

Use of Specialists on Audit Engagements: A Research Synthesis and Directions for Future Research

Candice T. Hux, Ph.D.
Northern Illinois University
chux@niu.edu

June 2017

ABSTRACT

This synthesis covers academic research on the use of valuation, tax, information technology (IT), and forensic specialists on audit engagements. The importance and role of specialists on audit engagements have recently increased, and specialist use has garnered significant attention from regulators and academics. Given the PCAOB's (2017b) recent proposal to revise auditing standards regarding specialists' involvement, it is important to review the specialist literature as a whole. By integrating research across these four domains, I identify commonalities and differences related to: (1) factors associated with the use of specialists on audit engagements (including the nature, timing, and extent of use); (2) factors impacting auditors' interactions with specialists (including specialists contracted by the auditor or management); and (3) outcomes associated with the use of specialists. This integrated analysis of the specialist literatures shows variation in the use of specialists, and various factors affecting both *if* and *how* they are involved and whether auditors use specialists internal or external to the audit firm. Additionally, research has sometimes (but not always) linked specialist involvement to higher audit quality. The commonalities and areas of variation identified are informative to audit research and practice, particularly as regulators and audit firms look to improve the quality of audits using specialists. Throughout the synthesis, I also provide a number of directions for future research.

KEYWORDS: specialist; expert; management's specialist; audit quality

1. Introduction

The specialist's role on audit engagements has recently assumed greater significance, and is a topic of ongoing discussion among academics and regulators, including proposed changes to the auditing standards regarding the use of specialists (PCAOB 2017b). Specialists are experts who may perform a range of duties on audits, such as helping auditors to assess risk and

performing testing procedures. Yet, because specialists are not formally audit personnel, the auditor assumes responsibility for the specialist's work in supporting the audit opinion, and using specialists does not always translate to higher audit quality (Boritz, Kochetova-Kozloski, & Robinson 2015).¹ Therefore, the importance of specialists on audits and the increased interest in specialists' involvement motivate this review.

Based on research and reports from accounting firms (Boritz, Robinson, Wong, & Kochetova-Kozloski 2016; Deloitte 2016; PwC 2016), the most commonly used specialists on audits are those in valuation, tax, IT audit, and forensic.² Currently, the research in these four specialist domains is largely growing independently of each other. Given the increased interest in specialists' involvement and the PCAOB's (2017b) proposed standard revision, it is important to evaluate the specialist literature as a whole. Therefore, the primary purpose of this review is to synthesize research in these four specialist domains. In doing so, I also identify commonalities across these literatures and (if applicable) where unique findings in one specialist domain could help inform research in other domains, and thus increase the generalizability of certain research findings. I organize the collective specialist findings according to: (1) factors associated with auditors' use of specialists on an audit engagement (including the nature, timing and extent of involvement); (2) factors impacting auditors' interactions with specialists (including specialists contracted by the auditor or management); and (3) outcomes associated with specialist use.

First, across the four specialist domains, the following five factors commonly contribute (alone or in combination) to auditors' use of specialists: (1) the need for specific skills/expertise;

¹ Throughout the paper, the terms "auditor", "auditors", and "audit team" refer to the core financial statement audit personnel. Additionally, when I discuss specialists' use or involvement, this includes both the decision of whether to involve and considerations about the nature, timing, and extent of the specialists' involvement.

² I do not review the role of industry specialization, which is a characteristic of auditors, or other specialists that may contribute to a financial statement audit (e.g., actuaries, engineers) or sustainability audit, as those specializations appear less common in a financial statement audit based on research and accounting firm reports.

(2) complexity; (3) risk; (4) budget; and (5) firm guidance/aids. While the first three common factors are consistent with auditing standards on using specialists (PCAOB 1994: AS 1210: IFAC 2015: ISA 620), the standards do not show the multidimensionality of these factors. However, across the specialist research, “risk” is categorized by account-, process-, audit-, and client-related characteristics, and studies measure those characteristics differently (e.g., materiality, new client, management’s knowledge). This shows the different elements that auditors consider when using specialists. Further, research finds variation in the nature, timing, and extent of specialist use, thus not a “one-size-fits-all” approach. For example, the nature of valuation and forensic specialists’ work varies from providing advice to auditors (i.e., a consulting role) to actually performing audit tests (Cannon & Bedard 2016; Jenkins, Negangard, & Oler 2016; Asare & Wright 2016). Further, IT audit and forensic specialists sometimes review auditors’ work, and thus are involved beyond the audit planning and testing phases (Bauer & Estep 2014; Jenkins et al. 2016; Asare & Wright 2016). Whether other specialists also perform these various duties is an important empirical question; further research on this topic would increase our understanding of the specialists’ role on audit engagements and potentially identify other duties. Additionally, there is variation in involvement based on audit firm size (Glover, Taylor, & Wu 2017; Janvrin, Bierstaker, & Lowe 2008, 2009) and location (Axelsen, Green, & Ridley 2017).

Future research could also examine the *inherent* variation in specialists’ involvement, which could generalize to other specialist domains. Valuation and tax specialists’ involvement is typically at the account or transaction level (e.g., determining the reasonableness of a fair value or tax position), whereas IT audit and forensic specialists are often involved at the entity and process level by considering issues pervasive to the client’s operations and internal controls over

financial reporting (ICFR). Thus, while the subject matter differs among these domains, there are overlapping elements in using these specialists that can inform research across other domains.

Second, studies of auditor-specialist interactions across all domains emphasize coordination and communication as key factors influencing the effectiveness of those interactions (Bauer & Estep 2016; Boritz Robinson, Wong, & Kochetova-Kozloski 2016; Griffith, Hammersley, & Kadous 2015). Coordination and communication also influence other factors commonly found among the specialist literatures that affect these interactions (e.g., budget overruns, supervision, and trust). Additionally, some research finds that auditors lack an understanding of specialists' work and their value to the audit (Bauer & Estep 2016; Griffith et al. 2015; Griffith 2016a; Jenkins et al. 2016; Vendirzyk & Bagranoff 2003), both of which likely affect audit quality and the firm culture. Future research could identify mechanisms that can facilitate better interactions, and thus improve audit quality. For example, recent studies examine how valuation specialists' communications affect auditors' decisions (Griffith 2016b; Joe et al. 2017), but examining these effects in other specialist domains would increase the generalizability of these findings (i.e., is it a "valuation-specific issue" or a general issue affecting the broader use of specialists). Also, much of our understanding of auditor-specialist interactions is based on larger audit firms, where auditors tend to use specialists internal to the firm because they have the resources in-house (e.g., Glover et al. 2017). Further understanding is needed on auditors' interactions specialists external to the firm and management's specialists.³

Third, the use of and interaction with specialists across these four domains have important consequences, particularly audit quality (Boritz et al. 2016; Griffith 2016a; Stoel,

³ While research on management's specialists is limited, emerging studies reveal that the perceived credibility of management's specialist (Brown-Liburd, Mason, & Shelton 2014; Griffith 2016b), the proximity of the specialist (Weisner & Sutton 2015), the specialist's report format (Joe, Vandervelde, & Wu 2017), and messaging from firm leadership (Pyzoha, Taylor, & Wu 2016) can influence auditors' judgments.

Havelka, & Merhout 2012). Research suggests that specialist involvement can lead to higher-quality fraud brainstorming (Brazel, Carpenter, & Jenkins 2010), increased identification of ICFR deficiencies and material misstatements (Jenkins et al. 2016), and increased support for proposed audit adjustments (Cannon & Bedard 2017). However, specialist use does not *always* yield higher audit quality (Boritz et al. 2015). Future research could also explore potential drawbacks of specialist use (e.g., audit inefficiencies and over-auditing) and negative audit outcomes (e.g., auditors trusting the specialists' work too much). Therefore, further understanding of how and when specialists contribute to audit quality, including triangulation using other research methods and to other domains, is needed. For example, outside of the IT audit specialist literature, we lack understanding of whether and how specialists contribute to auditors' assessments of clients' ICFR quality (which is particularly important for accurate reporting of fair values and taxes). Similarly, in the tax literature, almost all issues relating to audit quality are studied in the *non-audit* services context, with little attention to tax specialists' involvement on *audit* engagements.

In sum, this paper contributes to the accounting literature by integrating extant research and identifying future research opportunities regarding auditors' decisions to use specialists, the auditor-specialist interaction, and the consequences of specialist use. This synthesis also benefits practice by identifying important aspects and issues of using specialists and is timely for regulators in revising the auditing standards governing specialist use (PCAOB 2017b).

Section 2 discusses auditors' responsibilities when using specialists. Section 3 presents the methodology used to prepare this review and the variation of methods employed in the specialist literatures. Sections 4 to 6 synthesize research in the three topic areas and include future research suggestions. Section 7 concludes and discusses contributions of this review.

2. Auditors' Responsibilities When Using Specialists

PCAOB AS 1210 (1994) and ISA 620 (IFAC 2015c) state that auditors should exercise professional judgment when deciding to engage a specialist, and provide general procedures auditors should perform when using a specialist.⁴ Interestingly, the guidance on specialist use diverges on three key areas: (1) auditor's versus management's specialist⁵; (2) whether the specialist is engaged or employed (i.e., external or internal to the audit firm, respectively); and (3) tax and IT audit specialists versus other specialty areas. Figure 1 (adapted from PCAOB 2015a, 2017b) summarizes these key differences and the guidance applicable for each scenario.

Insert Figure 1 About Here

The first two areas of divergence in the guidance on specialist use are important because specialist use is not uniform across the profession. For example, in engagements inspected in 2015, the PCAOB (2017b) reports considerable variation in specialist use by audit firm size. In large, global accounting firms, at least one auditor specialist was used in about 85 percent of audits and the firm almost always employed the specialist.⁶ In contrast, for smaller accounting firms, the auditors used a specialist in about seven percent of audits, and in most cases the firm engaged an external specialist. Among the smaller accounting firms, the PCAOB (2017b) also reports that the auditors used the work of management's specialist in about ten percent of audits inspected. These statistics are qualitatively similar to 2014 PCAOB inspection data (PCAOB 2015a). Because the PCAOB inspection data is not a random sample, these statistics may not apply to the general population of companies or specialist use. However, selection for inspection is based on risk, so this provides some evidence that specialists are used on engagements of

⁴ International auditing standards refer to specialists as "experts". For consistency, I use the term specialist throughout this review.

⁵ Management's specialists could be internal to the company, such as an IT auditor who is part of the company's internal audit function (Weisner & Sutton 2015), or a third party (i.e., external to the company). Management may hire external specialists to perform various tasks, such as: estimating the fair values (e.g., business acquisitions or financial instruments), testing the company's internal controls for SOX compliance, or preparing the tax provision.

⁶ The PCAOB (2015a, 2017b) does not report the percent of audits by large, global accounting firms where auditors used management's specialists.

certain characteristics, but not on all engagements. Therefore, auditors must decide when and how to engage various specialists.

Using the inspection data as an illustrative example, smaller accounting firms are more likely to engage external audit specialists and occasionally use management's specialist. The use of an *external specialist engaged by the auditor or management's specialist* (regardless of internal or external to the management) requires using the guidance AS 1210, *Using the Work of a Specialist* (PCAOB 1994), which instructs auditors to evaluate the specialist's qualifications and to obtain an understanding of work performed.⁷ However, this standard does not govern the use of work performed by the *internal specialists employed by the firm* (PCAOB 2017b), which is common among large accounting firms (Griffith 2016a). When using internal specialists, AS 1201, *Supervision of the Audit Engagement*, mandates that auditors supervise work performed by these specialists, including informing specialists of their responsibilities and reviewing their work (PCAOB 2010b). However, research shows that auditors tend to question what constitutes appropriate supervision and/or assessment of work performed (Glover, Taylor, & Wu 2015). Based on the recently proposed amendments to these standards, the PCAOB intends to retain this bifurcation based on external specialists (subject to AS 1210) and internal specialists (subject to AS 1201), but is seeking the public's opinion. Using work performed by management's specialists will also be subject to AS 1210 and AS 1105, *Audit Evidence* (PCAOB 2010a).

The third divergence arising from current PCAOB and ISA standards on specialist involvement is that while firms tend to consider tax and IT audit professionals as specialists (Joe et al. 2015), regulators do not (PCAOB 1994; IFAC 2015c). Rather, regulators define a specialist as an expert in a subject matter *outside* of accounting and auditing (e.g., valuation, engineering,

⁷ These requirements are consistent with ISA 620 (IFAC 2015c), which applies to *auditor's specialist*, and ISA 500, which applies to using work performed by *management's specialists* (IFAC 2015b). International auditing standards do not differentiate between internal or external to the firm).

actuarial determinations). Therefore, the use of a tax or IT audit professional necessitates guidance from AS 1201 on engagement supervision (PCAOB 2010b) and ISA 220 on quality controls (IFAC 2015a), and not the specialist standard, AS 1210 (PCAOB 1994). Under the PCAOB's (2017b) proposal, AS 1201 would still apply to tax and IT audit specialists, regardless of whether they are employed or engaged, and as mentioned above, would apply to the use of *internal* specialists (e.g., a valuation specialist employed by the firm). This suggests that the PCAOB perceives some commonality in issues faced by auditors when using internal specialists across these specialty domains. The amendments do not explicitly state where forensic specialists would fall among these various standards.

In light of the divergence between practice and regulatory standards, and proposed amendments to regulatory standards, it is important to jointly review the rapidly growing academic literature examining auditors' judgments of why and how they use these four types of specialists on engagements and the effects on audit quality.

3. Method and Sample Description

I followed literature review guidelines outlined by Andiola, Bedard, and Hux (2016). First, I read prior reviews within each of the four domains to understand research on each type of specialist.⁸ Second, to identify research for inclusion, I searched Google Scholar using the keywords "*specialist*" and "*expert*", and these keywords in combination with: *valuation*, *tax*, *IT*, *computer assurance*, *fraud*, and *forensic*, including all research methods in the search. I also searched for reference to the relevant auditing standards (i.e., PCAOB 1994: AS 1210: IFAC 2015: ISA 620). To identify emerging specialist studies, I searched the Social Science Research

⁸ Those reviews are: Asare, Fitzgerald, Graham, Joe, Negangard, & Wolfe (2013); Bratten, Gaynor, McDaniel, Montague, & Sierra (2013); Trompeter, Carpenter, Desai, Jones, & Riley Jr. (2013); Christensen, Glover, & Wood (2012); Curtis, Jenkins, Bedard, & Deis (2009); Hogan, Rezaee, Riley, Jr. & Velury (2008); Martin, Rich, Wilks (2006); Messier, Jr. (2010).

Network and presentations at recent academic conferences. Lastly, I used the discussion of prior literature and reference list in each paper to verify that my sample is complete.⁹

Within the sample, two interesting observations are apparent. First, the frequency of studies examining certain specialists varies considerably. Only one empirical paper, Boritz et al. (2016), analyzes the interaction between auditors and multiple specialist types.¹⁰ The second observation is the variation in research methods employed among the specialist literatures. Figure 2 shows the variation in and volume of research and methods among the literatures. For example, in the valuation, IT audit, and forensic specialist literatures, only qualitative (e.g., interview, survey, and questionnaires) and experimental methods are used. This method choice is likely due to the limited data availability, as the use of these specialists is not publicly reported. Alternatively, most of the tax specialist literature is archival-based and studies audit outcomes from tax specialists' *non-audit* tax services (NATS) rather than *audit* services, likely due to publicly available NATS fees. Due to its focus on NATS, research on tax specialists' interactions with auditors and involvement on audit engagements is scarce. The type of research method employed is important because qualitative and experimental methods permit studying interpersonal relationships and team dynamics among auditors and specialists, whereas archival studies focus on firm-level characteristics and outcomes of these processes. As I discuss below, the variation in research methods used among the literatures calls for future research, particularly by triangulating prior findings with different research methods (e.g., using factors identified in interview or survey studies to build experimental designs).

⁹ Some of the studies identified and included in this review are also contained in prior syntheses on related subject matters (e.g., IT, fraud, and valuation). However, this synthesis differentiates from those prior syntheses as I only focus on specialist involvement and analyze research across several specialist types.

¹⁰ Boritz et al. (2016) compare and contrast responses from auditors and the four general types of specialists to offer broad insight regarding specialist involvement on audits. While some differences among the various specialists are expected given the nature of the work performed, they find several similarities that underlie the opinions of auditors and the specialists regarding their interactions. Their findings are discussed in the applicable sections below.

Insert Figure 2 About Here

After reviewing each study in the sample, I categorized the findings according to three topic areas: (1) factors associated with auditors' use of specialists on an audit engagement, including the nature, timing, and extent of specialist use, (2) factors impacting the auditors' interactions with specialists, and (3) outcomes associated with the use of specialists. The Appendix summarizes the papers included in this synthesis, ordered by author name, with reference to each section where the work is discussed. I discuss the three topic areas next.

4. Factors Associated with Auditors' Use of Specialists

Specialists' use on audits involves several considerations. First, auditors must *recognize* when a situation warrants specialist involvement. Beyond that initial binary decision, auditors must also make judgments as to the *nature*, *timing*, and *extent* of that involvement. As noted above, specialists are not always used on engagements (PCAOB 2015a, 2017b), therefore understanding the factors affecting how and when to involve specialists is important. Surveying the individual specialist literatures, I find some commonality in factors leading to the use of specialists in an audit engagement, suggesting a systematic decision process. Table 1 shows the five common factors: (1) the need for skills and expertise; (2) complexity; (3) risk; (4) budget; and (5) firm guidance/decision aids. The first three factors are consistent with auditing standards (PCAOB 1994: AS 1210: IFAC 2015: ISA 620). While the standards discuss these factors in broad terms, the specialist research shows interesting variation in how these factors are assessed and measured (e.g., account- versus process-level complexity), which sheds additional light on the different elements auditors consider when using specialists.

Insert Table 1 About Here***4.1. Need for Specific Skills/Expertise***

Specialists possess skills and knowledge on specific subject matters and contexts, including task- or domain-specific expertise, and/or industry/regulatory expertise. Consistent with auditing standards on specialists (PCAOB 1994: AS 1210: IFAC 2015: ISA 620), auditors' need for expertise on certain matters or contexts is a key factor influencing specialist use on audits. These specialists also serve a wide variety of clients, which can benefit audit procedures. For example, specialists build competencies performing various non-audit services for non-audit clients, such as valuation work and tax provision advice, and they can leverage that expertise gained from those non-audit services to better assist the auditors (PwC 2016). Further, while tax and IT are currently considered accounting areas that are not within the scope of specialists in audit standards (PCAOB 1994: AS 1210: IFAC 2015: ISA 620), what becomes apparent from the findings below is that these areas are highly specialized, which lends support for clarifying guidance on specialist use.

In U.S. and international settings, a number of studies (Boritz et al. 2016; Glover et al. 2017; Griffith et al. 2015; Griffith 2016a; Kumarasiri & Fisher 2011) note that auditors tend to lack valuation knowledge, which leads to specialist involvement to help auditors understand and test the client's fair value measurements (FVMs; e.g., financial instruments, acquisitions, and impairments).¹¹ For example, valuation specialists are involved in developing independent estimates (Cannon & Bedard 2017), testing management's assumptions, and evaluating the preparer's credibility (Griffith 2016a). For higher risk FVMs, specialists often perform a combination of these procedures (Glover et al. 2017). Alternatively, valuation specialists could assume a consultative role, providing advice to the audit team (Cannon & Bedard 2017). Valuation specialists' industry and regulatory knowledge is also a driving factor for their audit

¹¹ While auditing standards do not require specialist use, auditors often recognize the need for valuation expertise and thus tend to employ a valuation specialist, particularly more than their clients (Cannon & Bedard 2017).

involvement (Boritz et al. 2016; Griffith 2016a). For large audit firms, valuation expertise is often available in-house, whereas non-Big 4 firms, including firms in developing countries, tend to engage an *external* specialist (Griffith 2016a; Glover et al. 2017; Kumarasiri & Fisher 2011).

Next, auditing the tax provision requires extensive knowledge of tax law (often domestic and international) and a thorough understanding of U.S. GAAP (Maydew & Shackleford 2007). Also, Boritz et al. (2016) find that tax specialists' expertise in the tax regulatory environment tends to drive their involvement on an audit engagement. Outside of their study, the tax literature has not previously considered factors affecting tax specialists audit involvement. This literature gap is important because taxes are pertinent to many areas of a client's business and a challenging audit area (e.g., Bedard, Hoitash, Hoitash, & Westermann 2012; Graham & Bedard 2015). Thus, further study is needed to determine how differing client financial and operating characteristics and components of the tax provision affect need for specialists with a particular expertise (e.g., tax law in international jurisdictions, transfer pricing, uncertain tax positions).

Regarding IT, prior research also finds that these specialists' involvement is a function of their domain-specific expertise and industry expertise (Bauer & Estep 2016; Boritz et al. 2016). Their expertise in IT systems and related internal controls enables them to more adequately respond to IT risks than financial auditors (Selby 2010) and also to effectively review the auditors' testing (Bauer & Estep 2016). While these specialists can help auditors with responding to IT risks, evidence also suggests that the auditors' knowledge of IT systems is important to audit planning and overall IT audit quality (Stoel et al. 2012). For example, the auditors' IT knowledge affects how auditors effectively respond to IT risks and determine the nature, timing, and extent of specialists' involvement (Brazel & Agoglia 2007). Nevertheless, while IT audit specialists' expertise is important and often needed, studies find that involvement of these

specialists on an audits varies by firm size, with Big 4 firms using IT audit specialists more than smaller firms (Janvrin 2008, 2009). This could be attributed to the types of clients audited by the various firms or the availability of this expertise within firms. Additionally, firms in various international jurisdictions do not always have the expertise in house, thus needing to engage external specialists (Axelsen, Green, & Ridley 2017). Further study is needed to understand how auditors assess their own expertise and the specialists' expertise and how the use and type of IT audit specialists (internal versus external) varies by firm sizes and locations.¹²

Lastly, forensic specialists possess unique skills and expertise in uncovering and testing for fraud. Similar to some findings in the IT context, auditors' experience and fraud knowledge may affect their decision to use a specialist. Sakalauskaite and Stuart (2016) find that auditors are less likely to involve a forensic specialist when the fraud relates to fraudulent reporting than when it relates to misappropriation of funds; this decision about the specialist's involvement is affected by the auditors' experience with improper revenue recognition. Further, the nature of forensic specialists' involvement can vary considerably, as the involvement could be consultative or they could actually performing procedures (Jenkins et al. 2016; Asare & Wright 2016), similar to valuations specialists as noted above. For example, a forensic specialist could be engaged to help auditors with: (1) fraud brainstorming and identifying how fraud could occur; (2) fraud-related inquiries of management; (3) design and performance of testing procedures to address fraud risks (e.g., document authentication); (4) defining fraud attributes in a dataset; and (4) review of problem areas and fraud-related testing performed by the auditors (Jenkins et al. 2016; Asare & Wright 2016). These findings suggest that auditors' relative experience and their

¹² Appelbaum, Kogan, & Vasarhelyi (2016) highlight the importance of big data and data analytics in the audit environment, which is another type of IT and statistical expertise needed on engagements. Research on how auditors are engaging data analytics professionals (or acquiring this skillset) and audit quality implications is a timely topic.

perceived expertise in the relevant subject matter can influence the nature, timing, and extent of forensic specialists' involvement on the engagement.

In summary, the extant literature finds that consistent with auditing standards (PCAOB 1994: AS 1210: IFAC 2015: ISA 620), specialists are engaged because auditors do not have the requisite task-specific knowledge, and/or industry and regulatory expertise. While this is not surprising, three interesting observations emerge from the literature. First, auditors must *recognize* that they need certain expertise and prior research shows in various specialist settings that auditors may not engage or rely on specialists because of confidence in their own abilities or lack of confidence in the specialists' abilities. This warrants further study, particularly given potential judgment bias that auditors could exhibit.

RQ1: When auditors choose not to engage a specialist, what is the role of judgment bias (e.g., overconfidence bias) in those settings?

RQ2: Given that auditors lack expertise needed to test certain subject matters, how are auditing firms providing auditors with the technical knowledge and skills needed to adequately supervise and understand the specialists' work (e.g., through cross trainings)?

Second, the nature, timing, and extent of how auditors use the specialists' expertise vary by engagement. For example, findings above show that valuation and forensic specialists may assume a consultative versus testing role, and that specialists participate in different phases of the audit, such as planning, testing, and even potentially reviewing the auditors' work (as seen in IT audit and forensic research). Future studies could build on these findings in the tax setting, where the consultative role could be more pronounced given certain permissible NATS to audit clients. Further, whether the specialist simply advises the auditor or actually performs procedures would likely affect feelings of responsibility/accountability, supervision, and potentially costs.

RQ3: What are the implications of having specialists perform different roles (e.g., consultant, participant in risk assessment and testing, reviewer)? What do specialists

evaluate when consulting with auditors and/or reviewing auditors' testing (e.g., sufficiency of testing and/or relevance of a testing procedure to address the risk)?

Third, different aspects of expertise emerge among the specialist literatures, which warrants further study. For example, different components of the tax provision or different client profiles likely warrant specific expertise (e.g., international tax expertise). Similarly, little is known about the need of industry expertise for forensic specialists, where certain industries could represent higher fraud risk. This raises the important point that auditors may not be able to use a general specialist in these domains (e.g., a general tax specialist), but must consider who among the available specialists has the *relevant* expertise. Also, as found in multiple settings, audit firm size impacts the in-house availability of subject-matter expertise and the extent of specialist use. I discuss research related to firm size in subsection 4.6.

RQ4: What specific expertise do specialists provide for the audit, such as industry expertise for forensic specialists or specific tax expertise (e.g., transfer pricing) to audit a tax provision? Also, do auditors use a combination of internal and external specialists when only certain expertise is available in-house? If so, how does this affect auditors' judgments and behavior?

4.2. Complexity

Complexity influences the need for expertise, and thus the decision to use a specialist on an audit as well as the nature, timing, and extent of specialist use. While this factor is consistent with auditing standards (PCAOB 1994: AS 1210: IFAC 2015: ISA 620), it is important to note that the standards define complexity broadly and provide limited examples.¹³ In the specialist literatures, complexity is categorized and measured in a variety of ways, at the account or process level (e.g., judgment, models or tools used) as well as at the client level (e.g., size, industry/regulatory environment, sophistication).

¹³ According to AS 1210 (PCAOB 1994), examples of complex audit areas are: valuation, determination of physical characteristics relating to quantity or condition, determination of amounts derived using specialized techniques, and interpretation of technical requirements, regulations, or agreements (e.g., legal documents).

Complexity is often inherent in the nature of an account or reporting process, thus warranting specialists' involvement in auditing that area. For example, in the valuation setting, the complexity of FVMs is based on the estimation uncertainty, lack of verifiable evidence, the judgment involved in evaluating valuation assumptions (e.g., discount rate, risk premium, and/or comparables), and the use of proprietary valuation models by pricing services (e.g., Griffith 2016a; Cannon & Bedard 2017; Glover et al. 2017).¹⁴ FVMs can also involve forward-looking information and company-specific conditions (e.g., amount and timing of cash flows), both of which are subjective and difficult to estimate (Martin et al. 2006). Therefore, the inherent subjectivity of FVMs and the complexities in auditing these items affects valuation specialists' involvement on the audit (Griffith 2016a; Cannon & Bedard 2017; Boritz et al. 2016). Presumably, both auditors and the clients recognize the inherent complexity of FVMs, as research finds that auditors tend to always use a specialist when the client does (Cannon & Bedard 2017). However, because management's lack of valuation knowledge is a challenge of auditing FVMs (Glover et al. 2017), further study is needed to understand clients' judgments.

Valuation specialist use is also affected by client-level complexity. Entities of greater size tend to have more resources and probably better ICFR, but are likely more complex. Interestingly, limited research finds no effect of client size on valuation specialist use (Cannon & Bedard 2017), which may be due to the net effect of those characteristics. Yet, greater regulatory complexity (i.e., accelerated filer) (Cannon & Bedard 2017) and the client's industry (Boritz et al. 2016) do contribute to specialist use. This mixed evidence of client characteristics might imply that inherent features of the FVM are more important drivers of valuation specialist use than the business context in which it occurs.

¹⁴ Estimation uncertainty, lack of verifiable evidence, and industry/regulatory environment could influence the *complexity* and *riskiness* of auditing estimates and engaging specialists. For brevity, I only discuss these characteristics under the complexity factor.

Tax is another complex account-level domain warranting specialist involvement. Tax is complex due to the assumptions and estimations inherent in some tax items (e.g., uncertain tax positions and assertions about reinvestment of foreign earnings), and the continuous changes in tax guidance. Boritz et al. (2016) find that the complexity of the tax provision and the regulatory environment contribute to specialist use. However, Boritz et al. (2016) only briefly discuss these complexities in the tax context because they study several different types of specialists. Further, while tax specialists are among the most frequently involved specialists, particularly during planning and risk assessment, Boritz et al. (2016) provide evidence that tax specialists are not involved in all audits. Taken together, understanding the boundary conditions of tax specialists' audit involvement is important for future research.

Other than Boritz et al. (2016), complexity considerations leading to tax specialist involvement are examined through archival research on NATS (tax planning and compliance services) provided by the audit firm. The NATS literature differs from other studies cited in this review in two key ways: (1) that literature examines on non-audit tax involvement; and (2) the decision to engage an audit firm's tax specialist for NATS is the client's rather than the auditor's. However, this literature warrants discussion given its volume and significance in measuring client complexity and the related tax specialists' involvement on an audit client. Research finds various measures of tax and operating complexity to be associated with clients' decision to purchase NATS from their auditor, such as foreign earnings, firm size, growth opportunities, and net operating losses (Omer, Bedard, & Falsetta 2006; Lassila, Omer, Shelley, & Smith 2010).¹⁵ While complexity affects auditors and clients' decisions to use the audit firm's tax specialists for certain tax services, this construct differs in measurement granularity between the audit and

¹⁵ Following Lassila et al. (2010), many studies use measures of tax complexity in tests for selection bias (McGuire, Omer, & Wang 2012, DeSimone, Ege, & Stomberg (2012), Christensen, Olson, & Omer 2015b, Choudhary, Koester & Pawlewicz 2015) and as control variables when NATS is the dependent variable (Bédard & Paquette 2010).

NATS literatures. Complexity is measured as the overall regulatory environment and the nature of the tax provision in the limited audit literature, versus more granular and quantitative measures of complexity (e.g., firm size, foreign earnings) in NATS studies. This divergence also motivates further research on tax specialists' involvement in both audit and NATS engagements.

In contrast to FVM and tax accounts, IT audit specialists do not focus on specific accounts. Rather their involvement is at the process level, considering issues pervasive to the client's operations and financial reporting processes (e.g., testing of accounting systems). IT system complexity, system changes, and the client's reliance on these systems affect the nature and extent of IT audit specialist's involvement (Bauer and Estep 2016; Boritz et al. 2016; Axelsen et al. 2017). Additionally, certain client characteristics, such as registrant status, size, industry, and expertise lead to IT audit specialist involvement (Bauer & Estep 2016; Boritz et al. 2016; Axelsen et al. 2017). This specialist involvement is also likely influenced by SOX 404(b) requirements, which apply only to the U.S. accelerated filer public companies. In an international context, not bound by SOX 404, Axelsen et al. (2017) find that IT audit specialists are not always engaged or will only be engaged for certain types of testing (such as general computer controls, but not application controls). These international trends are likely similar to non-accelerated filer and private company audits, which are still a big section of the market. As such, considerations of process and client complexities affect the use of IT audit specialists on audits.

Forensic specialist involvement is also associated with process and client complexities. Detecting fraud is particularly complex given the processes through which fraudsters conceal the illegal activity (Trompeter et al. 2013). Auditors' decision to use a forensic specialist stems from

the nature (Jenkins et al. 2016) and significance of fraud-related issues (Boritz et al. 2016),¹⁶ and occurs on a case-by-case, potentially reactive, basis (Boritz et al. 2016). For that reason, the nature and timing of forensic specialists' involvement varies considerably (Jenkins et al. 2016) and often less frequently than the other specialists (Boritz et al. 2016).

In sum, complexity is key determinant of specialists' audit involvement, consistent with auditing standards (PCAOB 1994: AS 1210: IFAC 2015: ISA 620). Yet, complexity is difficult to compare across literatures, as it is measured broadly in some studies and narrowly in others. Complexity arises at account or process levels, from client characteristics and actions, and the nature of issues. While research cites certain characteristics as contributing to specialist use, it is unclear why certain factors affect specialist use particularly more than others. For example:

RQ5: How and why does regulatory environment contribute to complexity and specialist use? Research (outside of the SOX 404(b) context) does not fully disentangle what makes the regulatory environment complex (e.g., public issuer, industry-specific regulations).

RQ6: Why does auditor use of valuation specialists increase when the clients also use a specialist? Is this attributed to similar judgments of complexity and risk, or a reaction to client use where auditors are anticipating difficulty in auditing the FVM?

The various complexity characteristics identified can be used to further our understanding of specialist types that are less researched in the audit context (e.g., tax specialists). For example:

RQ7: What complexity factors contribute to the use of tax specialists for audit-related services? How do these factors differ from those found in the NATS literature?

4.3. Risk

In addition to complexity, the nature, timing and extent of specialist use also depend on risk, which comprises multiple dimensions, such as account or process risks, audit risks, and

¹⁶ Boritz et al. (2016) do not elaborate on the types of significant fraud issues, but presumably, the complex nature of the fraud (e.g., collusion, override of controls), the number and ranks of people involved, and the magnitude of the fraud are used to measure the degree of significance. These issues are topics that could be studied in future research.

client risks.¹⁷ These dimensions identified across the specialist research provide a better understanding of auditors' risk considerations, which can inform the PCAOB's (2017b) proposed standard amendments and future research.

Regarding valuation specialists, account-specific risks such as materiality, inherent risk, control risk, type of FVM (financial versus nonfinancial)¹⁸ drive auditors' engagement of these specialists to help audit estimates and FVMs (Boritz et al. 2016; Cannon & Bedard 2017; Griffith 2016a; Glover et al. 2017). Cannon and Bedard (2017) find that estimation uncertainty, Level 3 investments, control risk, and filing status are associated with auditors' assessment of inherent risk for FVMs. Client-level risks, such as management's expertise in determining fair value and the reputation of management's preparer, also affect the testing of FVMs, leading to valuation specialist involvement (Griffith 2016a; Glover et al. 2017). Further, research finds that these specialists are sometimes involved in audit planning and risk assessments, which can influence auditors' decision to use a specialist and the extent of that use (Griffith 2016a; Boritz et al. 2016).

Similar to the valuation setting, tax specialists' involvement occurs when the tax provision is material (Boritz et al. 2016), which increases the inherent risk of tax accounts.¹⁹ Sometimes these specialists also assist auditors during the planning and risk assessment phase (Boritz et al. 2016; Brazel et al. 2010). Despite the considerable significance and risk of accounting for taxes,²⁰ research on the risk considerations that are influencing tax specialists'

¹⁷ In a related study on functional expertise, Johnstone and Bedard (2003) find that during auditors' client acceptance decisions, the intention to assign specialists to the audit engagement is a mechanism to mitigate client risks. This provides further evidence of how client risks affect auditors' use of specialists.

¹⁸ PCAOB (2012a) inspection findings apply to both financial FVMs (e.g., financial instruments) and nonfinancial FVMs (e.g., business combinations, asset impairment). Glover et al. (2017) find that these two types of FVMs generate different audit challenges.

¹⁹ Several client-specific factors tested in the NATS literature previously described as complexity measures could also proxy for the inherent risk of taxes (e.g., foreign earnings, firm size, growth opportunities).

²⁰ ICFR surrounding taxes also contribute to overall audit risk. Research finds that ICFR deficiencies in tax accounts are more likely to be severe and to have caused a misstatement (Graham & Bedard 2015). In fact, tax continues to be

involvement is scarce. Interestingly, research on NATS clients reveals that they are sometimes hesitant to share information with tax specialists due to concern that the specialists may exaggerate risks to secure future work (Hasseldine, Holland, & van der Rijt 2011). The extent to which auditors also share this concern when deciding whether to engage a specialist is unstudied and important for studies looking at the economic bond between auditors and their clients.

IT-related risks and client-specific risks, including assessed inherent risk (Axelsen et al. 2017) and control risk (Janvrin et al. 2009), are key considerations in auditors' decisions to engage an IT audit specialist. Similar to some evidence for valuation and tax specialists, the engagement of IT audit specialists often occurs proactively, during planning and risk assessment stages (Bauer & Estep 2014; Boritz et al. 2016; Brazel et al. 2010). Specialist participation in assessing risks is important because auditors can be influenced by non-diagnostic information and not sufficiently plan for IT risks (Selby 2010). If an auditor underestimates IT risks, then testing of the system and system outputs may be inadequate. Inadequate IT testing, coupled with the extent of planned reliance on those systems and the IT-related controls, has a pervasive impact on the auditors' subsequent substantive testing, which holds consequential audit quality implications. Interestingly, Bauer and Estep (2014) find that outside of the fraud risk assessment, IT audit specialists are not involved in other fraud-related procedures, which they suggest could be a sign of underutilization of these specialists.

Identifying, assessing, and responding to fraud risks is the primary reason auditors involve a forensic specialist on an engagement given the specialists' proficiency in helping auditors manage risks (Boritz et al. 2016; Jenkins et al. 2016; Hammersley, Johnstone, & Kadous 2011; Asare & Wright 2004, 2016). The involvement can occur early in the audit, such as during

continuous source of restatements (Scholz 2014). These findings further motivate the need for understanding the determinants of tax specialists' involvement.

fraud brainstorming sessions (Brazel et al. 2010) or during the audit when certain factors are triggered (Asare & Wright 2016). These triggers are various audit- and client-specific risks, such as whether the client is new or is planning to issue an initial public offering, results of analytical testing, revamping of fraud procedures, recent restatements, an audit committee request, and investigations by regulators or law enforcement agencies (Jenkins et al. 2016; Asare & Wright 2016). Additionally, some audit partners may prefer to engage these specialists to show that the audit team appropriately responded to the fraud risks or to incorporate some unpredictability (randomized forensic involvement) (Jenkins et al. 2016). This could also suggest that the attitude and/or experience of engagement leaders are important to specialist involvement.

In sum, risk is a multi-faceted construct where various types of risk influence specialists' involvement on audit engagements. Given a risk-based audit approach, it is natural that risk is a key consideration in engaging a specialist. A more interesting issue is how auditors decide on the nature, timing, and extent of the specialists' involvement. Considering complexity and risk together, specialists' involvement on engagements could be proactive (during planning and risk assessments for tax and IT audit specialists) or reactive (when certain conditions arise for forensic specialists) (Boritz et al. 2016), and research tends to suggest that the early involvement helps identify risks and benefits the audit process. Therefore research on the benefits of engaging tax and IT specialists earlier in the audit could help inform future studies on the broader use of other audit participants (e.g., other types of specialists, component auditors, etc.). Additionally, research should examine reasons why specialists are not engaged or have limited involvement. For example, are auditors concerned that specialists will exaggerate risks to grow revenue for their respective service line? This question has interesting tension given that audit firms are a

business with a profit motive, and the literature argues that auditors' judgments could be impaired due to the economic bond between the firm and client (e.g., Gleason & Mills 2011).

RQ8: Do auditors perceive that specialists exaggerate risks to secure work or future services? If so, what contributes to this perception?

Further, while the traditional thought is that specialists assist with audit testing procedures, there is a growing literature about each of these four specialists' involvement in audit planning and risk assessments, and some evidence of specialists reviewing the auditor's work (Griffith et al. 2015; Bauer & Estep 2016; Boritz et al. 2016; Jenkins et al. 2016). For valuation and tax specialists, much of the research relates to substantive testing involvement. Although, given the risks and complexities identified for these domains, are these specialists also used in other phases such as the assessment of internal controls? This is an important question given regulators' focus on controls (PCAOB 2016) and that controls specialists are now being incorporated into inspection teams, rather than IT audit specialists (Bauer & Estep 2014).

RQ9: To what extent are specialists involved in control risk assessments and ICFR testing for complex audit areas (e.g., controls around fair value estimates and the tax provision), or do auditors usually perform these functions without specialists' assistance?

4.4. Budget

Budgetary resources and concerns resonate for all four specialists (Boritz et al. 2016; Griffith 2016a). Because specialists tend to carry higher fees, their use can quickly erode the overall audit budget. While above where I compare and contrast across the specialist types, prior research on this factor finds a disparity between *specialists and auditors' perceptions* of how fees influence specialist involvement. Specifically, auditors report that the specialist's fee does not influence the decision to use a specialist, whereas specialists believe cost does influence their involvement (Boritz et al. 2016) and is the most difficult factor for auditors to overcome (Jenkins et al. 2016). One study provides further evidence that the fees do not affect auditors' decision

whether to engage a forensic specialist, but do affect the *extent* of involvement (Sakalauskaite & Stuart 2016). Axelsen et al. (2017) also find that auditors limit the extent of IT audit specialists' involvement due to fees; or the audit team may not choose to rely on controls (thus choose not to engage the specialist at all) but rather perform a fully substantive audit to manage costs. This is important because research finds that even when controls are effective for public company audits, the audit teams do not always rely on those controls (Bedard & Graham 2011). Therefore, the specialists' involvement for some public company audits may be to satisfy regulatory requirements (i.e., test and issue an ICFR opinion), but little efficiencies are gained on the audit. Interestingly, Asare and Wright (2016) find that there is minimal cost impact from engaging specialists because of efficiencies gained from specialist use offset the higher rates. Given the mixed research findings, future research should investigate the impact of budgetary pressures and cost concerns on the decision to use a specialist, particularly in different contexts.

RQ10: How do budgetary concerns affect auditors' use of specialists in different contexts (e.g., auditor experience, client tenure, client sophistication, across specialty areas)?

4.5. Decision Aids / Firm Guidance

While auditors must exercise professional judgment when determining whether to consult with/use a specialist, research finds that some firms provide auditors with policies and/or decision aids to assist with the judgment process (Boritz et al. 2016; Griffith 2016a; Glover et al. 2017).²¹ For example, firm policy may require consultation with specialists based on the nature of the engagement (Boritz et al. 2016; Asare & Wright 2016), or on account-specific considerations such as materiality or the nature of the account/transaction (e.g., Level 2 and 3

²¹ In a study on consultations with technical experts in a fraud scenario, Gold, Knechel, & Wallage (2012) find that auditors' propensity to consult a technical expert is higher under a strict consultation requirement, but only when fraud risk is high. Thus, while guidance is intended to be mandatory by the firm, it is not uniformly applied. An important consideration is that such guidance and consultations could improve audit quality if the guidance is designed appropriately; if not designed appropriately, it could lead to inefficiencies or over-auditing.

fair values) (Griffith 2016a; Glover et al. 2017). However, such policies may differ between firms, and may not be consistently applied within firms. Boritz et al. (2016) find significant variation in the types of aids and policies among firms, specifically in regard to the length and nature of the content, aid structure, incorporation with the audit program, reference to auditing standards, and override capabilities. Similarly, some studies find little evidence that firm policy would influence engagement of a specialist (Jenkins et al. 2016), and that informal channels, such as personal networks, are more influential to specialist use (Bauer & Estep 2014).

This variation naturally suggests further study, particularly where the aids or guidance do not require strict adherence or where the aids potentially lead to differential audit quality outcomes. When guidance is not strict, do teams default to some type of “best practice” or rely on informal consultations with specialists in their personal network (Bauer & Estep 2014)? Also, how do these social bonds or other personal characteristics affect other specialists’ involvement? This is important because just as auditors need to identify who has the best expertise for the audit area, they may also consider who will be the best fit with the team and the client. Also, how do the aids help auditors recognize patterns or situations that would warrant specialist use? Drawing on the decision aid literature, auditors may become too reliant on aids, in turn affecting their decisions (e.g., Arnold, Collier, Leech, & Sutton 2004).

RQ11: What types of support (e.g., firm guidance, trainings, checklists) do firms provide auditors regarding the decision to engage specialists or the extent of specialist use? How do these tools affect the auditor’s decision-making behavior? What are the outcomes of that behavior (e.g., better audit quality, inefficiencies/over-auditing)?

RQ12: If a decision tool to determine specialist use is mandatory, do auditors override or work around the tool to arrive at a more desirable outcome? If the decision tools are not mandatory, when and how do auditors use them?

RQ13: Building on Bauer & Estep (2014), what social and personal factors affect specialist involvement (e.g., relationships, reputation, attitude)?

4.6. Summary and Other Future Research

While the four specialist domains differ in several ways, there is some commonality in the factors that affect auditors' decisions to engage any of these specialists. This provides some evidence for the PCAOB (2017b) to consider when revising guidance that would apply to various specialist types (e.g., the proposed amendments to AS 1201 that would apply to the use of internal tax, IT audit and valuation specialists), and whether their definition of specialist is too narrow.²² In this section, I discussed five common factors: the need for domain-specific skills and expertise, complexity, risk, budgetary concerns, and firm guidance/decision aids. The review of relevant research reveals that these factors are multifaceted and interrelated, in that a combination of factors affects specialists' involvement. Additionally, the decision to involve specialists is not just a binary (yes/no) decision, but rather a series of decisions on the *nature*, *timing*, and *extent* of specialist involvement. Given the variation in specialist involvement found in both PCAOB inspections and academic research, further understanding of the nature, timing, and extent of specialist involvement and the implications for audit quality is warranted.

In addition to the research questions above, other avenues of future study are: (1) seeking further insight through triangulation of research findings; (2) identification of other relevant factors; and (3) obtaining evidence outside of the large public accounting firms. First, the depth of our understanding of specialist use has been greatly increased with the rich data provided by recent interview and survey studies (Boritz et al. 2016; Bauer & Estep 2014, 2016; Griffith et al. 2015; Griffith 2016a; Jenkins et al. 2016). To triangulate existing findings, future research could examine the identified factors affecting the use of specialists with different research methods, particularly experiments. This allows for assessing robustness of results across different data-gathering techniques (Bloomfield, Nelson, & Soltes 2016). Additionally, Figure 2 shows that

²² One observation is that the PCAOB's (2017b) proposed amendments to AS 1210 largely discuss specialist involvement with auditing accounting estimates, which would apply to valuation specialists. This is interesting because the tax provision is also an accounting estimate, although the standard does not apply to tax specialists.

most of the specialist literature is on valuation specialists, in part driven by regulators' focus on fair values. Triangulation is also needed to investigate whether certain considerations that affect auditors' decision-making are a "domain-specific issue" (i.e., specific to valuation) or a general issue affecting the broader use of specialists. One way to examine these considerations is to use the operationalization of constructs (e.g., complexity and risk) in one domain to design future studies in other specialist domains. This could lead to further triangulation of existing findings or identification of unique differences among the specialist domains, which is important to the PCAOB's (2017b) standard-setting initiative and when generalizing research findings.

Second, research could identify and study other potential factors, both internal and external to the firm, impacting specialist use.

RQ14: What and how do other mechanisms (e.g., past experience with the specialist; staff continuity; location) influence specialists' involvement on audit engagements?

RQ15: How and to what extent do external factors or pressures (e.g., fear of or response to PCAOB inspections; fines or other legal repercussions; competitive response to peers auditing in similar industries) affect the decision to use specialists?

Third, our current understanding of determinants of specialist use is primarily based on the large U.S. accounting firms and/or Big 4 firms. Because the Big 4 firms are multidisciplinary and have the expertise in-house, there may be a greater propensity and ease to engaging these specialists, or greater use could also reflect the types clients they serve. Little is known about specialist use among small to medium-size firms.²³ These firms likely also face situations that are complex, risky, or where auditors lack the relevant expertise. Consequently, I propose:

RQ16: What is the extent of specialists needed and used by small- to medium-size firms? If small- to medium-sized firms are using specialists, what factors influence the decision to engage a specialist? How do those factors compare with those of larger firms?

²³ Research examining specialist use at small- to medium-sized firms could also study beyond determinants, i.e., the process and outcomes of using specialists at these firms.

RQ17: Do small- to medium-size firms possess the specific expertise in-house or need to engage external specialists? How does this availability affect their budgetary concerns?

5. Factors Impacting the Auditors' Interactions with Specialists

Next, it is important to understand factors that can impede or facilitate a successful interaction between the auditors and specialists. Table 2 organizes the following factors identified in prior research: (1) communication and coordination, (2) budgetary concerns, (3) supervision, and (4) trust. Additionally, some studies find a fifth factor where the lack of common knowledge between auditors and specialists or understanding of the specialists' contribution can affect the auditor-specialist interaction. In this section, I also discuss research related to auditors' behavior when using work of management's specialists.

Insert Table 2 About Here

5.1. Coordination and Communication

A conspicuous theme across the specialist literatures is the importance of effective coordination and communication between the specialist and auditor (Boritz et al. 2016; Griffith et al. 2015; Griffith 2016a).²⁴ Coordination and communication also indirectly impact many of the other factors discussed in this section. In general, coordination refers to an agreement on the division of responsibilities between the auditor and specialist (i.e., scope of work) and managing the scoped work. Common characteristics of coordination are when it occurs (e.g., up-front or throughout the audit), how it is monitored (Boritz et al. 2016), understanding of respective responsibilities, and the extent and nature of specialist utilization (Boritz et al. 2016; Griffith 2016a). Communication relates to how, when, and what information is shared. Communication is

²⁴ Coordination and communication issues also arise in the geographically distributed audit work literature (Hanes 2013; Downey & Bedard 2015), which studies auditors' interaction with component auditors. This literature serves as a beneficial resource to the specialist literatures, particularly if specialists are not located near the audit team. For instance, Downey & Bedard find that "modularization" (advance allocation of work between lead team and component auditors) is relatively ineffective in complex engagements. Research has not yet investigated whether this result also holds in the context of auditor/specialist interaction.

characterized by timeliness and frequency, particularly when sharing important issues or findings, and its effectiveness differs by channel type (e.g., email or in-person).

In the valuation literature, coordination and communication issues take the form of inadequate or untimely determination of who (auditors or specialists) will complete certain procedures, or auditors failing to inform the specialist of client information and related matters (Griffith 2016a; Griffith et al. 2015). Lack of coordination or communication between auditors and specialists could impact the perception of what has been tested and whether additional procedures are necessary, potentially leading to lower audit quality. Because auditors are often the liaison between their specialist and management, they may filter information provided to the specialists (Griffith 2016a), thus controlling the outcome of the specialists' work and again, potentially lower audit quality.

Coordination and communication between auditors and specialists are also important in resolving valuation differences that arise between the firm's specialist and the client's specialist (Smith-Lacroix, Durocher, & Gendron 2012), particularly when both valuation specialists arrive at a supportable (but materially different) fair value estimate. Carpentier, Labelle, Laurent, & Suret (2008) find that valuation specialists using acceptable methods to estimate initial public offering valuations derive markedly different valuations. This causes considerable frustration when the valuation assumptions or estimates of management's specialist and the auditor's specialist significantly differ but are both supportable (Cannon & Bedard 2017). This variability contributes to the difficulty in determining the "right" fair value, likely affecting auditors' low propensity to propose an audit adjustment (Cannon & Bedard 2017).

Given that certain components of the tax provision and accounting for taxes also involve estimation and judgmental assumptions, these frustrations could affect auditors' interaction with

tax specialists. While Boritz et al. (2016) report coordination and communication issues for all specialist types, they do not specifically elaborate on tax specialists' responses. In the tax setting, coordination and communication issues are plausible given the complexity of tax guidance and accounting standards, as well as time pressure resulting from the work on the tax provision occurring late in the audit. Further, the NATS literature attributes the positive association between NATS and audit outcomes to effective knowledge sharing between auditors and tax specialists (discussed in Section 6). However, outside of Boritz et al. (2016), there is limited understanding of the knowledge exchanges when tax specialists are providing *audit* services.

Moreover, coordination and communication affect the interaction between auditors and IT audit specialists. Bauer and Estep (2016) find that both parties attribute a good interaction and stronger relationship to effective coordination throughout the audit (especially during planning) and frequent communication, which appears more effective when it occurs in-person versus email. If frictions occur between the auditors and specialists (possibly due to lack of communication, the division of responsibilities, or a two-team mentality) a weaker team identity develops, which in turn can impact audit efficiency and quality (Bauer & Estep 2016).

A successful interaction between auditors and forensic specialists occurs when there is effective collaboration between the two, which is facilitated by timely involvement of specialists (Jenkins et al. 2016). Timely collaboration provides specialists sufficient time to learn the client's business, to identify client risks, and to perform testing procedures, as needed. Yet, forensic specialists comment that they feel underutilized (Boritz et al. 2016), suggesting that there may be missed opportunities for collaboration between auditors and these specialists.

In sum, among all specialists, coordination of work appears most effective when done upfront and monitored throughout the audit, to ensure appropriate understanding of each

person's responsibilities. Similarly, lack of timely and open communication can hinder the interaction between the audit and specialist teams. Given the importance of coordination and communication when using specialists, future research could study ways that firms could better facilitate collaboration during audit planning, testing, and reporting.²⁵ For example, recent studies find that increasing specialists' psychological ownership for their work (Bauer, Estep & Griffith 2016) and having auditors take the perspective of specialists (Joe, Yu, & Zimmermann 2016) can lead to more timely communication and improved judgment quality. Building on recent findings in the specialist literature, I also propose the following research questions.

RQ18: What mechanisms (e.g., organizational culture) could facilitate better interactions and/or better communication and coordination between auditors and specialists?

RQ19: Borrowing from the negotiation literature, how do auditors reconcile or negotiate differences between the conclusions of their specialist and management's specialist?

RQ20: While research assumes that knowledge sharing exists between tax specialists and auditors when NATS are performed, what information is shared to improve audit, financial reporting, and internal control quality (as discussed below)?

5.2. Budgetary Concerns

In Section 4, budgetary concerns are noted as a possible consideration for auditors when determining to engage a specialist. However, when the specialist "blows the budget", the interaction between auditors and specialists can be negatively impacted. Some reasons for cost overruns are communication issues (described above), timing delays, and identification of misstatements (Boritz et al. 2016). Cost overruns from misstatements are presumably less controllable than communication and timing issues, particularly because an error can necessitate

²⁵ Trotman, Bauer, & Humphreys (2015) review research on group judgment and decision-making in auditing, including research on auditors' consultations with other auditors' within a firm. They offer directions for future research relevant to team interactions that could inform interactions with specialists (e.g., implications of multidisciplinary teams during the audit process).

additional testing, evidence gathering, and inquiries with the client or specialists, and those additional costs are potentially recoverable from the audit client.

Another reason for cost overruns is inadequate planning/budgeting of the specialist's work. Boritz et al (2015) find that auditors and forensic specialists design similarly effective standard audit programs, but when proposing additional effective procedures beyond the standard program, specialists failed to sufficiently budget for those procedures. Their findings suggest that specialists may not be fully cognizant of the incremental audit effort needed when additional procedures are planned. Therefore, upfront and continuous discussions with specialists are necessary to effectively track deliverables and to monitor testing and findings/issues.

Firms continue to look for audit efficiencies without compromising audit quality; thus practices that prevent budget/cost overruns also hold a promising avenue for future study. Additionally, the reasons/situations for overruns deserve further study as they could be attributed to larger issues in the auditing environment, such as management not adequately identifying errors in the company's financial accounts or deficiencies in the company's control processes.

RQ21: How do auditors interact with or monitor specialists' work to prevent overruns? When specialists exceed budgets, does that affect future use of the specialists?

RQ22: Extending the findings of Boritz et al. (2015), do specialists generally consider budgetary effects when they suggest additional or more extensive testing procedures? How do auditors manage proposed budget changes from the specialists for their services?

5.3. Supervision

Recall from above that when using internal (employed) specialists, auditing standards mandate that auditors maintain adequate supervision over work performed by those specialists (PCAOB 2017b). Boritz et al. (2016) find that auditors supervise the work of the specialists by engaging in continuous communication, conducting scoping procedures, and reviewing work performed. Yet, aside from their study, little is known about the nature and extent of supervision

of specialists' work. This is an important issue because regulators are concerned that auditors' supervision of specialists is inadequate and they tend to over-rely on specialists.²⁶ To adequately supervise specialists, auditors must have sufficient knowledge to discuss their planned audit procedures and to evaluate the results of those procedures (Curtis et al. 2009). This creates a difficult juxtaposition as auditors (although presumably less knowledgeable) are responsible for supervising and reviewing the work of specialists (Bratten et al. 2013). Additionally, in response to PCAOB inspection deficiencies, auditors criticize current standards for not clearly specifying what constitutes sufficient procedures, supervision, and audit precision when auditing certain complex areas where specialists are used (Glover et al. 2015). Research on ways to alleviate the supervision issues and review of specialists is timely and important to regulators and audit firms, given the increased use of specialists and the impending changes to auditing guidance.

5.4. Trust

The auditor's interactions with the specialist can also influence the trust that develops between these two parties. Trust is important as it can affect the knowledge sharing that occurs between parties (Andrews & Delahaye 2000) and the team's relationship (Bauer & Estep 2016). Interviews with auditors reveal that they tend to have a high level of trust in specialists' work (Boritz et al. 2016; Griffith 2016a; Bauer & Estep 2016). Although, when do auditors trust specialists too much? For instance, trust in the specialist could affect auditors' skepticism and supervision of the specialist's work, particularly when that specialist is internal to the audit firm (e.g., given institutional loyalty and perceived quality of their firm's specialists versus another firm). Future research could study how auditors' trust differs when an external specialist is used.

RQ23: What factors (e.g., extent/nature of communication) impact the auditor's trust in a specialist? How does a change in the auditor's trust in a specialist impact the auditor's decisions and reliance on the specialist's work, including their use on future audits?

²⁶ Griffith et al. (2015) provide examples of these concerns from regulators' reports.

RQ24: How does auditors' reliance differ when internal versus external specialists perform work? If differences exist, why does this happen (e.g., trust or overconfidence)?

5.5. Lack of Understanding the Specialist's Work Performed and/or Contribution to the Audit

Another factor impacting auditors' interactions with specialists is that auditors sometimes lack a clear understanding of the work performed or how the specialists' work adds value to the audit engagement (Bauer & Estep 2016; Jenkins et al. 2016; Griffith et al. 2015; Vendirzyk & Bagranoff 2003).²⁷ Specifically, auditors may not fully comprehend the specialists' work (Smith-Lacroix et al. 2012; Griffith et al. 2015) or may fail to understand concerns raised by the specialists (Griffith 2016a), which can lead to overreliance. This could be attributed to complex terminology or jargon used by specialists (Griffith et al. 2015). Understanding the specialist's work is particularly important if the specialist notes reservations (i.e., caveats) in their memorandums or workpapers that would require auditors to perform more testing on a particular assumption or obtain more information from management (Griffith 2016b).²⁸ If auditors do not fully comprehend or discount the significance of the specialist's advice (Fitzgerald 2015; Griffith 2016b), inadequate testing and inappropriate conclusions could result.²⁹ Therefore, the knowledge gap between auditors and specialists can affect their interaction, in turn impacting coordination of testing and communication of issues.

While there is no direct evidence of auditors' failure to recognize tax specialists' contribution to the audit, there is research showing that tax accounts are a continued source of

²⁷ Importantly, the findings of Vendirzyk and Bagranoff (2003) are based on interviews from the then Big 5 firms in 1999 to 2000. Given the advances in IT and the role of SOX Section 404 since that interview period, auditors may now exhibit a stronger understanding of the IT audit specialists' contribution.

²⁸ In the literature on auditors consulting with other auditors, Knechel and Leiby (2016) study how specialized knowledge and status motives affect consulting auditors' recommendations. They find that among consultants with higher specialized knowledge, status motives decrease contrariness but increase precision in recommendations. Future research could examine whether similar effects occur when receiving recommendations from specialists.

²⁹ Bell and Griffin (2012) provide examples of PCAOB inspection findings where auditors failed to resolve questions raised by specialists and accepted management's assumptions that the specialist had raised as concerns.

restatements (Scholz 2014). This indirectly suggests that auditors may not realize the value of tax specialists to the audit or do not fully understand the specialists' work when they are engaged. Further study on tax-related restatements and tax specialists' use is needed to sort this out.

IT audit specialists are concerned about the auditors' lack of understanding of how IT systems and related controls affect the audit and how IT audit specialists can contribute value in those areas (Bauer & Estep 2014). Auditors' failure to integrate these specialists into the audit process can lead to overreliance on IT controls and system-generated information (Bauer & Estep 2016), which could lower audit quality. In the forensic context, auditors' lack of understanding of forensic specialists' contribution to the audit could be attributed to overconfidence in performing fraud risk assessment and related testing, or to infrequent interaction with these specialists (Boritz et al. 2016; Jenkins et al. 2016). Additionally, audit clients may express resistance when auditors use forensic specialists on engagements (Jenkins et al. 2016). There is apparent tension here given the economic bond from the client's audit fees.

The specialist literatures and audit practice would benefit from research that improves auditors' understanding of specialists' deliverables and their contribution to the audit. For instance, could joint trainings or rotations within other service lines in the firm help auditors and specialists to better understand each other's contributions? Another practical proposition for firms is to increase networking opportunities across services lines to foster relationships and informal interactions. Auditor networks and recurring interactions contribute to knowledge sharing (e.g., Bianchi, Falsetta, Minutti-Meza, & Weisbrod 2015), and as discussed below, knowledge sharing has been linked to improved audit quality.

RQ25: What do auditors need to know in order to understand and appreciate specialists' work and contributions to the audit? What do specialists need to know to comprehend the nature of auditing procedures? What mechanisms narrow the knowledge gap?

RQ26: To what extent and how do firms foster opportunities for auditors and specialists to network between service lines?

Lastly, mechanisms that reduce auditors' overreliance on specialists could improve audit quality. For example, Kadous and Zhou (2016) find that auditors' intrinsic motivation reduces overreliance on specialists' work and improves auditors' skepticism on complex tasks.

RQ27: How do auditors overcome their propensity to over-rely on specialists' work?

5.6. Using Work from Management's Specialists

Another element of the specialist literatures is auditors' behavior when interacting with or using work of management's internal or third-party specialists. For example, a greater psychological distance between the auditor and specialist causes lower auditor confidence and reliance on the work of management's specialist, which is most apparent in the presence of a material weakness (Weiser & Sutton 2015). Further, while auditors may consider management's third-party specialist as a credible source, and incorporate that specialist's work into their audit risk assessment, this perception does not change their extent of substantive testing (Brown-Liburd et al. 2014).³⁰ Additionally, when the credibility of management's specialist is low and the auditor's specialist indicates potentially biased assumptions, auditors incorporate this information into their assessment of management's estimate (Griffith 2016b). These studies show how certain characteristics of management's specialist influence auditors' judgments.

Auditors' judgments are also influenced by the presentation of information provided by management and messaging from certain parties. Joe et al. (2017) find that when control risk is high, the extent of quantitative information in management's specialist's report influences auditors' planning decisions (hours allocated to subjective versus objective procedures). They

³⁰ In support of external consultants as a credible source in a different context, Bedard and Graham (2011) find that client detection of unremediated internal control deficiencies, including severe deficiencies, is more likely when the client uses a large audit firm consultant with the SOX Section 404 work. As I propose below, further understanding of specialist involvement with internal control quality is needed, particularly in the valuation and tax setting.

also find that a practice alert from regulators about management bias in subjective FVM inputs does not significantly affect auditors' procedures to test the inputs, but does increase audit effort. In contrast, Pyzoha et al. (2016) find that messaging from firm leadership that focuses on audit quality reduces overreliance on management's specialists. Therefore, research finds mixed evidence on how prompts from regulators versus firm leadership improve auditors' judgments.

Collectively, these studies offer interesting insights into auditors' behavior when using work from management's internal and third-party specialists. It appears that auditors regard these specialists as credible sources, but hesitate to make significant changes to their audit plan when receiving work from them. One could infer that auditors are maintaining professional skepticism by not placing too much reliance on management's specialist's work and by not significantly changing their testing approach simply because the client uses a credible expert. Yet, the PCAOB criticizes auditors for overreliance on the specialists' work (PCAOB 2012b, 2012c, 2013). Building on the discussion in this section, factors that influence auditors' reliance or trust in management's specialist or alter their decisions are interesting avenues for future research.

RQ28: When working with management's specialists, to what extent do client factors (e.g., client risk), specialist factors (e.g., prior experience with the specialists), and environmental factors (e.g., time pressure, task complexity, information overload, prompts) affect audit effort and auditor decisions?

5.7. Summary and Future Research

In summary, the literature finds that communication and coordination are key factors that can affect the interaction between auditors and specialists. Communication and coordination permeate many other related factors that impact the interaction (e.g., budget overruns, supervision, and trust). Importantly, lack of timely coordination and communication among auditors and specialists can lead to inadequate planning and risk assessments, insufficient testing

or testing that pushes against the reporting deadline. Additionally, lack of common knowledge and lack of understanding of specialists' contribution can negatively affect these interactions.

Building on these factors, another area warranting investigation is the growing trend of global engagements teams and the use of remote-working specialists. For example, in the valuation setting, pricing centers or industry valuation specialists in one city can service a multitude of offices for an audit firm. Similarly, audit firms may use IT specialists from certain locations (e.g., India) to perform IT audit tests. Further, some global audits rely on internal tax "sub-specialists" to audit parts of a client's tax provision in a local jurisdiction given their familiarity with the country's specific tax laws and the company's local operations.

RQ29: If using an internal firm specialist who is working remotely, what factors affect the specific tasks that an auditor designates to that specialist? How do auditors supervise the work of specialists in remote locations?

RQ30: If using an internal firm specialist who is working remotely, what factors affect the auditor's extent of reliance on the specialist's work? Does the reliance differ if the auditors' internal specialist is located domestically or internationally?

A recent synthesis of geographically distributed audit work suggests investigating the effects of coordination, communication, work design, and social identity among remote team members (Hanes 2013). Limited research in this area finds that some audit teams use protocols to facilitate communication with component auditors (Downey & Bedard 2015). As noted above, communication is especially important to the specialist realm, and thus future studies could investigate (a) whether audit teams employ certain protocols, such as standard memorandums and templates, to help facilitate the interactions with specialists, and (b) the effects of using these protocols. Also, prior research finds that the nature and content of valuation specialists' communications affect auditors' decisions (Griffith 2016b; Joe et al. 2017). Future research

could examine the generalizability of these issues in other specialist contexts (e.g., memos from tax and IT audit specialists).

6. Outcomes Associated With Using Specialists

Research identifies a few outcomes associated with using specialists, shown in Table 3. The specialist literatures, including those in the NATS context, generally study and draw important inferences about the effects of specialist involvement on audit quality. In Table 3, I show various ways that audit quality has been operationalized among the specialist literature. Beyond audit effectiveness, some research examines audit efficiencies gained from specialist use. Another outcome, that also warrants further study, is the public's perceptions of audit quality when specialists are involved on the audit.

Insert Table 3 About Here

6.1. Audit Quality

Interviews and surveys of auditors and specialists indicate that the use of specialists impacts audit quality (Boritz et al. 2016; Christensen, Glover, Omer, & Shelley 2015a; Jenkins et al. 2016). Whether that effect is positive or negative depends on when and how the specialist is used when a situation calls for their expertise (such as the factors discussed in Sections 4 and 5).

Among the specialist literatures, the improvements to audit quality and reporting outcomes when specialists are used can take several forms, including higher-quality fraud brainstorm (Brazel et al. 2010), increased identification of ICFR deficiencies, material misstatements, and/or fraud (Jenkins et al. 2016), and increased support for proposed audit adjustments (Cannon & Bedard 2017). Yet, as mentioned above, Griffith (2016a) finds that auditors may alter the specialists' workpapers or influence their work to conform to the auditors' view, which could lead to lower audit quality. Further, tax accounts are a continuous source of

restatements (Scholz 2014), which could be because tax specialists were not involved when they should have been, or auditors and the specialists did not interact well to gain higher audit quality.

While NATS are not a focus of this review, that literature provides evidence consistent with knowledge sharing between auditors and tax specialists improving audit quality.³¹ Specifically, companies purchasing NATS from their auditors issue fewer restatements (Kinney, Palmrose, & Scholz 2004; Seetharaman, Sun, & Wang 2011); exhibit better tax reserves (Gleason & Mills 2011); are less likely to manage earnings (Krishnan & Visvanathan 2011; Christensen et al. 2015b); and are less likely to report a material weakness in ICFR (Harris & Zhou 2013; DeSimone et al. 2012). Auditor-provided NATS are also positively associated with the auditor's issuance of a going concern report prior to a bankruptcy filing (Robinson 2008). Interestingly, one study does not find evidence of improved audit quality, which is ascribed to auditors lowering their skepticism when reviewing work by their internal specialists (Choudhary et al. 2015). This implies that using internal specialists, which is common among Big 4 firms (Griffith 2016a), could lead to lower audit quality, and is an important topic for future study.

As noted above, while prior research reports some examples of how specialists' involvement contributes to more effective audits, Boritz et al. (2015) find that specialist use is not always more effective, and that specialists procedures could lead to some inefficiencies. The extent of audit efficiencies gained from specialist involvement is an area of future study, particularly because the mixed evidence on audit effectiveness and efficiencies could affect the nature, timing, and extent of future specialist use.

Collectively, there may be boundaries to *how much* specialist use contributes to better and more efficient audits. Most of the research on audit quality outcomes is based on perceptions

³¹ Because these studies rely on publicly available non-audit fee data for audit clients, they cannot directly test interpersonal relationships and communication between auditors and tax specialists.

or experiences of auditors and specialists gathered from surveys, experiential questionnaires, and interviews. While this research provides interesting and important insights, further triangulation of these findings, (such as using experimental methods), could help provide a lens into the magnitude of audit quality benefits as well as other outcomes. Because specialist use is not publicly reported (unless the auditor chooses to discuss such use in an explanatory paragraph of a modified audit report (PCAOB 1994: AS 1210) or is required by law (IFAC 2015: ISA 620)), there are few opportunities to study outcomes of specialist use with archival research methods. However, in section 6.2, I offer one suggestion regarding recent changes to the auditors' reporting model (PCAOB 2017a) where archival research could potentially be used.

RQ31: Under what circumstances does specialist involvement improve audit quality? What are the actual versus perceived audit quality benefits of specialist involvement (e.g., design more effective procedures, identify more ICFR deficiencies or identify a seeded misstatement better than auditors)?

RQ32: While research suggests that specialists contribute to audit effectiveness, do they also contribute to audit efficiency? If so, what factors provide these efficiencies?

Additionally, when auditors engage external specialists, they may share less information and have less visibility into the specialists' processes. However, if auditors use an employed (internal) specialist, they may share more information because they are all members of the same firm, but could over-rely because it was "their firm" that did the testing.

RQ33: How do internal specialists' testing and conclusions impact auditors' skepticism? Similarly, do factors about third-party specialists' work (e.g., complexity or sophistication of models) affect auditors' skepticism and ultimately audit quality?

6.2. The Public's Perceptions of Specialist Involvement and Audit Outcomes

Investors are a key stakeholder group likely to be concerned with specialist involvement in the audit. Interviews with investors reveal that while the use of specialists is not observable to them, they perceive specialist involvement as an important factor contributing to higher audit

quality (Christensen et al. 2015a). Regulators recently adopted guidance that will require critical audit matter (CAM) disclosures in the auditor's report, where auditors can make reference to specialist involvement as a way of addressing the CAM (PCAOB 2017a). They also adopted disclosures about audit partner identification and component auditor use in the new Form AP (PCAOB 2015c), but excluded specialist involvement in their final Form AP ruling, despite advocacy from the PCAOB's Investor Advisory Group (PCAOB 2015b). This could provide the opportunity for research on investors' use of information about specialist involvement, which would provide valuable information to regulators.

Another measure of the public's perception is juror reaction, especially given the litigious environment in the U.S. Prior research finds that jurors perceive auditors' acceptance of aggressive management estimates as more justifiable (Brown, Grenier, Pyzoha, and Reffett 2016), and evaluate the auditor as less negligent, when a specialist was used versus was not used (Grenier, Lowe, Reffett, & Warne 2015;). However, specialist use does not shield the auditor from legal liability when the audit failure is more severe (Kadous 2000) or when an expert panel recommends that the auditor was negligent (Grenier et al. 2015). Yet, use of an external specialist does provide some protection for auditors (Brown et al. 2016). Collectively, these findings suggest that even if specialist use is a signal for higher audit quality, competing cues (e.g., outcome severity, expert witnesses) could reduce or negate the audit quality benefits in the public's eye. Importantly, juror perceptions of specialist involvement are only studied in a valuation context. Thus, it is unclear whether jurors' perceptions would hold in different contexts (e.g., the nature of the specialist's role on the engagement, such as consultative versus performing procedures; the frequency of the specialists' involvement on engagements where tax and IT audit specialists used more often than forensic specialists). Future research could leverage

these findings from the valuation specialist domain, exploring the generalizability of juror perceptions in other specialist contexts.

Perceptions of auditors' responsibilities when using a specialist, which can be investigated experimentally through investor and litigation settings, are a fruitful area for research. For example, future research could examine investment decisions (including potential differences between professional and non-professional investors) and trust in the auditor following an audit failure where specialists were involved. Further, prior research finds some evidence on the boundaries of specialists use as a mechanism to lower auditors' liability.

RQ34: Because auditors and management are not required to disclose information on specialist use, would investors understand and react to such information? Would the reaction differ by professional and non-professional investors?

RQ35: When an audit failure occurs in an area where the specialist was involved, is the audit firm's reputation and investors' trust in that firm significantly affected? What factors reduce or negate the benefits of specialist use on auditors' liability for audit failures, and do these factors generalize to different types of specialists?

6.5. Summary

The use of specialists impacts audit quality, and the extent to which the impact is positive or negative largely depends on the execution of many factors mentioned above. Drawing on Section 5, limited research suggests that all specialist areas can experience similar execution problems (e.g., coordination and communication issues, budget constraints). Thus, there may be boundary conditions on *how much* specialist use is contributing to higher audit quality. Additionally, the public may not always view the use of specialists as an indication of higher audit quality. Understanding how the public, such as investors and jurors, perceive specialist use and its impact on audit quality is an important area for future research.

7. Conclusion

In conclusion, changes in the financial reporting environment, such as increasingly complex estimates, the nature of clients' operations, and greater technology use, are prompting auditors' use of specialists on audit engagements. These specialists are highly-skilled experts in their domain, who help auditors assess risk and/or perform procedures to support the audit opinion. Currently, the lines of research on valuation, tax, IT audit, and forensic specialists are growing independently of each other, so it is important to review these literatures collectively, particularly given the PCAOB's (2017b) amendments to auditing standards on specialist use and that there are common issues across these literatures. This synthesis consolidates the extant research regarding auditors' use of these four types of specialists to show: (1) specific factors and dimensions of those factors that influence the nature, timing and extent of specialists' involvement (e.g., risks and complexities); (2) factors that impact the effectiveness of auditor-specialist interactions, both when working with auditors' specialists and management's specialists; and (3) how these factors affect audit outcomes and audit quality. Throughout this synthesis, I also suggest numerous opportunities for future research on these topics and note where individual specialist research streams investigate certain matters that other literatures could build upon.

Three important findings in this synthesis particularly warrant further examination. First is the variation in the specialists' role on audit engagements (e.g., consultative, performing testing procedures, reviewing auditors' work) and how effective the specialists are in performing these various roles. Additionally, our understanding of specialists' roles is mostly based on large accounting firms, but this synthesis finds variation in specialist use based on firm size and location, which needs further study. These are important research gaps that show specialist use is not a uniform approach. Second, the variation in internal versus external specialists and

specialists contracted by the auditor versus management are important distinctions that likely affect the interactions between auditors and specialists (e.g., the nature/extent of communication, and trust in the specialist work). Research on the social, interpersonal, and organizational factors when working with these different types specialist is also an interesting avenue for future study. Third, we need a better understanding of the boundaries of audit quality benefits and potential drawbacks from specialist involvement, including triangulating existing findings from qualitative research on specialists with other research methods. Likewise, recent studies reveal insight about how jurors perceive specialist involvement, but research is needed on others' perceptions, particularly investors who rely on the audit report for their investment decisions. Importantly, research that fills these gaps in the literature would benefit practice and inform regulators.

Acknowledgements and Funding:

This paper is part of my doctoral dissertation at Bentley University. I appreciate helpful comments on this literature review from Lindsay Andiola, Jean C. Bedard (dissertation chair), Catherine Byrne, Jenna Burke, Annie Lastowski, Erin Masters, Melissa Reville, Tracy Noga (dissertation committee member), Jay Thibodeau, Sandra Vera-Muñoz (dissertation committee member), and workshop participants at Bentley University and Northern Illinois University. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

APPENDIX: Summary of Papers Included in Synthesis

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4	Asare & Wright 2004	Forensic	Study auditors' fraud detection plans	Prompts to improve judgments	69 auditors from 3 Big 5 firms	Experiment	Fraud risk assessments are positively associated with the propensity to consult a fraud expert.

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4	Asare & Wright 2016	Forensic	Identify factors relevant to auditors' consultation with and role of the specialist on the engagement	Multilevel theory of team decision-making	86 experienced auditors	Survey	Identify circumstances where firms require consultation with forensic specialists (e.g., restatement or suspected fraud) and provide insight on the specialists' role on engagements (identify fraud risks and perform testing) Also identify challenges between auditors and forensic specialists and suggestions to overcome those challenges
4	Asare et al. 2013	IT Audit	Summarize prior research on auditors' evaluation of and reporting on ICFR post-SOX	Lends towards confidence theories	N/A - Summary of prior research	Synthesis	Suggests future research examine how audit and environmental attributes affect auditors' ICFR decisions
4	Axelsen et al. 2017	IT Audit	Examine and develop theory related to the IT audit role in public sector financial audits	Explanation theory of IT auditor role in financial audit	55 senior auditors among four countries Australia, Canada, New Zealand, and United Kingdom	Interview	IT expertise drives the specialists' involvement, yet client size, IT complexity, inherent client risks, and client resources can affect the role of the specialist Also, specialists are not always used or their use is limited to just general computer controls, not application controls due to cost. Some auditors prefer to take a substantive approach and not rely on controls to keep costs low.
4, 5	Bauer & Estep 2014	IT Audit	Examine the use of IT auditors on audit engagements	Audit and ICFR quality	16 financial auditors and 17 IT audit specialists	Interview	Identify circumstances that influence the use of IT specialists, what the IT audit specialists do, and areas for improvement
4, 5	Bauer & Estep 2016	IT Audit	Examine the team interactions between financial and IT auditors	Social identify theory; intergroup processes; institutional theory	16 financial auditors and 17 IT audit specialists	Interview	Identify circumstances that constitute a good versus difficult relationship or interaction between auditors and IT audit specialists, and offer suggestions for practice

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
5	Bauer, Estep, & Griffith 2016	Valuation	Study how psychological ownership and auditors' suggestions affect specialists' judgments and communication	Accountability theory; Elaboration likelihood model; and general dual process models	82 MBA students enrolled in a financial accounting course	Experiment	Specialists with higher psychological ownership exhibit better judgment quality, communicate issues more proactively, and recognize weakly justified suggestions from auditors
3, 5	Bratten et al. 2013	Valuation	Synthesize prior research regarding auditing FVMs	Auditor judgment framework	Prior research and PCAOB findings	Synthesis	Suggests future research examine factors that impact auditors' expertise and decisions when auditing FVMs
4	Brazel & Agoglia 2007	IT Audit	Study the effects of IT expertise on risk assessments and decisions in a complex IT environment	Expertise; Theory of planned behavior	71 auditors	Experiment	When a specialist's competence was low, auditors with higher accounting information system expertise exhibit better planning decisions than auditors with lower accounting information system expertise
4, 6	Brazel et al. 2010	IT Audit and Forensic	Develop a measure of fraud brainstorm quality and examine how it affects auditors' fraud decisions	Fraud brainstorming sessions	Survey data of brainstorming sessions for 179 audit engagements	Survey	IT audit specialists (forensic specialists) attended approximately 69% (31%) of engagements fraud brainstorming sessions Specialists attendance is associated with higher brainstorm quality
5	Brown-Liburd et al. 2014	Management's Specialist	Examines auditors' reliance on management's specialist when auditing FVMs	Heuristic-systematic model (HSM)	69 auditors	Experiment	Auditors consider management's third-party specialist as a credible source, which they incorporate into their risk judgments but does not influence their planned level of substantive testing

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4, 5, 6	Cannon & Bedard 2017	Valuation	Study the nature, judgments, and outcomes when auditing difficult-to-audit FVMs	Extends auditor decision-making and expertise literature	97 auditors and 3 valuation specialists	Survey	Identify the most difficult FVMs to audit and reasons for audit difficulty Find that audit adjustments pertaining to FVMs are rare because of estimation uncertainty and lack of verifiable data
5	Carpentier et al. 2008	Valuation	Analyze the quality of experts' valuations	Application of FVM subjectivity	43 business valuation experts	Experiment	Valuation specialists used a various methods and multiples, resulting in a wide range of IPO valuations
4, 6	Choudhary et al. 2015	Tax	Revisit the knowledge spillover argument post-SOX	Knowledge spillover; Independence risks	Firm-year observations from 2003 - 2011	Archival	Tax fees are negatively associated with tax accrual quality, supporting the independence impairment argument No evidence of economic bonding; auditor expertise reduces, but does not fully mitigate independence impairment
3	Christensen et al. 2012	Valuation	Synthesize the extent and nature of assurance on FVMs required by auditing standards	Lends to signaling theory	N/A - summary of research issues	Synthesis	Suggest that where extreme estimation uncertainty exists, auditors can provide limited positive assurance on fair value estimates
6	Christensen et al. 2015b	Tax	Examine the extent audit firm's expertise and knowledge spillover constrain earnings management	Expertise; knowledge spillover	Firm-year observations from 2004 - 2011	Archival	National audit firm expertise and auditor-provided tax services for non-expert firms help constrain earnings management through the tax accounts
3, 5	Curtis et al. 2009	IT Audit	Review research on auditors' knowledge of information systems (IS)	Lends towards knowledge and expertise literatures	N/A - Summary of prior research	Synthesis	Suggests research areas regarding auditor's IS knowledge, auditors' interactions with IT audit specialists and role of IT on audits

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4, 6	DeSimone et al. 2015	Tax	Examine the association between ICFR quality and auditor-provided non-audit tax services (NATS)	Knowledge spillover; Independence risks	Sec. 302 and 404 ICFR disclosures observations from 2004 - 2012	Archival	<p>On average, NATS are associated with a better internal control quality.</p> <p>Also the benefits of NATS are stronger when a company experiences a change in its operations and earlier in the audit firm's tenure.</p>
6	Gleason & Mills 2011	Tax	Investigate whether NATS improve the estimate of tax reserves	Knowledge spillover; Independence risks	Firm observations between 2000 - 2002 for which the IRS completed an examination	Archival	<p>Companies that purchase NATS have better reporting as evidenced by their tax reserves for Internal Revenue Service (IRS) disputes or settlements</p> <p>Companies that do not purchase NATS necessitate additional tax reserves for IRS disputes or settlements</p>
4, 6	Glover et al. 2015	Valuation	Examine fair value challenges auditors face	Inspection findings and auditing standards	32 audit partners	Survey	Identify challenges of auditing FVMs and areas for improved guidance and disclosures when auditing FVMs
4	Gold et al. 2012	Forensic	Investigate how different forms of guidance affect the propensity to consult	Consultation and fraud literatures	Experiment 1 and 2: 163 Dutch audit managers and partners from 3 Big 4 firms	Experiment	Auditors' propensity to consult a technical expert is higher under a strict guidance, but only when fraud risk is high and under tight time pressure.
4	Graham & Bedard 2015	Tax	Examine the nature of tax internal control deficiencies (ICD) and remediation process	Tax ICD characteristics	Account-specific ICDs from 2004 - 2005	Archival	<p>ICDs related to the tax provision controls are less likely to be remediated before fiscal year-end than other ICDs</p> <p>Tax-related ICDs tend to be more severe and more likely to cause a misstatement than other account-specific ICDs</p>

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
6	Grenier et al. 2015	Valuation	Study the effects of experts' recommendations on juror negligence judgments	Negligence; heuristic-systematic processing model	346 participants using Amazon's Mechanical Turk	Experiment	Jurors' negligence verdicts were insensitive to whether the auditors used a specialist when the expert panel concluded that the auditors were negligent When the panel concluded that the auditors were not negligent, use of a specialist resulted in lower juror negligence verdicts, relative to no specialist use
4, 5, 6	Griffith 2015	Valuation	Analyze auditors' decision to use specialists when auditing FVMs	Theory of trust in expert systems	28 audit partners and managers	Interview	Discuss reasons why specialists are used and procedures specialists perform Identify common problems in the auditor-specialist interaction
5	Griffith 2016	Valuation	Examine audit-team specialists' caveats	Elaboration and persuasion theories; source credibility	78 experienced senior auditors	Experiment	Source credibility influences auditors' reaction to the audit specialist's caveat
4, 5, 6	Griffith et al. 2015	Valuation	Study the process of auditing complex estimates and problems auditors encounter	Institutional theory; Task framing	24 partners and senior managers	Interview	Auditors infrequently generate independent estimates and review subsequent events when auditing FVMs Identify problems auditors experience when using valuation specialist
4	Hammersley et al. 2011	Forensic	Study how auditors respond to heightened fraud risk	Draws on prior fraud research	54 audit seniors	Experiment	When a material weakness is present, auditors are more likely to assess fraud risk higher and increase their propensity to consult a fraud expert. However, their modifications to the audit program are not effective to detecting fraud.

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
6	Harris & Zhou 2013	Tax	Examine the association between auditor-provided tax consulting services and ICFR quality	Knowledge spillover; Independence risks	Sec. 302 and 404 ICFR disclosures observations from 2004 - 2010	Archival	Tax consulting fees are associated with a reduced likelihood of receiving a non-tax internal control weakness
4	Hasseldine et al. 2011	Tax	Study knowledge sharing relationships between accounting firms, corporate taxpayers and revenue authorities	Knowledge sharing	19 interviews with employees from the UK HM Revenue and Customs (HMRC), UK accounting firms, and UK corporations	Interview	Accounting firms are a key intermediary between HMRC and corporate taxpayers, e.g., for interpreting and sharing knowledge about tax legislation Corporate taxpayers' barriers to sharing knowledge with accounting firms: (1) inequality in the knowledge flows, and (2) accounting firms' tendency to exaggerate risks for future services
3	Hogan et al. 2008	Forensic	Synthesize research on fraud for PCAOB synthesis project	Fraud triangle; Fraud risk; audit procedures	N/A - summary of research issues	Synthesis	Suggest future research examine how and when forensic specialists should be used in an audit, and if the mindset of auditors and forensic specialists differs
4	Janvrin et al. 2008	IT Audit	Study the IT use across varying audit firm sizes	IT use and importance, firm size effects	181 auditors	Questionnaire	IT audit specialists' use and perceived importance varies by firm size and involvement of an IT audit specialist depends on client's IT complexity
4	Janvrin et al. 2009	IT Audit	Examine the nature and extent of IT audit procedures across various audit firm	Firm size and IT complexity	181 auditors	Questionnaire	Big 4 respondents used an IT audit specialists much more than regional, national and local firms

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4, 5, 6	Jenkins et al. 2016	Forensic	Study how auditors use forensic specialists	Auditing standards; Differences between auditors and specialists skillsets	48 experienced auditors and 54 forensic professionals	Survey	Risk considerations are the main reason in deciding to involve a forensic specialist yet budgetary pressures and lack of a clear understanding of specialists' contribution also impact use Describe the typical uses of forensic specialists during the audit
5	Joe et al. 2014	Management's Specialist	Assess auditors' decision-making behavior when using a client's third-party specialist report	Decision-making theoretical framework, drawing on ambiguity and quantification vs. non-quantification literatures	Experiment 1: 93 audit seniors with fair value auditing experience Experiment 2: 64 audit seniors who participated in Experiment 1	Experiment	Auditors' planning judgments are influenced by client risk and the extent of quantification in the specialists' report A reminder of the PCAOB's preference for more audit testing of subjective inputs did not change the auditors' proportion of subjective audit procedures designed to test a client's FVM; however, auditors did increase the planned audit hours and suggested using a firm's internal specialist
6	Kadous 2000	Valuation	Examines how providing higher quality audits affects auditors' legal liability	Negligence; standard of care; consequence severity	107 jury-eligible participants	Experiment	When audit failures are severe, providing high-quality audits (proxied by consulting a specialist) may not protect auditors from legal liability
6	Kadous 2001	Valuation	Studies whether outcome effects in litigation are influenced by jurors' affective reactions to negative outcomes	Affect attribution; blame theory and negligence	216 jury-eligible participants	Experiment	Relative to a control group, jurors receiving instructions of negative affect attribution placed less reliance on the audit outcome and more reliance on audit quality (proxied by consulting a specialist) when evaluating negligence

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
6	Kinney et al. 2004	Tax	Examine whether non-audit service fees impact auditor's independence or reporting quality	Economic dependence; Knowledge spillover	Restatements from 1995-2000, matched with a non-restating company	Archival	Some evidence that tax services fees are negatively associated with restatements
6	Krishnan & Visvanathan 2011	Tax	Study the association between earnings management and tax avoidance with NATS	Knowledge spillover; Independence risks	Firm-year observations from 2000 - 2007	Archival	Negative relation between earnings management and tax fees paid to the incumbent auditor, consistent with knowledge spillover between the audit team and tax team
4	Lassila et al. 2010	Tax	Examine whether complexity, governance, and auditor independence affect purchase of NATS	Economic dependence; Knowledge spillover	Firm-years with tax fees identified in 2001 - 2003	Archival	Positive relationship firms' purchase of NATS and the company's tax and operating complexity, and the company's corporate governance strength. Long auditor tenure reduces the odds of purchasing NATS when perceived auditor independence is low.
3, 4	Martin et al. 2006	Valuation	Summarize the role of auditors in auditing FVMs	Motivated reasoning; confirmation bias	N/A - summary of research issues	Synthesis	Suggests that auditors lack adequate understanding of fair value and future studies should investigate auditors' FVM risk assessments, testing procedures, and potential biases
4	Mayde & Shackelford 2007	Tax	Analyze the auditor's role in corporate tax planning post-SOX	Independence; Corporate tax planning	Companies that report audit and tax fees in 2001 - 2003, matched with a company that does not report fees	Archival	In 2001-2004, companies were moving their tax services from their audit firms to other providers

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
3	Messier 2010	All	Discusses aspects of the audit process where research benefitted our understanding	Task level research	N/A - Summary of prior research	Synthesis	Recognizes that the audit teams constitute a variety of specialists with expertise in IT, valuation, forensic, tax and other (e.g., geologists) and proposes four research questions related to understanding the use of specialists
4	Omer et al. 2006	Tax	Study the changes in auditor-provided tax services pre-SOX	Changes in NATS; Independence risks	Firm-years with tax fees identified in 2000 - 2002	Archival	Results suggest significant shifts in auditor-provided tax services prior to 2003
6	Robinson 2008	Tax	Investigate the association between NATS and financial reporting quality	Knowledge spillover; Independence risks	Bankrupt firms from 2001 - 2004	Archival	Positive relationship between tax fees and the auditor correctly issuing a going concern report prior to the company filing for bankruptcy, suggesting knowledge spillover
4	Sakalaukaite & Stuart 2016	Forensic	Examine how experience with type of fraud and fee pressure affect decision to use a forensic specialist	Expertise; Engagement economics	49 auditors	Experiment	Auditors' decisions to involve forensic specialists depends on auditors' experience with the fraud type Fees do not affect the decision to involve a specialist, but do affect the extent of involvement
6	Seetharaman et al. 2011	Tax	Investigate the association between NATS and financial reporting quality	Knowledge spillover; Independence risks	Restated companies from 2003 - 2005 259 tax-restatements for 150 companies based on proprietary data	Archival	No association between auditor-provided NATS and all restatements, but a negative association between NATS and tax-related restatements Public companies that purchased tax services from their incumbent auditor issued fewer tax-related restatements than public companies that purchased these services from a third-party or performed the tax services in-house

Section of Review	Citation	Specialist Type	Purpose	Theoretical or Practical Framework	Sample	Method	Contribution / Key Findings
4	Selby 2010	IT Audit	Examine planning decisions when encountering material weaknesses in automated controls	Dilution effect	52 auditors	Experiment	Auditors are influenced by non-diagnostic evidence and do not adjust their audit plans for material weaknesses in automated controls as much as IT auditors
5, 6	Smith-Lacroix et al. 2012	Valuation	Investigate how fair value accounting affects audit engagements	Theory of trust in expert systems	18 audit partners and managers	Interview	Auditors do not possess the level of expertise needed to audit complex valuations At times, auditors act as an arbiter between internal and external specialists regarding discrepancies over subjective values
4, 6	Stoel et al. 2012	IT Audit	Analyze attributes impacting IT audit quality	Knowledge, skill, and business/environmental factors	187 IT audit specialists, auditors and other professionals involved with IT audits	Survey	Identified 13 factors relevant to IT audit quality and rank in factors in perceived importance
3, 4	Trompeter et al. 2013	Forensic	Summarize fraud-related literature post-Hogan et al. (2008) and outside literature	Model of auditors' approach to fraud	N/A - Summary of prior research	Synthesis	Synthesize research and identify future research opportunities using a model of auditor's approach to fraud (e.g., fraud triangle, existence and effectiveness of anti-fraud measures, considerations of fraud acts)
5	Vendryk & Bagranoff 2003	IT Audit	Study IT audit and financial auditors' perceptions of the role of IT auditing	Relationship between IT and financial audit	10 IT audit and 10 audit managers and partners	Survey	Financial auditors and IT auditors diverge in their perceptions regarding the role of IT auditing
5	Weisner & Sutton 2015	Management's Specialist	Investigate effects of specialists' proximity on auditors' reliance on third-party specialists	Construal level theory and halo effects	121 auditors	Experiment	Suggests that as the psychological distance between the auditor and the specialist increases, auditors reduce their reliance confidence and willingness to decrease budgeted audit hours

References

- Andiola, L., Bedard, J. C., Hux, C. (2016). *Writing a literature review in behavioral accounting research*. Forthcoming in *The Routledge Companion to Behavioral Research in Accounting* (T. Libby and L. Thorne, eds.)
- Andrews, K. M. & Delahaye, B. L. (2000). Influences on knowledge processes in organizational learning: The psychosocial filter. *Journal of Management Studies* 37(6): 797-810.
- Appelbaum, D., Kogan, A., & Vasarhelyi, M. (2016) Big data and analytics in the modern audit engagement: research needs. *Auditing: A Journal of Practice & Theory*, forthcoming.
- Arnold, V., Collier, P. A., Leech, S. A., & Sutton, S. G. (2004). Impact of intelligent decision aids on expert and novice decision- makers' judgments. *Accounting & Finance* 44(1): 1 – 26.
- Asare, S. K., & Wright, A. M. (2004). The effectiveness of alternative risk assessment and program planning tools in a fraud setting. *Contemporary Accounting Research* 21(2): 325 – 352.
- Asare, S. K., & Wright, A. M. (2016). Field evidence on auditors' experiences in consulting with forensic specialists. *Behavioral Research in Accounting* (forthcoming).
- Asare, S., Fitzgerald, B., Graham, L. Joe, J., Negangard, E., & Wolfe, C. (2013). Auditors' internal control over financial reporting decisions: Analysis, synthesis, and research directions. *Auditing: A Journal of Practice & Theory* 32(Supplement 1): 131 – 166.
- Axelsen, M., Green, P., & Ridley, G. (2017). Explaining the information systems auditor role in the public sector financial audit. *International Journal of Accounting Information Systems* 24: 15 – 31.
- Bauer, T. & Estep, C. (2016). One team or two teams? Exploring the relationship between auditors and IT specialists and its implications for a collective audit team identity and audit quality. *Working paper*. University of Illinois, Emory University.
- Bauer, T. & Estep, C. (2014). The IT auditor function on financial statement and integrated audits: Description of practice and avenues for future research. *Working paper*. University of Illinois, Emory University.
- Bauer, T., Estep, C., & Griffith, E. (2016). The effects of psychological ownership on specialists' judgments and communication in audit teams. *Working paper*. University of Illinois, Emory University, University of Wisconsin-Madison.
- Bédard, J., & Paquette, S. M. (2010). Perception of auditor independence, audit committee characteristics, and auditor provision of tax services. *Working paper*. Université Laval.
- Bedard, J. C., & Graham, L. (2011). Detection and severity classifications of Sarbanes-Oxley Section 404 internal control deficiencies. *The Accounting Review* 86(3): 825-855.
- Bedard, J.C., Hoitash, R., Hoitash, U. & Westermann, K. (2012). Remediation of internal control material weaknesses: A detailed examination. *Auditing: A Journal of Practice & Theory* 31(1): 39–56.
- Bell, T. B., & Griffin, J. B. (2012). Commentary on auditing high-uncertainty fair value estimates. *Auditing: A Journal of Practice & Theory* 31(1): 147–155.
- Bianchi, P. A., Falsetta, D., Minutti-Meza, M., Weisbrod, E. (2015). How is expertise acquired and shared by professional accountants? Evidence from Italian statutory auditors' networks and tax avoidance. *Working paper*, University of Miami.
- Bloomfield, R., Nelson, M.W. & Soltes, E. (2016). Gathering data for archival, field, survey, and experimental accounting research. *Journal of Accounting Research* 54(2): 341-395.
- Boritz, J. E., Kochetova-Kozloski, N., & Robinson, L. (2015). Are fraud specialists relatively more effective than auditors at modifying audit programs in the presence of fraud risk?. *The Accounting Review* 90(3): 881 – 915.
- Boritz, J. E., Robinson, L. A., Wong, C. & Kochetova-Kozloski, N. (2016). Auditors' and specialists' views about the use of specialists during an audit. *Working paper*. University of Waterloo and Saint Mary's University.
- Bratton, B., Gaynor, L. M., McDaniel, L., Montague, N. R., & Sierra, G. E. (2013). The audit of fair values and other estimates: The effects of underlying environmental, task, and auditor-specific factors. *Auditing: A Journal of Practice & Theory* 32(Supplement 1): 7 – 44.

- Brazel, J. & Agoglia, C. (2007). An examination of auditor planning judgments in a complex accounting information system environment. *Contemporary Accounting Research* 24(4): 1059 – 1083.
- Brazel, J. F., Carpenter, T. D., & Jenkins, J. G. (2010). “Auditors’ use of brainstorming in the consideration of fraud: Reports from the field.” *The Accounting Review* 85: 1273 – 1301.
- Brown, O. J., Grenier, J. H., Pyzoha, J. S., Reffett, A. (2016) Does using specialists provide auditors with safe harbor protection for aggressive management estimates? *Working paper*. Baylor University and Miami University of Ohio.
- Brown-Liburud, H. L., Mason, S. A., & Shelton, S. W. (2014). The effect of reliance on third-party specialists under varying levels of internal control effectiveness on the audit of fair value measurements. *Working paper*. Rutgers University and DePaul University.
- Cannon, N. & Bedard, J. C. (2017). Auditing challenging fair value measurements: Evidence from the field. *The Accounting Review* (forthcoming).
- Carpentier, C., Labelle, R., Laurent, B., & Suret, J. (2008). Does Fair Value Measurement Provide Satisfactory Evidence for Audit? The Case of High Tech Valuation. *Working paper*. Laval University, HEC Montreal, and Ernst & Young.
- Christensen, B. E., Glover, S. M., & Wood, D. A. (2012). Extreme estimation uncertainty in fair value estimates: Implications for audit assurance. *Auditing: A Journal of Practice & Theory*, 31(1): 127 – 146.
- Christensen, B. E., Glover, S. M., Omer, T. C., & Shelley, M. K. (2015a). Understanding audit quality: Insights from audit professionals and investors *Contemporary Accounting Review* (forthcoming).
- Christensen, B. E., Olson, A. J., & Omer, T. C. (2015b). The role of audit firm expertise and knowledge spillover in mitigating earnings management through the tax accounts. *Journal of the American Taxation Association*, 37(1): 3 – 36.
- Choudhary, P, Koester, A., & Pawlewicz, R. (2015). Do auditor-provided tax services generate knowledge spillover? *Working Paper*, Georgetown University and George Mason University.
- Curtis, M. B., Jenkins, J. G., Bedard, J. C., & Deis, D. R. (2009). Auditors’ training and proficiency in information systems: A research synthesis. *Journal of Information Systems* 23(1): 79 – 96.
- Deloitte LLP. (2016). *US Audit Quality Report*. New York, United States: Deloitte LLP.
- De Simone, L., Ege, M., & Stomberg, B. (2012). Tax internal control quality: The role of auditor-provided tax services. *Working paper*, University of Texas at Austin.
- Downey, D. & Bedard, J. C. (2015). Coordination and communication challenges in global groups audits. *Working paper*. Villanova University and Bentley University.
- Fitzgerald, B. C. (2015). Specialist or colleagues: Who do auditors listen to? *Working paper*. Northeastern University.
- Gold, A., Knechel, W.R., & Wallage, P. (2012). The Effect of the Strictness of Consultation Requirements on Fraud Consultation. *The Accounting Review* 87(3): 925 – 949.
- Gleason, C. A. & Mills, L. F. (2011). Do auditor-provided tax services improve the estimate of tax reserves? *Contemporary Accounting Research* 28(5): 1484 – 1509.
- Glover, S. M., Taylor, M. H., & Wu, Y. (2017). Current practices and challenges in auditing fair value measurements and complex estimates: Implications for auditing standards and the academy. *Auditing: A Journal of Practice & Theory* 36(1): 63 – 84.
- Glover, S. M., Taylor, M. H., & Wu, Y. (2015). Mind the gap: Why do experts disagree on the sufficiency of audit evidence supporting complex fair value measurements?. *Working paper*. Brigham Young University, Case Western Reserve University, Texas Tech University.
- Grenier, J. H., Lowe, D. J., Reffett, A., & Warne, R. C. (2015). The effects of independent expert recommendations on juror judgments of auditor negligence. *Auditing: A Journal of Practice & Theory* 34(4): 157 – 170.
- Graham, L. & Bedard, J.C. (2015). Internal control deficiencies in tax reporting: A detailed view. *Accounting Horizons* 29(4): 917–942.

- Griffith, E. E., Hammersley, J. S., & Kadous, K. (2015). Audits of complex estimates as verification of management numbers: How institutional pressures shape practice. *Contemporary Accounting Research* 32(3): 833 – 863.
- Griffith, E. E. (2016a). Auditors, specialists, and professional jurisdiction in audits of fair values. *Working paper*. University of Wisconsin - Madison.
- Griffith, E. E. (2016b). When do auditors use specialists' work to develop richer problem representations of complex estimates?. *Working paper*. University of Wisconsin - Madison.
- Hammersley, J. S., Johnstone, K. M., & Kadous, K. (2011). How do audit seniors respond to heightened fraud risk?. *Auditing: A Journal of Practice & Theory* 30(3): 81 – 101.
- Hanes, D. R. (2013). Geographically distributed audit work: Theoretical considerations and future directions. *Journal of Accounting Literature* 32: 1 – 29.
- Harris, D. G. & Zhou, J. (2013). Auditor-provided tax consulting, knowledge spillovers, and reported weaknesses in internal control. *Working paper*. Syracuse University and University of Hawaii at Manoa.
- Hasseldine, J., Holland, K., & van der Rijt, P. (2011). The market for corporate tax knowledge. *Critical Perspectives on Accounting* 22(1): 39-52.
- Hogan, C. E., Rezaee, Z., Riley Jr, R. A. & Velury, U. K. (2008). Financial statement fraud: Insights from the academic literature. *Auditing: A Journal of Practice & Theory* 27(2): 231 – 252.
- International Federation of Accountants (IFAC). 2015a. *2015 Handbook of International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements: ISA 220 Quality control for the audit of financial statements*.
- International Federation of Accountants (IFAC). 2015b. *2015 Handbook of International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements: ISA 500 Audit evidence*.
- International Federation of Accountants (IFAC). 2015c. *2015 Handbook of International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements: ISA 620 Using the Work of an Auditor's Expert*.
- Janvrin, D., Bierstaker, J., & Lowe, J.D. (2008). An examination of audit information technology use and perceived importance. *Accounting Horizons* 22(1): 1 – 21.
- Janvrin, D., Bierstaker, J., & Lowe, J.D (2009). An investigation of factors influencing the use of computer-related audit procedures. *Journal of Information Systems* 23(1): 97 – 118.
- Jenkins, J.G., Negangard, E., & Oler, M. J. (2016). Understanding firms' usage of forensic specialists in the financial statement audit. *Working paper*. Virginia Polytechnic Institute, University of Virginia, University of Wyoming.
- Joe, J. R., Vandervelde, S. D., & Wu, Y. (2017). Use of high quantification evidence in fair value audits: Do auditors stay in their comfort zone? *The Accounting Review*, forthcoming.
- Joe, J. R., Wu, Y., & Zimmerman, A. (2016). Overcoming communication challenges: Can taking the specialist's perspective improve auditors' critical evaluation and integration of the specialist's work? *Working paper*. University of Delaware, Texas Tech University, Northern Illinois University.
- Joe, J. R., Janvrin, D. J., Barr-Pulliam, D., Mason, S., Pitman, M. K., Rezaee, Z., Sanderson, K. & Wu., Y. (2015). The Auditing Standards Committee of the Auditing Section of the American Accounting Association is pleased to provide comments on PCAOB Staff Consultation Paper No. 2015-01, the auditor's use of the work of specialists. *Current Issues in Auditing* 9(2): C18–C37.
- Johnstone, K. M., & Bedard, J. C. (2003). Risk management in client acceptance decisions. *The Accounting Review* 78(4): 1003-1025.
- Kadous, K. (2000). The effects of audit quality and consequence severity on juror evaluations of auditor responsibility for plaintiff losses. *The Accounting Review* 75(3): 327 – 341.
- Kadous, K. & Y. D. Zhou. (2016). How does intrinsic motivation improve auditor skepticism in complex audit tasks? *Working paper*. Emory University.

- Kinney, W., Palmrose, Z-V., & Scholz, S. (2004). Auditor Independence, non audit services, and restatements: Was the U.S. government right? *Journal of Accounting Research* 42(3): 561 – 588.
- Knechel, W. R. & Leiby, J. (2016). If you want my advice: Status motives and audit consultations about accounting estimates. *Journal of Accounting Research* 54(5): 1331 – 1364.
- Krishnan, G. V. & Visvanathan, G. (2011). Is there an association between earnings management and auditor-provided tax services? *Journal of the American Taxation Association* 33(2): 111 – 135.
- Kumarasiri, J., & Fisher, R. (2011). Auditors' perceptions of fair-value accounting: Developing country evidence. *International Journal of Auditing* 15(1): 66 – 87.
- Lassila, D. R., Omer, T. C., Shelley, M. K., & Smith, L. M. (2010). Do complexity, governance, and auditor independence influence whether firms retain their auditors for tax services?. *Journal of the American Taxation Association* 32(1): 1 – 23.
- Martin, R. D., Rich, J. S., & Wilks, T. J. (2006). Auditing fair value measurements: A synthesis of relevant research. *Accounting Horizons* 20(3): 287 – 303.
- Maydew, E. & Shackelford, D. (2007). “The Changing Role of Auditors in Corporate Tax Planning.” In *Taxing Corporate Income in the 21st Century*, 307–337. Cambridge, UK: Cambridge University Press.
- McGuire, S. T., Omer, T. C., & Wang, D. (2012). Tax avoidance: Does tax-specific industry expertise make a difference?. *The Accounting Review* 87(3): 975 – 1003.
- Messier Jr, W. F. (2010). Opportunities for task-level research within the audit process. *International Journal of Auditing* 14(3): 320 – 328.
- Omer, T. C., Bedard, J. C., & Falsetta, D. (2006). Auditor-provided tax services: The effects of a changing regulatory environment. *The Accounting Review* 81(5): 1095 – 1117.
- PricewaterhouseCoopers, LLP. (PwC). (2016). *Our focus on audit quality*.
- Public Company Accounting Oversight Board (PCAOB). (1994). *Auditing Standard 1210: Using the Work of a Specialist*. December 15. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2010a). *Auditing Standard 1105: Audit evidence*. December 15. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2010b). *Auditing Standard 1201: Supervision of the audit engagement*. December 15. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2012a). *Auditing the Future*. June 7. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2012b). *Observations from 2010 inspections of domestic annually inspected firms regarding deficiencies in audits of internal control over financial reporting*. PCAOB Release No. 2012-006. Washington, D.C.: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2012c). *Report on 2011 Inspection of KPMG LLP*. PCAOB Release No. 104-2012-199. Washington, D.C.: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2013). *Report on 2012 inspection of PricewaterhouseCoopers LLP*. PCAOB Release No. 104-2013-148. Washington, D.C.: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2015a). *The auditor's use of the work of specialists*. Staff Consultation Paper No. 2015-01. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2015b). Investor Advisory Group Meeting. September 9. Washington, DC: PCAOB. Available at: http://pcaobus.org/News/Events/Pages/09092015_IAG.aspx.
- Public Company Accounting Oversight Board (PCAOB). (2015c). Improving the transparency of audits: Rules to require disclosure of certain audit participants in new PCAOB form and related amendments to auditing standards. Release No. 2015-008, December 15. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2016). *Information for 2016 inspections*. Staff Inspection Brief Vol. 2016/3. Washington, DC: PCAOB.

- Public Company Accounting Oversight Board (PCAOB). (2017a). The auditor's report on an audit of the financial statements when the auditor expresses an unqualified opinion and related amendments to PCAOB standards. Release No. 2015-001, June 1. Washington, DC: PCAOB.
- Public Company Accounting Oversight Board (PCAOB). (2017b). Proposed amendments to auditing standards for auditor's use of the work of specialists. Release No. 2015-003, June 1. Washington, DC: PCAOB.
- Pyzoha, J. S., Taylor, M., & Wu., Y. (2016). The effects of tone-at-the-top messaging and specialists on auditors' judgments during complex audit tasks. *Working paper*, Miami University, Case Western University, Texas Tech University.
- Robinson, D. (2008). Auditor independence and auditor-provided tax service: Evidence from going-concern audit opinions prior to bankruptcy filings. *Auditing: A Journal of Practice & Theory* 27(2): 31 – 54.
- Sakalauskaite, D. & Stuart, I. (2016). The role of experience with type of fraud and fee pressure in auditors' decisions to involve forensic specialists in audit engagements. *Working paper*, Copenhagen Business School.
- Scholz, S. (2014). *Financial restatement trends in the United States: 2003–2012*. Center for Audit Quality.
- Seetharaman, A., Sun, Y. & Wang, W. (2011). Tax-related financial statement restatements and auditor-provided tax services. *Journal of Accounting, Auditing & Finance* 26(4): 677 – 698.
- Selby, D. (2010). Do auditors adjust their audit plans accordingly when they encounter material automated control weaknesses? 7th International Conference on Enterprise Systems, Accounting and Logistics.
- Smith-Lacroix, J., Durocher, S., & Gendron, Y. (2012). The erosion of jurisdiction: Auditing in a market value accounting regime. *Critical Perspectives on Accounting* 23(1): 36 – 53.
- Stoel, D., Havelka, D., & Merhout, J. (2012). An analysis of attributes that impact information technology audit quality: A study of IT and financial audit practitioners. *International Journal of Accounting Information Systems* 13: 60 – 79.
- Trompeter, G. M., Carpenter, T. D., Desai, N., Jones, K. L., & Riley Jr, R. A. (2012). A synthesis of fraud-related research. *Auditing: A Journal of Practice & Theory* 32(Supplement 1): 287-321.
- Trotman, K. T., Bauer, T. D., & Humphreys, K. A. (2015). Group judgment and decision making in auditing: Past and future research. *Accounting, Organizations and Society*, 47: 56 –72.
- Vendrzyk, V. & Bagranoff, N. (2003). The evolving role of IS audit: A field study comparing the perceptions of IS and financial auditors. *Advances in Accounting* 20: 141 – 163.
- Weisner, M. & Sutton, S. (2015). When the world isn't always flat: The impact of psychological distance on auditors' reliance on specialists. *International Journal of Accounting Information Systems* 16: 23 – 41.

FIGURE 1
Overview of Auditing Standards on the Auditor's Use of Specialists

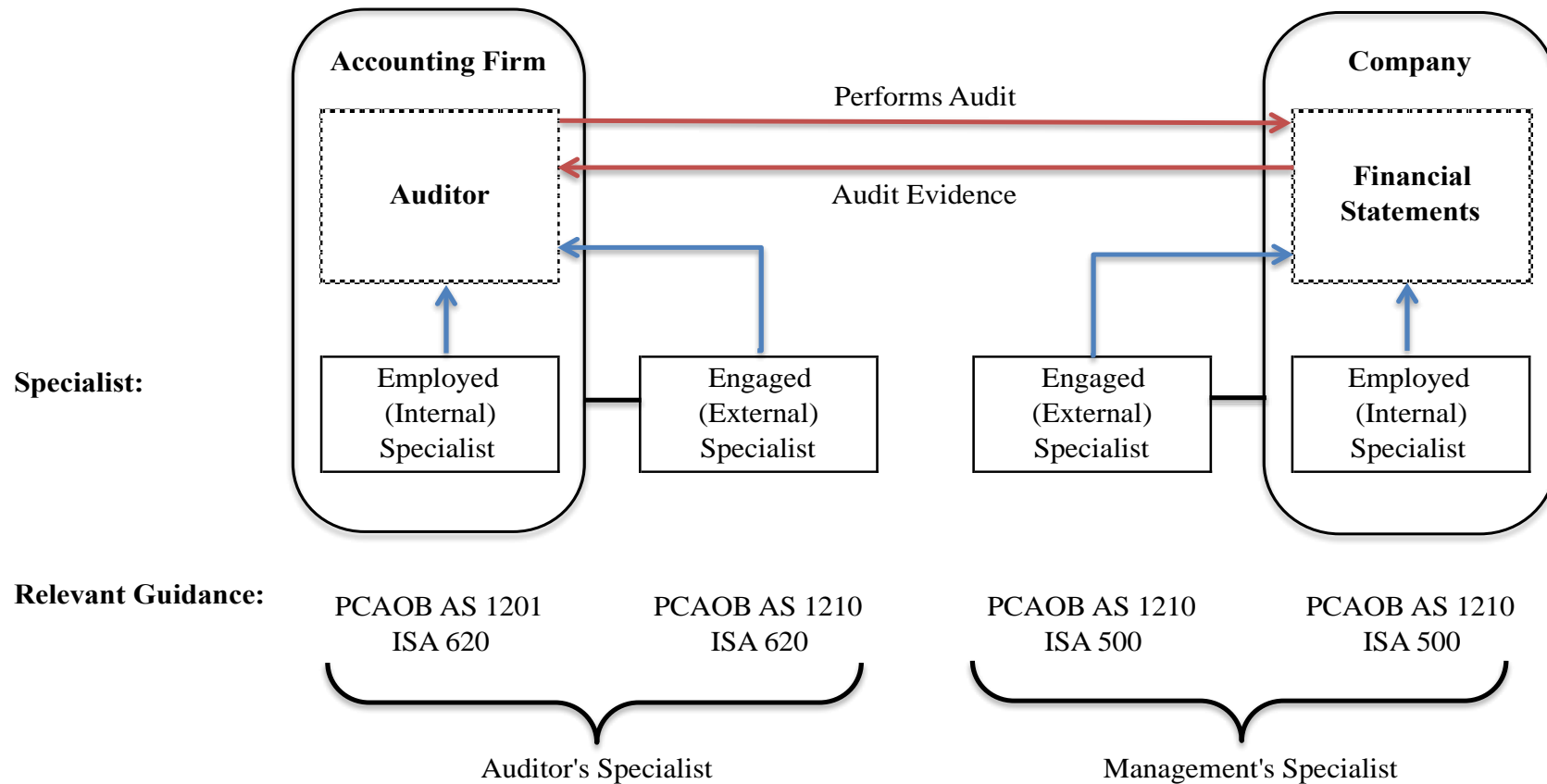


Figure Notes: This figure, adapted from a figure in PCAOB (2015a, 2017b) provides an overview of relevant auditing standards based on the type of specialist used during the audit. Specifically, the guidance diverges on: (1) auditor versus management's specialist; (2) whether the specialist is engaged or employed by the firm. Further, current auditing standards in the U.S. and internationally do not consider tax and IT audit professionals as "specialists" because tax and IT are areas of accounting and auditing. However, the firms consider these professionals as specialists (see commentary by Joe et al. 2015). The PCAOB (2017b) recently proposed amendments to these auditing standards and are seeking public comment.

FIGURE 2

Summary of the Number of Studies and Types of Research Method Employed in Each Specialist Domain

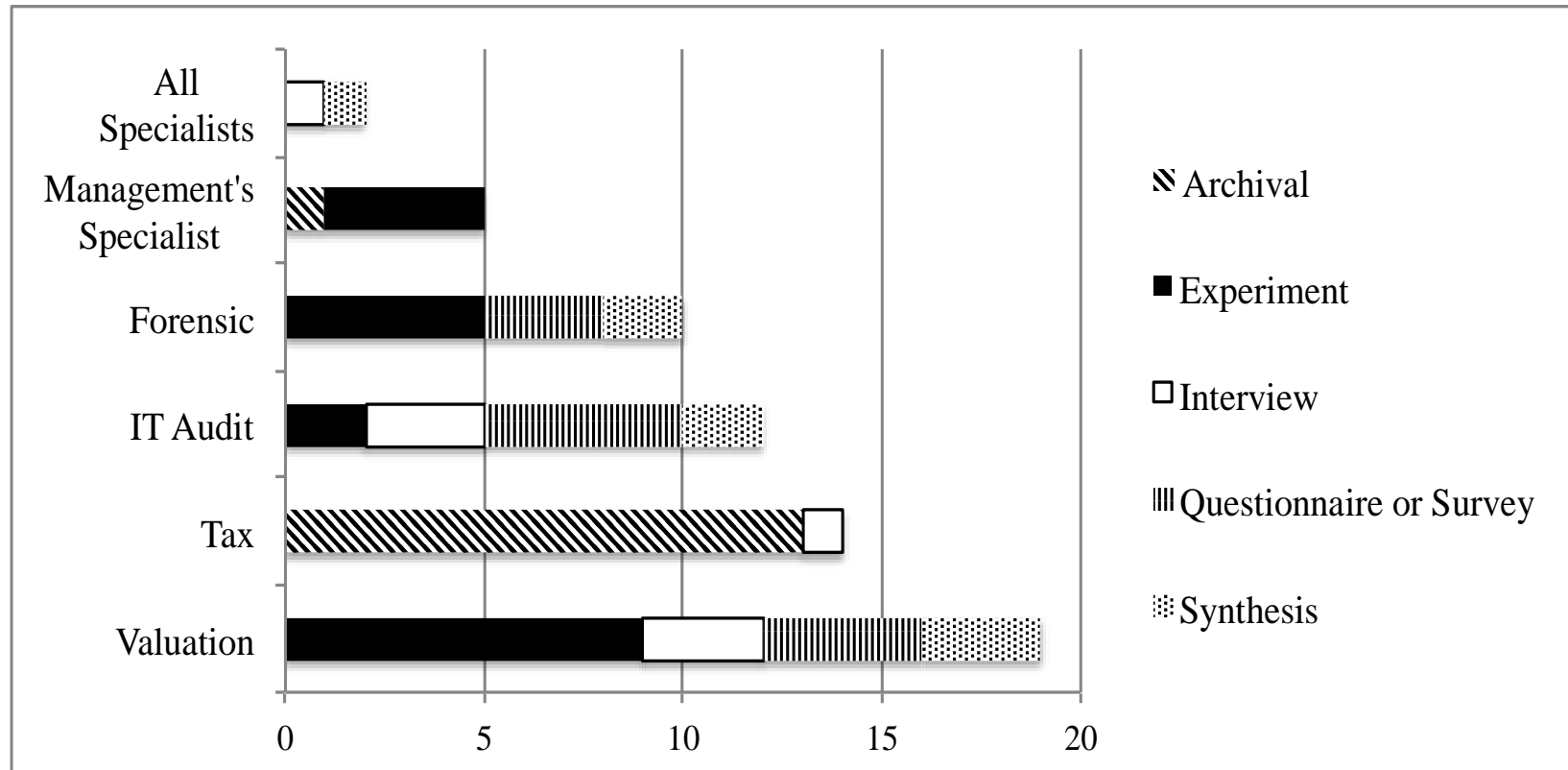


Figure Notes: This figure shows the distribution of research studies and the types of research methods employed by the various specialist types (n = 62). All tax studies included in the figure relate to non-audit tax services. Considering that, the lack of literature on tax specialists' involvement in the financial statement audit is important. Also apparent is the limited number of studies on auditors' decisions when interacting with or receiving information from management's specialists. This figure also highlights the variation in research methods across the specialist literatures and motivates the need for future research triangulating extant research with different research methods.

TABLE 1**Factors Leading to Auditors' Use of Specialists on an Audit Engagement (Including the Nature, Timing, and Extent of Use)**

Need for Expertise/Skills	Complexity	Risk	Budget	Guidance and/or Decision Aid	Future Research
• Industry	<i>Account Characteristics</i>	<i>Account Characteristics</i>	• Efficiencies	• Aid restrictiveness • Risk score	• Audit firm size
• Regulatory	• Estimation / assumptions	• Control risk	• Extent of use • Higher fees		• External vs. internal spec.
• Task	• Judgment	• Inherent risk			
• Extent of auditors' expertise	• Continuous changes in laws	• Materiality			• Location
	• Proprietary models				• Past experience
	<i>Process Characteristics</i>	<i>Process Characteristics</i>			• Relationships
	• Client's reliance on systems	• Assessment of / response to risk			
	• Complexity of IT system	• Partner preference			
	• Fraud concealment process	• Revamping procedures / unpredictability			
	• Nature / significance of issue				
	<i>Client Characteristics</i>	<i>Audit Characteristics</i>			
	• Client use	• New engagement			
	• Client size				
	• Industry	<i>Client Characteristics</i>			
	• Registrant status	• Audit committee request			
	• Regulatory environment	• Investigation by law enforcement or regulatory agency • IPO setting			
	• NATS: foreign earnings, size, NOLs, growth opportunities				
		• Management's expertise			

Table Notes: This table shows five common factors identified in extant research that affect auditors' decisions to use specialists, including the nature, timing and extent of that involvement. The items listed below each factor show how the specialist literatures operationalize or capture the factor and/or different facets of the factors that have been studied. The first three columns are consistent with auditing standards. Yet, auditing

standards are broad and what we learn from the accounting literature is the depth and breadth of these factors (e.g., what auditors are all considering). I also include a column with some suggestions for future research. See the Research Questions in the paper for further details.

TABLE 2
Factors Impacting Auditor's Interaction with the Specialist

Communication and Coordination	Budget Concerns / Cost Overruns	Supervision	Trust	Lack of Knowledge or Perceived Value	Management's Specialist	Future Research
<i>Channel</i>	• Timing delays	<i>Ways to monitor</i>	• High level in specialists	• Discount comments from specialist	• Information presentation	• Exaggerate risks
• Email vs. in-person	• Communication issues	• Continuous communication				
• Filtering information		• Misstatements identified	• Review of work	• Lack of trust impairs use / relationship	• Failure to understand work / and integrate cues	• Management credibility
<i>Timing</i>	• Adjusting budget for additional procedures	• Scoping				
• Continuous / throughout audit		• Upfront (planning or as issues arise)	<i>When insufficient</i>	• Failure to understand value / contribution to audit	• Reminders from regulators and firm leadership	• Remote specialist
• Upfront (planning or as issues arise)	• Overreliance					
<i>Other</i>					• Social factors (e.g., relationship, reputation)	
• Division of responsibilities						
• Resolving differences between specialists					• Tax and valuation ICFRs	
• Underutilization						
<i>Improvements</i>						
• Greater psychological ownership						
• Taking specialists' perspective						

Table Notes: Table 2 shows five common factors identified by research that affect auditors' interaction with specialists. Again, the items listed below each factor show how the specialist literatures operationalize the factor and/or different facets of the factors that have been studied. I also include a column for factors studied on auditors' judgments and decision-making when using work of management's specialists and a column with some suggestions for future research.

TABLE
Outcomes Associated with Using Specialists on an Audit Engagement

Audit Outcomes	The Public's Perceptions	Future Research	
<i>Positive audit quality</i>	<i>Investors</i>	<i>Audit quality</i>	
• Audit adjustments	• Care about specialists use, but largely unobservable	• Not all instances lead to higher audit quality, so need to better understand boundaries of when audit quality benefits are gained vs. not gained	
• Better reserves / estimates			
• Better risk assessments			
• Better and more sufficient testing procedures (e.g. independent expectation for FVMs)	<i>Jurors</i>		
• Fraud brainstorm quality	• Less likely to find negligent when a specialist is used.		
• Identify ICFR deficiencies		• Negligence assessments are also influenced by severity of audit failure, expert witness, and internal vs. external specialist	<i>Actual efficiencies</i>
• Identify misstatements			
	<i>Investors</i>		
<i>Negative audit quality</i>		• Information in CAMs	
• Conform to auditors' view		• Is information useful?	
• Lower professional skepticism		• Trust in / reputation of the audit firm	
<i>Perceived efficiencies</i>			
		<i>Jurors</i>	
		• Factors that could reduce or negate the benefits of specialist use on auditor's liability	

Table Notes: This table represents outcomes of auditors' use of specialists identified in extant research, as well as some opportunities for future research.