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Effects of Auditor Type and Evidence Domain Type on the Influence of Irrelevant Internal Control Evidence and the Potential for Audit Failure

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FLORIDA STATE UNIVERSITY
COLLEGE OF BUSINESS

THE EFFECTS OF AUDITOR TYPE AND EVIDENCE DOMAIN TYPE ON THE
INFLUENCE OF IRRELEVANT INTERNAL CONTROL EVIDENCE AND THE
POTENTIAL FOR AUDIT FAILURE

By

DANIEL D. SELBY

A Dissertation submitted to the
Department of Accounting
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

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For the Selby Team: Tangela, Nyla, Tiye, Adam, and me.

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ABSTRACT

Internal control systems consist of two evidence domains, automated control evidence and manual process evidence. Auditors can possess knowledge and expertise in both internal control evidence domains. But, auditors tend to possess more knowledge and expertise in one internal control evidence domain than the other internal control evidence domain. Thus, auditors have superior domain knowledge in one of the internal control evidence domains.

Auditors at large accounting firms tend to specialize in the evidence domain of automated controls (information technology auditors or IT auditors) or manual processes (financial auditors). Audit Standard 5 requires IT auditors and financial auditors to gain an understanding of clients' automated controls and manual processes in order to integrate key client activities with the dollar amounts reported on the financial statements. While investigating controls and processes, IT auditors and financial auditors are exposed to relevant and irrelevant evidence from both domains. IT and financial auditors become exposed to irrelevant evidence when they conduct walkthroughs, read corporate policies and procedures, interview various employees, and trace transactions through client systems.

The exposure of IT auditors and financial auditors to irrelevant internal control evidence may contribute to audit failure. For example, audit failure could occur if irrelevant internal control evidence influences IT auditors and financial auditors to reduce their judgments of relevant control weaknesses and underestimate the amount of effort required to evaluate internal controls. The influence of irrelevant internal control evidence may vary when IT auditors and financial auditors specialize, or do not specialize, in the internal control evidence domain.

Previous studies have found that irrelevant evidence influenced financial auditors to reduce their fraud risk assessments and going concern assessments of relevant evidence. The current study extends this literature by focusing on the effects of superior domain knowledge on the use of irrelevant internal control evidence. The researcher compared the internal control judgments (effectiveness of internal controls and risk of material misstatement) and audit planning judgments (the hours necessary to effectively

audit internal controls) of IT auditors and financial auditors when both *auditor-types* were exposed to relevant evidence with, and without, the presence of irrelevant evidence. Both types of auditors evaluated evidence from the automated control domain and the manual process domain separately.

Consistent with the existing literature on the influence of irrelevant evidence, the results in this study suggest that both *auditor-types* are influenced by irrelevant internal control evidence from both *evidence domains*. Anecdotal evidence suggests that IT auditors and financial auditors should be less influenced by irrelevant internal control evidence when they have superior domain knowledge. The results of this study suggest otherwise. The influence of irrelevant internal control evidence on IT auditors and financial auditors was stronger when IT auditors and financial auditors had superior domain knowledge.

Keywords: *Domain knowledge, irrelevant evidence, internal controls, integrated audit, risk of material misstatement, audit hour budget, over-auditing, audit failure*

Data Availability: *Contact the author*

CHAPTER 1

INTRODUCTION

1.1 Overview of the Research Question

The internal control environment is an intertwined network where automated controls and manual process controls converge and diverge at different control points within the internal control structure. Internal control networks are gradually transforming from manual process dominated environments into automated control dominated environments. Companies are steadily increasing their number of automated control points so that they can reduce costs and improve overall quality control. Automation has expanded the role of Information Technology (IT) auditors in the evaluation of internal controls. IT auditors are increasingly called on to utilize manual-process evidence-gathering techniques (like financial statement auditors) in addition to their automated control evidence-gathering techniques (Hall and Singleton 2005). For example, an IT auditor might analyze coded rules within the computer system and occasionally vouch inventory items to database records.

Financial auditors are required to gain an understanding of key client processes and controls (PCAOB [2007, AS 5]). To gain this understanding, financial auditors conduct walkthroughs and trace transactions through the internal control system. In addition to conducting walkthroughs, financial auditors interview various employees and review corporate policies and procedures. When financial auditors encounter automated-control evidence, they have the option to, but are not required to, call on IT auditors to evaluate evidence at automated control points (AICPA [2006, AU 319]). When financial auditors bypass the assistance of IT auditors, financial auditors must utilize automated-control evidence-gathering techniques and evaluate the same automated control evidence as IT auditors. For example, a financial auditor can not only physically observe stock-outs or excessive buildups of inventory but occasionally analyze coded rules, embedded within the computer system, that specify when, how much, and from which vendor items can be ordered (Hall and Singleton 2005).

Evaluating internal control evidence in today's integrated audit environment is a very complicated process (Fogelman et al. 2007; Rittenberg, et al. 2007; McConnell and Schweiger 2008). IT auditors and financial auditors have to evaluate evidence from both domains when they consider the effects of internal controls on the nature and extent of substantive testing to be performed (Hall and Singleton 2005; Louwers, et al. 2008). IT auditors and financial auditors also evaluate internal control evidence to form perceptions of internal control strengths and weaknesses, assess the risk of material misstatements, and estimate the number of audit hours necessary to effectively test internal controls (Moriarity 1975; Gaumnitz et al. 1982; Kaplan 1985; Libby et al. 1985; Waller 1993).

The results in previous accounting studies suggest that irrelevant evidence will influence auditors to reduce their judgments of relevant evidence (e.g., Hackenbrack 1992). Therefore, irrelevant internal control evidence may influence IT auditors and financial auditors to decrease their assessments of relevant internal control weaknesses. If so, irrelevant internal control evidence may also affect audit planning judgment and lead to audit failure.¹ In an internal control context, audit failure can occur when IT auditors and financial auditors are influenced by irrelevant internal control evidence to evaluate fewer internal control items and perform fewer internal control test procedures than necessary. When IT auditors and financial auditors reduce the extent and degree of their internal control tests, they may limit their ability to detect significant deficiencies and material weaknesses that materially affect financial statements.

IT auditors and financial auditors document their findings on internal controls in their workpapers. The evidence in the workpapers is usually reviewed by superiors with the same domain knowledge specialization as the subordinate who collected the workpaper evidence. But, restricting the evidence collection and evaluation to IT auditors and financial auditors based on their domain knowledge specialization may not improve audit effectiveness (Bamber and Ramsay 1997). Ergo, superior domain knowledge might not increase the likelihood that relevant internal control items will be adequately separated from irrelevant items during the workpaper review process.

¹ Audit failure occurs when someone suffers a loss as a result of their reliance on audited financial statements that are later found to be materially misstated.

1.2 Contribution of Research

Internal control evidence can be partitioned into two specialized evidence domains, automated controls and manual processes. Automated control evidence is generated by computerized control points within the technology infrastructure (Hall and Singleton 2005). Manual processes evidence, on the other hand, is generated by human components within the internal control system (Louwers et al. 2008).

In general, people reduce their assessments of relevant information in prediction tasks when they are exposed to irrelevant information (Nisbett et al. 1981; Tetlock et al. 1989; Tetlock et al. 1996). This phenomenon is referred to as the dilution effect (Nisbett et al. 1981). Previous studies have documented that financial auditors are influenced by irrelevant evidence (e.g., Hackenbrack 1992; Glover 1997; Hoffman and Patton 1997; Shelton 1999). To the researcher's knowledge, no prior study investigated the effects of superior domain knowledge on the influence of irrelevant internal control evidence. In this study, superior domain knowledge refers to more knowledge and expertise in the automated control evidence domain or the manual process evidence domain. Domain knowledge differences have been used to explain judgment performance differences (i.e., Shaft and Vessey 1995 and Vera-Munoz et al. 2001). This study examines how superior domain knowledge affects the influence of irrelevant evidence on both IT auditors and financial auditors.

Irrelevant internal control evidence use by IT auditors and financial auditors is an important problem. Irrelevant internal control evidence can decrease audit effectiveness by as much as 35% and contribute to audit failure (Fogelman et al. 2007; McConnell and Schweiger 2008). Thus, the influence of irrelevant internal control evidence can result in lawsuits from stakeholders and indirect third-parties, negative publicity that drives away existing clients, and a loss of reputation that can deter new business (Prentice 2000).²

Domain knowledge is thought to lead to more effective diagnosis and problem solving (Sun 2007). IT auditors have superior domain knowledge over financial auditors in the evaluation of automated controls. Meanwhile, financial auditors have superior

² Irrelevant evidence may also influence over-auditing. Auditors bear the cost of over auditing when they cannot bill the client for the additional work. For auditors, the costs of audit failure are higher than the cost of over-auditing.

domain knowledge over IT auditors in the evaluation of manual processes. IT and financial auditors should be able to conduct more effective audits when they evaluate automated control evidence and manual process evidence, respectively. If this is the case, irrelevant automated control evidence should have less influence on IT auditors than irrelevant manual process evidence. Also, irrelevant manual process evidence should have less influence on financial auditors than irrelevant automated control evidence.

There are several reasons why superior domain knowledge differences exist between IT auditors and financial auditors. First, IT auditors adhere to internal control standards that are specific to automated controls (e.g., Control Objectives for Information Related Technology or COBIT). Financial auditors, on the other hand, are not required to follow COBIT standards (Tarantino 2006). Second, financial auditors and IT auditors differ in their routine data gathering techniques. Financial auditors tend to be more familiar with collecting internal control evidence while auditing around the computer (Hunton et al. 2004). IT auditors, on the other hand, tend to be more familiar with gathering evidence while auditing through the computer (Duffy 2004; Lanz and Tie 2004).

Third, IT auditors and financial auditors also tend to have contrasting educational backgrounds. IT auditors are more likely to have technical degrees in computer science or management information systems (Curtis and Viator 2000). Financial auditors, on the other hand, are more likely to have degrees in accounting. Fourth, Big Four audit firms separate IT and financial auditors into departments because of their different skill sets as well as their typical audit roles. Fifth, the licensing examinations for IT auditors and financial auditors differ in overall content (Gleim and Hillison 2006). Internal control questions from the Certified Information System Auditor (CISA) exam tend to deal with the IT infrastructure. Internal control questions from the Certified Public Accountant (CPA) exam focus mainly on manual processes.

The expectation that IT auditors and financial auditors should be more capable of separating irrelevant internal control evidence from relevant internal control evidence in their respective domains appears to be self-evident (McConnell and Schweiger 2008). However, some studies present evidence that contradict the position that superior domain knowledge will mitigate the influence of irrelevant evidence on IT auditors and financial

auditors. The findings of other research suggest that superior domain knowledge may make IT auditors and financial auditors less able to separate relevant from irrelevant evidence within their specialized domains. The results in one psychological study conclude that individuals may be better at separating relevant from irrelevant evidence in unfamiliar decision contexts versus familiar decision contexts (Zukier and Jennings 1984). Ergo, auditors may perform better at separating relevant from irrelevant evidence when they lack superior domain knowledge. Also, auditors may perform worse at separating relevant from irrelevant evidence when they have superior domain knowledge. Existing studies have found that financial auditors who are familiar with audit evidence can draw incorrect inferences (Moeckel 1989, 1990; Lindberg and Maletta 2003).

1.3 Overview of Method and Results

A 2x2 quasi-experiment was conducted. Internal control *evidence domain* type was manipulated within-subjects (manual process versus automated). *Auditor-type* (Financial versus IT) was manipulated between-subjects, but in naturally occurring (nonrandom) groups. Task-specific knowledge (based on multiple choice knowledge tests) and experience (based on months of longevity) were measured as covariates. IT auditors and financial auditors assessed a relevant manual process evidence weakness in one integrated audit task scenario and a relevant automated evidence weakness in a second integrated audit task scenario. In each scenario, an initial assessment was made in which irrelevant evidence was combined with relevant evidence. A second assessment was made without irrelevant evidence. The audit context was an integrated internal control evaluation of Electronic Funds Transfer (EFT) Operations with and without irrelevant evidence. The integrated audit scenarios in this study provided a contemporary setting where the effects of superior domain knowledge could be investigated. In integrated audits, IT auditors and financial auditors (regardless of their superior domain knowledge) may have to gather internal control evidence from both automated-control and manual-process evidence domains.

Consistent with the existing irrelevant influence literature, IT auditors and financial auditors were influenced by irrelevant literature. In this study, IT auditors and financial auditors reduced their internal control judgments and audit planning judgments

when they were exposed to irrelevant evidence. The results of this study suggest that superior domain knowledge did cause a statistically significant interaction between *auditor-type* and *evidence domain* for audit planning judgment. But, IT auditor and financial auditor planning judgments were more influenced by irrelevant evidence when they had superior domain knowledge.

The aforementioned significant interaction between *auditor-type* and *evidence domain* on audit planning judgment is driven by the influence of irrelevant manual process evidence on financial auditors' audit planning judgments. The audit planning judgments of financial auditors were significantly more influenced by irrelevant evidence than IT auditors. In addition, irrelevant manual process evidence had more influence than automated control evidence on financial auditors. The internal control effectiveness ratings of financial auditors were also found to have a positive and significant association with their audit planning judgments. These results mean that both *auditor-types* may reduce their judgments of internal control weaknesses when they are exposed to irrelevant internal control evidence. But, after forming internal control judgments, financial auditors may reduce the extent and degree of internal control test procedures. Ergo, irrelevant internal control evidence may contribute to audit failure.

1.4 Organization of the Dissertation

The remainder of this dissertation is organized as follows. Chapter 2 provides background and hypotheses development. Chapter 3 describes the experiment and methodology. Chapter 4 presents the results. Chapter 5 concludes the dissertation with a discussion of the limitations, implications of the results, and directions for future research.

CHAPTER 2

BACKGROUND AND HYPOTHESES DEVELOPMENT

This chapter first discusses the internal control environment and the prior literature, and develops the formal hypotheses to be tested. This dissertation seeks to determine if (1) auditors reduce their assessments of relevant internal control evidence when they are exposed to irrelevant internal control evidence, (2) auditors with different domain specializations respond differently to irrelevant evidence when they possess or lack superior domain knowledge, and (3) irrelevant evidence affects subsequent audit planning judgment. The background consists of prior literature from different areas of research as illustrated in figure 1. Section 2.1 provides background on the internal control environment. Section 2.2 discusses the literature on domain knowledge. Section 2.3 describes the integrated audit approaches used by auditors. Section 2.4 discusses the literature on the influence of irrelevant evidence. Section 2.5 develops eleven hypotheses based on this literature. Sections 2.6 and 2.7 discuss how domain knowledge could exacerbate the influence of irrelevant internal control evidence or have no effect on the influence of irrelevant internal control evidence, respectively. Section 2.8 briefly summarizes chapter 2.

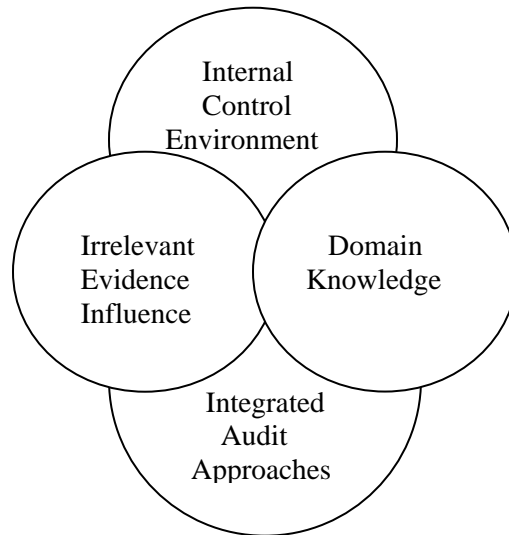


Figure 1: Diagram of Various Literature Streams Reviewed

2.1 Internal Control Environment

The integrated audit process requires IT auditors and financial auditors to integrate their audits of the financial statements with their audits of the internal control system (PCAOB [2007, AS 5]). The integrated audit encourages IT auditors and financial auditors to obtain a sufficient understanding of key internal control processes. IT auditors and financial auditors integrate key internal control processes with the amounts reported on the financial statements. Both IT auditors and financial auditors assess the likelihood that risks are inherent in the internal control system (Tarantino 2006; Louwers et al. 2008). IT auditors and financial auditors also assess whether the internal control system will fail to detect internal control irregularities (Ashton 1974; Libby et al. 1985; Waller 1993; Tarantino 2006). Prior to making these judgments, IT and financial auditors conduct walkthroughs of internal control systems. They also review corporate policies and procedures, interview various employees, trace transactions through the control system, and observe the impact of transactions on the financial statements.

In an integrated audit setting, IT auditors and financial auditors obtain an understanding of key control processes and make preliminary audit judgments. In addition to the direct effect on internal control judgments, irrelevant evidence may affect audit planning judgments (Moriarity 1975; Guamnitz et al. 1982; Knechel 1983; Biggs and Mock 1983; Libby et al. 1985; Kaplan 1985; Meservy et al. 1986). The audit planning judgment in this study involves assessing the number of required audit hours necessary to effectively audit internal controls relative to the number of hours used in the prior year.

Knechel (1983) argued that preliminary assessments of controls are associated with subsequent financial auditor judgments. Financial auditors have been found to adjust their risk assessments and audit plans based on their perceptions of the effectiveness of controls (Meservy et al. 1986). The audit risk model (audit risk = inherent risk x control risk x detection risk) suggests that internal control evaluations influence individual audit planning decisions and interact with other components of the audit (Moriarity 1975; Libby et al. 1985). Kaplan (1985) found that planned audit hours increase as the effectiveness of the internal control system is thought to diminish. Guamnitz et al. (1982)

found that when financial auditors gave a strong rating to internal control, their budgeted audit hour estimates were low, and vice versa.

IT auditors and financial auditors gain an understanding of internal control systems for two reasons. First, IT auditors and financial auditors use their understanding of internal controls to make internal control judgments (e.g., internal control effectiveness and the risk of material misstatement). In practice, IT auditors and financial auditors take their internal control judgments a step further and issue a separate opinion on the overall effectiveness of internal controls (PCAOB [2007, AS 5]). Second, IT auditors and financial auditors use their understanding of internal controls to revise their audit planning judgments. Thus, IT auditors and financial auditors determine whether more or less internal control testing is necessary based on their assessment of the internal control evidence that they have analyzed. Internal control testing complements substantive testing. So indirectly, IT auditors and financial auditors also base the degree and extent of their substantive test procedures on their assessment of the internal control system (Louwers et al. 2008). That is, when IT auditors and financial auditors perform fewer internal control test procedures they perform more substantive test procedures and vice versa.

IT auditors and financial auditors may communicate relevant and irrelevant internal control evidence to their subordinate and superior audit team members. This communication can occur during hierarchical reviews and routine communications between IT and financial auditors from the same and/or different domains. Financial auditors could share manual control evidence with IT auditors that might be irrelevant to IT auditors but relevant to financial auditors. Similarly, IT auditors could pass automated control evidence to financial auditors, which might be relevant to the IT auditors but irrelevant to the financial auditors. Such communication, while intended to be useful, could have an adverse effect on audit decisions made by IT auditors and financial auditors.

When IT auditors are included in the audit engagement team (which does not necessarily occur on every audit) or called in to serve as consultants to financial auditors, financial auditors communicate the objectives of the audit to the IT auditors (AICPA AU sec. 319 paragraph 32, 2006). During this communication, IT auditors are informed by

financial auditors about the nature and extent of manual processes. IT auditors are then asked to identify or investigate the adequacy of automated controls that complement manual process controls. For example, a financial auditor can observe stock-outs or excessive buildups of inventory and communicate this evidence, along with the client's manual override process over procurement, to an IT auditor (Hall and Singleton 2005).

Some of the manual process evidence (related to inventory stock-outs or buildups) communicated to the IT auditor in the above example may be irrelevant for automated control judgments (not related to the computerized control points), though not necessarily irrelevant for manual control judgments. IT auditors are expected to be more influenced by irrelevant manual process evidence than irrelevant automated evidence, because IT auditors tend to have less domain knowledge of manual controls than of automated controls (Duffy 2004; Lanz and Tie 2004).

The communication of irrelevant evidence between IT and financial auditors could also be initiated by IT auditors. In this scenario, financial auditors are informed by IT auditors about potentially irrelevant automated evidence. Financial auditors are then asked by IT auditors to identify or investigate the adequacy of manual control points that complement automated process controls, or the lack thereof. For example, an IT auditor might solicit financial auditors to review manual controls that compensate for the finding that coded rules, embedded within the computer system, fail to specify when, how much, and from which vendor inventory items are ordered (Hall and Singleton 2005).

Some of the automated process evidence (related to the coded rules) communicated to the financial auditor in the above example could be irrelevant for manual control judgments (related to manual processes), though not necessarily irrelevant for automated control judgments. Irrelevant evidence from automated processes should influence financial auditors to use irrelevant evidence because financial auditors should have superior domain knowledge of manual controls but less domain knowledge of automated controls (Duffy 2004; Lanz and Tie 2004).

2.2 Domain Knowledge

Audit firms facilitate the acquisition of domain knowledge by assigning auditors to areas of domain specialization. Examples of firm emphasis on domain knowledge can

be observed where Big Four audit firms hire domain knowledge managers and encourage their auditors to specialize based on audit approach, industry, service area, and internal control evaluation approach in order to minimize business risks (Brazel and Agoglia 2007). As auditors acquire domain knowledge, they improve their ability to transfer their knowledge from previously solved problems to new problems that are related to their specialized domain area (Frederick and Libby 1986; Vera-Munoz et al. 2001).

For the evaluation of internal controls, auditors tend to function as IT auditors or financial auditors. IT auditors perform tasks that are more related to automated control evidence. Therefore, IT auditors have more domain knowledge in automated controls than financial auditors. Financial auditors perform tasks that are more related to manual process evidence. So, financial auditors have more domain knowledge in manual process controls.

2.2.1 Audit approach

Familiarity with problems and contexts are thought to lead to more effective diagnosis and problem solving (Sun 2007). Familiarity has also been used to describe domain knowledge (Sun 2007). Nelson et al. (1995) found that financial auditors familiar with the audit objective approach to conducting an audit improved their ability to access and use previously observed error frequencies. The financial auditors in the study by Nelson et al. were more familiar to the audit objective approach, as opposed to the transaction cycle approach. The audit objective approach better enabled auditors to access conditional probabilities. The results of Nelson et al. suggested that familiarity with the audit objective ease cognitive processing and improved judgmental quality.

2.2.2 Industry specialization

Financial auditors improve their ability to transfer knowledge from previously solved problems to new problems in tasks where they have domain knowledge (Frederick and Libby 1986). Solomon et al. (1999) found that industry specialist auditors had more knowledge of financial statement errors than auditors without industry specialization. However, Solomon et al.'s results did not suggest that industry specialization can explain the variation in auditors' cued recall performance. Owhoso et al. (2002) investigated

whether industry specialization explained error detection variation. Their results indicate that industry specialists in healthcare and banking consistently detected more mechanical and conceptual errors than their non-industry specialist counterparts. Their results held when audit teams of industry specialists were compared to teams of non-industry specialists. Their results also held when individual industry specialists' responses were compared to the responses of non-industry specialist individuals.

2.2.3 Service area

Vera-Munoz et al. (2001) found that management accountants outperformed financial auditors when both groups were asked to identify opportunity costs. Management accountants and financial auditors both have declarative knowledge in identifying opportunity costs. However, Vera-Munoz et al. (2001) attribute their results to the fact that management accountants have superior domain knowledge in measuring opportunity costs because they routinely consider opportunity costs. Financial auditors do not consider opportunity costs on a routine basis.

2.2.4 Internal controls

IT auditors and financial auditors assess the strengths of the control points within an internal control system. The control points involve two internal control knowledge domains: manual process controls and automated controls (AICPA 2006). Manual process evidence is created by humans within the internal control system. Automated control evidence is created by the IT infrastructure. Financial auditors tend to have superior domain knowledge in manual process evidence, whereas IT auditors tend to have superior domain knowledge of automated control evidence (Hunton et al. 2004; Duffy 2004; Lanz and Tie 2004).

2.3 Integrated Audit Approaches

There are two approaches that can be used to conduct integrated audits: intra-domain and inter-domain. The intra-domain approach limits IT auditors and financial auditors to auditing internal control evidence that is mainly within their knowledge domain. This approach may reduce the influence of irrelevant evidence because IT

auditors and financial auditors would be limited to evaluating evidence within their domain. The downside of this approach is that IT auditors would not be able to trace transactions through the entire transaction cycle unless the system was totally automated. Likewise, financial auditors would only be able to trace a transaction through the entire system if the system consisted of manual processes performed entirely by humans, with no automated control points.

The inter-domain approach allows both IT auditors and financial auditors to evaluate evidence outside of their primary knowledge domain. Both IT auditors and financial auditors can trace transactions through the entire internal control system from start to finish. The transactions can be evaluated by both types of auditor as they pass through both domains. Ergo, IT auditors and financial auditors would be authorized to evaluate internal control evidence regardless of whether that evidence matches their primary knowledge domain.

A benefit of the inter-domain approach is that IT auditors and financial auditors would be permitted to trace a transaction through its entire processing cycle. However, given the difficulties that IT auditors and financial auditors already face when they encounter irrelevant evidence within their own domain, evaluating internal evidence from an unfamiliar domain could further impair their judgment of internal controls. Also, the cost of an audit can be higher under the inter-domain approach. IT auditors have a higher average hourly billing rate compared to their financial auditor counterpart. Potentially, IT auditors could perform parts of the internal control evaluation that would normally be performed by financial auditors. In contrast, the inter-domain approach can also reduce the cost of an audit if internal control test procedures that are normally performed by IT auditors are performed by financial auditors. Financial auditors have the option to determine the effect of automated evidence on the audit (Hunton et al. 2004) without consulting IT auditors. When financial auditors bypass the use of IT auditors and evaluate automated control evidence on their own, they may lack the domain knowledge that is necessary to understand the complexity of the automated evidence (Brazel and Agoglia 2007; Duffy 2004; Lanz and Tie 2004). The inability of IT auditors and financial auditors to understand the complexity of the internal control structure could increase the probability of audit failure.

In the intra-domain approach, IT auditors mainly evaluate automated control evidence while financial auditors mainly evaluate manual (non-automated) process evidence. In this setting, accounting firms use audit teams that consists of auditors with domain specializations to evaluate internal controls. Under this approach, IT and financial auditors encounter minimal irrelevant evidence that is outside of their domain. The likelihood of audit failure is, however, still present because auditors will encounter irrelevant evidence within their domain specialization.

2.4 Influence of Irrelevant Evidence

Irrelevant evidence has been found to decrease financial auditor judgments of relevant fraud risk evidence (Hackenbrack 1992; Hoffman and Patton 1997; and Glover 1997). However, irrelevant evidence did not decrease audit judgments in Wood's (2003) investigation of relevant fraud risk evidence. These studies are discussed in more detail below.

2.4.1 Irrelevant evidence and fraud risk assessments

Hackenbrack (1992) investigated financial auditors' fraud risk assessments by manipulating irrelevant evidence using a between-subjects design (the financial auditors in his study were conditioned on neutral or non-neutral irrelevant evidence). Non-neutral evidence was further manipulated at two levels: The non-neutral evidence either mitigated fraud or did not mitigate fraud. Hackenbrack described his neutral evidence as irrelevant evidence that was uninformative about fraud. Hackenbrack also manipulated the direction of the relevant evidence (increased fraud risk versus decreased fraud risk).³ Hackenbrack's results suggest that financial auditors are influenced by non-neutral irrelevant evidence. His results also suggest that the non-neutral irrelevant evidence

³ In this dissertation, relevant internal control evidence signaled internal control weakness. The irrelevant evidence was uninformative about EFT Operation controls and had no implication on other areas of the audit. The irrelevant evidence signaled internal control strengths outside of EFT Operations. Similar to Hackenbrack (1992), the influence of irrelevant evidence was observed when assessments of relevant evidence were lower when irrelevant internal control evidence was present.

resulted in more regressive fraud risk assessments than the neutral irrelevant evidence when the relevant evidence increased fraud risk assessments.

Hoffman and Patton (1997) and Glover (1997) both used between-subject designs to determine whether accountability would mitigate the use of irrelevant evidence. Both studies manipulated accountability by requiring some of their financial auditor participants to justify their fraud risk judgments to superiors. Their results suggest that accountability has no effect on financial auditors' use of irrelevant evidence.⁴ The financial auditors in both studies used irrelevant evidence when they should have ignored it. The Glover study, however, did show that time pressure can mitigate the use of irrelevant evidence.

Wood (2003) investigated whether decision aids could mitigate the use of irrelevant evidence among financial auditors. Her results suggest that decision-aid use does not mitigate the effect of irrelevant evidence. Wood observed that the financial auditors in her study focused their attention on becoming familiar with the decision aid. Thus, the decision aid distracted them and inhibited their ability to separate relevant and irrelevant evidence. The findings in Hackenbrack (1992), Hoffman and Patton (1997), and Glover (1997) are robust. The results in these accounting studies suggest that auditors reduce their fraud risk assessments when irrelevant evidence was present. In contrast, Wood (2003) did not find similar results.

2.4.2 Going concern assessments

Irrelevant evidence has been found to decrease auditor judgments of relevant going concern evidence (Shelton 1999, Young et al. 2001). The results of Shelton (1999) and Young et al. (2001) are similar to the aforementioned accounting studies on the influence of irrelevant evidence. These studies are discussed in more detail below.

2.4.2.1 Individuals

Shelton (1999) investigated whether experience would mitigate the use of irrelevant evidence. Financial auditors were conditioned between-subjects on relevant evidence only or mixed (relevant and irrelevant) evidence. She found that less-

⁴ Auditors are accustomed to being accountable when they perform audit-related tasks.

experienced financial auditors (audit seniors) produced significantly lower assessments of the likelihood that a client would fail when they were exposed to mixed evidence versus relevant evidence only. In contrast, the assessments made by the more experienced financial auditors (partners and managers) were not significantly different between the relevant and mixed evidence treatments.

2.4.2.2 Groups

Young et al. (2001) investigated the effects of small groups on the use of irrelevant evidence. They predicted that groups would use irrelevant evidence because group members adopt more extreme positions in order to make favorable impressions. Two hundred thirty-one students rated the likelihood that a small business would continue to operate for at least one year. Young et al. (2001) used 2 prediction types (individual or three-member team) x 3 information types (relevant, relevant and irrelevant, or a rating of the relevance of each cue prior to making the going-concern prediction). Their results suggest that individuals and groups are influenced by irrelevant evidence. Their results also suggest that the groups are more affected by the irrelevant information than the individual participants.

2.5 Hypotheses Development

Based on the preceding discussion, eleven hypotheses were developed. The hypotheses in section 2.5.1 predict that auditors' internal control judgment (H1) and audit planning judgment (H2) will be less influenced by irrelevant internal control evidence when auditors have superior domain knowledge, and more influenced when auditors lack superior domain knowledge. The section 2.5.2 hypotheses predict that financial auditors will be less influenced by irrelevant manual process evidence than IT auditors when they assess internal control effectiveness (H3) and make audit planning judgments (H4). The section 2.5.3 hypotheses predict that IT auditors will be less influenced by irrelevant automated control evidence than financial auditors when they assess internal controls (H5) and make audit planning judgments (H6). The section 2.5.4 hypotheses predict that financial auditors will be less influenced by irrelevant manual process evidence than automated control evidence when they assess internal controls (H7) and make audit

planning judgments (H8). The section 2.5.5 hypotheses predict that IT auditors will be less influenced by irrelevant automated control evidence than manual process evidence when they assess internal controls (H9) and make audit planning judgments (H10). In section 2.5.6, hypothesis 11 examines the relationship between internal control assessments (ratings of effectiveness and the risk of material misstatement) on subsequent audit planning judgment.

2.5.1 Interaction between auditor type and internal control evidence type

The researcher hypothesizes an interaction between the *auditor-type* and internal control *evidence domain* type. If this prediction holds, IT auditors and financial auditors with superior domain knowledge should be less influenced by irrelevant evidence. On the other hand, when IT auditors and financial auditors lack superior domain knowledge, they are expected to be more influenced by irrelevant evidence. The expected interaction should indicate that IT auditors (financial auditors) are less (more) influenced by irrelevant automated control evidence but more (less) influenced by irrelevant manual process evidence.

H1: IT auditors' (financial auditors') internal control judgments will be less influenced by irrelevant automated control (manual process) evidence than by irrelevant manual process (automated control) evidence.

H2: IT auditors' (financial auditors') audit planning judgments will be less influenced by irrelevant automated control (manual process) evidence than by irrelevant manual process (automated control) evidence.

2.5.2 Intra-domain financial auditors vs. inter-domain IT auditors

The researcher hypothesizes that financial auditors separate irrelevant manual process evidence from relevant manual process evidence better than IT auditors with the same evidence. In this scenario, financial auditors have superior domain knowledge of the internal control evidence. If this prediction holds, financial auditors should be less influenced by irrelevant manual process evidence than IT auditors who encounter identical evidence.

H3: Financial auditors' internal control judgments will be less influenced by irrelevant manual process evidence than IT auditors' internal control judgments.

H4: Financial auditors' audit planning judgments will be less influenced by irrelevant manual process evidence than IT auditors' audit planning judgments.

2.5.3 Intra-domain IT auditors vs. inter-domain financial auditors

The researcher hypothesizes that IT auditors separate irrelevant automated evidence from relevant automated evidence better than financial auditors with the same evidence. In this scenario, IT auditors have superior domain knowledge of the internal control evidence. If this prediction holds, IT auditors should be less influenced by irrelevant automated control evidence than financial auditors who encounter identical evidence.

H5: IT auditors' internal control judgments will be less influenced by irrelevant automated control evidence than financial auditors' internal control judgments.

H6: IT auditors' audit planning judgments will be less influenced by irrelevant automated control evidence than financial auditors' audit planning judgments.

2.5.4 Intra-domain financial auditors vs. inter-domain financial auditors

The researcher hypothesizes that financial auditors separate relevant from irrelevant evidence best when they have superior domain knowledge. In this scenario, financial auditors with relevant and irrelevant manual process evidence have superior domain knowledge. Financial auditors with automated control evidence have less domain knowledge than IT auditors. If this prediction holds, financial auditors should be less

influenced by irrelevant manual process evidence than irrelevant automated control evidence.

H7: Financial auditors' internal control judgments will be less influenced by irrelevant manual process evidence than by irrelevant automated control evidence.

H8: Financial auditors' audit planning judgments will be less influenced by irrelevant manual process evidence than by irrelevant automated control evidence.

2.5.5 Intra-domain IT auditors vs. inter-domain IT auditors

The researcher hypothesizes that IT auditors separate relevant evidence from irrelevant evidence best when they have superior domain knowledge. In this scenario, IT auditors with relevant and irrelevant automated evidence have superior domain knowledge. IT auditors with irrelevant manual process evidence do not have superior domain knowledge. If this prediction holds, IT auditors should be less influenced by irrelevant automated control evidence than irrelevant manual process evidence.

H9: IT auditors' internal control judgments will be less influenced by irrelevant automated control evidence than irrelevant manual process evidence.

H10: IT auditors' audit planning judgments will be less influenced by irrelevant automated control evidence than irrelevant manual process.

2.5.6 Other consequences of irrelevant evidence: audit planning judgments

The researcher hypothesizes that irrelevant evidence influences the audit planning judgments of IT auditors and financial auditors. In addition to the studies mentioned above, Biggs and Mock (1983) described financial auditors' use of internal control evidence as a systematic and directed search and evaluation process that had implications for subsequent parts of the audit. Financial auditors expend a significant amount of

cognitive effort in searching for relevant cues and evaluating the cues with respect to the appropriateness of the audit plan. Each audit step is treated as a self-contained process with its own thorough and sequential information search. When the control search is completed, financial auditors make choices about the appropriateness of audit scopes and sample sizes. Thus, if irrelevant evidence does influence IT and financial auditor judgments of relevant cues, their judgments are likely to affect other parts of the audit.

H11: IT auditors' and financial auditors' assessments of internal control effectiveness are correlated with their audit planning judgments.

2.6 The Detriments of Domain Knowledge on Audit Judgment

People apply more focus on information that is atypical and appropriately filter (segregate relevant and irrelevant, then ignore irrelevant) information (Zukier and Jennings 1984). IT auditors and financial auditors may view evidence that is within their domain as typical. So, contrary to the discussion above, IT auditors and financial auditors might not adequately filter irrelevant evidence that is in their domain specialization. Inadequate filtering may occur because the irrelevant evidence could resemble evidence that both *auditor-types* are accustomed to processing. Familiarity with evidence may encourage IT auditors and financial auditors to include irrelevant evidence if the evidence resembles evidence that is part of their routine information set (Brown and Solomon 1991).

IT auditors and financial auditors outside of their domain may provide less dilutive judgments that may lead to more effective audits. This position may seem illogical to many, but in some cases, long-term knowledge structures have been found to inhibit cognitive processing (Nelson 1993). Therefore, it is not entirely self-evident that the final results will match the hypotheses in this study.

2.7 The Potential of No Domain Knowledge Effect

Contrary evidence exists that suggests that superior domain knowledge might not mitigate the influence of irrelevant evidence. Previous accounting studies of the influence of irrelevant evidence on financial auditors documented factors that did not reduce

financial auditors' sensitivity to irrelevant evidence.⁵ Factors such as decision aid use (Wood 2003) and accountability (Glover 1997; Hoffman and Patton 1997) have been found not to mitigate the influence of irrelevant evidence. Thus, the aforementioned predictions of the effects of superior domain knowledge on the use of irrelevant evidence may not explain variations in the responses provided by IT auditors and financial auditors. So, IT auditors and financial auditors with superior domain knowledge might not exhibit judgments that are significantly different from IT auditors and financial auditors without superior domain knowledge.

2.8 Summary of Chapter 2

This dissertation adds to the behavioral accounting research paradigm by examining IT auditors and financial auditor judgment. The researcher develops and tests hypotheses to determine auditors' use of irrelevant evidence. This dissertation, investigates the effects of superior domain knowledge on IT auditors' and financial auditors' use of irrelevant internal control evidence. This dissertation connects the internal control environment and two integrated audit approaches with irrelevant evidence influence, and domain knowledge.

Eleven hypotheses are tested in chapter 4 of this dissertation. Hypothesis 1 evaluates the interaction between *auditor-type* and *evidence domain* for internal control judgments (internal control effectiveness and risk of material misstatement). Hypothesis 2 examines the interaction between *auditor-type* and *evidence domain* for audit planning judgments (audit hours necessary to effectively complete the audit of internal controls).

Hypotheses 3 and 4 compares the influence of irrelevant evidence on financial auditors to the influence on IT auditors when they are conditioned on manual process evidence for internal control judgments (H3) and audit planning judgments (H4). Hypotheses 5 and 6 compare the judgment of IT auditors to that of financial auditors when they are conditioned on automated control evidence for internal control judgments (H5) and audit planning judgments (H6). Hypotheses 7

⁵ More importantly, the financial auditors in the prior studies had some familiarity with performing the task (e.g. fraud risk assessment).

and 8 compare financial auditors' judgment of manual process evidence to that of automated control evidence for internal control judgments (H7) and audit planning judgments (H8). Hypotheses 9 and 10 compare IT auditors' judgment of manual process evidence to that of automated control evidence for internal control judgments (H9) and audit planning judgments (H10).

Hypothesis 11 evaluates the effect of internal control judgments on IT and financial auditors' audit planning judgments. This analysis was performed for IT auditors, and financial auditors, respectively. The research design used to test hypotheses 1 through 11 is described in chapter 3.

Table 1: Summary of Hypothesized Results

Panel A: Hypothesis 1 through 10

<i>Auditor Type</i>	Irrelevant Internal Control Evidence Influence			
	<u>IT</u>		<u>Financial</u>	
<i>Evidence Domain</i>	<u>Auto</u>	<u>Manual</u>	<u>Auto</u>	<u>Manual</u>
Hypothesis				
H1 Internal Control Judgment:				
Effectiveness Rating	Lower	Higher	Higher	Lower
Risk of Material Misstatement Estimate	Lower	Higher	Higher	Lower
H2 Audit Planning Judgment:				
Hours Necessary to Effectively Audit Internal Controls	Lower	Higher	Higher	Lower
H3 Internal Control Judgment:				
Effectiveness Rating	--	Higher	--	Lower
Risk of Material Misstatement Estimate	--	Higher	--	Lower
H4 Audit Planning Judgment:				
Hours Necessary to Effectively Audit Internal Controls	--	Higher	--	Lower
H5 Internal Control Judgment:				
Effectiveness Rating	Lower	--	Higher	--
Risk of Material Misstatement Estimate	Lower	--	Higher	--
H6 Audit Planning Judgment:				
Hours Necessary to Effectively Audit Internal Controls	Lower	--	Higher	--

Table 1: Continued

Panel A: Hypothesis 1 through 10

<i>Auditor Type</i>	<i>Evidence Domain</i>	Irrelevant Internal Control Evidence Influence			
		<u>IT</u>		<u>Financial</u>	
		<u>Auto</u>	<u>Manual</u>	<u>Auto</u>	<u>Manual</u>
Hypothesis					
H7	Internal Control Judgment: Effectiveness Rating	--	--	Higher	Lower
	Risk of Material Misstatement Estimate	--	--	Higher	Lower
H8	Audit Planning Judgment: Hours Necessary to Effectively Audit Internal Controls	--	--	Higher	Lower
H9	Internal Control Judgment: Effectiveness Rating	Lower	Higher	--	--
	Risk of Material Misstatement Estimate	Lower	Higher	--	--
H10	Audit Planning Judgment: Hours Necessary to Effectively Audit Internal Controls	Lower	Higher	--	--

Panel B: Hypothesis 11

Regression of Change in Internal Control Effectiveness on Change in Audit Hours Necessary to Effectively Audit Internal Controls

<u>Auditor Type</u>	<u>B</u>	<u>p-value</u>
IT	non-zero	<.05
Financial	non-zero	<.05

Table 1: Continued

Panel C: Hypothesis 11

Regression of Change in Risk of Material Misstatement on Change in Audit Hours Necessary to Effectively Audit Internal Controls

<u>Auditor Type</u>	<u>B</u>	<u>p-value</u>
IT	non-zero	<.05
Financial	non-zero	<.05

Note: Higher and Lower represent the differences in values based on participant responses to mixed evidence (irrelevant evidence cues with a relevant evidence cue) then to the relevant evidence cue only.

CHAPTER 3

DESIGN AND METHOD

Chapter 3 describes the cue development and the research method used to gather data to test the hypotheses developed in chapter 2. Section 3.1 discusses cue development and pre-testing. Section 3.2 describes the participants. Section 3.3 presents the experimental design and procedures. Section 3.4 describes the dependent variables. Chapter 3 is summarized in section 3.5.

3.1 Cue Development/Pre-testing

Two rounds of pre-testing were used to determine the relevance of the relevant cues and the irrelevance of the irrelevant cues. The cues were pre-tested in the first round with two senior managers from two different Big Four accounting firms. The cues in the second round were pre-tested on four IT auditors and four financial statement auditors.

3.1.1 Round 1

The control evidence cues and knowledge test questions were adapted from audit manuals, contemporary banking periodicals, and professional accounting exam manuals. The relevant automated control evidence cue was adapted from *IS Standards, Guidelines and Procedures for Auditing and Control Professionals: P11 Electronic Funds Transfer (EFT)* (ISACA 2007). Manual process evidence cues (relevant and irrelevant) and irrelevant automated internal control evidence cues were adapted from the Internal Control-Integrated Framework (COSO 1994) and the audit guide of a major international bank (Bank of America NT&SA 1994).

Recent technological advances in EFT operations were captured in the design, based on contemporary practitioner banking literature on domain key technology (Wolfe 2007a), wireless remittances (Wolfe 2007b), digital check imaging (Bills 2007a, Costanzo 2007, Wade 2007a), remote safe technology (Wade 2007b), and pure electronic business-to-business transfers (Bills 2007b). These recent technological advances

illustrate the rapid changes that financial institutions must make in order to maintain their competitive advantage. IT auditors and financial auditors must identify potential material control threats posed by these technological advances on an ongoing basis.

All of the control evidence items were validated during round 1 by an IT audit senior manager and an IT audit specialist manager from two of the Big Four accounting firms. They both were Certified Information System Auditors and Certified Public Accountants. They had nine and seven years of experience, respectively, evaluating the controls of automated IT and manual processes. They have spent 70% and 50% of their time, respectively, in practice, evaluating the automated and manual controls of large financial institutions (both of them had experience as financial auditors also). They completed one version of the experimental instrument and verified that the task and the cues were realistic.

The round 1 pre-test participants rated the domain of the cues provided in all experimental conditions using a (-5 to +5) scale where -5 was labeled as “risk addressed only by IT audit specialist.” The midpoint 0 was labeled as “risk addressed by neither the IT audit specialist nor the financial auditor.” The label +5 is specified to indicate that the cue was “risk addressed only by financial auditor.” The researcher discussed each rating with both pre-test participants at the end of both sessions. These discussions helped the researcher determine whether the experimental cues and their wording were representative of the internal control evidence seen in practice. Any cue that was consistently rated in an incorrect domain was eliminated from the instrument. The scale, labels, and one of the non-diagnostic cues were replaced as a result of phase 1 of the pre-test. Also, the relevant automated cue was reworded to include the term “material.”

3.1.2 Round 2

Different participants were used for the round 2 pre-testing and pilot test (see Table 2 below). Four IT auditors and four financial auditors rated the evidence cues. All of the round 2 pilot participants were current or former Big Four IT and financial auditors. Round 2 pilot participants were asked to review ten evidence cues that were presented to them in randomized order. The pilot participants were unaware that two of

the cues were relevant while eight of the evidence cues were irrelevant.⁶ The irrelevant cues were irrelevant to the experimental task of evaluating the controls over EFT Operations. Also, the irrelevant evidence cues did not signal internal control weaknesses and therefore, had no implications on other audit areas.

Table 2: Round 2 Pre-test Participant Characteristics

<u>Auditor Type</u>	<u>IT</u>	<u>Financial</u>
Number of Pre-test Participants	4	4
Average Months of Superior Domain Experience	64.75	31.75
Average Months of Internal Control Evaluation Experience	83.75	24.75
Average Number of Total Client Engagements	22.75	15.50

Pilot participants were asked to “assign 1 point to the one piece of evidence that would be least relevant to your evaluation of controls around Electronic Funds Transfer Operations.” Participants were also asked to “assign values (2 to 100) to the remaining evidence where 100 would mean that the item is 100 times more relevant to the evaluation of the controls around Electronic Funds Transfer Operations than an item assigned a 1.” The two relevant evidence cues were identified as the most relevant cues by the pilot participants (see figure 2 below).

⁶ The mix of four irrelevant cues and one relevant cue for both evidence domains is consistent with the existing accounting studies on the influence of irrelevant evidence.

Evidence Cues and their Irrelevant Round 2 Pre-Test Rankings
(Overall rankings in parentheses, 1=least relevant)

Relevant Evidence Cues

Automated: “ABC Banking Corp. implemented an ERP module for electronic funds transfer that receives data from a legacy system that does not transfer hash totals, control totals, and record counts.” (80)

Manual: “ABC Banking Corp. EFT personnel can send wire transfers before obtaining authorization.” (90)

Irrelevant Automated Evidence

“During the current year under audit, ABC Bank Corp. modified their PIN system to restrict personnel access to the Human Resource system via the company’s Intranet after three failed login attempts.” (3.8)

“ABC Bank Corp. uses IT to initiate orders for the purchase and delivery of supplies based on predetermined decision rules of what to order and in what quantities based on system-generated decisions. No other documentation of orders placed or supplies received is produced or maintained, other than through the IT system. Changes to this process are documented.” (16.3)

“New packaged software applications were installed this year to manage the travel expense files for ABC Banking Corp.’s Retail Banking Operation managers. Their IT staff has formal training and experience using this new software.” (16.5)

“ABC Bank Corp. uses automated fraud prevention technology to monitor and data warehouse accountholder card usage and activation in the current year under audit. They also used the technology to monitor closed accounts, dormant accounts, and deceased accounts in the current year under audit.” (22.6)

Irrelevant Manual Process Evidence

“Fraud prevention department personnel attend mandatory fraud training on a routine basis. They notify accountholders of dubious account activity.” (15.9)

“Human resource and employee benefits hotline personnel verify the identity of all callers before ensuing phone conversations.” (12.4)

“Travel expense reimbursement forms require inspection and authorization by the employee’s immediate supervisor and the supervisor’s manager before the authorized form is entered into the travel reimbursement system.” (2.6)

“ABC Bank Corp. maintains physical security over purchase orders for the purchase and delivery of supplies by limiting access to blank order forms and supplies received to appropriate personnel.” (7.4)

Figure 2: Evidence Cues and their Irrelevant Round 2 Pre-test Rankings

3.1.3 Pre-test results

Data was collected from eight pilot test participants who rated the evidence cues during round 2 of the pre-testing phase (see table 3 below). Pilot participants were asked to assess control effectiveness, risk of material misstatement, and changes to audit hour budget. Pilot participants completed a seven-question multiple choice test on Electronic Funds Transfer. Pilot participants also rated the risk domain for each evidence cue on a continuum (100% automated, 0% manual to 0% automated, 100% manual). Pilot test participants completed the pilot test in approximately 30 minutes.

The task-specific knowledge scores were almost the same for both types of auditors who participated in the pilot test. IT auditors received an average score of 50% correct. Financial auditors received an average score of 43% correct. While these scores appear low, the test was deliberately designed to be difficult in order to increase variability in the task-specific knowledge covariate measurement.

IT auditors correctly associated a slightly higher percentage of the automated evidence with automated risks than the financial auditors did, 90% and 80% respectively. Financial auditors associated a much higher percentage of the manual process evidence with manual process risks than the IT auditors did, 80% and 20% respectively. Overall, financial auditors correctly identified more of the evidence risk domains than IT auditors, 80% and 55% respectively. This difference is explained by the finding that IT auditors rated more evidence as 50% automated and 50% manual as opposed to leaning more towards automated or manual. IT auditors' neutral responses to the risk identification task might come as a result of their exposure in practice to evidence in both (automated and manual) domains. IT auditors are also exposed to manual control evidence via communication with financial auditors.

Table 3: Pre-test Results of Knowledge and Risk Area Identification Test

<u>Auditor Type</u>	<u>Financial</u>	<u>IT</u>
Average Minutes to Complete Pilot Test	25.75	35.3
Average EFT Knowledge Test Score	43%	50%
Average Percentage of Correctly Identified Automated Risks	80%	90%
Average Percentage of Correctly Identified Manual Process Risks	80%	20%
Average Percentage of Correctly Identified Risks	80%	55%

During follow-up interviews, pilot participants indicated that they were able to adjust to the relevant evidence cues when the cues were presented *ex post* with mixed evidence (this was the initial design that was used for pilot testing). In a complex task such as evaluating an internal control weakness, a recency effect should be expected (Ashton and Ashton 1988; Hogarth and Einhorn 1992). Irrelevant evidence use is analogous to recency because people update their beliefs based on a sequential anchoring-and-adjustment process. The relevant evidence cue in my pilot test can be viewed as the anchor in the Hogarth and Einhorn (1992) belief revision model. The subsequent evidence (mixed relevant and irrelevant evidence) acts as new evidence that is used to modify outcomes and update beliefs.

Like LaBella and Koehler (2004), the pilot test results in this dissertation indicated that mixed evidence had little or no influence when it was presented after the relevant cue. Pilot test participants indicated that presenting mixed evidence after the relevant cue made the experimental manipulations transparent. Thus, the pilot test design did not effectively capture the influence of irrelevant evidence use as it was originally intended to do.

Although the pilot test did not consistently capture the use of irrelevant evidence and allow for interpretation of the hypothesized results, insight was still gained from this exercise. As a result, the instrument was redesigned (as it is presented in this study) to make the manipulations less transparent. Irrelevant

evidence should be mixed with the relevant evidence in the quasi experiment and then presented separately as relevant evidence in the quasi experiment. As a pilot test subject pointed out, “irrelevant evidence exists in practice and in the real world of internal control evaluation. Presenting the relevant cue alone *ex ante* is unrealistic.”

The pilot test also indicated that randomizing the order of the evidence type (automated and manual process) would be helpful to minimize the possibility of learning effects. Theoretical explanations for counterbalancing order (e.g., control for participant fatigue) is provided in the order effects literature (see, e.g., Slamecka and Graf 1978; Hoch 1984; Libby 1985; Levi and Pryor 1987; Heiman 1990; Koehler 1991; Moser 1992; Hirt and Markman 1995; Davies 1998; Dougherty and Hunter 2003; Favere-Marchesi 2006) and Kerlinger (1986). When participants self-generated responses, participants tend to carry their responses into subsequent tasks. These studies have found that distraction tasks are necessary to clear the memory of the participants. In the instrument that was revised for the quasi-experiment in this dissertation, participants evaluated mixed evidence initially. Then they were distracted with knowledge questions. This precaution minimized the likelihood that the participants would carry their judgments of the current *evidence domain* into the subsequent *evidence domain*.⁷

3.2 Participants

Thirty-two IT auditors and forty-four financial auditors with internal control engagement experience participated in this experiment.⁸ The participants in this study have audit practice experience, mainly with Big Four accounting firms as either IT auditors or financial auditors (see Table 4 below). They have participated in at least one audit or consulting engagement where they evaluated internal controls.

IT auditors had a 97% response rate and financial auditors had a 94% response rate. IT auditors and financial auditors completed the instrument on average in

⁷ Participants were assigned to the automated control domain or the manual process domain in random order. Statistical analysis revealed that there were no significant differences between the first and second assignments.

⁸ Pre-test and pilot test participants did not participate in the quasi-experiment.

approximately 47 minutes and 38 minutes, respectively. IT auditors (financial auditors) answered correctly an average of 3.34 (2.14) out of six multiple choice questions on automated controls adapted from the CISA (Certified Information System Auditor) exam. An independent sample t-test revealed that IT auditors and financial auditors differed significantly in their knowledge of automated control exam questions. IT auditors (financial auditors) answered correctly an average of 2.63 (2.89) out of six multiple choice questions on manual process controls adapted from the CPA (Certified Public Accounting) exam. IT auditors answered an average of 3.16 out of six multiple choice questions on EFT while financial auditors answered an average of 2.8 of the EFT questions correctly.

Table 4: Participant Demographics

	<u>Auditor Specialization</u>		t	p-value
	IT	Financial		
Number of participants	44	32		
Response rate	97%	94%		
Minutes to complete ⁹	47.42 (24.95)	38.15 (17.81)	-1.81	.075
Avg. AC knowledge score	3.34 (1.40)	2.14 (1.17)	-4.07	<.000
Avg. MP knowledge score	2.63 (1.45)	2.89 (1.08)	.90	.372
Avg. EFT knowledge score	3.16 (1.37)	2.80 (1.52)	-1.07	.290
Avg. # of months of exp as IT auditor	45.69 (35.33)	3.00 (9.59)	-7.65	<.000
Avg # of months of exp as nonIT auditor	19.94 (33.78)	66.20 (64.51)	3.70	<.000
Avg. # of AC engagements	19.94 (28.58)	3.16 (3.96)	-3.85	<.000
Avg. # of MP engagements	12.25 (26.23)	18.52(49.72)	.65	.518
Avg. # of professional IT audit classes	8.50 (8.26)	1.86 (2.85)	-4.95	<.000
Avg. # of college IT audit classes	3.34 (3.86)	1.02 (1.11)	-3.79	<.000
Avg. # of months evaluating ACs	40.59 (38.21)	17.98(31.31)	-2.83	.006
Avg. # of months evaluating MPs	29.63 (39.83)	50.39(69.42)	1.52	.133
Avg. # of IC walkthroughs	9.00 (12.36)	16.09(49.53)	.79	.432
Avg. # of EFT IC walkthroughs	1.91 (4.44)	1.30 (3.45)	-.68	.502
% Time spent on audit engagements	75.03 (28.96)	71.70 (39.94)	-.40	.690
% Time spent on consulting engagements	24.97 (28.96)	28.30 (39.94)	.40	.690
% Time auditing financial institutions	17.88 (30.37)	7.07(17.85)	-1.95	.056

Note:

AC = Automated Control, MP = Manual Process, Exp = Experience, and IC = Internal Control

Standard deviations are in parentheses

⁹ Two IT auditors and four financial auditors are excluded from this average because they did not complete their instrument in one sitting.

IT auditors and financial auditors differed significantly in the number of automated control engagements ($t = -3.85$, $p\text{-value} < .000$) and number of months spent on evaluating automated controls ($t = -2.83$, $p\text{-value} < .006$). IT auditors had an average of 45.69 months of IT audit experience and 19.94 months of non-IT audit experience. Financial auditors had an average of 3 months of IT audit experience and an average of 66.2 months of non-IT audit experience. IT auditors and financial auditors participated in an average of 19.94 and 3.16 automated control evaluation engagements, respectively. IT auditors and financial auditors participated in an average of 12.25 and 18.52 manual process evaluation engagements respectively. IT auditors appear to be more balanced in their exposure to automated controls and manual processes than financial auditors. IT auditors self-reported that they spent 40.59 months evaluating automated controls and 29.63 months evaluating manual processes. Financial auditors evaluated automated controls for 17.98 months and manual processes for 50.39.

IT audit training is another area where IT auditors and financial auditors differed significantly. IT auditors received an average of 8.50 IT audit training courses as professionals and 3.34 IT audit training courses while they were in college. Financial auditors, on the other hand, received an average of 1.86 IT audit training courses as professionals and 1.02 IT audit training courses while they were in college.

IT auditors participated in an average of 9 internal control walkthroughs, while financial auditors participated in an average of 16.09 internal control walkthroughs. In the number of walkthroughs that pertain to EFT operations, IT auditors and financial auditors self-reported similar averages, 1.91 and 1.30 respectively.

IT auditors and financial auditors did not self-report significant differences in the percentage of time that they spent between auditing and consulting engagements. IT auditors and financial auditors spent 75.03% and 71.7% of their time on auditing engagements, respectively. IT auditors and financial auditors also did not differ significantly in their percentage of audits that involved

financial institutions. IT and financial auditors spent 17.88% and 7.07% of their time on engagements that involved financial institutions.

Neither the IT auditors nor the financial auditors who participated in this experiment had a knowledge advantage in the experimental context, financial institutions and EFT Operations. Their self-reported EFT knowledge scores, number of internal control walkthroughs, number of walkthroughs that involve EFT, and the percentage of their time spent auditing financial institutions reveal that neither type of auditor should be better at performing the experimental task. Another important observation is that IT auditors and financial auditors do cross over into the other internal control domain. However, IT auditors do so more than financial auditors.

3.3 Design and Procedures

3.3.1 Overview

Data was collected via a computer program designed according to the Tailored Design Method (Dilman 2007). The computer program automatically randomized question choices to control for order effects (Favere-Marchesi 2006). The computer program also controlled the order in which the participants completed the experiment.¹⁰ The program mandated responses and prevented the changing of responses once participants had already answered a question and proceeded to the next webpage. Participants were not subject to any time pressure but IT auditors and financial auditors spent an average of 47.42 minutes and 38.15 minutes completing the task, respectively.

3.3.2 Research design

The research design was a 2x2 quasi-experiment (see Figure 3 below). *Evidence domain* type, automated control and manual process, was presented in randomized order and manipulated within-subject.¹¹ *Auditor-type* (financial or IT) was between-subject.

¹⁰ The order of the experiment is described in section 3.3.3. The experimental instrument that presents automated control evidence then manual process evidence in this order is provided in Appendix A.

¹¹ Within each cell, the evidence was presented as mixed then relevant only. The mixed versus relevant only dichotomy is not mentioned as a manipulation in the design because

Participant’s self-reported demographic information was treated as covariates.¹² Superior domain knowledge was observed when the *auditor-type* matched the *evidence domain* type. For example, superior domain knowledge was observed when financial auditors were provided with manual process internal control evidence. Superior domain knowledge was also observed when IT auditors were provided with automated internal control evidence.

		Evidence Domain Type	
		Manual Process	Automated Control
Auditor Type	Financial	Cell 1 Superior Domain Knowledge	Cell 2
	IT	Cell 3	Cell 4 Superior Domain Knowledge

Figure 3: 2x2 Quasi-Experiment Cell Components

3.3.3 Task and instrument

Participants read an overview that summarized the purpose of the study, and then agreed to participate. The researcher granted passwords and personal identification numbers (PIN) to participants. Participants used their password to enter the program. After reading the general instructions, participants entered their PIN and provided their formal consent to participate in the study. Participants initially rated the effectiveness of prior year’s controls after reading a brief narrative about a hypothetical financial institution and an excerpt from the hypothetical company’s prior year independent internal control opinion.¹³ The scale was labeled from left to right as “extremely

only one response is captured in each cell for each dependent variable (which is the response to the relevant cue minus the response to the mixed cues).

¹² None of the treated covariates were later found to be statistically significant.

¹³ The prior year’s independent internal control opinion served as a baseline only for the ratings of the hours necessary to effectively complete the current year’s audit.

effective,” “effective,” “somewhat effective,” “neutral,” “somewhat ineffective,” “ineffective,” and “extremely ineffective.”

Participants were then given mixed evidence cues (four irrelevant cues and one relevant cue [similar to Nisbett et al. (1981) and Hoffman and Patton (1997)]) and asked to rate the effectiveness of the current year’s internal controls over EFT.¹⁴ Participants then estimated the risk of material misstatement by entering a whole number between 0 (no risk) and 100 (certain risk). Participants then provided their audit planning judgment. They rated the number of audit hours necessary to effectively complete the audit relative to the prior year.¹⁵ Participants repeated all of these steps for the relevant cue only and then responded to six multiple choice questions related to internal controls from Gleim and Hillison’s (2006) professional examination preparation guide. The multiple choice questions served three purposes: to distract participants from the next evidence domain case, to gauge the subjects’ knowledge in the current evidence domain, and to provide background data that was used to determine whether knowledge is a latent variable in the current study.¹⁶ Participants were then prompted to repeat these steps for the next evidence domain case. After completing the second evidence domain case, participants completed a background questionnaire, six new multiple choice questions that dealt with Electronic Fund Transfers, and two manipulation checks. The first manipulation check asked participants to rate the relevance of each cue to the task. The second manipulation check asked participants to identify the domain of each cue.

3.4 Dependent Variables

IT auditors and financial auditors’ change in rating of internal control effectiveness and their change in estimate of the risk of material misstatement was used to measure the influence of irrelevant evidence on internal control judgment. The

¹⁴ The irrelevant cues signaled internal control strength but were not relevant to the task.

¹⁵ An 11-point scale was anchored at “Significantly Decrease” and “Significantly Increase.” The neutral point was labeled “Do Not Adjust.”

¹⁶ Adapted manual process control questions from the CPA exam were used for the manual process domain case and adapted automated control questions from the CISA exam were used for the automated control domain case. The number of correct responses was measured as covariates. These covariates did not have significant individual p-values and were excluded from the statistical model.

influence of irrelevant evidence on audit planning judgment was measured using auditors' change in rating of audit hours necessary to effectively audit internal controls relative to the prior audit year. These dependent variables were based on the difference between the participants' response to the relevant evidence cue, minus their response to the mixed evidence cues.

3.4.1 Influence of irrelevant evidence on internal control judgments¹⁷

The influence of irrelevant evidence on internal control judgment was measured based on participant changes in their internal control effectiveness ratings and risk of material misstatement estimates (I_s , and CR_s , see equations 1 and 2 below). Positive I_s or CR_s indicate that irrelevant internal control evidence did reduce perceptions of relevant internal control weaknesses. If I_s or CR_s is zero, irrelevant internal control evidence had no influence on auditors' perceptions of relevant internal control weaknesses. Negative I_s or CR_s indicate that irrelevant internal control evidence increased perceptions of relevant internal control weaknesses.

$$I_s = X_1 - X_2 \quad (1)$$

I_s = influence of irrelevant evidence on the change in internal control effectiveness

X_1 = assessment of the relevant evidence cue only

X_2 = assessment of the relevant evidence cue when mixed with irrelevant evidence

$$CR_s = Y_1 - Y_2 \quad (2)$$

CR_s = influence of irrelevant evidence on the change in material misstatement assessments

¹⁷ Pearson Correlation Matrices were compiled for all participants (Appendix C) and separately for IT auditors for (Appendix D) and financial auditors (Appendix E). Appendix C, Appendix D, and Appendix E reveal the expected correlation between automated control effectiveness ratings and automated control risk of material misstatement estimates. Similar results were found for manual process effectiveness ratings and manual control risk of material misstatement estimates in Appendix C and Appendix D.

Y_1 = assessment of the relevant evidence cue only

Y_2 = assessment of the relevant evidence cue when mixed with the irrelevant evidence

3.4.2 Influence of irrelevant internal control evidence on audit planning judgment

The influence of irrelevant evidence on audit planning judgments was based on changes in audit hours necessary to effectively audit internal controls relative to the prior year (AH_s , see equation 3 below). Positive AH_s indicate that irrelevant internal control evidence did reduce perceptions of relevant internal control weaknesses. This implies that audit failure could occur if auditors are influenced to incorrectly reduce the degree and extent of internal control tests. If AH_s is zero, irrelevant internal control evidence had no influence on perceptions of relevant internal control weaknesses. Negative AH_s indicate that irrelevant internal control evidence increased perceptions of relevant internal control weaknesses. Audit failure could occur because the degree and extent of control testing might be reduced and the likelihood of overlooking control deficiencies and weaknesses increases.

$$AH_s = Z_1 - Z_2 \quad (3)$$

AH_s = influence of irrelevant evidence on the change in budgeted audit hours necessary to effectively audit EFT controls relative to the prior year

Z_1 = assessment of the relevant evidence cue only

Z_2 = assessment of the relevant evidence cue when mixed with the irrelevant evidence

3.5. Control Variables

3.5.1 Task-specific knowledge

The researcher acknowledged that specialized knowledge could impact the influence of irrelevant internal control evidence. Knowledge of the task could affect the participants' judgment of internal control effectiveness, risk of material misstatement, and audit hours when they are exposed to irrelevant internal control evidence. IT auditor participants and financial auditor participants self-reported that they took part in 1.91 and 1.3 respective walkthroughs of EFT operations (see table 4 above). To measure their

knowledge of EFT operations, the researcher presented each participant with six multiple choice questions on contemporary EFT topics.¹⁸ IT auditors and financial auditors answered an average of 3.16 and 2.8 questions correctly, respectively. The researcher used the number of correct EFT responses as a covariate to control for participants' knowledge of EFT operations. No significant p-values of the covariate were identified.

3.5.2 Experience

Prior studies of auditor judgment have found years of experience to be directly associated with judgment consistency (Reckers and Taylor 1979, Ashton and Kramer 1980), judgment performance (Choo and Trotman 1991), and selective cue attention (Davis 1996). These studies, in addition to Shelton (1999), attribute their results to the fact that experience is thought to enhance the acquisition of knowledge in auditors. That is, through time auditors build expertise that improves judgmental performance. Shelton (1999) manipulated experience as a surrogate for expertise. Shelton's results suggest that experience mitigates susceptibility to the influence of irrelevant evidence.

The results in other studies suggest that experience might not mitigate the susceptibility to irrelevant evidence. Moreover, in an internal control task, experience has not been found to consistently result in better auditor judgments (e.g., Davis 1996). Guarnitz et al. (1982) concluded that auditors with one to two, three to five, and ten to twenty years of experience did not differ statistically in their internal control evaluations of accounts receivable and audit hour correlations. Hamilton and Wright's (1982) results suggest that auditing students, auditors with less than three years of experience, and auditors with three or more years of experience differed in only one category (self-insight) in their judgments of a payroll control system. Meanwhile, they found no variation in judgment consensus and cue weighting.

The effects of experience have not been consistent in the accounting literature. So, it is not clear whether experience would affect the influence of irrelevant internal control evidence. Self-reported demographic information on participants' months of experience in both the IT and manual process domains was collected by the researcher. The

¹⁸ All multiple choice questions are presented in Appendix A in the same order that they were presented during data collection.

researcher measured both of these measures as covariates. No significant p-values were noted for the experience covariates.

3.6 Summary of Chapter 3

This chapter described the research method used to collect the data to test the hypotheses developed in chapter 2. Section 3.1 discusses the two rounds of cue development and the pilot test participants. Pre-testing and pilot testing enabled the researcher to gather preliminary feedback on the adequacy of the experimental cues, the realism of the task, and the aptness of the experimental format. The feedback led to wording modifications of the experimental instrument and stressed the need to present the mixed evidence before the relevant cues for both evidence types.¹⁹ Section 3.2 discusses the background of the actual experimental participants. Section 3.3 discusses the experimental design and procedures. Section 3.4 discusses the dependent variables. Section 3.5 discusses the control variables that are measured as covariates. Chapter 4 summarizes the data collected in the experiment and describes the statistical tests of the eleven hypotheses.

¹⁹ The modifications made the experiment less transparent and more realistic.

CHAPTER 4

RESULTS

This chapter describes the statistical techniques used to test the hypotheses developed in Chapter 2. The data used in these statistical tests were gathered from IT and financial auditors as outlined in Chapter 3. The chosen α level for this dissertation was 0.05. All numbers except the p-values, regression constants, and R^2 's were rounded to the nearest hundredths. Section 4.1 discusses the manipulation checks. Section 4.2 discusses the influence of the irrelevant internal control evidence. Section 4.3 discusses the results of testing the eleven hypotheses. Section 4.4 summarizes chapter 4.

4.1 Manipulation Checks

Data from the manipulation checks revealed that IT auditors and financial auditors did interpret the two relevant cues as either relevant or extremely relevant. Both auditor-types rated the relevant manual process cue as either relevant or extremely relevant 91% of the time. IT auditors and financial auditors rated the relevant automated control cue as either relevant or extremely relevant 81% of the time. The IT auditors and financial auditors also correctly identified whether the cues originated from the automated control evidence domain or the manual process evidence domain 91% of the time. Ergo, the two relevant cues were deemed as relevant as intended by the researcher. The auditors were also able to identify the evidence domain of the relevant and irrelevant cues per the intent of the researcher.

4.2 Influence of Irrelevant Internal Control Evidence

Consistent with the literature on the influence of irrelevant evidence, (Hackenbrack 1992; Glover 1997; Hoffman and Patton 1997; and Shelton 1999), IT auditors and financial auditors rated EFT controls to be weaker when they provided judgments of the relevant cues alone versus when the relevant cue was

mixed with irrelevant cues. The influence of irrelevant evidence were consistent for changes in internal control effectiveness, changes in the risk of material misstatement estimates, and changes to budgeted audit hours in relation to the prior year (see Table 5 below).

Table 5: Paired Sample t-test of the Influence of Irrelevant Internal Control Evidence across Auditor Types

<u>Dependent Variable</u>	Mixed	Relevant	<u>Std. Dev.</u>	t	p-value
	Cues	Only			
	<u>Mean</u>	<u>Mean</u>			
I _s	4.18	5.49	1.32	12.24	<.0001
CR _s	47.33	59.49	23.65	6.34	<.0001
AH _s	4.34	4.93	1.81	4.03	<.0001

Number of participants²⁰ = 76

I_s: Change in Internal Control Effectiveness

CR_s: Change in Risk of Material Misstatement Assessment

AH_s: Change in Budgeted Audit Hours to Effectively Audit EFT Controls

4.3 Test of Hypotheses

Eleven hypotheses are developed in chapter 2 of this dissertation. These hypotheses examine the influence of irrelevant internal control evidence on internal control judgments and audit planning judgments. To test these hypotheses, the researcher analyzed the influence of irrelevant evidence on changes to: ratings of internal control effectiveness, material misstatement assessment, and the audit hours necessary to effectively audit internal controls relative to the prior year. The researcher used a 2x2 mixed factor ANOVA model (Kinnear and Gray 2006). For hypotheses 1 through 10, *evidence domain type* (manual process, automated control) was varied within-subjects and *auditor type* (Financial Auditor versus IT Auditor) was varied between subjects. Regression analysis was used for hypothesis 11.

²⁰ Note that paired differences were determined based on within-subject comparison of mixed (relevant and irrelevant) evidence then relevant only evidence. This step was repeated for both evidence domains and generated 152 data points.

The interactions of *auditor-type* and *evidence domain* on the influence of irrelevant internal control evidence are examined in H1 for ratings of internal control effectiveness and the risk of material misstatement assessment. The interaction effects of *auditor-type* and *evidence domain* on the influence of irrelevant internal control evidence are examined in H2 for the audit hours necessary to effectively audit internal controls relative to the prior. IT auditor versus financial auditor judgments are compared while holding manual process domain evidence constant in H3 (ratings of internal control effectiveness and the risk of material misstatement assessment) and H4 (audit hours necessary to effectively audit internal controls relative to the prior year). IT auditor versus financial auditor judgments are compared while holding automated control domain evidence constant in H5 (ratings of internal control effectiveness and the risk of material misstatement assessment) and the audit hours necessary to effectively audit internal controls relative to the prior year (H6).

Financial auditors with manual process evidence versus financial auditors with automated control judgments are compared in H7 (ratings of internal control effectiveness and the risk of material misstatement assessment) and the audit hours necessary to effectively audit internal controls relative to the prior year (H8). In H9, IT auditors with manual process evidence versus IT auditors with automated control judgments are compared (ratings of internal control effectiveness and the risk of material misstatement assessment) and the audit hours necessary to effectively audit internal controls relative to the prior year (H10).

The researcher examined the influence of irrelevant internal control judgment on audit planning judgment by regressing internal control effectiveness on the ratings of the number of audit hours necessary to effectively audit internal controls in H11. Also, the risk of material misstatement was regressed on the ratings of the number of audit hours necessary to effectively audit internal controls. Bivariate regressions were performed for IT auditors and financial auditors, respectively. Each regression included their responses to both automated internal control evidence and manual process internal control evidence.

4.3.1 Dependent variable: internal control effectiveness

Hypothesis 1 predicted an interaction between *auditor-type* and *evidence domain* for the influence of irrelevant internal control evidence on internal control effectiveness. That is, IT auditors will be more influenced by irrelevant evidence from the manual process domain and less influenced by irrelevant evidence from the automated control evidence domain. Simultaneously, financial auditors will be more influenced by irrelevant evidence from the automated control evidence domain and less influenced by irrelevant evidence from the manual process domain. The results indicate that the interaction between *auditor-type* and *evidence domain* was not significant (Table 6, panel A, $F = .24$, $p\text{-value} = .628$).

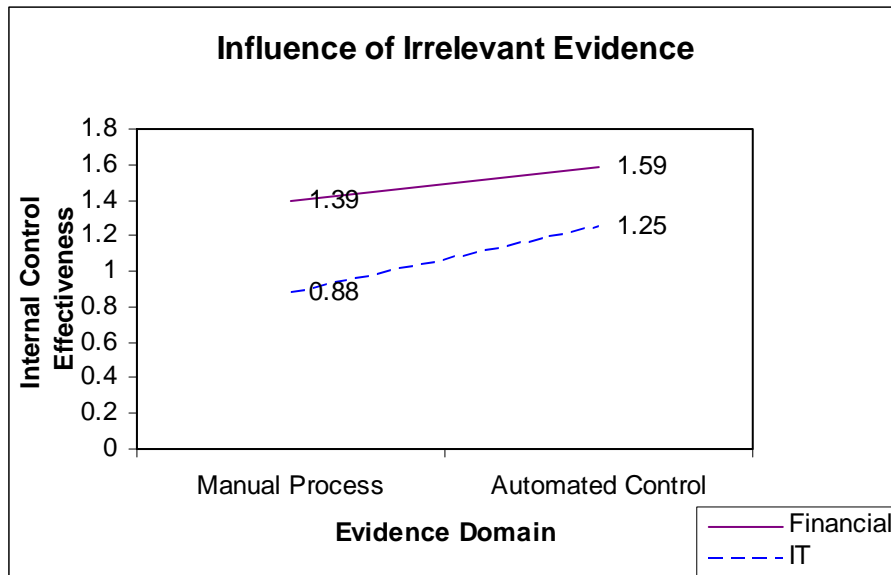


Figure 4: Plot of Means for Internal Control Effectiveness

Descriptive analysis of the data in panel C of Table 6 and the plot of the interactions (see Figure 4 above) of mean auditor ratings of internal control effectiveness revealed that IT auditors and financial auditors were more influenced by irrelevant internal control evidence when they have superior domain knowledge but the statistical difference is not significant. IT auditors have a mean influence of 1.25 with automated control evidence and only .88 with

manual process evidence. Financial auditors have a mean influence of 1.59 with automated control evidence and 1.39 with manual process evidence.

Table 6: Results of Mixed Factor ANOVA for Internal Control Effectiveness

Panel A: Test of Within-Subjects Effects

<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p-value</u>
Evidence Domain	1	3.11	3.11	2.73	.103
Evidence Domain*Auditor Type	1	0.27	0.27	.24	.628
Error	74	84.33	1.14		

Panel B: Test of Between-Subject Effects

<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p-value</u>
Auditor Type	1	6.73	6.73	2.96	.09
Error	74	168.24	2.27		

Panel C: Mean (Standard Deviation) Influence of Irrelevant Evidence on Internal Control Effectiveness

<u>Auditor Type</u>	<u>Evidence Domain Type</u>	
	<u>Manual Process</u>	<u>Automated Control</u>
Financial	1.39 (1.42)	1.59 (1.32)
IT	.88 (1.21)	1.25 (1.22)

Panel D: Simple Effect Tests of Auditor Differences

<u>Evidence Domain</u>	<u>t</u>	<u>p-value</u>
Manual Process (H3)	1.65	.104
Automated Control (H5)	1.15	.254

Panel E: Simple Effect Tests of Domain Evidence Differences

<u>Auditor Type</u>	<u>t</u>	<u>p-value</u>
Financial (H7)	.86	.395
IT (H9)	1.49	.142

Simple effects tests of auditor difference in Table 6, panel D revealed that IT auditors and financial auditors were not significantly different from each other when they rated the effectiveness of controls with evidence from the manual process domain (H3, $t = 1.65$, $p\text{-value} = .104$). Table 6, panel D also revealed that IT auditors and financial auditors were not significantly different from each other when they rated the effectiveness of controls with evidence from the automated control domain (H5, $t = 1.15$, $p\text{-value} = .254$).

Within-subject analyses of effectiveness ratings are presented in Table 6, panel E. The simple effect tests of auditor differences revealed that financial auditors' effectiveness ratings of manual process evidence were not significantly different from their effectiveness ratings of automated control evidence (H7, $t = .86$, $p\text{-value} = .395$). The simple effect tests of auditor differences also revealed that IT auditors' effectiveness ratings of manual process evidence were not significantly different from their effectiveness ratings of automated control evidence (H9, $t = 1.49$, $p\text{-value} = .142$). The results in panels D and E of Table 6 suggest that there were no significant differences between *auditor-types* and their judgment in different *evidence domains* when IT auditors and financial auditors rated internal control effectiveness.

4.3.2 Dependent variable: risk of material misstatement

Hypothesis 1 predicted an interaction between *auditor-type* and *evidence domain* for the influence of irrelevant internal control evidence on estimates of material misstatements. That is, IT auditors will be more influenced by irrelevant evidence from the manual process domain and less influenced by irrelevant evidence from the automated control evidence domain. Simultaneously, financial auditors will be more influenced by irrelevant evidence from the automated control evidence domain and less influenced by irrelevant evidence from the manual process domain. The results in this dissertation indicate that there is no statistically significant interaction between *auditor-type* and *evidence domain* (Table 7, panel A, $F = 1.09$, $p = .301$).

Descriptive analysis of the data in Panel C of Table 7 and the plot of the interactions (see Figure 5 below) of mean auditor ratings of internal control effectiveness revealed that financial and IT auditors were more influenced (but significantly) by irrelevant internal control evidence when they have domain knowledge. IT auditors have a mean influence of 14.13 with automated control evidence and only 11.09 with manual process evidence. Financial auditors have a mean influence of 10.00 with automated control evidence and 13.68 with manual process evidence.²¹

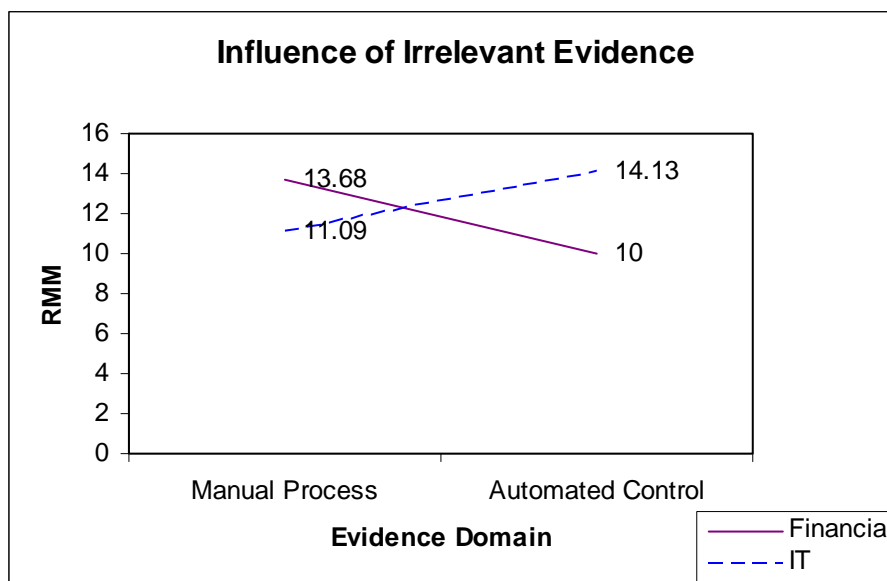


Figure 5: Plot of Means for Risk of Material Misstatement

Simple effects tests of auditor difference in Table 7, panel D revealed that IT auditors and financial auditors were not significantly different from each other when they estimated the rate of material misstatement with evidence from the manual process domain (H3, $t = .52$, $p\text{-value} = .516$). Table 7, panel D also revealed that IT auditors and financial auditors were not significantly different

²¹ The interaction plot of the means in figure 5 makes the interaction appear to be significant. However, the ANOVA p -value for this interaction in table 6, panel A reveals that the interaction is not statistically significant. The appearance of the significant interaction in the plots can be attributed to the size of the standard deviations.

from each other when they estimated the rate of material misstatement with evidence from the automated control domain (H5, $t = .82$, $p\text{-value} = .604$).

Table 7: Result of Mixed Factor ANOVA for Risk of Material Misstatement

Panel A: Test of Within-Subjects Effects

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Evidence Domain	1	3.92	3.92	0.10	.920
Evidence Domain*Auditor Type	1	417.44	417.44	1.09	.301
Error	74	28,415.26	383.99		

Panel B: Test of Between-Subject Effects

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Auditor Type	1	21.88	21.88	.03	.865
Error	74	55,566.51	750.90		

Panel C: Mean (Standard Deviation) Influence of Irrelevant Evidence on Internal Control Effectiveness

<i>Auditor Type</i>	<i>Evidence Domain Type</i>	
	<i>Manual Process</i>	<i>Automated Control</i>
Financial	13.68 (26.71)	10.00 (24.98)
IT	11.09 (19.50)	14.13 (22.50)

Panel D: Simple Effect Tests of Auditor Differences

<i>Evidence Domain</i>	<i>t</i>	<i>p-value</i>
Manual Process (H3)	.52	.516
Automated Control (H5)	.82	.604

Panel E: Simple Effect Tests of Domain Evidence Differences

<i>Auditor Type</i>	<i>t</i>	<i>p-value</i>
Financial (H7)	1.46	.148
IT (H9)	1.60	.115

Within-subject analyses of the rate of material misstatement estimates are presented in Table 7, panel E. The simple effect tests of auditor differences revealed that financial auditors' rate of material misstatement estimates of manual process evidence were not significantly different from their rate of material misstatement estimates of automated control evidence (H7, $t = 1.46$, $p\text{-value} = .148$). The simple effect tests of auditor differences also revealed that IT auditors' rate of material misstatement estimates of manual process evidence were not significantly different from their rate of material misstatement estimates of automated control evidence (H9, $t = 1.60$, $p\text{-value} = .115$). The results in panels D and E of Table 7 suggest that there were no significant differences between *auditor-types* and their judgment in different *evidence domains* when IT auditors and financial auditors estimated the rate of material misstatement.

4.3.3 Dependent variable: hours necessary to effectively audit internal controls relative to the prior year

Hypothesis 2 predicted an interaction between *auditor-type* and *evidence domain* for the influence of irrelevant internal control evidence on the hours necessary to effectively audit internal controls relative to the prior year. That is, IT auditors will be more influenced by irrelevant evidence from the manual process domain and less influenced by irrelevant evidence from the automated control evidence domain. Simultaneously, financial auditors will be more influenced by irrelevant evidence from the automated control evidence domain and less influenced by irrelevant evidence from the manual process domain. The results in this dissertation indicate that the interaction between *auditor-type* and *evidence domain* was significant (Table 8, panel A, $F = 5.28$, $p = .024$).

Descriptive analysis of the data are provided in Panel C of Table 8 and the plot of the interactions (see Figure 6 below) of mean auditor ratings of the number of hours necessary to effectively audit internal controls. IT auditors had a mean influence of .56 with automated control evidence and only .03 with manual process evidence. Financial auditors had a mean influence of .52 with automated control evidence and 1.14 with manual process evidence.

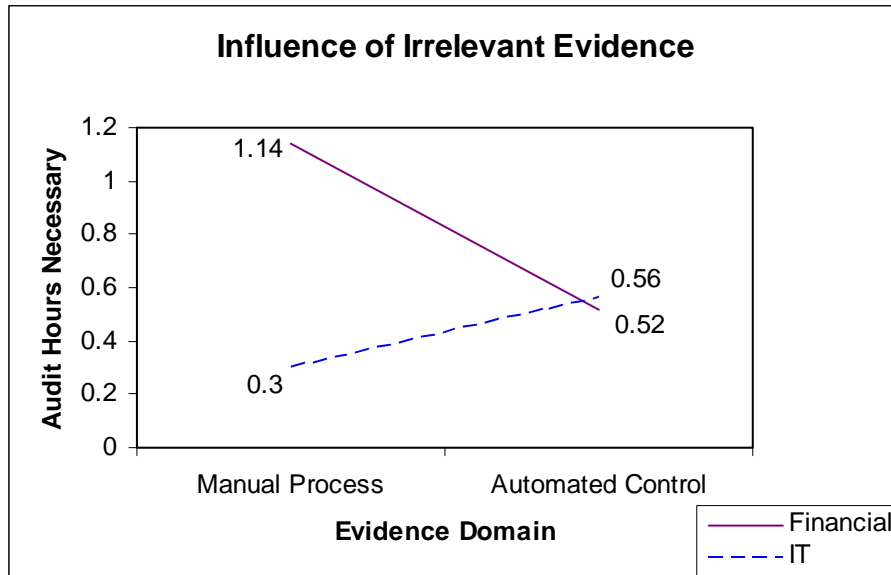


Figure 6: Plot of Means for the Number of Hours Necessary to Effectively Audit Internal Controls Relative to the Prior Year

Simple effects tests of auditor difference in Table 8, panel D revealed that IT auditors and financial auditors did significantly differ from each other when they rated the hours necessary to effectively audit internal controls with evidence from the manual process domain (H4, $t = 2.64$, $p\text{-value}=.010$). Table 8, panel D also revealed that IT auditors and financial auditors were not significantly different from each other when they rated the hours necessary to effectively audit internal controls with evidence from the automated control domain (H6, $t = .82$, $p\text{-value}=.923$).

Within-subject analyses of hours necessary to effectively audit internal controls are presented in Table 8, panel E. The simple effect tests of auditor differences revealed that financial auditors' ratings of the hours necessary to effectively audit internal controls of manual process evidence was significantly different from their ratings of the hours necessary to effectively audit internal controls of automated control evidence (H8, $t = 2.06$, $p\text{-value}=.042$). The simple effect tests of auditor differences also revealed that IT auditors' rating of the hours necessary to effectively audit internal controls of manual process evidence were not significantly different from their rating of the hours necessary to

effectively audit internal controls of automated control evidence (H10, $t = 1.24$, p -value=.219).

Table 8: Result of Mixed Factor ANOVA for the Hours Necessary to Effectively Audit Internal Controls

Panel A: Test of Within-Subjects Effects

<u>Source</u>	<u>Df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p-value</u>
Evidence Domain	1	0.06	0.06	0.03	.869
Evidence Domain*Auditor Type	1	12.14	12.14	5.28	.024
Error	74	170.20	2.30		

Panel B: Test of Between-Subject Effects

<u>Source</u>	<u>Df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>p-value</u>
Auditor Type	1	10.51	10.51	2.60	.111
Error	74	298.80	4.04		

Panel C: Mean (Standard Deviation) Influence of Irrelevant Evidence on Change in Budgeted Audit Hours

<u>Auditor Type</u>	<u>Evidence Domain Type</u>	
	<u>Manual Process</u>	<u>Automated Control</u>
Financial	1.14 (1.65)	.52 (1.81)
IT	.03 (1.98)	.56 (1.70)

Panel D: Simple Effect Tests of Auditor Differences

<u>Evidence Domain</u>	<u>t</u>	<u>p-value</u>
Manual Process (H4)	2.64	.010
Automated Control (H6)	.82	.923

Panel E: Simple Effect Tests of Domain Evidence Differences

<u>Auditor Type</u>	<u>t</u>	<u>p-value</u>
Financial (H8)	2.06	.042
IT (H10)	1.24	.219

4.3.4 Audit judgment regressions

Regression analysis of the internal control judgments on audit planning judgment offers an alternative approach to examining the influence of irrelevant internal control evidence. The researcher separately regressed both internal control judgment dependent variables (effectiveness ratings and risk of material misstatement estimate) on the dependent variable for audit planning judgment (hours necessary to effectively audit internal controls). This analysis presents mixed evidence that irrelevant internal control evidence could affect the effort put forth by financial auditors when they evaluate internal control evidence.

Table 9: Influence of Internal Control Judgment on Audit Effort

Panel A: Regression of Internal Control Effectiveness Ratings on the Ratings of the Audit Hours Necessary to Effectively Audit Internal Controls

Auditor Type	Constant	B	t	p-value	R ²
Financial	2.67	.49	2.26	.025	.04
IT	2.64	.46	1.54	.128	.03

Panel B: Regression of Change in Risk of Material Misstatement on Change in Audit Hours Necessary to Effectively Audit Internal Controls

Auditor Type	Constant	B	t	p-value	R ²
Financial	4.90	.00	0.21	.833	.00
IT	4.12	.02	1.09	.280	.01

Table 9, Panel A, reveals the bivariate regressions of a statistically significant beta (for financial auditors only, Table 9, panel A, B = .49, p-value = .025). Thus, financial auditors' judgments of the effectiveness of internal controls had a positive correlation with the audit hours necessary to effectively audit internal controls. IT auditors were not significantly influenced (Table 9, panel A, p-value=.128). Table 9, Panel B revealed that there was no significant relationship between of the ratings of the risk of material misstatement and the audit hours

necessary to effectively audit internal controls relative to the prior year for financial auditors (p-value=.833) and IT auditors (p-value=.280).²²

4.4 Summary of Chapter 4

This chapter discussed the results of the tests of the hypotheses that were developed in chapter 2. Section 4.2 discusses results of a paired sample t-test that revealed that auditors are influenced by irrelevant internal control evidence. Sections 4.3.1, 4.3.2, and 4.3.3 include discussions and presentations of descriptive data that reveal higher irrelevant evidence influence means for IT auditors and financial auditors when they are inside their domain. That is, IT auditors and financial auditors appear to be more influenced by irrelevant internal control evidence when they have superior domain knowledge than when they lack superior domain knowledge.

Section 4.3.3 discusses the finding that *auditor-type* and *evidence domain* interact to significantly affect the influence of irrelevant internal control evidence on the ratings of the hours necessary to effectively audit EFT controls relative to the prior year (H2). Section 4.3.3 also discusses simple effects analysis that reveals significant auditor differences to manual process domain evidence (H4) and significant financial auditor differences based on *evidence domain* (H8). Section 4.3.4 discusses the statistically significant correlation (for financial auditors only) of internal control effectiveness with the audit hours necessary to effectively complete the audit relative to the prior year (H11). These findings are depicted in Table 10.²³

Chapter 5 concludes this dissertation. In chapter 5, the researcher restates the research question, reviews the research method, and summarizes the results. Also in chapter 5, the researcher discusses the results, contributions, and limitations of this dissertation. Chapter 5 concludes with the implication of this dissertation for future research.

²² Control variables for task specific knowledge and experience were intentionally excluded from the bivariate regression analyses because they both provided insignificant regression coefficients. The control variables were excluded only for parsimony.

²³ A MANOVA was conducted for the overall model. The MANOVA yielded statistically insignificant results for differences in *auditor-type* (Appendix F, Wilk's Lambda F = 1.709, p-value = .132).

Table 10: Summary of Results**Panel A: Hypothesis 1 through 10**

<i>Auditor Type</i> <i>Evidence Domain</i>	Irrelevant Control Evidence Influence				<i>p-value</i>
	<u>IT</u>		<u>Financial</u>		
	<u>Auto</u>	<u>Manual</u>	<u>Auto</u>	<u>Manual</u>	
Hypothesis					
H1 Internal Control Judgment: Effectiveness Rating	1.25	.88	1.59	1.39	.628
Risk of Material Misstatement Estimate	14.13	11.09	10.00	13.68	.865
H2 Audit Planning Judgment: Hours Necessary to Effectively Audit ICs	.56	.03	.52	1.14	.024²⁴
H3 Internal Control Judgment: Effectiveness Rating	--	.88	--	1.39	.104
Risk of Material Misstatement Estimate	--	11.09	--	13.68	.516
H4 Audit Planning Judgment: Hours Necessary to Effectively Audit ICs	--	.03	--	1.14	.010
H5 Internal Control Judgment: Effectiveness Rating	1.25	--	1.39	--	.245
Risk of Material Misstatement Estimate	14.13	--	10.00	--	.604
H6 Audit Planning Judgment: Hours Necessary to Effectively Audit ICs	14.13	--	10.00	--	.923
H7 Internal Control Judgment: Effectiveness Rating	--	--	1.59	1.39	.395
Risk of Material Misstatement Estimate	--	--	10.00	13.68	.148
H8 Audit Planning Judgment: Hours Necessary to Effectively Audit ICs	--	--	.52	1.14	.042
H9 Internal Control Judgment: Effectiveness Rating	1.25	.88	--	--	.142
Risk of Material Misstatement Estimate	14.13	11.09	--	--	.115
H10 Audit Planning Judgment: Hours Necessary to Effectively Audit ICs	.56	.03	--	--	.219

²⁴ This is the p = value on the interaction term

Table 10: Continued

Panel B: Hypothesis 11

Regression of Change in Internal Control Effectiveness on Change in Audit Hours Necessary to Effectively Audit Internal Controls

<u>Auditor Type</u>	<u>B</u>	<u>t</u>	<u>p-value</u>
IT	.46	1.54	.128
Financial	.49	2.26	.025

Panel C: Hypothesis 11

Regression of Change in Risk of Material Misstatement on Change in Audit Hours Necessary to Effectively Audit Internal Controls

<u>Auditor Type</u>	<u>B</u>	<u>t</u>	<u>p-value</u>
IT	.02	1.09	.280
Financial	.00	0.21	.833

IC = Internal Controls

Boldfaced indicate statistically significant p-values.

CHAPTER 5

SUMMARY AND DISCUSSION

This chapter concludes this dissertation. Section 5.1 restates the research question. Section 5.2 discusses the research method. Section 5.3 summarizes the results. Section 5.4 discusses the results. Section 5.5 discusses the contributions of this dissertation. Section 5.6 discusses the limitations of this dissertation. Section 5.7 discusses the implications of this dissertation for future research.

5.1 Research Question

This dissertation addresses how superior domain knowledge affects the influence of irrelevant internal control evidence on audit judgments. This research question is based on a common problem in the practice of accounting where IT auditors and financial auditors with specialized internal control knowledge form judgments on internal controls and audit planning judgments after evaluating evidence inside and outside of their areas of domain specialization. IT auditors and financial auditors tend to have superior domain knowledge in evaluating automated control evidence or manual process control evidence, respectively.

Suboptimal judgments of relevant internal control evidence based on exposure to irrelevant internal control evidence could lead to audit failure. This may occur when irrelevant internal control evidence influences IT auditors and financial auditors to reduce their assessments of relevant internal control weaknesses. Then IT auditors and financial auditors may incorrectly reduce the extent and degree of internal control testing. The reduction of internal control testing may increase the likelihood that significant deficiencies and material weaknesses in internal controls will not be detected by IT auditors and financial statements. Ultimately, materially misstated financial statements could be certified by auditors; thus, audit failure could occur.

5.2 Review of Research Method

This study investigated the effects of domain knowledge on the influence of irrelevant internal control evidence. The researcher compared IT auditors' and financial auditors' internal control judgments (effectiveness of internal controls and risk of material misstatement) and audit planning judgments (hours necessary to effectively audit internal controls) when *auditor-type* was exposed to relevant evidence with, and without, the presence of irrelevant evidence. The auditors evaluated evidence from the automated control domain and the manual process domain separately.

5.3 Summary of Results

The results of a paired sample t-test revealed that the auditors who participated in this experiment were influenced by irrelevant internal control evidence. Descriptive data consistently revealed means that emphasized the influence of irrelevant evidence on internal control judgments and audit planning judgments. IT auditors and financial auditors were more influenced by irrelevant internal control evidence when they had superior domain knowledge. *Auditor-type* and *evidence domain* interacted significantly on audit planning judgments (H2). The interaction in H2 appears to be driven by the statistically higher influence of the irrelevant manual process evidence on financial auditors than IT auditors (H4). Financial auditors were also more influenced by the irrelevant manual process evidence than they were influenced by irrelevant automated control evidence (H8). Lastly, financial auditors' subsequent audit planning judgments were correlated with their perceptions of internal control effectiveness (H11).

5.4 Discussion of Results

The results in Table 5 indicate that IT auditors and financial auditors reduced their audit planning judgments when they were exposed to irrelevant (mixed) internal control evidence. Also, Table 8 shows that IT auditors' and financial auditors' audit planning judgments were more influenced by irrelevant internal control evidence when they had superior domain knowledge. This means that IT auditors and financial auditors may allocate insufficient audit budget hours to internal control investigations of significant deficiencies or material weaknesses when they are exposed to irrelevant internal control

evidence. Given the potential for over-reliance on internal controls in this context, audit failure could occur if IT auditors and financial auditors fail to detect significant deficiencies and material weaknesses.

Both *auditor-types* had planning judgments that were influenced by irrelevant (mixed) internal control evidence. But IT auditors' planning judgments were no more influenced by irrelevant internal control evidence when IT auditors had superior domain knowledge than when they did not have superior domain knowledge. A possible explanation for this conclusion is presented in the demographic information in Table 4. The IT auditor participants in this study have superior domain knowledge in automated controls. However, IT auditors have almost just as much self-assessed experience with manual process evidence as they do to automated control evidence.

The audit planning judgment interaction between evidence domain and auditor-type can be attributed to two other significant findings. First, the audit planning judgments of financial auditors were significantly more influenced by manual process evidence than IT auditors. Second, the audit planning judgments of the financial auditors were significantly lower for automated control evidence in comparison to manual process evidence.

A regression of financial auditors control effectiveness ratings on their audit planning judgments also revealed a significant, positive correlation. Thus, financial auditors' perceptions of internal controls may affect their audit planning judgments. This finding presents further evidence of how irrelevant internal control evidence may ultimately lead financial auditors to audit failure.

5.5 Contributions

This study extends the literature on auditors' use of irrelevant evidence (Hackenbrack 1992; Glover 1997; Hoffman and Patton 1997; Shelton 1999; Young et al. 2001; Wood 2003). The results in this dissertation suggest that IT auditors and financial auditors may be influenced by irrelevant internal control evidence from automated and manual process domains. However, the researcher found mixed evidence that superior domain knowledge can affect the use of irrelevant internal control evidence. Both IT and financial auditors show that they are influenced by irrelevant evidence when they have

superior domain knowledge. Thus, superior domain knowledge might contribute to audit failure. Auditors with superior domain knowledge of internal control evidence may be more influenced by irrelevant internal control evidence even though their domain knowledge should cause them to ignore irrelevant evidence.

5.6 Limitations

A limitation of this dissertation is that the researcher relied on the participants' self-reported specialization as IT auditors or financial auditors to partition *auditor-type* between-subject. To counter this limitation, the researcher collected background information on each participant. The researcher used the background information to determine whether the participants had superior knowledge in one of the two domains. Financial auditors were determined to have superior domain knowledge in manual processes. IT auditors were determined to have superior domain knowledge in automated controls. However, IT auditors provided background information that revealed that they had almost just as much familiarity with manual processes as they did with automated controls.

Experimental studies cannot capture all of the complexities of the real world (Kerlinger 1986). Likewise, this dissertation does not capture all of the complexities of a real internal control evaluation environment in its entirety. For example, the researcher asked participants to make judgments based solely on summarized evidence cues. In practice, the environment may be more complex because the evidence obtained from walkthroughs, interviews, corporate policies, and transaction traces might not be readily summarized for the IT auditors and financial auditors as they are in this experiment (but the cues may emulate internal control evaluation exceptions that are noted in audit workpapers for hierarchical review purposes). Also, IT auditors and financial auditors might have to make one assessment on internal control strength that covers many transaction classes. In this experiment, participants were asked to focus their cognitive abilities on just one transaction system, EFT Operations. Irrelevant evidence is influential in this highly simplified quasi-experimental context. So, the results in this dissertation may suggest to IT auditors and financial auditors that their use of irrelevant evidence may be more severe than originally expected.

5.7 Future Research

This dissertation is only a first step that identifies this internal control problem. Future research might identify variables that may mitigate this problem. To date, little is known about whether the presence of supervision while conducting an audit will mitigate the use of irrelevant evidence. The first standard of fieldwork requires the supervision of staff while conducting the audit (AICPA 2006 [SAS no. 1 sec. 150; SAS no. 43]), so it seems practical to expect that accountability would mitigate the use of irrelevant evidence. The results in the psychology literature suggest that accountability does mitigate the use of irrelevant evidence (Tetlock et al. 1989). Surprisingly, these results have not held in the accounting studies on irrelevant evidence use (Glover 1997; Hoffman and Patton 1997).

Audit team collaboration is a constant in accounting practice. Groups are another factor that should mitigate the influence of irrelevant evidence. But a study by Young et al. (2001) documented that small groups exacerbate the use of irrelevant evidence among students. An investigation of irrelevant evidence use among small audit teams with practicing auditors may be fruitful.

In this dissertation, the researcher found evidence that shows that IT auditors and financial auditors may not adequately separate relevant evidence from irrelevant evidence when they have superior domain knowledge. This concept extends the study conducted by Hackenbrack (1992). However, neither this dissertation, nor the existing literature on the influence of irrelevant evidence describes the cognitive strategies that IT auditor and financial auditors utilize when they encounter irrelevant internal control evidence. This issue, in addition to the issues mentioned above, is left for future research.

APPENDIX A

EXPERIMENTAL INSTRUMENT

General Instructions

GENERAL INSTRUCTIONS

Many thanks in advance for your willingness to participate in this study. With your help, this experiment is intended to reveal an approach that improves the ability of audit professionals to evaluate internal control evidence and improve the effectiveness of audits.

You will be presented with summarized internal control evidence of a hypothetical audit client. You will be asked to (1) respond to questions based on your judgment of summarized internal control evidence where there are no right or wrong answers, (2) answer multiple choice questions or skip them if you do not know the answer, (3) provide background information about your experience as an audit professional, and (4) briefly comment on any difficulties you experienced while completing this experiment.

You are not subject to a time limit but it should take you about 30 minutes to finish. Enlarging your screen window should allow you expedite this project.

When you complete this project, please do not discuss the survey questions or your answers with anyone who may also complete the survey. Your responses and identity are strictly confidential.

To begin, please enter your PIN and click on the "next" button at the bottom of this webpage. The "next" button will allow you to navigate through this experiment after you respond to the required questions on each page. If you would like to receive the summarized results of this study after its completion, please provide your e-mail address below.

Best regards,
Daniel D. Selby

Please enter your PIN in the box below.

E-mail address?

Informed Consent Form

INFORMED CONSENT FORM

I HAVE BEEN INFORMED THAT:

1. Daniel Selby, a PhD Candidate in Accounting at Florida State University has requested my participation in a research study.
2. The purpose of this research is to understand how auditors use evidence when making professional judgments.
3. Participation in this research involves reading summarized audit evidence and providing various judgments. There are no foreseeable risks associated with participation in this study.
4. The benefits of this study may suggest an approach that will improve the ability of audit professionals to evaluate internal control evidence and improve the effectiveness of audits.
5. The researcher will not retain my individual identifying information. The researcher will maintain the confidentiality of my identity to the extent allowed by law by assigning a subject code to my name. The researcher will destroy any master list containing identifying information immediately after subject codes have been assigned.
6. Questions concerning this research study should be addressed to Daniel Selby or Greg Gerard (Dissertation Chair). Daniel Selby can be reached at 850-459-7895 and dselby@fsu.edu. Greg Gerard can be reached at 850-644-9115 and ggerard@fsu.edu; Their address is Florida State University, The College of Business, Accounting Department, 821 Academic Way, P.O. Box 3061110, Tallahassee, FL 32306-1110.
7. Questions about my rights as a subject/participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Office of the Vice President for Research, Florida State University at (850) 644-8633, jjcooper@admin.fsu.edu.

I have read the above informed consent form. I understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefits to which I may otherwise be entitled. By clicking yes on this consent form, I am not waiving any legal claims, rights or remedies.

- Yes, I give my consent.
- No, I will click on "exit the survey" in the upper right corner of this webpage and exit

Background and 2006 IC Opinion

BACKGROUND and 2006 INTERNAL CONTROL OPINION

ABC Banking Corporation, a Delaware Corporation whose headquarters are located in San Francisco, California, is a financial institution. Its major business segments are Global Consumer & Small Business Banking, Global Wealth & Investment Management, and Global Corporate & Investment Banking. These three segments account for 97% of revenues.

Electronic Funds Transfer (EFT) Operations is a key service provider for ABC Banking Corp.'s three business segments. It is consistently an area of audit concern because it plays a substantial role in several material line items that are reported on ABC Banking Corporation's financial statements. EFT Operations provide the following services to ABC Corporation's three main business segments: virtual and remote vault operations, converting checks into digital images, creating ACH files that settle across ACH networks with other financial institutions, sending and receiving domestic and foreign wire transfers, enabling wireless customer remittances, and electronic bill payment services.

For the past two years, your firm has audited ABC Banking Corp. Both years, your firm found ABC Banking Corp.'s internal controls around EFT Operations, as well as ABC Banking Corp.'s overall internal control environment to be effective. Management has established effective general control mechanisms throughout the organization. Application controls have also been deemed effective by your firm in the past.

The internal audit department reports directly to the audit committee of the Board of Directors. Few audit adjustments have been necessary in prior engagements. The fiscal year for both accounting and tax purposes is December 31.

Before you consider the controls of the current (2007) year, please read the following information that was extracted from the prior year's (2006) unqualified opinion on internal controls for ABC Banking Corporation and then assess the effectiveness of internal controls:

"Management assessed the effectiveness of the Corporation's internal control over financial reporting as of December 31, 2006, based on the framework set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control - Integrated Framework. Based on that assessment, management concluded that, as of December 31, 2006, the Corporation's internal control over financial reporting is effective based on the criteria established in the Internal Control Integrated Framework."

"Management's assessment of the effectiveness of the Corporation's internal control over financial reporting as of December 31, 2006, has been audited by WaterYoungMarwickTouche, LLP, an independent registered public accounting firm."

Based solely on the information that was presented on this web page, what is your rating of the effectiveness of ABC Banking Corp.'s internal controls as of 12/31/2006.

	extremely effective	effective	somewhat effective	neutral	somewhat ineffective	ineffective	extremely ineffective
2006	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Automated Mixed

Electronic Funds Transfer (EFT) Operations has been identified as an area of potential control risk.

Please imagine that you are assigned to the audit team for the 2007 audit of ABC Banking Corp. Your responsibilities include the control evaluation of ABC Banking Corp.'s EFT Operations. This is the first time that you have participated in the audit of this client. Those who reviewed controls of ABC Banking Corp.'s EFT Operations in the past are no longer with your firm.

The following internal control evidence was observed during the 2007 audit year that involve line items that are material in dollar amount on ABC Corp.'s financial statements:

- ABC BANK CORP. USES IT TO INITIATE ORDERS FOR THE PURCHASE AND DELIVERY OF SUPPLIES BASED ON PREDETERMINED DECISION RULES OF WHAT TO ORDER AND IN WHAT QUANTITIES BASED ON SYSTEM-GENERATED DECISIONS. NO OTHER DOCUMENTATION OF ORDERS PLACED OR SUPPLIES RECEIVED IS PRODUCED OR MAINTAINED, OTHER THAN THROUGH THE IT SYSTEM. CHANGES TO THIS PROCESS ARE DOCUMENTED.
- NEW PACKAGED SOFTWARE APPLICATIONS WERE INSTALLED THIS YEAR TO MANAGE THE TRAVEL EXPENSE FILES FOR ABC BANKING CORP.'S RETAIL BANKING OPERATION MANAGERS. THEIR IT STAFF HAS FORMAL TRAINING AND EXPERIENCE USING THIS NEW SOFTWARE.
- ABC BANK CORP. USES AUTOMATED FRAUD PREVENTION TECHNOLOGY TO MONITOR AND DATA WAREHOUSE ACCOUNTHOLDER CARD USAGE AND ACTIVATION IN THE CURRENT YEAR UNDER AUDIT. THEY ALSO USED THE TECHNOLOGY TO MONITOR CLOSED ACCOUNTS, DORMANT ACCOUNTS, AND DECEASED ACCOUNTS IN THE CURRENT YEAR UNDER AUDIT.
- ABC BANKING CORP. IMPLEMENTED AN ERP MODULE FOR ELECTRONIC FUND TRANSFERS THAT RECEIVES DATA FROM A LEGACY SYSTEM THAT DOES NOT TRANSFER HASH TOTALS, CONTROL TOTALS, AND RECORD COUNTS.
- DURING THE CURRENT YEAR UNDER AUDIT, ABC BANK CORP. MODIFIED THEIR PIN SYSTEM TO RESTRICT PERSONNEL ACCESS TO THE HUMAN RESOURCE SYSTEM VIA THE COMPANY'S INTRANET AFTER THREE FAILED LOGIN ATTEMPTS.

Based solely on the internal control evidence that is presented on this webpage, what is your rating of ABC Corp.'s effectiveness of EFT controls as of 12/31/2007?

	extremely effective	effective	somewhat effective	neutral	somewhat ineffective	ineffective	extremely ineffective
A	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based solely on the internal control evidence that is presented on this webpage, what is your estimate of the risk of material misstatement due to controls around EFT operations as of 12/31/2007 (Please enter a whole number in the range from 0 to 100)?

How would you suggest adjusting the number of audit hours for the 2007 testing of controls around Electronic Funds Transfer operations relative to the previous 2006 audit year?

	Significantly Decrease					Do Not Adjust					Significantly Increase
A hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Automated Relevant

Electronic Funds Transfer (EFT) Operations has been identified as an area of potential control risk.

Please imagine that you are assigned to the audit team for the 2007 audit of ABC Banking Corp. Your responsibilities include the control evaluation of ABC Banking Corp.'s EFT Operations. This is the first time that you have participated in the audit of this client. Those who reviewed controls of ABC Banking Corp.'s EFT Operations in the past are no longer with your firm.

The following internal control evidence was observed during the 2007 audit year that involve line items that are material in dollar amount on ABC Corp.'s financial statements:

ABC BANKING CORP. IMPLEMENTED AN ERP MODULE FOR ELECTRONIC FUND TRANSFERS THAT RECEIVES DATA FROM A LEGACY SYSTEM THAT DOES NOT TRANSFER HASH TOTALS, CONTROL TOTALS, AND RECORD COUNTS.

Based solely on the internal control evidence that is presented on this webpage, what is your rating of ABC Corp.'s effectiveness of EFT controls as of 12/31/2007? Please disregard your response to this question on the previous webpage.

	extremely effective	effective	somewhat effective	neutral	somewhat ineffective	ineffective	extremely ineffective
A	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based solely on the internal control evidence that is presented on this webpage, what is your estimate of the risk of material misstatement due to controls around EFT operations as of 12/31/2007 (Please enter a whole number in the range from 0 to 100)? Please disregard your response to this question on the previous webpage.

How would you suggest adjusting the number of audit hours for the 2007 testing of controls around Electronic Funds Transfer operations relative to the previous 2006 audit year? Please disregard your response to this question on the previous webpage.

	Significantly Decrease					Do Not Adjust					Significantly Increase
A hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Automated Control MCs

The following six multiple choice questions are related to automated controls. Please read each question and all answer choices thoroughly then select what you feel is the best answer. If you feel that you do not know the answer to the question, you may skip the question.

All of the following are examples of corrective controls except:

- AUTOMATIC ERROR CORRECTION
- TRANSACTION TRAILS
- PASSWORDS
- SKIP, I DO NOT KNOW
- UPSTREAM RESUBMISSION

Which of the following controls will best protect production programs from unauthorized modification?

- REQUIRING TWO OPERATORS TO BE PRESENT DURING EQUIPMENT OPERATION
- SKIP, I DO NOT KNOW
- IMPLEMENTING MANAGEMENT REVIEW OF DAILY RUN LOGS
- LIMITING PROGRAM ACCESS SOLELY TO OPERATORS
- RESTRICTING PROGRAMMER ACCESS TO THE COMPUTER ROOM

Application control objectives do not normally include assurance that:

- PROCESSING RESULTS ARE RECEIVED BY THE INTENDED USER
- AUTHORIZED TRANSACTIONS ARE COMPLETELY PROCESSED ONCE AND ONLY ONCE
- REVIEW AND APPROVAL PROCEDURES FOR NEW SYSTEMS ARE SET BY POLICY AND ADHERED TO
- TRANSACTION DATA ARE COMPLETE AND ACCURATE
- SKIP, I DO NOT KNOW

If, in reviewing an application system, it is noted that batch controls are not used, which of the following statements by the user of the system is acceptable as a compensating control?

- "THE SUPERVISOR MUST APPROVE ALL INPUTS."
- "WE DO A 100% PHYSICAL REVIEW OF THE INPUT DOCUMENT TO THE OUTPUT DOCUMENT"
- "THE VOLUME OF TRANSACTIONS PROHIBITS BATCHING"
- SKIP, I DO NOT KNOW
- "WE DO A 100% KEY VERIFICATION OF ALL DATA INPUT"

A primary purpose of an input-output control module in an operating system is to assure that:

- READ AND WRITE REQUEST ARE PROPERLY EXECUTED
- HARDWARE ERRORS ARE RECORDED PROMPTLY
- SKIP, I DO NOT KNOW
- CONTROL MODULES ARE HELD TO NEAR SIZE
- A RECORD IS MAINTAINED OF ALL FILE ACCESSES

An appropriate control technique for a data communication security review is to ensure that:

- SENSITIVE MESSAGES ARE ALWAYS TRANSMITTED BIT BY BIT, ENCLOSED BETWEEN A START BIT AND A STOP BIT
- MESSAGES TRANSMITTED OVER SECURE MEDIA ARE ALWAYS ENCRYPTED
- SKIP, I DO NOT KNOW
- USER AUTHENTICATION MECHANISMS ARE USED WITH STAND-ALONE PERSONAL COMPUTER INSTALLATIONS
- TELECOMMUNICATION SYSTEM COMMANDS CAN BE ENTERED ONLY FROM THE MASTER CONSOLE

Manual Mixed

Electronic Funds Transfer (EFT) Operations has been identified as an area of potential control risk.

Please imagine that you are assigned to the audit team for the 2007 audit of ABC Banking Corp. Your responsibilities include the control evaluation of ABC Banking Corp.'s EFT Operations. This is the first time that you have participated in the audit of this client. Those who reviewed controls of ABC Banking Corp.'s EFT Operations in the past are no longer with your firm.

The following internal control evidence was observed during the 2007 audit year that involve line items that are material in dollar amount on ABC Corp.'s financial statements:

- ABC BANKING CORP. EFT PERSONNEL CAN SEND WIRE TRANSFERS BEFORE OBTAINING AUTHORIZATION.
- FRAUD PREVENTION DEPARTMENT PERSONNEL ATTEND MANDATORY FRAUD TRAINING ON A ROUTINE BASIS. THEY NOTIFY ACCOUNTHOLDERS OF DUBIOUS ACCOUNT ACTIVITY.
- TRAVEL EXPENSE REIMBURSEMENT FORMS REQUIRE INSPECTION AND AUTHORIZATION BY THE EMPLOYEE'S IMMEDIATE SUPERVISOR AND THE SUPERVISOR'S MANAGER BEFORE THE AUTHORIZED FORM IS ENTERED INTO THE TRAVEL REIMBURSEMENT SYSTEM.
- HUMAN RESOURCE AND EMPLOYEE BENEFITS HOTLINE PERSONNEL VERIFY THE IDENTITY OF ALL CALLERS BEFORE ENTERING INTO PHONE CONVERSATIONS.
- ABC BANK CORP. MAINTAIN PHYSICAL SECURITY OVER PURCHASE ORDERS FOR THE PURCHASE AND DELIVERY OF SUPPLIES BY LIMITING ACCESS TO BLANK ORDER FORMS AND SUPPLIES RECEIVED TO APPROPRIATE PERSONNEL.

Based solely on the internal control evidence that is presented on this webpage, what is your rating of ABC Corp.'s effectiveness of EFT controls as of 12/31/2007? Please disregard your response to this question on the previous webpages.

	extremely effective	effective	somewhat effective	neutral	somewhat ineffective	ineffective	extremely ineffective
A	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based solely on the internal control evidence that is presented on this webpage, what is your estimate of the risk of material misstatement due to controls around EFT operations as of 12/31/2007 (Please enter a whole number in the range from 0 to 100)? Please disregard your response to this question on the previous webpages.

How would you suggest adjusting the number of audit hours for the 2007 testing of controls around Electronic Funds Transfer operations relative to the previous 2006 audit year? Please disregard your response to this question on the previous webpages.

	Significantly Decrease					Do Not Adjust					Significantly Increase
A hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Manual Relevant

Electronic Funds Transfer (EFT) Operations has been identified as an area of potential control risk.

Please imagine that you are assigned to the audit team for the 2007 audit of ABC Banking Corp. Your responsibilities include the control evaluation of ABC Banking Corp.'s EFT Operations. This is the first time that you have participated in the audit of this client. Those who reviewed controls of ABC Banking Corp.'s EFT Operations in the past are no longer with your firm.

The following internal control evidence was observed during the 2007 audit year that involve line items that are material in dollar amount on ABC Corp.'s financial statements:

ABC BANKING CORP. EFT PERSONNEL CAN SEND WIRE TRANSFERS BEFORE OBTAINING AUTHORIZATION.

Based solely on the internal control evidence that is presented on this webpage, what is your rating of ABC Corp.'s effectiveness of EFT controls as of 12/31/2007? Please disregard your response to this question on the previous webpages.

	extremely effective	effective	somewhat effective	neutral	somewhat ineffective	ineffective	extremely ineffective
A	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based solely on the internal control evidence that is presented on this webpage, what is your estimate of the risk of material misstatement due to controls around EFT operations as of 12/31/2007 (Please enter a whole number in the range from 0 to 100)? Please disregard your response to this question on the previous webpages.

How would you suggest adjusting the number of audit hours for the 2007 testing of controls around Electronic Funds Transfer operations relative to the previous 2006 audit year? Please disregard your response to this question on the previous webpages.

	Significantly Decrease					Do Not Adjust					Significantly Increase
A hours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Manual Process MCs

The following six multiple choice questions are related to manual processes. Please read each question and all answer choices thoroughly then select what you feel is the best answer. If you feel that you do not know the answer to the question, you may skip the question.

If internal control is properly designed, the same employee may be permitted to:

- SKIP, I DO NOT KNOW
- RECONCILE THE BANK STATEMENTS AND ALSO RECEIVE AND DEPOSIT CASH
- RECEIVE AND DEPOSIT CHECKS AND ALSO APPROVE WRITE-OFFS OF CUSTOMER ACCOUNTS
- APPROVE VOUCHERS FOR PAYMENT AND ALSO SIGN CHECKS
- SIGN CHECKS AND ALSO CANCEL SUPPORTING DOCUMENTS

Proper authorization of write-offs of uncollectible accounts should be approved in which of the following departments?

- ACCOUNTS PAYABLE
- SKIP, I DO NOT KNOW
- CREDIT
- TREASURER
- ACCOUNTS RECEIVABLE

Which of the following is a standard control over cash disbursements?

- CHECKS SHOULD BE SENT DIRECTLY TO THE PAYEE BY THE EMPLOYEE WHO PREPARES DOCUMENTS THAT AUTHORIZE CHECK PREPARATION
- CHECKS SHOULD BE SEQUENTIALLY NUMBERED AND THE NUMERICAL SEQUENCE SHOULD BE ACCOUNTED FOR BY THE PERSON PREPARING BANK RECONCILIATIONS
- CHECKS SHOULD BE SIGNED BY THE CONTROLLER AND AT LEAST ONE OTHER EMPLOYEE OF THE COMPANY
- CHECK AND SUPPORTING DOCUMENTS SHOULD BE MARKED "PAID" IMMEDIATELY AFTER THE CHECK IS RETURNED WITH THE BANK STATEMENT
- SKIP, I DO NOT KNOW

Effective controls over the payroll function may include:

- RECONCILIATION OF TOTALS ON JOB TIME TICKETS WITH JOB REPORTS BY EMPLOYEES RESPONSIBLE FOR THOSE SPECIFIC JOBS
- PREPARATION OF PAYROLL TRANSACTION JOURNAL ENTRIES BY AN EMPLOYEE WHO REPORTS TO THE SUPERVISOR OF THE PERSONNEL DEPARTMENT
- VERIFICATION AGREEMENT OF JOB TIME TICKETS WITH EMPLOYEE CLOCK CARD HOURS BY A PAYROLL DEPARTMENT EMPLOYEE.
- CUSTODY OF RATE AUTHORIZATION RECORDS BY THE SUPERVISOR OF THE PAYROLL DEPARTMENT
- SKIP, I DO NOT KNOW

Each of the following is a proper control over securities and investments except:

- STORAGE IN A SAFE DEPOSIT BOX
- SKIP, I DO NOT KNOW
- PROPER AUTHORIZATION OF TRANSACTIONS
- CUSTODIAN SEPARATE FROM TREASURY FUNCTION
- CUSTODIAN BONDED AND SEPARATED FROM INVESTMENT RECORDS

Appropriate control over obsolete materials requires that they be:

- CARRIED AT COST IN THE ACCOUNTING RECORDS UNTIL THE ACTUAL DISPOSITION TAKES PLACE
- RETAINED WITHIN THE REGULAR STORAGE AREA
- SKIP, I DO NOT KNOW
- SORTED, TREATED, AND PACKAGED BEFORE DISPOSITION IN ORDER TO OBTAIN THE BEST SELLING PRICE
- DETERMINED BY AN APPROVED AUTHORITY TO BE UNUSABLE FOR THEIR NORMAL PURPOSE

Debriefing Questions

Please provide some background information about your work experience below.

Please select your most recent title as an auditor?

- Partner
- Senior Manager
- Manager
- Senior
- Staff
- Other (please specify)

Your audit experience was obtained at what type of entity (Please check all that apply)?

- Government Regulatory agency
- Big Four accounting firm
- Internal Audit department
- Non-Big Four accounting firm
- Other (please specify)

About how many months of experience do you have as an IT auditor?

Months of IT audit experience

About how many months of experience do you have as a non-IT auditor?

Months of non-IT audit experience

About how many client engagements have you evaluated automated control evidence?

Number of automated control engagements

About how many client engagements have you evaluated manual process evidence?

Number of manual process engagements

Please estimate the percentage of your experience as an auditor in the following client industries. Please use whole numbers and enter "0" in the industries where you do not have audit experience (your responses must add up to 100).

Financial Institutions	<input type="text"/>
High Tech	<input type="text"/>
Communications	<input type="text"/>
Real Estate	<input type="text"/>
Healthcare	<input type="text"/>
Manufacturing	<input type="text"/>
Retail	<input type="text"/>
Government & Not-for-profit	<input type="text"/>
Insurance	<input type="text"/>

About how many professional (employer sponsored, non-college instruction) IT audit training classes have you attended since you became employed as an auditor?

Number of professional IT training courses

About how many IT audit courses (undergraduate and graduate level) did you complete while you were in college?

Number of college IT audit courses

About what year did you receive the following professional designations?

CIA	<input type="text"/>
CFE	<input type="text"/>
CISA	<input type="text"/>
CPA	<input type="text"/>

About how many months of experience do you have in evaluating automated control evidence?

Months of experience with automated evidence

About how many months of experience do you have in evaluating manual process evidence?

Months of experience with manual process evidence

Based on your experience, how would you describe the typical use of IT audit specialists in the audits that you have been involved with?

- Integrated with the audit team at the beginning of the audit
- Used on an as needed basis to assist on information technology issues
- Other (please elaborate)

Have you ever participated in an internal control walkthrough?

- No
- Yes (please estimate the number of engagements in the box below?)

Have you ever participated in an internal control evaluation that involved EFT operations?

- No
- Yes (please specify about how many engagements in the box below?)

In your current position, you would consider yourself to be:

- on the IT side of auditing
- on the financial side of auditing
- Other, please elaborate

About what percentage of your time do you spend between audit engagements and consulting engagements?

Please use whole numbers in the range of 0 to 100. The total of both boxes must be 100.

Audit

Consulting

I had difficulty responding to the questions in this experiment.

Disagree

Agree, please elaborate on the difficulty that you encountered

The presentation of the webpages in this experiment made it easy for me to follow and respond to the questions.

Agree

Disagree, please elaborate on the presentation difficulties that you encountered

EFT MCs

The following six multiple choice questions are related to Electronic Funds Transfer Operations. Please read each question and all answer choices thoroughly then select what you feel is the best answer. If you feel that you do not know the answer to the question, you may skip the question.

Fraud detection programs at financial institutions should include:

- REQUIRING PERSONNEL TO PARTICIPATE IN FIRM-SPONSORED EXTERNAL ACTIVITIES
- SKIP, I DO NOT KNOW
- DOMAIN KEY TECHNOLOGY
- E-MAIL NOTICES THAT ARE SENT TO CUSTOMERS TO WARN THEM OF POTENTIALLY FRAUDULENT ACTIVITY
- COMPLETE DESTRUCTION OF HARD DRIVES THAT ARE NO LONGER IN USE THAT CONTAIN CONFIDENTIAL INFORMATION

Which service allows business customers of financial institutions to convert checks into digital images and deposit them electronically?

- DEBIT CARD PROCESSING
- SKIP, I DO NOT KNOW
- REMOTE CHECK DEPOSIT
- MOBILE REMITTANCE SYSTEMS
- WIRE TRANSFERS

Which of the following is a barrier for financial institutions as they encourage their customers to adopt electronic business-to-business payment links?

- THE NEED FOR ARMORED SERVICE VENDORS
- PERSUADING SUPPLIERS AND CUSTOMERS TO PARTICIPATE IN ELECTRONIC COMMERCE
- COMPETITION BETWEEN FINANCIAL INSTITUTIONS
- DISK AND STORAGE SPACE SHORTAGES
- SKIP, I DO NOT KNOW

What incentive do financial institutions have to send transactions electronically through their network?

- REDUCE COSTS
- SKIP, I DO NOT KNOW
- FOLLOW PREDETERMINED RULES
- DETECT FRAUD
- AVOID IMPERSONATION

The Remote Cash Deposit Service offered by financial institutions allows business accountholders to:

- WITHDRAW FUNDS FROM THEIR CUSTOMERS
- DEPOSIT CASH IN SPECIALIZED SAFES AT THEIR BUSINESS LOCATION
- SORT DATA
- REARRANGE DATA ELEMENTS
- SKIP, I DO NOT KNOW

In order to provide wire transfer services, financial institutions are required to:

- VERIFY THAT ACTIVITY IS CONSISTENT WITH THE BUSINESS COMPETITION OF THE CUSTOMER
- REGISTER WITH THE INTERNATIONAL MONETARY FUND
- MAINTAIN LOGS OF ALL WIRE TRANSFER ACTIVITY
- NOT SPECIFY THEY ARE THE ORIGINATOR, INTERMEDIARY, OR BENEFICIARY BANK
- SKIP, I DO NOT KNOW

Relevance Rating

Please rate the relevance of each item below to the effectiveness of the controls around Electronic Funds Transfer (EFT) Operations. Assume that each item can be associated with transactions that are material in dollar amount.

	Extremely Irrelevant	Irrelevant	Somewhat Irrelevant	Neutral	Somewhat Relevant	Relevant	Extremely Relevant
Immediate supervisors and the supervisor's manager inspect and authorize employee travel reimbursement before reimbursements are input into the system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A legacy system does not transfer hash totals, control totals, and record counts to a new EFT ERP module.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human resource and employee benefits hotline personnel verify the identity of all callers before entering into phone conversations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wire transfers can be sent without authorization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PIN system was modified to restrict personnel access to the Human Resource system via the company's Intranet after three failed login attempts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical security limits access to blank purchase order and supplies received to appropriate personnel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Predetermined decision rules in the IT system are used for purchase orders. Changes to this process are documented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraud prevention department personnel attend mandatory fraud training on a routine basis and notify accountholders of dubious account activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT staff is familiar with the new software application that manages travel expense files.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New automated fraud prevention technology is used to monitor card usage, card activation, and inactive accounts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Evidence Source test

Read each item below and rate the extent to which the control risk source of each item below is associated with automated processes (A) and/or manual processes (M).

Rate the extent to which the control risk associated with each item below is due to automated controls (A) and/or manual control processes (M).

	100%A	90%A 10%M	80%A 20%M	70%A 30%M	60%A 40%M	50%A 50%M	40%A 60%M	30%A 70%M	20%A 80%M	10%A 90%M	100%M
electronic funds transfer hash totals, control totals, and record counts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
travel expense software functionality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HR system PIN access code lockouts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verification of telephone caller identity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
automated fraud prevention technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wire transfer supervisors verify transfers before they are sent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
review and authorization of travel expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
fraud prevention department personnel ability to minimize accountholder losses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
change controls and decision rules over system-generated purchase order decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
physical security over purchase order forms and supplies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B

HUMAN SUBJECTS APPROVAL

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 4/14/2008

To: Daniel Selby

Address: 904 Park View Drive, Tallahassee, FL 32311
Dept.: ACCOUNTING

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
The Effects of Auditor Type and Evidence Type: Mitigating the Influence of Irrelevant Evidence on Auditors' Perceptions of Internal Control Weaknesses

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 4/8/2009 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and

approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Greg Gerard, Advisor
HSC No. 2008.1289

APPENDIX C

PEARSON CORRELATION MATRIX FOR ALL PARTICIPANTS

	1 <u>AutoEFF</u>	2 <u>ManEFF</u>	3 <u>AutoRMM</u>	4 <u>ManRMM</u>	5 <u>AutoHours</u>	6 <u>ManHours</u>
1	1.00000	0.35576 .0016	0.42694 .0001	0.05088 .6624	0.17838 .1231	-0.02921 .8022
2	0.35576 .0016	1.00000	-0.02206 .8500	0.29475 .0097	0.24912 .0300	0.39130 .0005
3	0.42694 .0001	-0.02206 .8500	1.00000	0.31749 .0052	0.32904 .0002	-0.18513 .0627
4	0.05088 .6624	0.29475 .0097	0.31749 .0052	1.00000	0.42138 .0002	0.21459 .0447
5	0.17838 .1231	0.24912 .0300	0.32904 .0037	0.42138 .0002	1.00000	0.23097 .0447
6	-0.02921 .8022	0.39130 .0005	-0.18513 .1094	0.21459 .0627	0.23097 .0447	1.00000

Notes

- 1 = AutoEff = Effectiveness ratings based on automated control evidence
- 2 = ManEFF = Effectiveness ratings based on manual process evidence
- 3 = AutoRMM = Risk of material misstatement estimates based on automated control evidence
- 4 = ManRMM = Risk of material misstatement estimates based on manual process evidence
- 5 = AutoHours = Ratings of the hours necessary to effectively audit internal controls based on automated Control evidence
- 6 = ManHours = Ratings of the hours necessary to effectively audit internal controls based on manual process evidence

APPENDIX D

PEARSON CORRELATION MATRIX FOR IT AUDITORS

	1 <u>AutoEFF</u>	2 <u>ManEFF</u>	3 <u>AutoRMM</u>	4 <u>ManRMM</u>	5 <u>AutoHours</u>	6 <u>ManHours</u>
1	1.00000	0.33093 .0643	0.66139 <.0001	0.22651 .2125	0.12602 .4919	-0.12804 .4850
2	0.33093 .0643	1.00000	0.25741 .1549	0.55673 .0009	0.57378 .0006	0.39638 .0247
3	0.66139 <.0001	0.25741 .1549	1.00000	0.35588 .0456	0.29708 .0987	-0.20465 .2612
4	0.22651 .2125	0.55673 .0009	0.35588 .0456	1.00000	0.48889 .0045	-0.07301 .6913
5	0.12602 .4919	0.57378 .0006	0.29708 .0987	0.48889 .0045	1.00000	0.01956 .9154
6	-0.02921 .4850	0.39130 .0247	-0.18513 .2612	0.21459 .6913	0.23097 .9154	1.00000

Notes

- 1 = AutoEff = Effectiveness ratings based on automated control evidence
- 2 = ManEFF = Effectiveness ratings based on manual process evidence
- 3 = AutoRMM = Risk of material misstatement estimates based on automated control evidence
- 4 = ManRMM = Risk of material misstatement estimates based on manual process evidence
- 5 = AutoHours = Ratings of the hours necessary to effectively audit internal controls based on automated Control evidence
- 6 = ManHours = Ratings of the hours necessary to effectively audit internal controls based on manual process evidence

APPENDIX E

PEARSON CORRELATION MATRIX FOR FINANCIAL AUDITORS

	1 <u>AutoEFF</u>	2 <u>ManEFF</u>	3 <u>AutoRMM</u>	4 <u>ManRMM</u>	5 <u>AutoHours</u>	6 <u>ManHours</u>
1	1.00000	0.34539 .0217	0.32119 .0335	-0.04957 .7493	0.21167 .1678	-0.02566 .8687
2	0.34539 .0217	1.00000	-0.13882 .3688	0.16459 .2857	0.08367 .5892	0.33512 .0262
3	0.66139 .0335	0.25741 .3688	1.00000	0.35588 .0298	0.29708 .0182	-0.20465 .4520
4	-0.04957 .7493	0.16459 .2857	0.32794 .0298	1.00000	0.39480 .0080	0.34935 .0201
5	0.21167 .1678	0.08367 .5892	0.35445 .0182	0.39480 .0080	1.00000	0.38283 .0103
6	-0.02566 .8687	0.33512 .0262	-0.11636 .4520	0.34935 .4520	0.38283 .0103	1.00000

Notes

- 1 = AutoEff = Effectiveness ratings based on automated control evidence
- 2 = ManEFF = Effectiveness ratings based on manual process evidence
- 3 = AutoRMM = Risk of material misstatement estimates based on automated control evidence
- 4 = ManRMM = Risk of material misstatement estimates based on manual process evidence
- 5 = AutoHours = Ratings of the hours necessary to effectively audit internal controls based on automated Control evidence
- 6 = ManHours = Ratings of the hours necessary to effectively audit internal controls based on manual process evidence

APPENDIX F

MULTIVARIATE TESTS

<u>Effect</u>		<u>F</u>	<u>Hypothesis df</u>	<u>Error df</u>	<u>sig.</u>
Intercept	Wilk's Lambda	19.347	6	69	<.0001
Auditor Type	Wilk's Lambda	1.709	6	69	.132

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Zukier, H. and D.L. Jennings. 1984. Nondiagnostic and Typicality Effects in Prediction. *Social Cognition* 2 (3): 187-198.

BIOGRAPHICAL SKETCH

Daniel D. Selby, CPA (Active Licenses in California and Florida)

Education

Current Florida State University, Ph.D – Accounting
2001 Florida State University, MAcc – Accounting Information Systems
1991 Norfolk State University, BS – Accounting

Working Papers

“The Effects of Domain Knowledge on Judgments of Relevant Internal Control Weaknesses, Subsequent Audit Judgments, and the Potential for Audit Failure.”

“Earnings Distribution Discontinuity and Audit Committee Independence: An Empirical Analysis of Earnings Smoothing Versus Accounting Conservatism.”

“Effects of Media Richness on Decision Performance in an Accounting Task Requiring Judgment.”

Dissertation

“The Effects of Auditor Type and Evidence Type On the Influence of Irrelevant Internal Control Evidence and the Potential for Audit Failure.”

Publication at Non-Refereed Journal

“Sys Trust Liability.” *Florida State University Business Review*. 2001.

Invited Participation at Conferences and Research Presentations

Accounting Doctoral Student Association Annual Conference in Anaheim, California (August, 2008), Presenter, “The Effects of Auditor Type and Evidence Domain: Mitigating the Influence of Irrelevant Evidence on Auditors’ Perceptions of Internal Control Weaknesses.”

Florida State University Accounting Research Colloquium in Tallahassee, Florida (June 9, 2008), Presenter, “The Effects of Auditor Type and Evidence Type: Mitigating the Influence of Irrelevant Evidence on Auditors’ Perceptions of Internal Control Weaknesses.”

American Accounting Association Accounting Information Systems Section New Scholars Consortium in Savannah, Georgia (January 2007), Presenter, “Untitled Dissertation Proposal.”

American Accounting Association Auditing Section Midyear Meeting in New Orleans, Louisiana (January, 2005), Discussant, “Changes in Audit Committee Financial Expertise” by Mike Braswell and Elaine Mauldin.

Accounting Doctoral Student Association Annual Conference in Orlando, Florida (August, 2004), Presenter, “Richness and Small Accounting Groups: An Analysis of Accountant Judgmental Decision Performance.”

Florida State University Accounting Research Colloquium in Tallahassee, Florida (September 2004), Presenter, “Effects of Media Richness on Decision Performance in an Accounting Task Requiring Judgment.”

Employment

Fall 2009	University of Richmond, Assistant Professor
2006 – 2009	Florida A&M University, Visiting Assistant Professor
2000 – 2007	Florida State University, Teaching and Research Assistant
1999 – 2000	Honeywell, Senior Financial Analyst, Los Gatos, CA
1997 – 1999	Hewlett-Packard, Senior Financial Analyst, Cupertino, CA
1995 – 1997	Bank of America, Internal Auditor, San Francisco, CA
1994 – 1995	Williams, Adley & Co., Auditor, Oakland, CA
1992 – 1994	AT&T, Corporate Accounting Associate Manager, Morristown, NJ
Spring 1992	Cypress Hills Tax Center, Tax Preparer, Brooklyn, NY
Fall 1991	Norfolk State University, Internal Audit Dept., Intern, Norfolk, VA
Summer 1991	ABC Capital Cities, Accounting Intern, New York, NY
Summer 1990	ALCOA, Accounting Intern, Pittsburg, PA

Teaching Experience

Fa08-Spr09	Seminar In Advanced Auditing (2 sections), Auditing and Assurance (4 sections)
Fa07-Sum08	Intermediate Acctng I (4 sections), Managerial Accounting (3 sections)
Spr07	Intermediate Accounting I, Intro to Financial Accounting (2 sections)
Spr06	Intermediate Accounting I (2 sections)
Spr05-Fa05	Cost Accounting for Decision Making (5 sections)
Sum03–Fa04	Introduction to Managerial Accounting (8 sections)
Sum02	Introduction to Financial Accounting
Spr02	Introduction to Financial Accounting, Teaching Assistant (2 sections)
Fa00– Spr01	Introduction to Financial Accounting, Teaching Assistant (4 sections)

Grants, Fellowships, and Awards

2008	FSU Dissertation Research Grant
2007	Deloitte Trueblood Seminar for Professors
2005	College of Business Doctoral Student Teaching Award
2004	Grady Rea Endowed Memorial Scholarship
2003 – 2007	AICPA Doctoral Fellow
2001 – 2006	KPMG FSU Doctoral Fellow
2000 – 2004	Wilson Assistantship

Reviewing and Service

2009	Reviewer, <i>American Accounting Association AIS Section Midyear Meeting</i> in Charleston, South Carolina
2005	Reviewer and Discussant, <i>American Accounting Association Auditing Section Midyear Meeting</i> in New Orleans, Louisiana
2003 – 2005	Conference Planning Committee, Accounting Doctoral Student Association
2003 – 2004	Business School Seat #1, Florida State University Congress of Graduate Students
2007 – 2009	Board Member, Girl Scouts of America, Apalachee Bend
2002 – present	Board Member, SafeChild Foundation
1997, 1998	Interviewer, Accounting Career Awareness Program (ACAP)
1992, 1993	Visiting Professor, Black Executive Exchange Program (BEEP)

Certification and Professional Associations

2006 – present	Florida Institute of Certified Public Accountants
2001 – present	American Accounting Association
2001 – 2009	FSU Doctoral Business Student Association
1997 – present	California State Board of Accountancy
1998 – present	California Society of Certified Public Accountants
1998 – 2000	American Institute of Certified Public Accountants
1987 – 1999	National Association of Black Accountants

Personal

Married to Tangela Billups-Selby since 1995

We have two daughters and a son: Nyla, 11; Tiye, 9; and Adam, 3.