THE ROLE OF TACIT KNOWLEDGE IN
AUDITOR EXPERTISE AND HUMAN CAPITAL DEVELOPMENT

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ABSTRACT

Prior audit research predicts and finds that tacit managerial knowledge is associated with better annual performance evaluations, but only for relatively experienced auditors (Tan and Libby [1997]). By contrast, and based on the increasing importance of social skills in today’s audit ecology, we predict and find that tacit knowledge is now also valued in relatively inexperienced auditors. In particular, audit firms reward both tacit managerial knowledge and tacit audit quality knowledge in relatively inexperienced auditors via career opportunities, better performance evaluations, and bonus compensation. Shifting to relatively experienced auditors, we predict that better supervision of subordinate auditors is one way in which tacit managerial knowledge enhances relatively experienced auditors’ performance. We find that, consistent with this prediction, supervisors with higher tacit managerial knowledge better develop this knowledge in their subordinates, value tacit knowledge more when evaluating subordinates’ annual performance, and strengthen the firm commitment of higher tacit knowledge subordinates to the firm.

**Keywords:** tacit managerial knowledge, tacit audit quality knowledge, audit expertise, performance evaluation, firm commitment

**Data Availability:** Data used in this study cannot be made public due to confidentiality agreements with the participating firm and survey participants.
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1. Introduction

This paper examines different roles of tacit knowledge in the development of audit expertise and audit firm human capital. Tacit knowledge helps people better manage themselves, others, and performance on complex tasks (Wagner and Sternberg [1985, 1987], Sternberg [1999], Hedlund and Sternberg [2000]). Tan and Libby [1997] introduced tacit managerial knowledge to the accounting literature, predicting and finding evidence that audit firms value tacit knowledge in relatively experienced auditors, but not in relatively inexperienced auditors. Specifically, they found that higher tacit managerial knowledge is associated with stronger annual performance evaluations, but only for relatively experienced auditors (i.e., managers but not seniors/staff). We build on this study by predicting and testing 1) whether, given the growing importance of social skills in today’s business and audit environments (Wilson and Remer [2010], Weinberger [2014], Deming [2015]), audit firms now value tacit knowledge in even relatively inexperienced auditors and 2) how tacit managerial knowledge improves relatively experienced auditors’ supervision of inexperienced auditors.

Our first objective examines whether and the extent to which audit firms value tacit knowledge in relatively inexperienced auditors. Although Tan and Libby [1997] predict and find no positive association to exist between tacit managerial knowledge and annual performance evaluations for inexperienced auditors (e.g., seniors and staff), we nevertheless predict that today’s audit firms value tacit knowledge in inexperienced auditors. Relative to the audit ecology of the mid 1990’s when Tan and Libby performed their study, social exchange has become more prevalent in audit settings, even at more junior levels (e.g., Bennett and Hatfield [2013]) and organizations now look for entry-level professionals with strong social skills (Wilson and Remer
[2010], Weinberger [2014]). Consistent with this observation a more recent study shows that, even at lower ranks, tacit knowledge improves conclusion justifiability (Shankar and Tan [2006]). Thus, we predict that, all else equal, in today’s environment, audit firms likely value inexperienced auditors who are more equipped to deal with these social exchanges, i.e., those with greater tacit knowledge (Nelson and Tan [2005]).

If tacit knowledge is valuable in relatively inexperienced auditors, the development, supervision, and retention of these inexperienced auditors takes on added importance. Thus, our second objective examines whether and how tacit managerial knowledge helps audit supervisors develop and reward tacit managerial knowledge in their subordinates, and retain subordinates who possess higher tacit managerial knowledge. Our study differs from prior tacit knowledge studies that focus on how tacit knowledge improves an individual’s ability to navigate social structures and complex interpersonal relationships by also focusing on how individuals with high tacit knowledge influence the development of human capital and expertise in others.

This focus helps identify better supervision as one key underlying reason for the previously documented association between higher tacit knowledge and enhanced performance of relatively experienced auditors (i.e., audit managers and partners). This is important as there are plausible alternative explanations to better supervision for the association between higher annual performance reviews and tacit managerial knowledge in experienced auditors documented by Tan and Libby [1997]. For example, tacit managerial knowledge might cause higher audit profitability, which positively affects the annual performance assessment. Thus, it remains an open question whether tacit managerial knowledge improves relatively experienced auditors’ supervision and development of subordinates.
Learning about the role of experienced auditors’ tacit knowledge in supervisory areas is important for several additional reasons. Proper supervision, for example, is critical for audit quality and a pervasive element of audit firms’ quality controls, as discussed in AICPA and PCAOB audit standards.\(^1\) Despite the importance of proper audit supervision, however, alleged supervision failures are commonly found in regulators’ audit inspection, quality control remediation, and enforcement action reports.\(^2\) Understanding specific ways that tacit knowledge helps audit supervisors has the potential to reduce the incidence of supervision failures.

It also is important to improve our understanding of the determinants of inexperienced auditors’ knowledge acquisition, as discussed in the audit expertise literature (see e.g., Nelson and Tan [2005]). Prior studies examine determinants of technical knowledge such as instruction, outcome and process feedback, and self-explanations (Bonner and Walker [1994], Earley [2001], Moreno, Bhattacharjee and Brandon [2007]) as well as determinants of knowledge of industry-dynamics such as a systems-thinking perspective (Brewster [2011]). By contrast, we study whether audit supervisors’ tacit knowledge is a determinant of their subordinates’ acquisition of tacit knowledge. To the degree it is a determinant, audit firms may want to consider revising how supervisors are assigned to or rotated across specific subordinates.

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\(^1\) The AICPA’s first standard of field work emphasizes proper supervision of audit assistants, and this standard is now part of the PCAOB’s Standards (PCAOB [2014a, Rule 3200T]). PCAOB Audit Standard (AS) No. 10, “Supervision of the Audit Engagement” (PCAOB [2010]) also emphasizes supervisory roles such as informing subordinates of responsibilities, reviewing subordinates’ work, and determining the extent of supervision that specific subordinates should receive. Finally, audit quality control standards recognize that how supervisors make these judgments depends on their assessments of subordinates’ knowledge, competencies, and abilities (e.g., PCAOB Quality Control Standards §20 and §40, (PCAOB [2003a, 2003b])).

\(^2\) Several recent PCAOB inspection and quality control reports address concerns about inadequate supervision of subordinates at large audit firms (see, e.g., PCAOB [2008, 2009, 2013,2014b]). In addition, the SEC has flagged inadequate supervision in several administrative proceedings and/or enforcement releases, including those related to alleged audit failures at Adelphia Communications and Lipper Holdings (SEC [2005a, 2005b, 2006]).
Finally, it is valuable to learn about specific ways in which individual supervisors influence the development of audit firm human capital.\(^3\) Human capital development costs constitute a substantial portion of audit firms’ total capital investment (Grant [1996], Nonaka [1994], Conger and Fulmer [2003], Hatch and Dyer [2004]). Yet, whether and the conditions under which shortcomings in individual audit supervisors’ tacit knowledge hinder the development of inexperienced auditors are poorly understood, as are the conditions in which audit firms initially succeed in developing tacit knowledge in specific subordinates only to heighten the risk of losing them to other organizations. To the degree that high tacit knowledge supervisors improve retention of subordinates with high tacit knowledge, audit firms may want to design interactions between high tacit knowledge subordinates and supervisors.

To address these two objectives, we posit and test four hypotheses, starting with a prediction that audit firms value tacit knowledge in their relatively inexperienced auditors (H1). Following, we predict that supervisors who possess higher tacit knowledge better develop such knowledge in their subordinates (H2), more highly weight tacit knowledge relative to technical knowledge in evaluating subordinates’ annual performance (H3), and strengthen the firm commitment of subordinates with higher tacit knowledge (H4).

We study our hypotheses by using a mixed-method research approach. Specially, we conduct a qualitative field study, collect proprietary archival performance evaluation data, and survey employees at a medium-sized audit firm in Europe. Our survey includes the firm’s audit subordinates (staff and seniors), supervisors (managers), and top management (partners). Our empirical tests rely on real pairings of audit supervisors and subordinates (Kennedy and Peecher [1997], Jamal and Tan [2001]). We find empirical evidence supporting H2, H3, and H4 and

\(^3\) Barney [1991, p. 101] defines human capital as “the training, experience, judgment, intelligence, relationships and insight of individual managers and workers in a firm” (italics in original).
limited empirical support for H1. Specifically, we find that tacit managerial knowledge in relatively inexperienced auditors is positively associated with the probability of being identified as a potential partner. Although this finding provides some support for H1, we desired additional evidence that higher tacit knowledge subordinates receive more immediate and tangible rewards using a different kind of test. We thus conduct a second study that exclusively tests H1.

In the second study, we examine inexperienced auditors at a variety of U.S. auditing firms, including all members of the Big 4. Specifically, we gather longitudinal data via two surveys of recent graduates of a large U.S. state university with a highly-ranked accounting program. The first survey is at graduation, and the second survey is after their first year in the audit profession. Current and former Big 4 professionals serve as our expert benchmark for the tacit knowledge measures. Our second study has several key advantages over the first study for testing H1. One, to capture the extent to which audit firms value tacit knowledge we use concurrent performance evaluation ratings and bonus compensation instead of longer-term career opportunities. Although being perceived as a potential future partner vaguely indicates that the firm values the auditor, performance evaluation ratings and bonuses are tangible, more immediate signals of the firm’s appreciation and commitment. Two, in our first study we use only the tacit managerial knowledge scale developed by Tan and Libby [1997]. One potential concern with this scale is that it captures a kind of tacit knowledge that is more relevant to auditors at the manager and above level but of lesser, more questionable relevance for relatively inexperienced auditors. To address this concern, we also use the tacit audit quality knowledge scale developed by Bol, Estep and Peecher [2015]. Last but not least, the longitudinal design of our second study enables us to capture participants’ change in tacit knowledge, which provides
for a stronger empirical test of whether inexperienced auditors are recognized and rewarded for improvements in their tacit knowledge.

The Study 2 findings indicate that, as predicted in H1, audit firms do value tacit knowledge in inexperienced auditors. In fact, using the same test we overturn one of the key findings in Tan and Libby [1997], in that we find that better performance evaluation ratings are indeed associated with higher tacit knowledge in inexperienced auditors. Going a step further, we find a significant positive association between bonuses and inexperienced auditors’ change, i.e., improvement, in tacit knowledge.

Our theory-consistent evidence makes several contributions to the accounting literature. Theory and findings pertaining to H1 demonstrate that audit firms do value tacit knowledge, including both tacit managerial knowledge and tacit audit quality knowledge, even in relatively inexperienced auditors. This clarification bolsters the practical implications of evidence in H2-H4 and sheds new light on the importance of social skills for novice auditors. Whereas one reading of Tan and Libby [1997] could make novice auditors (along with their instructors in colleges and universities) believe that they forgo no rewards by waiting to develop tacit knowledge until later in their careers, our findings refute this sort of thinking. There are immediate benefits for inexperienced auditors who develop tacit knowledge.

Our H2 finding that higher tacit managerial knowledge supervisors better develop their subordinate’s tacit managerial knowledge contributes to the audit expertise literature. Consistent with a conjecture in a recent literature review by Nelson and Tan [2005], this empirical finding suggests that supervisor-subordinate interpersonal interactions do influence the development of inexperienced auditors’ expertise. It also implies that inexperienced auditors who work under
supervisors with lower tacit knowledge are at a disadvantage in terms of acquiring tacit knowledge.

Our theory and findings related to H3 contribute to the auditing and managerial accounting literatures, specifically to studies on subjectivity in incentive contracting. Earlier research has shown that factors such as supervisors’ incentives (Bol [2011]) and monitoring intensity (Höppe and Moers [2011]) affect supervisors’ use of discretion in performance evaluation. Our study complements this literature stream by documenting the importance of supervisors’ own expertise. Adding to past results showing that supervisors’ skill sets influence how well supervisors evaluate subordinates (Tan and Jamal [2001], Dreher and Ash [1990]), our H3 findings show that their tacit managerial knowledge influences what factors audit supervisors more and less heavily value and reward. Considering the importance of supervisors’ subjective assessments in performance rewards and promotion decisions (see e.g., Grabner and Moers [2013]), understanding what drives their decision-making is important.

Theory and findings for H4 contribute to the human capital development literature in accounting. We find not only that supervisors with higher tacit managerial knowledge increase the firm commitment of subordinates with higher tacit managerial knowledge (as predicted), but also that unless such subordinates have supervisors with higher tacit managerial knowledge, they are less committed to their firm than are subordinates with lower tacit managerial knowledge. Lower firm commitment by subordinate auditors with higher tacit managerial knowledge is costly to audit firms because it reduces these valued subordinates’ (as per H1) willingness to remain with a firm (Ferris [1981], Ferris and Larcker [1983], Patten [1995], Brundage and Koziel [2010]).
Overall, our H1-H4 results are also consistent with the nascent claims made by economics scholars (e.g., Weinberger [2014], Heckman and Kautz [2012]) that the importance of social skills has grown tremendously in recent years. This suggests that tacit knowledge has not only become more important for inexperienced auditors (as shown in H1), it has likely become more important for all auditors.

We organize the rest of this paper as follows. Section II gives background and develops hypotheses. Section III describes the research design for our first study and Section IV presents the results. Section V presents the research design and results of our second study. Section VI concludes and discusses future directions.

2. Background and Hypothesis Development

In characterizing Tan and Libby [1997], Nelson and Tan [2005, p. 49] observe that it:

“signals a move by the audit expertise literature away from exclusive focus on technical knowledge and performance on strictly technical tasks…. Auditors perform a wide spectrum of tasks that vary from strictly technical tasks to tasks that involve the management of people, budgets, and their own reputation. We see promise in identifying determinants of success in these tasks.”

Along these lines, we posit and test hypotheses about the value that audit firms place on greater tacit knowledge in relatively inexperienced auditors and the influence of tacit managerial knowledge on relatively experienced auditors’ supervision of relatively inexperienced auditors. First, however, we give background on tacit knowledge.

2.1 TACIT KNOWLEDGE

Psychology research characterizes tacit knowledge as a form of procedural knowledge (Wagner and Sternberg [1985]). Procedural knowledge consists of skills and strategies that enable task performance and application of declarative knowledge, i.e., knowledge of facts about
the world (Anderson 1982). People typically acquire tacit knowledge more from daily social experiences than from formal instruction and training (Polanyi [1966], Hedlund and Sternberg [2000], Vera-Munoz, Ho, and Chow [2006]). In business settings, tacit knowledge helps people manage themselves, others, and complex tasks (Wagner and Sternberg [1985], Sternberg [1999], Hedlund and Sternberg [2000]).

Tacit knowledge about managing self pertains to managing one’s self-motivation, self-organization, and emotions, both on a daily basis and during high stress times, so as to prioritize and attain one’s important goals, such as productivity. Tacit knowledge about managing others refers to knowledge about how to navigate social structures and complex interpersonal relationships, including how to interpret and handle nonverbal hints and emotional information. Tacit knowledge about managing tasks refers to knowledge about how to plan, alter, get advice about, and evaluate the success of projects as well as about how to convince others of the worth of one’s ideas or products (Wagner and Sternberg [1985], Hedlund and Sternberg [2000]).

Tacit knowledge is domain-specific (D’Eredita and Barreto [2006], Matthew and Sternberg [2009]). Tacit knowledge is determined by those with more experience at organizations (e.g., top management), forming consensus views on what constitutes relatively (in)appropriate ways to manage oneself, others, and task performance given their mission, organizational goals, and mission.

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4 The relation between tacit knowledge and other kinds of knowledge is the topic of considerable research. Tacit knowledge differs from technical knowledge and problem-solving ability (Tan and Libby [1997]) as well as from “big five” personality variables (Hedlund and Sternberg 2000). In addition, tacit knowledge tends to be uncorrelated or slightly negatively correlated with academic intelligence measures, such as verbal or analytical reasoning ability (Hedlund and Sternberg [2000], Grigorenko and Sternberg [2001], Sternberg et al. [2001]). The relation between tacit knowledge and emotional intelligence, however, is a matter of debate. This debate arises in part because emotional intelligence has been defined both broadly to include all facets of intelligence other than IQ (see Goleman [1995]), and narrowly to be one’s ability to recognize, understand, and regulate emotions in others and in oneself (Mayer, Caruso, and Salovey [2000]). The latter definition conceptually seems to overlap with tacit knowledge, but we are unaware of empirical evidence on their relation. Hedlund and Sternberg [2000, p. 158] stress that the decision to call certain kinds of intelligence as social intelligence, practical intelligence, emotional intelligence or tacit knowledge ultimately should be borne out by empirically testing and conceptually integrating them into a “unified model” to avoid a proliferation of intelligences.
culture and values. Prior evidence indicates audit managers, seniors and even staff auditors vary considerably in terms of tacit managerial knowledge (Tan and Libby [1997]). Below, we examine whether firms value tacit knowledge in inexperienced auditors and whether differences in tacit managerial knowledge of audit supervisors’ affect the development, evaluation, and retention of inexperienced auditors.

2.2 H1 – AUDIT FIRMS VALUE TACIT KNOWLEDGE IN INEXPERIENCED AUDITORS

Relying in part on surveys of audit partners, managers, seniors and staff from the early 1990s (e.g., Abdolmohammadi and Shanteau [1992]), Tan and Libby [1997] predict and find no association between relatively inexperienced auditors’ tacit managerial knowledge and their overall annual performance ratings. They argue that inexperienced auditors perform relatively few ill-structured, complex tasks that require relatively high tacit knowledge. Contrary to their findings, we predict that contemporary audit firms value tacit knowledge in their relatively inexperienced auditors because of the changing audit ecology. In general, recent economics literature reports that a greater percentage of “high-skilled, difficult-to-automate jobs” across all settings now require social skills that tacit knowledge enables (Deming [2015, p. 3]). Specific to auditing, basic technical tasks that were the main priority of inexperienced auditors are being outsourced (Hanes [2013]) and, as a result, inexperienced auditors now perform more complex and less structured tasks that require higher levels of social interactions with their team and clients. As a result, tacit knowledge in the current audit setting is likely to be valued for inexperienced auditors. Indeed, Shankar and Tan [2006] find that tacit managerial knowledge improves performance of relatively inexperienced auditors in an ill-structured justification task.

Moreover, a lack of tacit knowledge is now more likely to have lasting negative reputational consequences for both auditors and organizations because mindless utterances that
were quickly forgotten two decades ago now can become infamously permanent and “go viral” in electronic communications, i.e., e-mail, texting, or social media (Aula [2010], Nellen, Manly, and Thomas [2009]). These technological trends have altered the audit setting in ways that likely fortify the value of tacit knowledge, even in relatively inexperienced auditors.\(^5\) For these reasons, we predict that audit firms value, and thus, reward tacit knowledge in inexperienced auditors:

**H1:** Audit firms value tacit knowledge in inexperienced auditors.

### 2.3 H2 – THE INFLUENCE OF SUPERVISORS’ TACIT KNOWLEDGE ON THEIR SUBORDINATES’ ACQUISITION OF TACIT KNOWLEDGE

Although H1 runs counter to a key prediction and finding in Tan and Libby [1997], we also posit H2-H4, which bolster one of their untested theoretical arguments. Specifically, Tan and Libby [1997, 103] argue that the increased importance of and time devoted to audit supervision and administration among relatively experienced auditors constitutes a basis for predicting a positive association between their tacit knowledge and annual performance evaluations. While they assume rather than empirically establish that higher tacit knowledge enhances audit supervision, we identify and test several specific ways by which higher tacit knowledge improves relatively experienced auditors’ supervision of subordinates.

Importantly, in examining these possibilities, our study differs from prior tacit knowledge empirical studies in that they have focused on how an individual’s tacit knowledge influences the behavior and actions of the *self* within interpersonal interactions. By contrast, we also investigate how an individual’s tacit knowledge (e.g., a supervisor) influences the development and behavior of the *other* (e.g., a subordinate) in that interpersonal interaction. Consistent with Libby and Luft [1993, p. 446] who argue that, what decision makers learn on the job depends on whether they

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\(^5\) Survey evidence suggests that over ninety percent of recruiters at diverse U.S. firms use social media, including LinkedIn, Facebook and Twitter, to search for evidence of (un)desirable social identities (Schawbel [2012]).
work alone or in a group, we expect that what subordinates learn in regards to tacit knowledge depends on the supervisors with whom they work.

To our knowledge, we are the first to argue and empirically test that the ‘quality’ of specific supervisors to whom organizations expose its subordinates is an important determinant of the degree to which these subordinates develop tacit knowledge. Specifically, because audit supervisors interact with their subordinates on a daily basis and they are trusted, powerful and well-connected individuals, subordinates likely mimic them and/or model themselves after them. Consequently, when their immediate supervisors have higher levels of tacit knowledge, subordinates likely will develop richer tacit knowledge. If the immediate supervisors have lower levels of tacit knowledge, however, subordinates likely will develop similar ‘bad habits’.

Further, since interactions with supervisors moderate subordinates’ knowledge acquisition (Vera-Muñoz et al. [2006]), supervisors who better manage others, i.e., those with higher tacit knowledge, likely better coach and develop their subordinates. For example, they are likely to provide both informal and formal feedback to subordinates regarding matters such as their preliminary plans, interacting with client management, and forming judgment calls (Dreher and Ash [1990], Gibbins and Trotman [2002]). By contrast, supervisors with lower tacit knowledge are likely less able to facilitate the acquisition of tacit knowledge through coaching,

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6 Public accounting firms often assign formal mentors to inexperienced auditors. While mentors likely help transfer tacit knowledge (e.g., Swap, Leonard, Shields, and Abrams [2001], Lankau and Scandura [2002]), having a mentor differs from having a day-to-day supervisor, as these mentors often do not regularly interact with their mentee auditors. In addition, it is likely that greater variation in tacit knowledge exists across day-to-day supervisors than across mentors, as mentors are specifically chosen to be a role model and often rank two or more hierarchical levels above their mentees.

7 One might ask why would a subordinate model themselves after supervisors with low tacit knowledge? The answer is because many subordinates will not be equipped to assess their supervisors’ tacit knowledge, and even supervisors with low tacit knowledge still have authority over their subordinates. Consequently, unless their own tacit knowledge is quite high, subordinates will model themselves after their supervisor, independent of their supervisor’s level of tacit knowledge. Moreover, knowledge transfer through social interactions often happens in the absence of intent, so subordinates might not even be conscious of their mimicking behavior (Bandura [1977], Anderson [1995]).
which means that subordinates who always work with supervisors with lower tacit knowledge likely have relatively impoverished levels of tacit knowledge.

To summarize, we predict that supervisor’s tacit knowledge improves subordinates’ acquisition of tacit knowledge both because supervisors with higher tacit knowledge likely are better role models for their subordinates and because they likely are better at coaching and developing their subordinates.

*H2*: The tacit knowledge of a subordinate’s immediate supervisor positively affects the subordinate’s tacit knowledge.

### 2.4 H3 – THE EFFECT OF SUPERVISORS’ TACIT KNOWLEDGE ON HOW THEY REACH ANNUAL EVALUATIONS OF SUBORDINATES’ PERFORMANCE

The level of tacit knowledge that supervising auditors possess is quite variable (Tan and Libby [1997]). This is important for performance evaluation practices within the firm, as we predict that supervisors tend to value in subordinates those skills and behaviors that they attribute to their own success when they were at that level and that these preferences manifest in their subjective choices in performance evaluation. Higher tacit knowledge supervisors likely appreciate how these skills and behaviors influenced their own development and performance. Supervisors with lower tacit knowledge, by contrast, are likely less aware of the potential important role of tacit knowledge for inexperienced auditors’ current performance (cf. Argyris [1990] and see H1). In addition, because they are less likely to have excelled (as subordinates) on the performance dimensions that the organization uses to capture tacit knowledge, they are less likely to think of these dimensions as crucial for the subordinates’ current performance. In their performance evaluation, they are thus less likely to highly value those dimensions relative to
other dimensions; instead their focus is likely more on the technical dimension.\(^8\)

Thus, we posit that supervisors who have higher tacit knowledge will put relatively more value on inexperienced subordinates’ tacit knowledge, while supervisors with lower tacit knowledge will put relatively more value on inexperienced subordinates’ technical knowledge. Formally:

\(H3\): Relative to supervisors with lower tacit knowledge, supervisors with higher tacit knowledge put relatively greater value on tacit versus technical knowledge in evaluating their subordinates’ annual performance.

2.5 H4 – THE EFFECT OF SUPERVISORS’ TACIT KNOWLEDGE ON HIGH TACIT KNOWLEDGE SUBORDINATES’ FIRM COMMITMENT

A well-known problem for audit firms is that they invest enormous resources in new professionals only to have many with promise leave (Patten [1995], Vera-Muñoz et al. [2006], ACCA [2012]). Turnover rates in audit firms are high, with estimates ranging from 22% to 28% per year (Satava [2003], Brundage and Koziel [2010]). A recent survey by the Association of Chartered Certified Accountants finds that only about 38% are satisfied with their career and only 35% plan to stay beyond three years, with no significant differences across Big 4 and mid-tier firms (ACCA [2012]). High dissatisfaction and turnover rates are a costly drain of technical and tacit knowledge (Francis and Yu [2009], Brundage and Koziel [2010]), so understanding how to increase satisfaction and retention of promising auditors is very valuable to audit firms.

We conjecture that immediate supervisors can help combat these satisfaction and retention problems, as they are among those most apt to provide feedback, carve out learning opportunities and shape professional and firm identities in their subordinates (Vera-Muñoz et al. [2006], Bauer [2015]). Specifically, we predict that subordinates’ commitment to the audit firm

\(^8\) To clarify, we view tacit and technical knowledge as complements, not substitutes. Sufficient technical knowledge must be present for both supervisor and subordinate auditors to be successful.
is stronger when working for higher tacit knowledge supervisors, especially if the subordinates’ tacit knowledge is also higher. Higher tacit knowledge subordinates are more likely to appreciate and benefit from rich advice and feedback and these, in turn, are more likely supplied by supervisors with higher tacit knowledge (see H2). As a result, higher tacit knowledge subordinates’ propensity to stay with the firm likely is stronger when they have higher tacit knowledge supervisors (Ferris and Larcker [1983], Meyer, Stanley, and Vandenberg [2013]).

To be clear, we are not predicting that higher tacit knowledge subordinates’ firm commitment is stronger overall. We expect firm commitment of higher tacit knowledge subordinate will be conditional on the supervisor’s level of tacit knowledge. Being managed by a supervisor who does not have the higher levels of tacit knowledge to enrich development (see H2) and who is likely to put relatively more focus on technical, mundane aspects of the profession (see H3) will likely cause higher tacit knowledge subordinates to become less enthusiastic about the firm, and more apt to look elsewhere for growth opportunities. Thus, it is not the subordinates’ higher level of tacit knowledge per se, but the combination of a higher tacit knowledge subordinate with a higher tacit knowledge supervisor that is predicted to result in stronger subordinates’ firm commitment. Formally:

\[ H4: \text{Firm commitment is stronger for subordinates with higher tacit knowledge when their supervisors also possess higher tacit knowledge.} \]

3. Research Design: Study 1

3.1 THE COMPANY AND RESEARCH METHODS

Our research setting is a mid-sized regional European audit firm with four offices and over 275 employees. The company is a strong player in their regional market and services small, mid-size and larger national and international clients.
In order to understand the human capital development and evaluation processes at the firm, and allow for quantitative analysis, we used a mixed-method research approach. As discussed below, we gathered information for our research by: (1) conducting a qualitative field study, (2) collecting proprietary archival data, and (3) conducting an extensive survey.

We gathered the qualitative field study data in two ways. First, we carried out eight in-depth semi-structured interviews with three partners, one manager, three subordinates at different job-levels, and the head of the HR department. The semi-structured interviews lasted about an hour and provided a general understanding of their human capital development and evaluation processes. Second, we studied internal documents, including the descriptions of the evaluation systems, which allowed us to better understand the structure of the organization and the internal procedures.

To gather the quantitative archival data, we examined HR documents that described subordinates’ positions and their immediate supervisor; this yielded 101 subordinate-supervisor/partner dyads. Following, we hand-collected the available performance records of audit subordinates in the firm, resulting in 92 performance documents. Last, the HR department provided us with demographics such as job tenure, firm tenure, age, and contact information.

To capture the subordinates’ and immediate supervisors’ tacit knowledge and information on subordinates’ firm commitment, we conducted two surveys. In the survey for experienced auditors, supervisors (managers and partners) were asked to fill out the tacit managerial knowledge scale (see discussion below) and to assess the potential of their subordinates. In the survey for inexperienced auditors, subordinates were asked to fill out the tacit managerial knowledge scale and to answer questions about their commitment to the firm. We designed the

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9 Administrative and HR employees were excluded, as were employees in tax and corporate finance.
surveys using the online tool Qualtrics, and emailed a link to all subordinates, supervisors, and partners. In the email, we stated that each participant would receive a movie voucher for € 12,50 and that one participant picked at random would receive an Apple iPad. Out of 101 subordinates that we contacted based on our subordinate-supervisor/partner dyads, 85 (84%) completed the survey, while 20 of the 22 (91%) partners and supervisors completed it. Table 1 summarizes the observations in each dataset as well as a description of the different samples used.

3.2 PERFORMANCE EVALUATION AND REWARD SYSTEM

Through our interviews, we learned that the firm’s evaluation system consists of five dimensions: Target Achievement, Technical Performance, Competencies, Training, and Leadership. Whether or not all these dimensions are used in the annual evaluation depends on the job-level of the subordinate. For example, until a subordinate reaches a supervisory level, the leadership dimension is excluded. However, the technical performance and competencies dimensions apply to all employees. Each dimension includes several performance measures that are specifically chosen for each subordinate and agreed upon at the beginning of the year. At the end of the year, the supervisor evaluates the subordinate’s performance on each relevant dimension on a scale from unsatisfactory (1) to excellent (4). The system uses subjective weighting, that is, the supervisors have discretion to compose the total score based on their implicit subjective weighted scores of the relevant dimensions, instead of using a formula to map from dimension scores to the total score. We collected information on the subordinate’s rating on each individual performance measure, the different dimensions, and the total score.

3.3 TACIT KNOWLEDGE MEASURES

Following Tan and Libby [1997], who in turn built on the work of others (for background see, e.g., Sternberg [1999], Wagner and Sternberg [1985, 1987]), we capture tacit managerial
knowledge via a modified tacit managerial knowledge scale. As shown in Appendix A, this scale presents ten work-related scenarios and nine to eleven options for each scenario. Respondents rated each option on a seven-point scale, with the endpoints being extremely unimportant and extremely important to success. Respondents include 5 partners, 14 supervisors (managers), and 85 subordinates (seniors and staff). Consistent with prior research (e.g., Tan and Libby [1997], Matthew and Sternberg [2009]), we use the partners’ importance ratings to measure the tacit managerial knowledge of the subordinates and supervisors and only include those items for which there is consensus among partners. Consensus is key as tacit knowledge is a domain-level construct, not a supervisor-specific construct.

Specifically, we measure subordinates’ (supervisors’) tacit managerial knowledge as the sum of the squared deviations between a subordinate’s (supervisor’s) ratings and the mean ratings of the panel of partners. Because smaller sums of squared deviations indicate higher levels of tacit managerial knowledge, we take the highest observed score minus the score of the subordinate (supervisor), so that higher values indicate higher tacit managerial knowledge (Tacit Knowledge Subordinate; Tacit Knowledge Supervisor). Then, to simplify interpretation of our tests, we rank these measures between 0 and 1, creating cumulative distribution functions of the subordinates’ and supervisors’ tacit managerial knowledge.

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10 Tan and Libby [1997] modified the tacit managerial knowledge scale initially developed by Wagner and Sternberg (1985) so that it would better fit the public accounting context.
11 Following Tan and Libby [1997], we define consensus as unimodal responses whose range is five or less, which leaves us with 98 items.
12 The ranks that we use are fractional ranks. That is, assume that there are n observations, then the fractional ranks are 1/n, 2/n, 3/n,…, 1. The main benefit of the fractional rank is that each number between 0 and 1 reflects the percentile of the distribution of the unranked variable, which helps in better interpreting interaction effects. The correlation between the unranked variables and the ranked variables ranges from 0.90 to 0.98. More importantly, all ranked variables that are significant in our tables are also significant when using the raw variables instead, and typically become more significant.
3.4 OTHER DEPENDENT, INDEPENDENT, AND CONTROL VARIABLES

For H1, we reason that subordinates who are valued by the organization will have better future career opportunities. Specifically, we expect them to have a higher likelihood of being identified by their supervisor as future leaders of their firm. We capture career opportunities by asking supervisors to indicate separately whether each of their subordinates has the potential to become a manager (*Potential Manager*) and or a partner (*Potential Partner*). Subordinates’ tacit managerial knowledge is the independent variable and we control for subordinates’ firm tenure (*Firm Tenure*), job level (*Job Level*), age (*Age*), and overall evaluation rating (*Overall Evaluation Rating*).

The test of H2 relies on supervisors’ tacit managerial knowledge as the independent variable and subordinates’ tacit managerial knowledge as the dependent variable. We capture subordinates’ experience with an immediate supervisor by using job tenure (*Job Tenure*). We also control for the subordinate’s job level (*Job Level*).

To test H3, we capture the value that supervisors accord to different knowledge categories by analyzing implicit weights they give to different behaviors and actions of their subordinates’ in reaching their annual performance evaluation ratings. Recall that supervisors evaluate subordinates on two to five dimensions, depending on their rank. For each dimension, supervisors provide a rating from 1 (unsatisfactory) to 4 (excellent). In addition, supervisors subjectively combine these dimensions to reach an overall rating (*Overall Evaluation Rating*). We use ratings on the technical performance dimension to proxy for the subordinates’ technical skills (*Technical Performance Rating*) and ratings on the competencies dimensions to capture the subordinates’ levels of tacit knowledge (*Competencies Rating*). The competencies dimension is likely broader than tacit knowledge, but we believe it is a reasonable a priori proxy for
subordinates’ tacit knowledge as it includes the sub-dimensions drive, self-confidence, independence, cooperation, customer orientation, solution-oriented, perseverance, and willingness to learn from mistakes. These sub-dimensions seem to be related to the ability to manage oneself, others and performance on complex tasks.

To examine H4, we capture the subordinate’s commitment to the firm by using four items: (1) “I see myself working at [the firm] in the long-run”, (2) “Unless [the firm] actively undertakes steps, I will consider leaving the company” (reverse-coded), (3) “Even if I could do my job at another company while being paid more or equal, I would stay at [the firm] because [the firm] offers me other advantages”, and (4) “What is the chance that you will still work at [the firm] in 12 months?”. We use an anchored 7-point scale specific to each item. We compute the construct Firm Commitment by simply averaging the scores of the four items.\textsuperscript{13} In our analysis, we control for subordinates’ Firm Tenure, Job Level, Age, and Overall Evaluation Rating, as well as subordinates’ outside opportunities. We measure subordinates’ outside opportunities by using a single-item with an anchored 7-point scale, which asks the respondents the extent to which they agree with the statement “with my qualifications, it would be easy to find a job elsewhere” (Outside Opportunities).

4. Results: Study 1

4.1 DESCRIPTIVE STATISTICS

Tables 2 and 3 provide descriptive statistics and correlations. The mean (median) age of our subordinates is approximately 32 (29) years, their mean (median) firm tenure is almost 7 (4) years, and their mean (median) job tenure is approximately 4 (2.5) years. It is also notable that,\textsuperscript{13} We also conducted a principal component analysis, which revealed one factor with an Eigenvalue greater than 1, explaining 68% of the total variance. The absolute factor loadings of the four items range from 0.76 to 0.90. Our results are robust to using the factor score as a measure of Firm Commitment.
on a univariate basis, subordinates’ tacit managerial knowledge is significantly positively correlated with competencies \((r = +0.33, p < 0.10)\), but not statistically significantly correlated with their overall annual performance evaluations \((r = +0.15)\).

4.2 TEST OF H1: AUDIT FIRMS VALUE TACIT KNOWLEDGE IN INEXPERIENCED AUDITORS

To test H1, which predicts that tacit knowledge in inexperienced auditors is valued by the firm, we examine whether the tacit managerial knowledge of inexperienced auditors influences future career opportunities. In particular, we examine the association between a subordinate’s tacit managerial knowledge and the likelihood that s/he is identified by their supervisor as a future leader. We estimate the following logit model:

\[
Pr(\text{Potential} = 1) = \beta_0 + \beta_1 \text{Tacit Knowledge Subordinate} + \beta_2 \text{Job Level} \\
+ \beta_3 \text{Job Tenure} + \beta_4 \text{Age} + \beta_5 \text{Overall Evaluation Rating} + \epsilon
\]

where “Potential” refers to either Potential Manager or Potential Partner. We run this model both with and without controlling for Overall Evaluation Rating.

The results, presented in Table 4, show that tacit managerial knowledge is significantly positively associated with the probability of being identified as a potential partner \((p < 0.05\), one-tailed\). To examine whether the audit firm’s performance evaluations already fully impound the forward-looking value of subordinates’ tacit managerial knowledge, we include Overall Evaluation Rating as a control. Although significance levels decrease, the results for potential partner are robust to including Overall Evaluation Rating. Thus, the results are consistent with H1 for potential partner, whether or not we include Overall Evaluation Rating in the analysis.

With respect to potential manager, the hypothesized association is positive but insignificant. A plausible explanation for weaker findings for potential manager is that, in line with H3, supervisors’ with low tacit managerial knowledge are less inclined to incorporate
subordinate tacit knowledge in identifying potential managers. Untabulated results suggest that this is indeed the case in that the association between *Tacit Knowledge Subordinate* and *Potential Manager* is significantly and positively affected by *Tacit Knowledge Supervisor* (p=0.03, one-tailed).

Regarding the control variables, we find that both *Job Level* and *Overall Evaluation Rating* are significantly positively associated with both *Potential Manager* and *Potential Partner*. This indicates that subordinates higher up the hierarchy and/or with a better performance evaluation are more likely to be identified as future potential leaders. Further, *Age* has a significant negative effect on the probability to become a manager, but not on the probability to become partner when we include *Overall Evaluation Rating*. *Job Tenure* is insignificant in all models.\(^{14}\)

Taken together, these results provide moderate support for H1, which predicts audit firms value tacit knowledge in inexperienced auditors. While it is desirable to be among a select set of inexperienced auditors perceived to have high potential to be a partner, the prospect of partnership is years away. Thus, in order to better test H1 we perform a second study, which we discuss after the following tests of H2, H3, and H4.

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\(^{14}\) In Study 1 we have multiple observations per supervisor, but our main analyses do not take this into account. Although our sample and number of supervisors is too small for fixed effects and clustered standard errors, respectively, we do two things econometrically to address having multiple observations per supervisor. One, we use jackknife resampling which entails eliminating all observations for one supervisor at a time, estimate our main models, and re-run this analysis as many times as the number of supervisors that we have. The jackknife estimator is the average coefficient over all jackknife samples. Two, to account for correlation within supervisors, we use clustered standard errors for each jackknife sample and correct these standard errors for small-sample bias by multiplying them by $\sqrt{(G-1)/(G-2)}$, where G is the number of supervisors (clusters) in the main sample (Cameron et al. [2008]). Significance is determined via the average t-statistic based on the adjusted clustered standard errors and a t-distribution with (G-1) degrees of freedom. The results (untabulated) are similar to those presented in previous sections.
4.3 TESTS OF H2: DEVELOPMENT OF TACIT KNOWLEDGE

To examine the hypothesized positive relation between the tacit knowledge of a subordinates’ immediate supervisor and subordinate’s tacit knowledge, we test whether the tacit managerial knowledge of subordinates differs between two types of supervisors, i.e., those with above-the-median tacit managerial knowledge and those with below-the-median tacit managerial knowledge (using the panel of partners as the benchmark). We limit our sample to supervisors and subordinates who have been in their current job for more than a year, in order to ensure that supervisors had the opportunity to impact their subordinates. This reduces the sample to 13 supervisors and 52 subordinates for whom we have tacit managerial knowledge data. Of these 52 subordinates, 29 (23) are associated with supervisors with above-the-median (below-the-median) tacit managerial knowledge. To ensure that we compare individual subordinates at the same job-level and with a similar length of experience, we match subordinates of supervisors with above-the-median tacit managerial knowledge to subordinates of supervisors with below-the-median tacit managerial knowledge based on the subordinates’ job level and job tenure. We use one-to-one propensity score matching, i.e., each “treatment” (above-the-median tacit managerial knowledge) is matched with a “control” (below-the-median tacit managerial knowledge), with replacement (see, e.g., Stuart and Rubin [2007]), using propensity scores determined by job level and job tenure. In case there are ties, in terms of multiple control observations being identical, the method randomly selects one of these observations.15 As a result, the final sample consists of 13 supervisors and 28 subordinates (14 matches).

The results, reported in Panel A of Table 5, show that the mean rank of tacit managerial knowledge of subordinates of relatively high tacit managerial knowledge supervisors is

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15 The random selection method is similar to using the random draw version when using nearest neighbor matching in estimating average treatment effects (see e.g., Becker and Ichino [2002]).
significantly higher than that of subordinates of relatively low tacit managerial knowledge supervisors (62.35% vs. 41.60%; p=0.03, one-tailed). We find similar results when using the Wilcoxon rank-sum test, which shows that subordinates of higher tacit managerial knowledge supervisors tend to have higher levels of tacit managerial knowledge than those of lower tacit managerial knowledge supervisors (p=0.03, one-tailed). Finally, the Kolmogorov-Smirnov test confirms that the two samples do not come from the same distribution (p=0.06).

Given that propensity score matching reduces the sample size for the analysis, we also use an alternative to this matching procedure that is similar in spirit but typically has a smaller impact on sample size. Specifically, we regress tacit managerial knowledge of the subordinate on an indicator variable for above vs. below-the-median tacit managerial knowledge of the supervisor after (i) controlling for job level and job tenure, and (ii) assuring that there is common support for these covariates.\(^\text{16}\) The common support requirement, over and above the requirement that supervisors and subordinates have been in their current job for more than a year, reduces the sample to 42 observations. Panel B of Table 5 shows that the regression coefficient for the indicator variable for above vs. below-the-median tacit managerial knowledge of the supervisor is positive and significant (p=0.01, one-tailed). The magnitude of the coefficient is +0.23, which indicates that the rank of tacit managerial knowledge of subordinates of higher tacit managerial knowledge supervisors is on average almost one quartile higher than that of subordinates of lower tacit managerial knowledge supervisors. Collectively, these results support H2, suggesting that because tacit knowledge is acquired through an interactive socialization process, immediate supervisors play a key role in subordinates’ tacit knowledge development.

\(^\text{16}\) Common support relates to the overlap in the distributions of covariates between the two subgroups and implies that only observations that lie within this overlap are used. That is, the sample is restricted to observations with covariate values that are observed for both the treated and the control group. See Angrist and Pischke [2009, pp. 69-77] for a discussion of the similarity between matching and regression.
An alternative explanation for these H2 results is that relatively high tacit managerial knowledge subordinates and/or supervisors self-select into working with one another. During our field examination, however, it became apparent that self-selection was unlikely at this particular firm because there were relatively few opportunities for subordinate and supervisor pairings to switch given the mid-size of the audit firm. To corroborate this observation, we examine whether indications of self-selection are present in our survey data. If self-selection were driving these results, we would expect to observe a positive relationship between the tacit managerial knowledge of subordinates and their immediate supervisors, even for quite new subordinate-supervisor relationships. We have data for 14 subordinate-supervisor dyads that have worked together for a year or less. Of these 14 dyads, four (ten) have supervisors with below-median (above-median) tacit managerial knowledge. We observe no significant difference in the tacit managerial knowledge of subordinates with relatively high versus relatively low tacit managerial knowledge supervisors. Although the small sample size reduces statistical power, the difference is clearly smaller for “new” subordinate-supervisor relationships (difference in medians is 15.88% [59.41% vs. 43.53%]) than for “established” subordinate-supervisor relationships (difference in medians is 41.18% [74.71% vs. 33.53%]). Thus, self-selection is not a viable alternative explanation for our findings. Overall, the evidence strongly supports H2.

4.4 TESTS OF H3: PERFORMANCE EVALUATION

To test H3 we examine the impact of supervisors’ tacit managerial knowledge on the relative weight they implicitly place on different performance dimensions. Following Ittner, Larcker and Meyer [2003], we infer these implicit weights by regressing the Overall Evaluation Rating on the ratings of the two dimensions of performance that are included for all subordinates.
and use the resulting regression coefficients as our estimates of the implicit weights. More specifically, the Overall Evaluation Rating is based on the weighting of the sub-ratings on technical performance and competencies, and a random component, i.e.,

\[ \text{Overall Evaluation Rating} = \beta \cdot \text{Technical Performance Rating} + \gamma \cdot \text{Competencies Rating} + \epsilon \]  
(2)

Of particular importance for testing H3 is to have a direct estimate of the weight on the competencies (Tacit Knowledge) relative to technical performance (Technical Knowledge), i.e., \( \gamma \) vs. \( \beta \). For this purpose, equation (2) can be rewritten to:

\[ \text{Overall Evaluation Rating} = \beta \cdot (\text{Technical Performance Rating} + \text{Competencies Rating}) + (\gamma - \beta) \cdot \text{Competencies Rating} + \epsilon \]  
(3)

This shows that the Overall Evaluation Rating can be rewritten as a weight on an aggregate measure, i.e., the sum of the Technical Performance Rating and the Competencies Rating, an adjustment based on whether competencies are weighted differently compared to technical performance, and a residual component. Thus, by empirically estimating equation (3), we can use the regression coefficient on Competencies Rating to infer the weight on competencies relative to technical performance, i.e., \( (\gamma - \beta) \). Furthermore, the regression coefficient on the aggregate measure reflects the absolute weight on Technical Performance Rating.

To examine the impact of supervisors’ tacit managerial knowledge on the subjective, implicit weights, we allow the regression coefficients to vary with the rank of Tacit Knowledge Supervisor. As a result, we use the following specification:

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17 When regressing Overall Evaluation Rating on the ratings of all five dimensions and taking the absence or presence of the other three dimensions into account by adding an indicator variable that equals 1 (0) if the dimension is present (absent), we find similar results (untabulated).
Overall Evaluation Rating = \beta_0 + \beta_1 \text{Aggregate Rating} \\
+ \beta_2 \text{Competencies Rating} + \beta_3 \text{Tacit Knowledge Supervisor} \\
+ \beta_4 \text{Tacit Knowledge Supervisor} \times \text{Aggregate Rating} \\
+ \beta_5 \text{Tacit Knowledge Supervisor} \times \text{Competencies Rating} + \epsilon  

where \text{Aggregate Rating} is the sum of the \text{Technical Performance Rating} and the \text{Competencies Rating} and \beta_5 estimates whether the relative weight on competencies changes with supervisor’s tacit knowledge.

Table 6 presents the results of the above specification. The coefficients on \text{Aggregate Rating} and on \text{Competencies Rating} represent the subjective weights on these dimensions by the supervisor with the lowest observed tacit managerial knowledge; the coefficients are significantly positive and negative but not significant, respectively. This implies that technical performance is significantly weighted and competencies less so, although not significantly less.

As predicted in H3, the coefficient on the \text{Tacit Knowledge Supervisor} \times \text{Competencies Rating} interaction is significantly positive. These results indicate that the higher the tacit knowledge of the supervisor, the higher the weight on the subordinates’ competencies relative to the weight on technical performance. In addition, the coefficient on the \text{Tacit Knowledge Supervisor} \times \text{Aggregate Rating} interaction is negative and significant, which implies that the absolute weight on technical performance decreases with increases in the rank of the supervisors’ tacit managerial knowledge.\(^{18}\)

Overall the results show different weighting patterns in performance evaluations of supervisors with lower versus higher tacit managerial knowledge that support H3. In particular,

\(^{18}\) To examine whether our results are driven by supervisors with relatively high tacit managerial knowledge whose subordinates happen to be at a higher job level, we rerun our model after (i) including \text{Job Level} and the interaction terms and (ii) replacing \text{Tacit Knowledge Supervisor} by \text{Job Level}. The results, untabulated, show that our H3 results are not driven by job level. That is, all of the added variables are insignificant, while results for the variables of interest to H3 are in line with Table 6.
supervisors with higher tacit managerial knowledge put relatively more weight on the dimension indicating tacit knowledge (Competencies Rating) and relatively less weight on the dimension indicating technical knowledge (Technical Performance Rating).\textsuperscript{19} Given that subordinates likely respond to supervisors’ weights, those overseen by supervisors with low tacit managerial knowledge might underinvest in developing tacit managerial knowledge.\textsuperscript{20}

4.5 TESTS OF H4: FIRM COMMITMENT

In H4, we predict that firm commitment is stronger for higher tacit managerial knowledge subordinates when their immediate supervisors also possess higher tacit managerial knowledge. To test H4, we regress subordinates’ firm commitment on their tacit managerial knowledge and allow the regression coefficient to vary across supervisors with different levels of tacit managerial knowledge. We also control for subordinates’ job level, firm tenure, age, overall evaluation rating, and outside opportunities, and so use the following specification:

\[
\text{Firm Commitment} = \beta_0 + \beta_1 \text{Tacit Knowledge Subordinate} + \beta_2 \text{Tacit Knowledge Supervisor} \\
+ \beta_3 \text{Tacit Knowledge Subordinate} \times \text{Tacit Knowledge Supervisor} \\
+ \beta_4 \text{Job Level} + \beta_5 \text{Firm Tenure} + \beta_6 \text{Age} \\
+ \beta_7 \text{Overall Evaluation Rating} + \beta_8 \text{Outside Opportunities} + \epsilon
\] (5)

Table 7 presents the results of the above specification. We find that the coefficient on Tacit Knowledge Subordinate is significantly negative, which indicates that subordinates with

\textsuperscript{19} Our hypotheses are silent on whether higher tacit managerial knowledge supervisors also have higher technical knowledge. We explore for differences using performance evaluation data from twelve non-partner supervisors’ Technical Performance Ratings. We find that lower and higher tacit managerial knowledge supervisors have essentially identical technical knowledge (3.07 vs. 3.03, p=0.66 two-tailed). This provides evidence that differences in tacit managerial knowledge, and not technical knowledge, drive differences in supervisors’ relative weighting of subordinates’ Competencies Ratings and Technical Performance Ratings.

\textsuperscript{20} It is also possible that some supervisors emphasize tacit managerial knowledge so much that their subordinates have insufficient incentive to develop their technical knowledge. However, we observe that subordinates with supervisors having higher (versus lower) tacit managerial knowledge not only have significantly higher Competencies Ratings (rho = +0.29, p\textsubscript{two-tailed} = 0.01) but also descriptively higher Technical Performance Ratings (rho = +0.15, p\textsubscript{two-tailed} = 0.20). Thus, in our data, subordinates with higher tacit managerial knowledge supervisors tend to be strictly better off in terms of their mix of tacit managerial and technical knowledge.
higher tacit managerial knowledge are less committed to the firm when their supervisor has very low tacit managerial knowledge (formally, the lowest observed level of tacit managerial knowledge). Consistent with H4, however, the coefficient on the Tacit Knowledge Subordinate*Tacit Knowledge Supervisor interaction is positive and significant. Taken together, these effects indicate that while subordinates with higher tacit managerial knowledge are less committed to the firm than are subordinates with lower tacit managerial knowledge when their immediate supervisor has lower tacit managerial knowledge, higher tacit managerial knowledge subordinates become more committed to the firm the higher the tacit managerial knowledge of their immediate supervisor (consistent with H4). While we did not predict the former effect, it actually makes our prediction and evidence of H4 contextually more important, i.e., higher tacit managerial knowledge subordinates are less committed to the firm, unless they are developed and overseen by higher tacit managerial knowledge supervisors. The pattern of the non-monotonic (or disordinal) interaction suggests that it is the combination of the superior ability of higher tacit managerial knowledge supervisors to instill professional identities and to provide high quality advice and feedback, and the higher tacit managerial knowledge subordinates’ appreciation of these elements that results in stronger firm commitment of subordinates.

Regarding the control variables, we find that Job Level significantly affects firm commitment. In particular, the higher subordinates are on the job ladder the less committed they become. Further, the older the subordinates and the more external opportunities they have, the greater the subordinates’ commitment.

5. Study 2: Design and Results

As discussed above, Study 1 findings support H2-H4, but provide only modest support for H1. The evidence for H1 from Study 1 is indirect and ambiguous as to whether audit
subordinates are rewarded for higher tacit knowledge at the time they are subordinates. For instance, while it is commendable to be among a select set of inexperienced auditors perceived to have high potential to be a partner, the prospect of partnership is years away for inexperienced auditors. To address this limitation, in Study 2, we collect more direct evidence of firms conveying that they value tacit knowledge in inexperienced auditors while they are still lower-ranked audit subordinates by examining the influence of inexperienced auditors’ tacit knowledge on their performance evaluations and compensation.

We also strengthen our test of H1 in two other important ways. Although prior work has consistently used tacit *managerial* knowledge (Tan and Libby 1997), one might question how relevant this type of tacit knowledge is for relatively inexperienced auditors. Tacit *audit quality* knowledge, however, is certainly a kind of tacit knowledge that is relevant for inexperienced auditors. We therefore augment our measure of tacit knowledge to include tacit audit quality knowledge in testing H1. Moreover, in Study 2 we employ a longitudinal design where we collected tacit knowledge measures at two points in time, over a year apart, capturing the change in tacit knowledge of inexperienced auditors. We believe that the use of alternative dependent variables, refinement of our independent variable by adding tacit audit quality knowledge, and our longitudinal approach enable a more direct test of H1.

5.1 PARTICIPANTS AND RESEARCH METHOD

For Study 2, we conducted two online surveys via Qualtrics. We recruited participants from a pool of recently graduating students (375) who earned a bachelor’s or master’s degree in accounting from a large state university in the U.S. For the first survey, which took place at the time of graduation, 121 participants (32% response rate) completed the online instrument and were paid $15 cash. We collected demographic information, including whether, where and what
type of post-graduation job the participant has secured, and tacit knowledge scale responses (described further below).

The second survey took place after participants had been working for over a year. We contacted the 120 of 121 participants from the first survey who provided personal email addresses and offered a $30 Amazon gift card for completion of the online instrument. Eighty-four participants completed the survey, for a 70% response rate. We collected tacit knowledge scale responses, compensation-related information, other work experience-related information (including self-reported performance evaluation ratings), and demographic information (including current employer). Of the 84 respondents, 31 currently work as auditors for accounting/audit firms; we include only these 31 participants in the following analyses as we are interested in whether audit firms value tacit knowledge in inexperienced auditors.

5.2 VARIABLES

H1 predicts that audit firms value tacit knowledge in inexperienced auditors. We conduct two tests of H1 in Study 2. First, we examine whether our tacit knowledge measures (described below) differ between top and bottom auditors using the same approach as in Tan and Libby [1997]. That is, we split our sample into top and bottom auditors using the mean of their self-reported performance evaluation (Performance Evaluation). Participants provided their overall performance evaluation rating relative to peers on a percentile scale from 0 to 100. For our second test, the main dependent variable is self-reported bonus compensation (Bonus) elicited via the open-ended question: “How much money have you received in bonuses (e.g.,

21 While our main goal was to collect the data reported in Study 2, participants also completed a brief pilot experiment that included a between-subjects manipulation. Our results are robust to controlling for manipulated conditions.
project/engagement performance, annual, etc.) since you began with your firm/company?” 22 We focus on bonuses as they are given on a fairly continuous basis and supervisors have considerable discretion when determining bonuses.

To capture the tacit knowledge of inexperienced auditors, we use both the tacit audit quality knowledge scale developed by Bol et al. [2015] and half of the questions in the Tan and Libby tacit managerial knowledge scale to (see Appendix A and B). We use half, or five, of the tacit managerial knowledge scale questions due to limited participant time and to keep the total number of tacit knowledge questions (ten) consistent. As our benchmark for both types of tacit knowledge, we collect importance ratings from a panel of 11 experienced auditors and former auditors from all Big 4 firms in the U.S. (8 years of experience on average) and use this expert panel’s importance ratings to measure the tacit knowledge of the participant. 23 As in Study 1 we include only those items for which there is consensus among the expert panel and measure participants’ tacit managerial knowledge and tacit audit quality knowledge as the sum of the squared deviations between a participant’s ratings and the mean ratings of the panel of experts. Tacit knowledge levels (Tacit Managerial Knowledge, Tacit Audit Quality Knowledge, Total Tacit Knowledge) serve as the main dependent variables in our first test and are calculated in the same way as Study 1 (reverse rank of the raw score between 0 and 1) using responses from the second survey. 24

For our second test, we leverage our longitudinal data by subtracting a participant’s raw tacit knowledge score in the first survey from that participant’s raw score in the second survey to

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22 Audit firms also pay bonuses for passing the CPA exam. All but five of the auditors in our sample have passed the CPA exam, and our results are robust to including a control for passing the CPA exam.
23 The Study 2 expert panel’s responses to the tacit managerial knowledge questions are significantly correlated with the partners’ responses in Study 1 (untabulated: r = +0.67, p < 0.001).
24 The raw total tacit knowledge score is the sum of the two (audit quality and managerial) tacit knowledge raw scores.
generate the change in tacit knowledge measures, where a positive value indicates an increase in tacit knowledge (Change in Tacit Managerial Knowledge, Change in Tacit Audit Quality Knowledge, Change in Total Tacit Knowledge). In our second test, these change variables serve as the main independent variables and we control for tacit knowledge level and Performance Evaluation (both defined above), as well as self-reported initial salary (Initial Salary) and whether the participant works for a Big 4 firm (Big 4) using an indicator variable where the value is 1 if the participant works for a Big 4 firm and 0 if not.

5.3 DESCRIPTIVE STATISTICS AND TEST OF H1

Tables 8 and 9 provide the descriptive statistics and correlations for our variables of interest in Study 2, respectively. On average, participants began their careers with an initial salary of $55,317 (SD: $2,135) and receive $2,780 (SD: $3,191) in bonus compensation during their first year of working (see Table 8). While there is little variation in initial salary, bonus compensation widely varies, noted by the large standard deviation of bonuses relative to the mean. As noted in Table 9, our two types of tacit knowledge, are significantly, but not perfectly, correlated, pointing to the measures capturing related, but not completely overlapping aspects of tacit knowledge.

For our first test of H1, we examine whether self-reported performance evaluation ratings are associated with tacit knowledge. Following Tan and Libby [1997], we split participants into “Top” and “Bottom” based on the mean of Performance Evaluation (72.581).25 As shown in Table 10, we find that Total Tacit Knowledge, Tacit Audit Quality Knowledge, and Tacit Managerial Knowledge are all significantly higher for Top versus Bottom auditors (p<0.01, p < 0.05, and p<0.01, one-tailed, respectively). Thus, consistent with our H1 and contrary to the

25 Results are the same if we split Top and Bottom using the median of Performance Evaluation (75); two participants at the median drop from the analysis leaving 15 Top auditors and 14 Bottom auditors.
findings of Tan and Libby [1997], we provide evidence that audit firms value tacit knowledge in inexperienced auditors (see Table 10 for a comparison).

For our second test, we use the following regression model:

\[
\text{Bonus} = \beta_0 + \beta_1 \text{Change in Tacit Knowledge} + \beta_2 \text{Tacit Knowledge Level} \\
+ \beta_3 \text{Performance Evaluation} + \beta_4 \text{Big 4} + \beta_5 \text{Initial Salary} + \epsilon
\] (6)

where we run three versions of this model with “Change in Tacit Knowledge” as Change in Total Tacit Knowledge, Change in Tacit Audit Quality Knowledge, and Change in Tacit Managerial Knowledge.\(^{26}\) We run the models with the corresponding “Tacit Knowledge Level”: Total Tacit Knowledge, Tacit Audit Quality Knowledge, and Tacit Managerial Knowledge.

The results of the models are presented in Table 11, with Change in Total Tacit Knowledge, Change in Tacit Audit Quality Knowledge, and Change in Tacit Managerial Knowledge as the independent variable of interest in Model 1, 2, and 3, respectively. In support of H1, changes in tacit knowledge measures are positively and significantly associated with the amount of bonus received.\(^{27}\) The coefficients we observe also suggest compensation changes of economic significance: an increase in total tacit knowledge that is one standard deviation above the average yields an estimated $916 increase in total compensation, which is close to the median bonus.\(^{28}\) Performance Evaluation is not significantly related to bonus compensation, while working for a Big 4 firm and Initial Salary are both positively related. In sum, these results provide new evidence that audit firms value tacit knowledge, including both tacit managerial knowledge and tacit audit quality knowledge, in inexperienced auditors (H1).

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\(^{26}\) We also include a base model that excludes the tacit knowledge-related measures.

\(^{27}\) Results are robust to the exclusion of tacit knowledge level. We also find similar results using total compensation [calculated as \(\text{Bonus} + \text{self-reported current salary}\)] or change in total compensation [calculated as \(((\text{Bonus} + \text{self-reported current salary}) - \text{Initial Salary}) / \text{Initial Salary}\)] as the dependent variable (untabulated).

\(^{28}\) The standard deviation of Change in Total Tacit Knowledge of the 30 auditors who provided compensation information is 76.175, thus we calculate the increase in compensation as 76.175*12.03 (\(\beta_1\) from Table 11) = $916.
6. Conclusion

In this study, we examine whether audit firms value tacit knowledge in relatively inexperienced auditors and whether supervisors’ tacit managerial knowledge affects their subordinates’ tacit managerial knowledge development, their evaluation of subordinates’ annual performance, and the strength of firm commitment of higher tacit knowledge subordinates. As predicted and contrary to Tan and Libby [1997], the empirical evidence is consistent with audit firms valuing the development of tacit knowledge even in relatively inexperienced auditors, as indicated by higher performance evaluations and bonus compensation. This finding is robust to tacit managerial knowledge and to tacit audit quality knowledge. We also find supervisors who possess higher tacit managerial knowledge are better at developing their subordinates’ tacit managerial knowledge and put relatively greater value on tacit versus technical knowledge in evaluating their subordinates’ annual performance. Additionally, higher tacit managerial knowledge subordinates are significantly more committed to their firm when their supervisors have higher tacit managerial knowledge, but are otherwise less committed to stay.

Our theory consistent findings related to the value that audit firms place on tacit knowledge provides a basis for those who aspire to participate and excel in the audit profession as well as for audit firms and educators to think about how to grow tacit knowledge. Related, there has been discussion for years that accounting often is less about getting to the single, right answer than about identifying a solution that is appropriate and justifiable to diverse stakeholders (Koonce, Anderson, and Marchant [1995], Kennedy, Kleinmuntz, and Peecher [1997]). Reinforcing and extending findings on beneficial effects of tacit managerial knowledge in Shankar and Tan [2006], our study motivates future work examining how total tacit knowledge,
including tacit audit quality knowledge, improves the ability of even relatively inexperienced auditors’ to identify and craft well-justified decisions.

Our study also contributes to the literature on performance evaluation and compensation contracting by providing new insights on subjectivity in incentive contracts. Our results show that supervisors’ skill sets, and their tacit managerial knowledge in particular, not only influence how well supervisors evaluate (Tan and Jamal [2001], Dreher and Ash [1990]) but also what factors they value and reward. Since supervisors have considerable discretion in performance evaluation (Bol [2008]) and their decisions are often critical to reward and promotion decisions (Grabner and Moers [2013]), understanding what drives supervisors’ decision-making is of importance to practitioners and contract designers.

As with all studies, the two herein have limitations. First, the tacit managerial knowledge scale and tacit audit quality knowledge scales we use capture whether auditors recognize actions that represent higher tacit knowledge, which is not the same as propensity to actually undertake these actions. Like earlier studies on tacit knowledge (e.g., Tan and Libby [1997], Wagner and Sternberg [1985, 1987]), we assume that better identification leads to greater likelihood of engaging in high tacit knowledge actions. Second, we are unable to distinguish whether and the degree to which the underlying reasons for firms valuing and rewarding tacit knowledge in inexperienced auditors pertain to better current-level performance, better anticipated future performance, or both. Future research, including experimental studies, showing a link between tacit audit quality knowledge and auditor task performance as well as field-based studies aimed at better understanding audit firms’ motivation for rewarding tacit knowledge in inexperienced auditors would provide valuable insights.
REFERENCES


APPENDIX A: EXCERPTS FROM TACIT MANAGERIAL KNOWLEDGE SCALE

1. Assume it is your second year as an audit manager in a department of about 30 professional staff. The evaluation of your first year on the job has been generally favorable. Though your staff are generally motivated, there are some who seem to go through the motions but are of little real help. You believe that although you are well-liked, there is little that would distinguish you in the eyes of your superiors from the nine other managers at comparable levels in your firm.
Your goal is rapid promotion. The following is a list of things you are considering doing in the next 12 months. You obviously cannot do them all. Rate the importance of each by its priority as a means of reaching your goal:

... 

  d. make an effort to better match the work that needs to be done with the strengths and weaknesses of individual employees
  e. put pressure on staff to cut their time/cost budgets

... 

*2. Rate the following characteristics of a job by their importance in leading to a successful career in a given company:

  a. the job will bring your work to the attention of higher-level management personnel
  ... 
  f. you can master the job with almost no effort
  ...

*3. During one of your recruiting interviews at the university, a student asks you about things one can do to increase one's chances for success in public accounting. Rate each of the following things one can do by its importance to a successful career in a public accounting firm:

  ... 
  b. avoid drawing attention to yourself at all costs
  ...
  g. take advantage of opportunities to take on responsibilities beyond the scope of your immediate assignment

4. Assume you have just been transferred to another department in the firm. You were asked to take on this new job because of rather serious personnel-related problems in the new department. Morale in the new department is low. The department is divided into those who are sorry the former manager has left and those who are sorry the manager has not left earlier. Performance of the department has been below expectations. The problem has been around for some time, and you realize that solving them won't happen overnight. You also believe that this is a chance to show your superiors what you can do in a tough situation, and you hope that by doing well, you will improve your opportunities for advancement. Rate the following actions by their importance in helping you to succeed in your new position:

  ... 
  a. always delegate to the most junior person who can be trusted with the task
  ...
  ... 
  j. do not try to do too much too soon
5. Rate the following motivations in terms of their importance as incentives for pursuing a career in public accounting:

   ... 
   e. I enjoy responsibility and the power that goes with it  
   ... 
   h. I like a job that I can "leave at the office" at the end of the day  
6. In auditing as in other fields, there are often several people who are acknowledged to do extraordinary work. Rate the following characteristics by how important you believe they help in contributing to the success of these individuals:

   ... 
   i. power hungry  
   ... 
   k. better able than most to grasp and operate in terms of the "big picture", i.e., the mission of the firm

*7. Rate the following strategies of working according to how important you believe they are to the day-to-day work of an audit manager:

   ... 
   c. be in charge of all phases of every task you are involved with  
   ... 
   k. carefully consider the optimal strategy before beginning a task

*8. A number of factors enter into the establishment of a good reputation in a public accounting firm as a manager. Consider some of these factors and rate their importance:

   a. critical thinking ability  
   ... 
   f. extent of education and the prestige of the school attended

9. Rate the following experiences by their importance in becoming a good audit manager:

   ... 
   e. a strong background in accounting  
   ... 
   i. experience as editor of a professional magazine

*10. Assume your company has sent you to a university to recruit and interview potential audit trainees. You have been considering characteristics of students that are important to later success in the public accounting firm. Rate the importance of the following student characteristics by the extent to which they lead to later success in public accounting:

   a. motivation  
   ... 
   j. the need to win at everything no matter what the cost

*Indicates tacit managerial knowledge questions included in Study 2

Due to limited participant time and in order to keep the total number of tacit knowledge questions (ten) consistent, we included five tacit managerial knowledge questions. The original tacit managerial knowledge scale includes questions pertaining to knowledge of behaviors that are more or less likely to lead to success across different ranks (2, 3, 5, 6, and 10) and questions asking participants to consider alternative behaviors after putting themselves into the shoes of auditors of a specific rank within a specific social context (1, 4, 7, 8, and 9). To provide representation from both categories, we include three questions from the former and two questions from the latter in Study 2.
APPENDIX B: EXCERPTS FROM TACIT AUDIT QUALITY KNOWLEDGE SCALE

1. You are the manager on the annual financial statement audit of an agricultural company whose major products are hybrid corn and soybean seeds. Although your firm has been the independent auditor for this company for years, this is your first year on the engagement. You notice that the company has been reserving for returns of sold hybrid seeds at replacement cost, instead of at gross sales price. You are aware that this is a common practice for clothing retailers as returns may be for very similar items (i.e., a red sweater for a blue sweater), however you are unsure the policy also can be applied to hybrid seeds, which can have limited shelf life. You are concerned the approach may cause management’s sales returns reserve to be understated, perhaps materially. Rate the quality of each of the following options for addressing your concerns.
   a. Casually mention your concerns at dinner with your team to generate other opinions.
   ...
   e. Wait and see if the senior manager on the engagement has an issue when she performs her review.
   ...

2. You are the manager on the annual financial statement audit of a publicly held bank. You are in attendance at your first audit committee meeting for this client. The partner on the engagement is also present and is leading your firm’s presentation, as you are only there to answer any detail questions that may come up. One of the audit committee members asks a question related to the loan loss reserve, an estimate that has been bothersome to you as well. The partner brushes off the question, indicating your team has done a deep, detailed dive into the amount and feels comfortable with it. You do not necessarily agree with the partner’s perspective. Rate the quality of each of the following options for bringing your concern to light.
   a. Mention your concern to the partner after the meeting while he is still on-site at the client.
   ...
   f. Quell your concerns and keep quite, as the partner is the one signing off on the audit.

3. You are the manager on an integrated audit of a diversified manufacturing company with decentralized operating companies. Management has a policy in place requiring monthly reconciliations of intercompany accounts and confirmation of balances between business units, as intercompany transactions occur often and are frequently material. During review of the monthly reconciliations, the staff on the engagement alerts you to the fact that several of the forms appear to be backdated, as the print date of the files reviewed is after the signoff date. Rate the quality of each of the following options for addressing the issue.
   ...
   c. Go to the controller, your main contact, and inquire as to his opinion on the integrity of the person completing the review, but do not tell him why you are asking.
   ...
   h. Mark the issue as a material weakness in the audit file and add the issue to the list of items to bring up in your next meeting with the CFO.
4. You are the manager on the annual financial statement audit of a cellular/satellite communications equipment manufacturer. Although your firm has been auditing the client for years, this is your first year on the engagement. You notice the client regularly uses the practice of recognizing revenue on a “bill and hold” basis for its equipment. The rationale is the equipment is often ready for use and only awaiting customers to upload security software provided by a continued service contract with your client. Given your familiarity with the requirements for invoking “bill and hold” basis, you are concerned that the regularity with which your client uses this basis may not be in compliance with GAAP. From reviewing client policy documentation, you notice a retired partner from your firm was involved in the development and approval of this policy at the client. Rate the quality of each of the following options for addressing your concerns.

   b. Consult with a peer who also audits cellular/satellite communication companies.

   f. Look at the prior year engagement file to determine if the same accounting policy was in place. If so, sign-off on your review.

5. You are the manager on the financial statement audit of a retail client. During the third quarter review, you’re performing analytical procedures while you wait for the rest of your team to roll off previous engagements. You notice a large increase in gross profit over the previous year and quarter. Based on your current knowledge of the industry and the client’s operations you aren’t sure what caused the change, so you meet with the controller to obtain an explanation. Immediately upon posing the question to the controller, she provides a detailed answer about the specific change in sales mix responsible for the change in gross profit. Her response appears reasonable and you return to the audit room to document the explanation. However, you immediately notice you had the sign of the change wrong; gross profit actually decreased since the prior year. Rate the quality of each of the following options for addressing your concerns.

   a. Immediately return to the controller to reevaluate the issue.

   e. Independently research industry sales reports to better understand plausible reasons for the change in gross profit.
### TABLE 1: STUDY 1 DATASETS AND SAMPLES

<table>
<thead>
<tr>
<th>Datasets / samples</th>
<th>#obs.</th>
<th>#obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) # of subordinate-supervisor/partner dyads based on personnel files</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>(2) # of subordinates with non-missing supervisor/partner survey data</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>(3) # of subordinates with non-missing supervisor (not partner) survey data</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>(4) # of subordinates with non-missing subordinate survey data</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>(5) # of subordinates with archival data on performance evaluation</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Hypothesis 1-3: Intersection of (1)-(5)</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Hypothesis 4: Intersection of (1), (2), and (4)</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Hypotheses 4: Intersection of (1), (2), (4), and (5)</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Tacit Knowledge Subordinate</td>
<td>85</td>
<td>197.06</td>
</tr>
<tr>
<td>Tacit Knowledge Supervisor</td>
<td>14</td>
<td>201.00</td>
</tr>
<tr>
<td>Firm Tenure</td>
<td>85</td>
<td>82.13</td>
</tr>
<tr>
<td>Job Tenure</td>
<td>85</td>
<td>48.51</td>
</tr>
<tr>
<td>Age</td>
<td>85</td>
<td>31.95</td>
</tr>
<tr>
<td>Job Level</td>
<td>85</td>
<td>2.32</td>
</tr>
<tr>
<td>Overall Evaluation Rating</td>
<td>79</td>
<td>2.99</td>
</tr>
<tr>
<td>Technical Performance Rating</td>
<td>79</td>
<td>2.98</td>
</tr>
<tr>
<td>Competencies Rating</td>
<td>79</td>
<td>2.94</td>
</tr>
<tr>
<td>Firm Commitment</td>
<td>85</td>
<td>5.12</td>
</tr>
<tr>
<td>Outside Opportunities</td>
<td>85</td>
<td>5.20</td>
</tr>
</tbody>
</table>

*Tacit Knowledge Subordinate:* Subordinate’s tacit managerial knowledge measured using the modified tacit managerial knowledge scale with the panel of partners as the benchmark.
*Tacit Knowledge Supervisor:* Supervisor’s tacit managerial knowledge measured using the modified tacit managerial knowledge scale with the panel of partners as the benchmark.
*Firm Tenure:* Subordinate’s tenure within the firm in months.
*Job Tenure:* Subordinate’s tenure within the job in months.
*Age:* Subordinate’s age in years.
*Job Level:* Subordinate’s level in the corporate hierarchy, where higher values reflect a higher level.
*Overall Evaluation Rating:* Performance rating received by the subordinate, ranging from 1 (poor) to 4 (excellent).
*Technical Performance Rating:* Performance sub-rating received by the subordinate on the dimension ‘Technical Performance’, ranging from 1 (poor) to 4 (excellent).
*Competencies Rating:* Performance sub-rating received by the subordinate on the dimension ‘Competencies’, ranging from 1 (poor) to 4 (excellent).
*Firm Commitment:* The average of four survey questions, each with an anchored 7-point scale, capturing the extent to which the subordinate is committed to the firm.
*Outside Opportunities:* Single survey question with an anchored 7-point scale, which asks the respondents the extent to which they agree with the statement “with my qualifications, it would be easy to find a job elsewhere”.


TABLE 3: STUDY 1 CORRELATIONS (PEARSON BELOW DIAGONAL; SPEARMAN ABOVE DIAGONAL)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tacit Knowledge Subordinate</td>
<td>1</td>
<td>-0.10</td>
<td>-0.14</td>
<td>-0.07</td>
<td>0.08</td>
<td>0.12</td>
<td><strong>0.35</strong></td>
<td><strong>0.24</strong></td>
<td>0.11</td>
<td>0.05</td>
</tr>
<tr>
<td>2. Firm Tenure</td>
<td>-0.15</td>
<td>1</td>
<td><strong>0.58</strong></td>
<td><strong>0.77</strong></td>
<td><strong>0.28</strong></td>
<td>0.05</td>
<td>0.16</td>
<td>-0.09</td>
<td>-0.10</td>
<td>0.03</td>
</tr>
<tr>
<td>3. Job Tenure</td>
<td>-0.17</td>
<td><strong>0.69</strong></td>
<td>1</td>
<td><strong>0.48</strong></td>
<td>0.09</td>
<td>0.07</td>
<td>0.12</td>
<td><strong>-0.19</strong></td>
<td>-0.02</td>
<td>-0.07</td>
</tr>
<tr>
<td>4. Age</td>
<td>-0.16</td>
<td><strong>0.85</strong></td>
<td><strong>0.76</strong></td>
<td>1</td>
<td><strong>0.39</strong></td>
<td>-0.04</td>
<td>0.12</td>
<td><strong>-0.19</strong></td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>5. Job Level</td>
<td>0.11</td>
<td><strong>0.21</strong></td>
<td>-0.03</td>
<td><strong>0.19</strong></td>
<td>1</td>
<td>0.05</td>
<td>0.16</td>
<td>-0.06</td>
<td><strong>-0.19</strong></td>
<td><strong>0.28</strong></td>
</tr>
<tr>
<td>6. Overall Evaluation Rating</td>
<td>0.15</td>
<td>0.02</td>
<td>-0.00</td>
<td>-0.01</td>
<td>0.09</td>
<td>1</td>
<td><strong>0.44</strong></td>
<td><strong>0.48</strong></td>
<td>-0.01</td>
<td><strong>0.20</strong></td>
</tr>
<tr>
<td>7. Technical Performance Rating</td>
<td>0.17</td>
<td>0.08</td>
<td>0.07</td>
<td>0.02</td>
<td>-0.07</td>
<td><strong>0.27</strong></td>
<td>1</td>
<td><strong>0.58</strong></td>
<td>0.01</td>
<td><strong>0.23</strong></td>
</tr>
<tr>
<td>8. Competencies Rating</td>
<td><strong>0.33</strong></td>
<td>-0.22</td>
<td>-0.06</td>
<td><strong>-0.23</strong></td>
<td>-0.08</td>
<td><strong>0.55</strong></td>
<td><strong>0.32</strong></td>
<td>1</td>
<td>0.11</td>
<td><strong>0.22</strong></td>
</tr>
<tr>
<td>9. Firm Commitment</td>
<td><strong>0.19</strong></td>
<td>0.02</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.15</td>
<td>0.07</td>
<td>-0.05</td>
<td>0.10</td>
<td>1</td>
<td>0.08</td>
</tr>
<tr>
<td>10. Outside Opportunities</td>
<td>0.10</td>
<td>-0.16</td>
<td><strong>-0.34</strong></td>
<td><strong>-0.19</strong></td>
<td><strong>0.31</strong></td>
<td><strong>0.19</strong></td>
<td>0.17</td>
<td><strong>0.19</strong></td>
<td>0.00</td>
<td>1</td>
</tr>
</tbody>
</table>

All correlation coefficients that are significant at the 10% level (two-tailed) or better are in bold. For variable definitions see Table 2.
### TABLE 4: H1 – TACIT KNOWLEDGE OF INEXPERIENCED AUDITORS VALUED BY ORGANIZATION: FUTURE CAREER OPPORTUNITIES

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Predicted sign</th>
<th>Potential to be Manager</th>
<th>Potential to be Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacit Knowledge Subordinate</td>
<td>+</td>
<td>1.17 (1.08)</td>
<td>4.95** (2.25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.23 (1.27)</td>
<td>4.56** (2.61)</td>
</tr>
<tr>
<td>Job Level</td>
<td>+</td>
<td>0.87*** (0.28)</td>
<td>1.65*** (0.62)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.85*** (0.32)</td>
<td>1.59** (0.72)</td>
</tr>
<tr>
<td>Job Tenure</td>
<td>?</td>
<td>0.01 (0.01)</td>
<td>0.03 (0.02)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.00 (0.02)</td>
<td>0.02 (0.03)</td>
</tr>
<tr>
<td>Age</td>
<td>+</td>
<td>-0.28*** (0.09)</td>
<td>-0.42** (0.20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.28*** (0.10)</td>
<td>-0.32 (0.21)</td>
</tr>
<tr>
<td>Overall Evaluation Rating</td>
<td>+</td>
<td>4.36** (2.27)</td>
<td>5.39** (2.62)</td>
</tr>
<tr>
<td>Sample size</td>
<td>85</td>
<td>79</td>
<td>85 79</td>
</tr>
</tbody>
</table>

***,**,* is significant at the 1%, 5%, and 10% level (one-tailed for predictions, two-tailed otherwise), respectively. Standard errors are in parentheses. Potential to be Manager (Partner) is a dummy variable that equals 1 if the subordinate’s immediate supervisor indicates that the subordinate has the potential to be a manager (partner), zero otherwise. All other variables are defined in Table 2.
### TABLE 5: H2 – IMPACT OF SUPERVISORS’ TACIT MANAGERIAL KNOWLEDGE ON SUBORDINATES’ TACIT MANAGERIAL KNOWLEDGE

#### Panel A: Univariate analysis using a propensity-score matched sample (n=28) \(^a\)

<table>
<thead>
<tr>
<th>Tacit Knowledge Supervisor</th>
<th>Below-the-median Tacit Knowledge</th>
<th>Above-the-median Tacit Knowledge</th>
<th>Differences</th>
<th>Wilcoxon test</th>
<th>K-S test (^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (median)</td>
<td>Mean (median)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subordinate Tacit Knowledge</td>
<td>41.60 (33.53)</td>
<td>62.35 (74.71)</td>
<td>-20.76**</td>
<td>p=0.03</td>
<td>p=0.06</td>
</tr>
<tr>
<td>Supervisor Tacit Knowledge</td>
<td></td>
<td></td>
<td>-41.18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Panel B: Regression analysis using common support for Job Level and Job Tenure

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Predicted Sign</th>
<th>Tacit Knowledge Subordinate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacit Knowledge Supervisor</td>
<td>+</td>
<td>0.23***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.09)</td>
</tr>
<tr>
<td>Job Level</td>
<td>+</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.04)</td>
</tr>
<tr>
<td>Job Tenure</td>
<td>+</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Adjusted R-square</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.61%</td>
<td>42</td>
</tr>
</tbody>
</table>

\(^a\) The variables Job Level and Job Tenure are used in constructing the propensity-score matched sample.

\(^b\) The K-S test is the Kolmogorov-Smirnov test for differences in distributions.

***,** is significant at the 1% and 5% level (one-tailed), respectively. In Panel B, standard errors are in parentheses. For variable definitions see Table 2.
### TABLE 6: H3 – IMPACT OF SUPERVISOR’S TACIT MANAGERIAL KNOWLEDGE ON RELATIVE WEIGHTS GIVEN TO TECHNICAL VERSUS TACIT MANAGERIAL KNOWLEDGE IN EVALUATING SUBORDINATES’ ANNUAL PERFORMANCE

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Predicted Sign</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Aggregate Rating</td>
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<td>0.74***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.28)</td>
</tr>
<tr>
<td>Competencies Rating</td>
<td>?</td>
<td>-0.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.48)</td>
</tr>
<tr>
<td>Tacit Knowledge Supervisor</td>
<td>?</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.50)</td>
</tr>
<tr>
<td>Tacit Knowledge Supervisor * Aggregate Rating</td>
<td>?</td>
<td>-0.95**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.38)</td>
</tr>
<tr>
<td>Tacit Knowledge Supervisor * Competencies Rating</td>
<td>+</td>
<td>1.33**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.73)</td>
</tr>
<tr>
<td>Adjusted R-square</td>
<td></td>
<td>34.38%</td>
</tr>
<tr>
<td>Sample size</td>
<td></td>
<td>61</td>
</tr>
</tbody>
</table>

***,**,* is significant at the 1%, 5%, and 10% level (one-tailed for predictions, two-tailed otherwise), respectively. Standard errors are in parentheses. 
Tacit Knowledge Supervisor is ranked between zero and one. 
All variables are defined in Table 2.
TABLE 7: H4 – IMPACT OF SUPERVISORS’ TACIT MANAGERIAL KNOWLEDGE ON HIGH TACIT MANAGERIAL KNOWLEDGE SUBORDINATES’ FIRM COMMITMENT

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Predicted Sign</th>
<th>Firm Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacit Knowledge Subordinate</td>
<td>-</td>
<td>-2.20* (1.29)</td>
</tr>
<tr>
<td>Tacit Knowledge Supervisor</td>
<td>-</td>
<td>-1.80* (1.00)</td>
</tr>
<tr>
<td>Tacit Knowledge Subordinate * Tacit Knowledge Supervisor</td>
<td>+</td>
<td>3.73** (1.87)</td>
</tr>
<tr>
<td>Job Level</td>
<td>-</td>
<td>-0.20** (0.10)</td>
</tr>
<tr>
<td>Firm Tenure</td>
<td>-</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Age</td>
<td>-</td>
<td>0.05* (0.03)</td>
</tr>
<tr>
<td>Overall Evaluation Rating</td>
<td>-</td>
<td>0.20 (0.61)</td>
</tr>
<tr>
<td>Outside Opportunities</td>
<td>-</td>
<td>0.21* (0.12)</td>
</tr>
</tbody>
</table>

Adjusted R-square 4.21%
Sample size 61

***,**,* is significant at the 1%, 5%, and 10% level (one-tailed for predictions, two-tailed otherwise), respectively. Standard errors are in parentheses.
Tacit Knowledge Subordinate and Tacit Knowledge Supervisor are both ranked between zero and one. All other variables are defined in the notes to Table 2.
### TABLE 8: STUDY 2 DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std</th>
<th>Q1</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Total Tacit Knowledge</td>
<td>31</td>
<td>25.736</td>
<td>14.909</td>
<td>74.895</td>
<td>-14.00</td>
<td>40.727</td>
</tr>
<tr>
<td>Change in Tacit Audit Quality Knowledge</td>
<td>31</td>
<td>23.484</td>
<td>14.000</td>
<td>43.376</td>
<td>-7.727</td>
<td>44.091</td>
</tr>
<tr>
<td>Change in Tacit Managerial Knowledge</td>
<td>31</td>
<td>2.252</td>
<td>0.273</td>
<td>41.104</td>
<td>-12.46</td>
<td>17.545</td>
</tr>
<tr>
<td>Total Tacit Knowledge</td>
<td>31</td>
<td>122.10</td>
<td>108.03</td>
<td>50.43</td>
<td>84.49</td>
<td>153.40</td>
</tr>
<tr>
<td>Tacit Audit Quality knowledge</td>
<td>31</td>
<td>48.78</td>
<td>43.64</td>
<td>21.00</td>
<td>35.00</td>
<td>64.82</td>
</tr>
<tr>
<td>Tacit Managerial Knowledge</td>
<td>31</td>
<td>73.32</td>
<td>59.40</td>
<td>34.83</td>
<td>49.03</td>
<td>90.85</td>
</tr>
<tr>
<td>Bonus</td>
<td>30a</td>
<td>2780</td>
<td>1075</td>
<td>3191</td>
<td>100.00</td>
<td>5000</td>
</tr>
<tr>
<td>Initial Salary</td>
<td>30a</td>
<td>55317</td>
<td>55000</td>
<td>2135</td>
<td>55000</td>
<td>57000</td>
</tr>
<tr>
<td>Performance Evaluation</td>
<td>31</td>
<td>72.581</td>
<td>75.000</td>
<td>16.466</td>
<td>57.000</td>
<td>85.000</td>
</tr>
</tbody>
</table>

*One participant elected not to provide compensation related information.

**Change in Total Tacit Knowledge:** (Raw tacit audit quality knowledge score[Round 1] + Raw tacit managerial score[Round 1]) - (Raw tacit audit quality knowledge score[Round 2] + Raw tacit managerial score[Round 2])

**Change in Tacit Audit Quality Knowledge:** Raw tacit audit quality knowledge score[Round 1] - Raw tacit audit quality knowledge score[Round 2]

**Change in Tacit Managerial Knowledge:** Raw tacit managerial knowledge score[Round 1] - Raw tacit managerial knowledge score[Round 2]

**Total Tacit Knowledge:** Sum of tacit audit quality knowledge and tacit managerial knowledge measures.

**Tacit Audit Quality Knowledge:** Measured using five developed tacit audit quality knowledge scale questions with panel of experts as the benchmark.

**Tacit Managerial Knowledge:** Measured using five of the modified tacit managerial knowledge scale questions with panel of experts as the benchmark.

**Performance Evaluation:** Self-reported measure indicating overall performance evaluation rating relative to peers on a percentile scale from 0 to 100

**Big 4:** Indicator variable where value equals 1 if participant works for a Big 4 firm, 0 otherwise

**Bonus:** Self-reported bonus compensation of participant

**Initial Salary:** Self-reported initial salary of participant
TABLE 9: STUDY 2 CORRELATIONS (PEARSON BELOW DIAGONAL; SPEARMAN ABOVE DIAGONAL)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Change in Total Tacit Knowledge</td>
<td>1</td>
<td>0.92</td>
<td>0.74</td>
<td>0.10</td>
<td>0.03</td>
<td>0.09</td>
<td>0.04</td>
<td>0.14</td>
<td>-0.12</td>
<td>-0.02</td>
</tr>
<tr>
<td>2. Change in Tacit Audit Quality Knowledge</td>
<td>0.88</td>
<td>1</td>
<td>0.49</td>
<td>0.04</td>
<td>0.13</td>
<td>-0.17</td>
<td>0.19</td>
<td>0.23</td>
<td>0.08</td>
<td>0.15</td>
</tr>
<tr>
<td>3. Change in Tacit Managerial Knowledge</td>
<td>0.87</td>
<td>0.54</td>
<td>1</td>
<td>0.11</td>
<td>-0.03</td>
<td>0.23</td>
<td>-0.24</td>
<td>-0.11</td>
<td>-0.22</td>
<td>-0.18</td>
</tr>
<tr>
<td>4. Total Tacit Knowledge</td>
<td>0.07</td>
<td>0.00</td>
<td>0.08</td>
<td>1</td>
<td>0.81</td>
<td>0.94</td>
<td>0.06</td>
<td>0.22</td>
<td>0.05</td>
<td>0.38</td>
</tr>
<tr>
<td>5. Tacit Audit Quality Knowledge</td>
<td>-0.02</td>
<td>0.04</td>
<td>-0.06</td>
<td>0.81</td>
<td>1</td>
<td>0.62</td>
<td>0.20</td>
<td>0.33</td>
<td>0.31</td>
<td>0.46</td>
</tr>
<tr>
<td>6. Tacit Managerial Knowledge</td>
<td>0.14</td>
<td>-0.05</td>
<td>0.22</td>
<td>0.94</td>
<td>0.62</td>
<td>1</td>
<td>0.03</td>
<td>0.12</td>
<td>-0.10</td>
<td>0.32</td>
</tr>
<tr>
<td>7. Big 4</td>
<td>-0.11</td>
<td>0.12</td>
<td>-0.32</td>
<td>0.06</td>
<td>0.20</td>
<td>0.03</td>
<td>1</td>
<td>0.56</td>
<td>0.28</td>
<td>0.40</td>
</tr>
<tr>
<td>8. Bonus</td>
<td>0.21</td>
<td>0.32</td>
<td>0.04</td>
<td>0.21</td>
<td>0.27</td>
<td>0.12</td>
<td>0.45</td>
<td>1</td>
<td>0.68</td>
<td>0.23</td>
</tr>
<tr>
<td>9. Initial Salary</td>
<td>-0.12</td>
<td>0.05</td>
<td>-0.27</td>
<td>-0.06</td>
<td>0.22</td>
<td>-0.17</td>
<td>0.25</td>
<td>0.49</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>10. Performance Evaluation</td>
<td>-0.07</td>
<td>-0.03</td>
<td>-0.09</td>
<td>0.39</td>
<td>0.45</td>
<td>0.32</td>
<td>0.38</td>
<td>0.21</td>
<td>0.14</td>
<td>1</td>
</tr>
</tbody>
</table>

All correlation coefficients that are significant at the 10% level (two-tailed) or better are in bold.
For variable definitions see Table 8.
TABLE 10: H1 – TACIT KNOWLEDGE OF INEXPERIENCED AUDITORS VALUED BY ORGANIZATION: PERFORMANCE EVALUATIONS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tan and Libby [1997]</th>
<th>Current Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top Auditors (n = 21)</td>
<td>Bottom Auditors (n = 17)</td>
</tr>
<tr>
<td><strong>Total Tacit Knowledge</strong></td>
<td>0.622 &gt;***</td>
<td>0.370</td>
</tr>
<tr>
<td></td>
<td>(0.282)</td>
<td>(0.250)</td>
</tr>
<tr>
<td><strong>Tacit Audit Quality Knowledge</strong></td>
<td>0.624 &gt;***</td>
<td>0.367</td>
</tr>
<tr>
<td></td>
<td>(0.233)</td>
<td>(0.311)</td>
</tr>
<tr>
<td><strong>Tacit Managerial Knowledge</strong></td>
<td>414.30 = 406.43</td>
<td>0.608 &gt;**</td>
</tr>
<tr>
<td></td>
<td>(86.87)</td>
<td>(125.71)</td>
</tr>
</tbody>
</table>

***,** is significant at the 1%, 5%, and 10% level (one-tailed for predictions) respectively. Standard deviations are in parentheses.

Top auditors are those who reported above the mean Performance Evaluation (72.581) and Bottom auditors are those who reported below the mean. All variables are defined in the notes to Table 8.

The values reported from Tan and Libby [1997] are measured on a different scale than the current study.
### TABLE 11: H1 – TACIT KNOWLEDGE OF INEXPERIENCED AUDITORS VALUED BY ORGANIZATION: BONUS COMPENSATION

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Predicted sign</th>
<th>Base Model</th>
<th>Bonus Compensation</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Total Tacit Knowledge</td>
<td>+</td>
<td></td>
<td>12.03***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Tacit Audit Quality Knowledge</td>
<td>+</td>
<td></td>
<td>18.56**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(10.42)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Tacit Managerial Knowledge</td>
<td>+</td>
<td></td>
<td>20.88**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(9.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Tacit Knowledge</td>
<td>+</td>
<td>2355.76</td>
<td>(1752.18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tacit Audit Quality Knowledge</td>
<td>+</td>
<td></td>
<td>1291.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2329.94)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tacit Managerial Knowledge</td>
<td>+</td>
<td></td>
<td>1652.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1802.95)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Evaluation</td>
<td>?</td>
<td>5.68</td>
<td>-10.10</td>
<td>0.77</td>
<td>-7.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(32.84)</td>
<td>(41.02)</td>
<td>(47.06)</td>
<td>(36.63)</td>
<td></td>
</tr>
<tr>
<td>Big 4</td>
<td>+</td>
<td>2203.48***</td>
<td>2454.32***</td>
<td>1956.76**</td>
<td>2787.52***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(852.25)</td>
<td>(853.70)</td>
<td>(927.57)</td>
<td>(879.79)</td>
<td></td>
</tr>
<tr>
<td>Initial Salary</td>
<td>?</td>
<td>0.60**</td>
<td>0.67**</td>
<td>0.56**</td>
<td>0.73**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.25)</td>
<td>(0.27)</td>
<td>(0.23)</td>
<td>(0.28)</td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td></td>
<td>35.30%</td>
<td>47.94%</td>
<td>43.01%</td>
<td>45.24%</td>
<td></td>
</tr>
<tr>
<td>Sample size</td>
<td></td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

***, ***, * is significant at the 1%, 5%, and 10% level (one-tailed for predictions, two-tailed otherwise), respectively. Standard errors are in parentheses. All variables are defined in the notes to Table 8.