 1995. Detecting framing effects in financial statements. *Contemporary Accounting Research* 12: 85-105.
- Jiambalvo, J., and W. Waller, 1984. Decomposition and assessments of audit risk. *Auditing: A Journal of Practice & Theory* 3 (2): 80-88.
- Johnson, P., K. Jamal, and R. Berryman. 1991. Effects of framing on auditor decisions. *Organizational Behavior and Human Decision Processes* 50: 75-105.
- Kachelmeier, S., and W. Messier. 1990. An investigation of the influence of a nonstatistical decision aid on auditor sample size decisions. *The Accounting Review* 65 (1): 209-226.
- Kinney, W. R. 1983. A note on compounding probabilities in auditing. *Auditing: A Journal of Practice & Theory* 2 (2): 13-22.
- Knapp, C., and M. Knapp. 2001. The effects of experience and explicit fraud risk assessment in detecting fraud with analytical procedures. *Accounting, Organizations and Society* 26 (1): 25-37.
- Libby, R., and P. Libby. 1989. Expert measurement and mechanical combination in control reliance decisions. *The Accounting Review* 64 (4): 729-747.

- Lipe, M., and S. Salterio. 2002. A note on the judgmental effects of the balanced scorecard's information organization. *Accounting, Organizations and Society* 27: 531–540.
- McDaniel, L., and W. R. Kinney. 1995. Expectation-formation guidance in the auditor's review of interim financial information. *Journal of Accounting Research* 33 (1): 59–76.
- Messier, W., S. Glover, and D. Prawitt. 2006. Auditing and assurance services: A systematic approach. 5e. McGraw-Hill Irwin.
- Nelson, M., R. Libby, and S. Bonner. 1995. Knowledge structure and the estimation of conditional probabilities in audit planning. *The Accounting Review* 70 (1): 27-47.
- Ng, T., and H.T. Tan. 2007. Effects of qualitative factor salience, expressed client concern, and qualitative materiality thresholds on auditors' audit adjustment decisions. *Contemporary Accounting Research* 24 (4): 1171-1192.
- Public Company Accounting Oversight Board (PCAOB). 2005. *Standing Advisory Group Meeting as of February 16, 2005 - Risk assessments in financial statement audits*. Washington D.C.: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). 2007. *Observations on Auditors' Implementation of PCAOB Standards Relating to Auditors' Responsibilities with Respect to Fraud*. Washington D.C.: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). 2008. *Proposed Auditing Standards Related to the Auditors' Assessment of and Response to Risk*. Release No 2008-006. Washington D.C.: PCAOB.
- Reed, A. II. 2004. Activating the self-importance of consumer selves: Exploring identity salience effects on judgments. *Journal of Consumer Research* (September): 286-295.
- Reimers J., S. Wheeler, and R. Dusenbury. 1993. The Effect of response mode on auditors' control risk assessments. *Auditing: A Journal of Practice & Theory* 12 (2): 62–78.
- Russo, J. 1977. The value of unit price information. *Journal of Marketing Research* 14 (2): 193-201.
- Schkade, D., and D. Kleinmuntz. 1994. Information displays and choice processes: Differential effects of organization, form, and sequence. *Organizational Behavior and Human Decision Processes* 57: 319-337.
- Shibano, T. 1990. Assessing audit risk from errors and irregularities. *Journal of Accounting Research* 28 (2): 110-140.
- Tversky, A., and D. Kahneman. 1974. Judgment under uncertainty: Heuristics and biases. *Science* 185: 1124-1131.

- Vessey, I. 1991. Cognitive Fit: A theory-based analysis of the graphs versus tables' literature. *Decision Sciences* 22 (2): 219-240.
- Wilks, J., and M. Zimbelman, 2004b. Decomposition of fraud risk assessments and auditors' sensitivity to fraud cues. *Contemporary Accounting Research* 21 (3): 719–745.
- Zimbelman, M. 1997. The effects of SAS No. 82 on auditors' attention to fraud risk factors and audit planning decisions. *Journal of Accounting Research* 35 (Supplement): 75–97.
- _____, and W. Waller. 1999. An experimental investigation of auditor-auditee interaction under ambiguity. *Journal of Accounting Research* 37 (Supplement): 135–155.

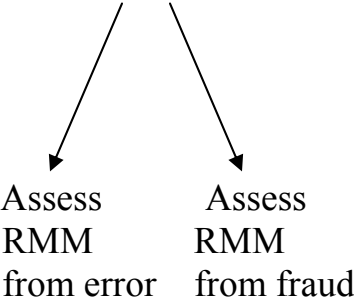
Figure 1: Source-based versus Type-based Risk of Material Misstatement (RMM) representation

Source-based RMM



No explicit integration of fraud risk

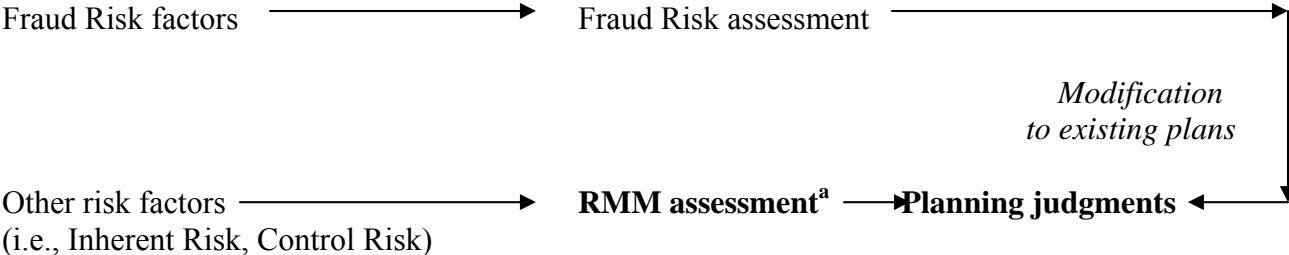
Type-based RMM



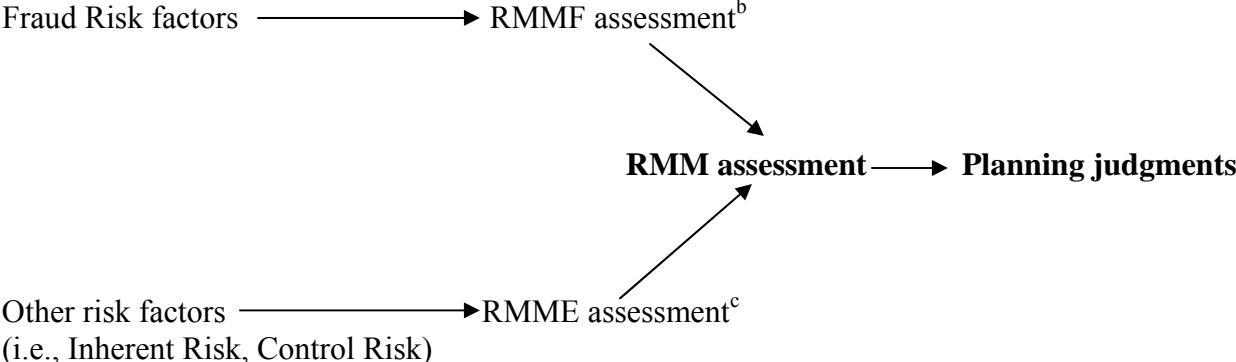
Explicit integration of fraud risk

Figure 2: Frameworks under Audit Risk Model (ARM) and Integrated Fraud Audit Risk Model (IFARM)

Current framework (ARM)



Proposed framework (IFARM)



^a Where RMM is risk of material misstatement
^b Where RMMF is risk of material misstatement due to fraud
^c Where RMME is risk of material misstatement due to error

Figure 3
Effects of Fraud Risk Levels and RMM Group on Auditors' Risk of Material Misstatement Assessments

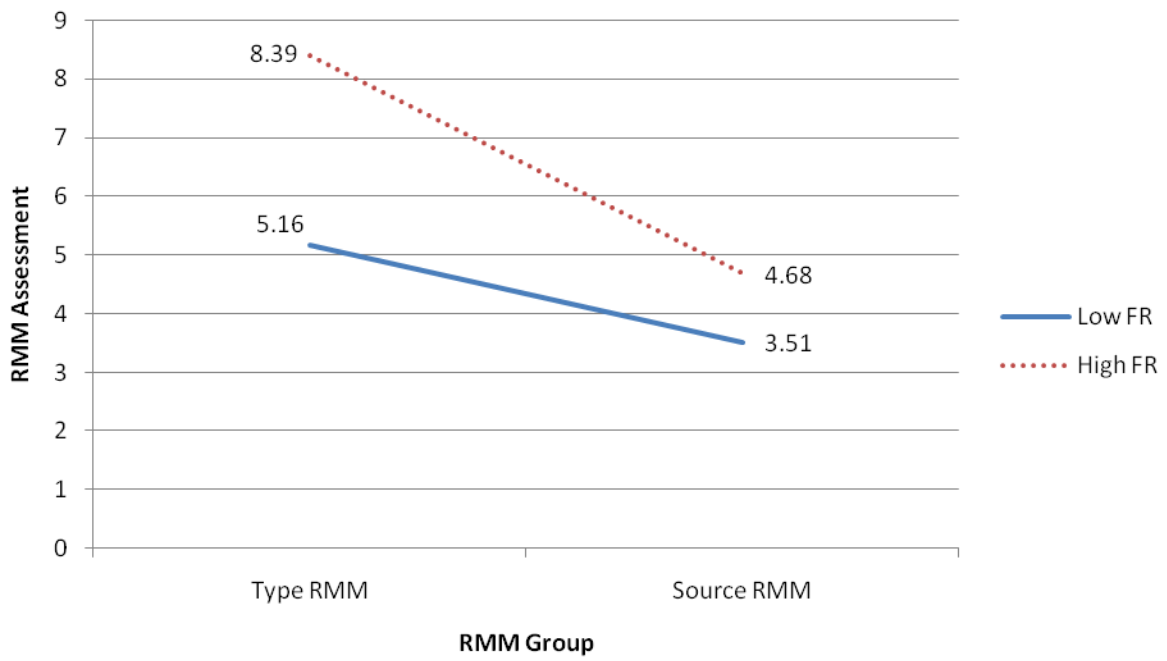


Figure 4
Effects of Fraud Risk Levels and RMM Group on Auditors' Budgeted Hours Assigned to Nonstandard Procedures

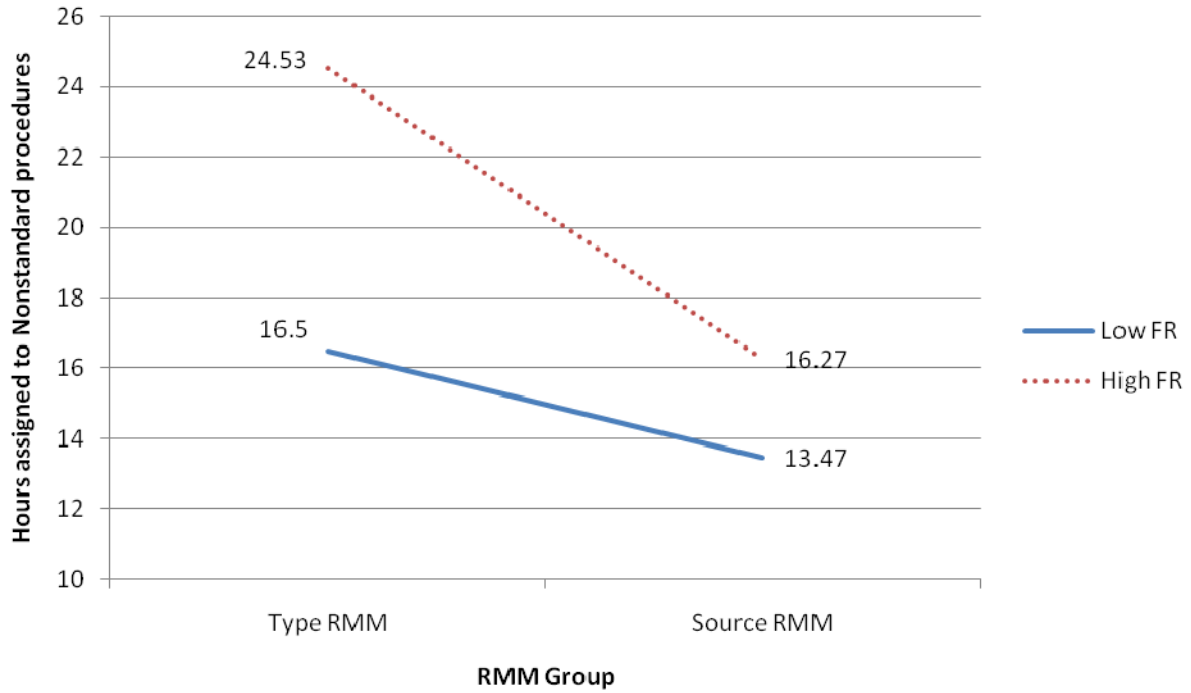


Figure 5
Effects of Fraud Risk Levels and RMM Group on Auditors' Budgeted
Average Cost per Audit Hour
(based on budgeted hours to various staff experience levels)

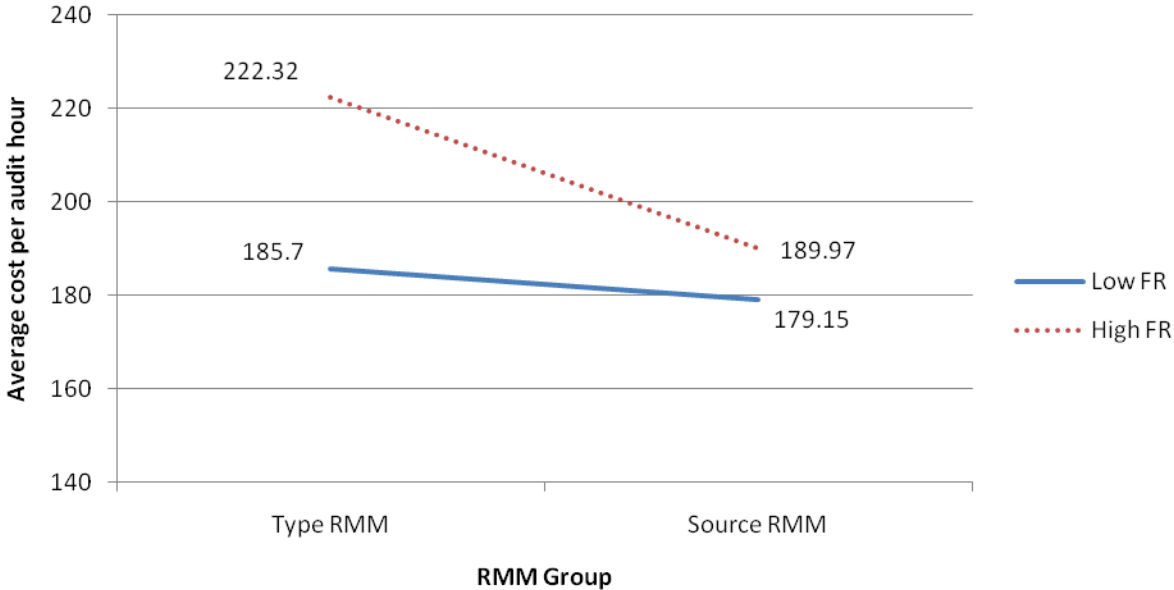


Table 1**Participants' Demographic Information**

Panel A: Audit staff level

Seniors	67%
Managers	32%
Partners	1%

Panel B: Firms

Big 4 firm 1	25%
Big 4 firm 2	15%
Big 4 firm 3	12%
Big 4 firm 4	12%
Not disclosed	36%

Panel C: Experience

27-60 months	54%
60 to 96 months	38%
More than 96 months	8%

Panel D: Experience in retail industry

No retail clients	69%
At least 1 retail client	31%

Panel E: Number of audits planned

0-5 audits ^d	54%
5-20 audits	35%
More than 20 audits	11%

^d There was only one participant with zero audits planned.

Table 2
Effects of Fraud Risk Levels and RMM Group on Auditors' Risk of Material Misstatement Assessments

Panel A: ANOVA Results

<u>Source</u>	<u>DF</u>	<u>Type III SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > F</u>
Fraud Risk (FR)	1	71.42	71.42	22.96	<.01
RMM Group (RMMGrp)	1	105.73	105.73	33.99	<.01
FR*RMMGrp	1	15.58	15.58	5.01	0.03

Panel B: Means (std. dev.)^a

	<u>Type RMM^b</u>	<u>Source RMM</u>
Low fraud risk	5.16 (2.30)	3.51 (1.83)
High fraud risk	8.39 (1.20)	4.68 (1.59)
<i>Group mean</i>	<i>6.83 (2.42)</i>	<i>4.09 (1.78)</i>

Panel C: Planned comparisons

<u>Comparison</u>	<u>Mean</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Pr > t </u>
High FR – Low FR within source RMM	1.17	0.64	1.82	0.07
High FR – Low FR within type RMM	3.23	0.66	4.93	<.01
<u>Comparison</u>	<u>Comparison SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > t </u>
Difference in type RMM ^c – Difference in source RMM	84.95	84.95	27.31	<.01

^a Risk of Material Misstatement (RMM) was assessed on 11 point scale with 0 representing very low risk and 10 representing very high risk.

^b Participants in the type RMM group evaluated the risk of material misstatement due to error, risk of material misstatement due to fraud, and overall risk of material misstatement. Participants in the source RMM group evaluated inherent risk, control risk, and overall risk of material misstatement.

^c The prediction is that the difference between low and high FR will be higher for the type RMM group than the source RMM group. This means that the highest assessment will be for type RMM in high fraud risk; followed by source RMM group and high fraud risk; lower for source RMM group and low fraud risk; lowest for the type RMM group and low fraud risk. The contrast coefficients were chosen to reflect that expectation (2,1,-1,-2 respectively).

Table 3
Effects of Fraud Risk Levels and RMM Group on Auditors' Increase in Total Budgeted Hours

Panel A: ANOVA Results

<u>Source</u>	<u>DF</u>	<u>Type III SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > F</u>
Fraud risk (FR)	1	4831.75	4831.75	21.76	<.01
RMM Group (RMMGrp)	1	7367.66	7367.66	33.19	<.01
FR*RMMGrp	1	1134.44	1134.44	5.11	0.03

Panel B: Means (std. dev.)^d

	<u>Type RMM</u>	<u>Source RMM</u>
Low fraud risk	8.79 (17.89)	-4.80 (8.14)
High fraud risk	35.67 (11.68)	4.53 (19.28)
<i>Group mean</i>	<i>22.69 (20.09)</i>	<i>-0.13 (15.30)</i>

Panel C: Planned comparisons

<u>Comparison</u>	<u>Mean</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Pr > t </u>
High FR – Low FR within source RMM	9.33	5.44	1.72	0.09
High FR – Low FR within type RMM	26.88	5.54	4.85	<.01

^d Participants were asked to budget hours for audit procedures for accounts receivable. The change in hours was calculated as participants' planned hours minus the listed hours for a client of similar size and average risk.

Table 4
Effects of Fraud Risk Levels and RMM Group on Auditors' Decrease in Tolerable Misstatement Allocated to Accounts Receivable

Panel A: ANOVA Results

<u>Source</u>	<u>DF</u>	<u>Type III SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > F</u>
Fraud Risk (FR)	1	124.75	124.75	23.57	<.01
RMM Group (RMMGrp)	1	63.58	63.58	12.01	<.01
FR*RMMGrp	1	3.83	3.83	0.72	0.40

Panel B: Means (std. dev.)^a

	<u>Type RMM</u>	<u>Source RMM</u>
Low fraud risk	0.29 (2.37)	1.85 (2.35)
High fraud risk	-3.13 (1.74)	-0.55 (2.64)
<i>Group mean</i>	<i>-1.48 (2.67)</i>	<i>0.65 (2.75)</i>

^a Participants were asked to determine a tolerable misstatement level for the accounts receivable account balance as a percentage of sales on a scale of 0% to 10%. Decrease in tolerable misstatement was calculated as participants' judged tolerable misstatement minus tolerable misstatement for a typical client of similar size and average risk (provided as 5% of sales in the case).

Table 5
Effects of Fraud Risk Levels and RMM Group on Auditors' Budgeted Hours Assigned to Nonstandard Procedures

Panel A: ANOVA Results

<u>Source</u>	<u>DF</u>	<u>Type III SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > F</u>
Fraud Risk (FR)	1	432.38	432.38	11.44	<.01
RMM Group (RMMGrp)	1	470.44	470.44	12.45	<.01
FR*RMMGrp	1	100.90	100.90	2.67	0.11

Panel B: Means (std. dev.)^a

	<u>Type RMM</u>	<u>Source RMM</u>
Low fraud risk	16.50 (5.32)	13.47 (3.38)
High fraud risk	24.53 (5.33)	16.27 (9.07)
<i>Group mean</i>	<i>20.65 (6.63)</i>	<i>14.87 (6.87)</i>

Panel C: Planned comparisons

<u>Comparison</u>	<u>Mean</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Pr > t </u>
High FR – Low FR within source RMM	2.80	2.24	1.25	0.22
High FR – Low FR within type RMM	8.03	2.28	3.52	<.01

^a Participants were asked to assign planned hours for the audit of accounts receivable balance to different procedures. SAS 99 suggests that some procedures, such as consulting a fraud specialist, can be used to address fraud risk. Prior research suggests that analytical procedures are good at addressing fraud risk. Discussion of the author with Big 4 representatives from various firms suggests that auditors use Computer Assisted Audit Techniques (CAATs) to address potential fraud risk. Therefore the nonstandard procedures in this test are defined as analytical procedures, use of CAATs, and consulting fraud specialists. The dependent variable is calculated as the planned hours of nonstandard procedures assigned by participants to the audit of accounts receivable.

Table 6
Effects of Fraud Risk Levels and RMM Group on Auditors' Budgeted Average
Cost per Audit Hour
(based on budgeted hours to various staff experience levels)

Panel A: ANOVA Results

<u>Source</u>	<u>DF</u>	<u>Type III SS</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Pr > F</u>
Fraud Risk (FR)	1	8291.60	8291.60	38.89	<.01
RMM Group (RMMGrp)	1	5573.01	5573.01	26.14	<.01
FR*RMMGrp	1	2454.18	2454.18	11.51	<.01

Panel B: Means (std. dev.)^a

	<u>Type RMM</u>	<u>Source RMM</u>
Low fraud risk	185.70 (17.34)	179.15 (14.87)
High fraud risk	222.32 (12.27)	189.97 (13.66)
<i>Group mean</i>	<i>204.64 (23.70)</i>	<i>184.56 (15.07)</i>

Panel C: Planned comparisons

<u>Comparison</u>	<u>Mean</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Pr > t </u>
High FR – Low FR within source RMM	10.82	5.33	2.03	0.05
High FR – Low FR within type RMM	36.62	5.43	6.75	<.01

Panel D: Mean hours for various staff levels

	<u>Type RMM</u>		<u>Source RMM</u>	
	<u>Low FR</u>	<u>High FR</u>	<u>Low FR</u>	<u>High FR</u>
Staff	33.86	38.40	27.40	30.20
Senior	13.14	23.13	9.20	13.73
Manager	6.29	14.00	4.27	5.73
Partner	2.14	7.13	1.07	1.73

^a Participants were asked to allocate the hours they budgeted for procedures to test accounts receivable to different staff levels. The cost per hour is calculated as the cost based on the staff levels assigned by participants to accounts receivable divided by the hours assigned by participants to the audit.

APPENDIX A

Risk assessments for the source and type based groups

Panel A: Risk assessments for the source-based RMM group

Q1: Indicate your assessment of the inherent risk for accounts receivable^b

Q2: Indicate your assessment of the control risk for accounts receivable

Q3: Indicate your assessment of risk of material misstatement (as a combination of the inherent and control risks) for accounts receivable

Panel B: Risk assessments for the type-based RMM group

Q1: Indicate your assessment of the risk of material misstatement due to error for accounts receivable

Q2: Indicate your assessment of the risk of material misstatement due to fraud for accounts receivable

Q3: Indicate your assessment of risk of material misstatement (as a combination of the risk of material misstatement due to error and the risk of material misstatement due to fraud) for accounts receivable

^b All questions assessments are made on 11 point Likert scale from 0 (Very low risk) to 10 (Very high risk).

APPENDIX B

Examples of the low and high fraud risk factors

High fraud risk factors	Low fraud risk factors
Forty percent of revenues coming from international sales	Five percent of revenues coming from international sales
High competition	Brand based competition and high customer satisfaction
Trend driven industry	Many manufacturers and distributors account for the merchandise
One manufacturer and one distributor account for large amount of merchandise	Forty percent of merchandise imported from unstable countries
Eighty percent of merchandise imported from unstable countries	Management has shown a strong desire to eliminate misstatements in the financial statements through the use of these internal controls and through conservative accounting policies. Management is therefore easy to work with.
Management attempts to justify marginal or inappropriate accounting on the basis of materiality and to influence the scope of your firm's work. This makes management difficult to work with.	Good system of controls existing and effectively monitored
Internal controls exist but not effectively monitored	Good corporate governance – high independence and frequency of meetings
Bad corporate governance – low independence and frequency of meetings	Satisfactory controls and good training for employees on the new accounting system
Unsatisfactory controls and poor employee training on the new accounting system	Low employee turnover with management viewing employees as invaluable resource
High employee turnover especially in the accounting department with main reason for turnover being management's unrealistic expectations of performance	Only small portion of upper management's compensation is tied to achieving a net income target each year.
Upper management's compensation is tied to achieving a net income target each year.	

APPENDIX C

Terminology descriptions for the source and type based groups

Panel A: Terminology description for the source-based RMM group

Inherent Risk is the susceptibility of an account to a material misstatement, assuming that there are no related controls

Control Risk is the risk that a material misstatement that could occur in an account will not be prevented or detected on a timely basis by the client's internal controls

Risk of material misstatement is the risk of a material misstatement occurring in an account. The risk of material misstatement is a combination of inherent and control risks as described above.

Panel B: Terminology description for the type-based RMM group

Risk of material misstatement due to error is the risk of an *unintentional* material misstatement occurring in an account and not being prevented or detected by the client's internal controls on a timely basis

Risk of material misstatement due to fraud is the risk of an *intentional* material misstatement occurring in an account and not being prevented or detected by the client's internal controls on a timely basis

Risk of material misstatement is the risk of a material misstatement occurring in an account. The risk of material misstatement is a combination of risk of material misstatement due to error and risk of material misstatement due to fraud as described above.

APPENDIX D

Planning judgments made by auditors in both groups

Panel A: Extent and nature of testing judgments

Please indicate in the table below how many total hours you would budget for testing the accounts receivable balance THIS YEAR and allocate these hours among the different available procedures:

Budgeted procedures	Typical hours for the audit of a client of similar size and <u>average</u> risk	Budgeted hours for Fabulous Clothes
Confirmations		
• Positive confirmations	20	
• Negative confirmations	10	
Other A/R work		
• Analytical procedures	10	
• Review	7	
• Test of journal entries using computer assisted audit techniques (CAAT)	0	
• Consult forensic expert	0	
• Other work	0	
Total hours	47	

Panel B: Staffing decisions

Please indicate in Panel B of the table below how many total hours you plan to budget for testing the accounts receivable balance THIS YEAR and allocate these hours among the different levels of auditors. A typical audit budget for a firm of this size and average level of risk is provided in Panel A for your information.

Panel A: Typical audit budget for a client of similar size and average level of risk

Budgeted hours	Staff	Supervising Senior	Manager	Partner	Total hours
Budgeted hours for all procedures testing A/R	30	10	5	2	47
Cost per hour	\$135	\$230	\$295	\$525	-

Panel B: Audit budget for the current client

Budgeted hours	Staff	Supervising Senior	Manager	Partner	Total hours
Budgeted hours for all procedures testing A/R					
Cost per hour	\$135	\$230	\$295	\$525	-