Audit Personnel Salaries and Audit Quality

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Abstract: This study examines the relationship between audit personnel salaries and office-level audit quality. We measure audit personnel salaries at the Associate, Senior and Manager ranks for Big 4 audit offices from 2004 to 2013 using unique data obtained from the U.S. Department of Labor. We find that offices that pay lower salaries have a higher percentage of clients that experience restatements. In related analysis, we also find lower levels of audit quality when audit employees are paid less relative to other lines of service in accounting firms (tax, consulting, etc.). Finally, we examine the ability of audit offices to pass the costs of audit labor onto their clients. We document positive and significant associations between salary and fees, suggesting that audit offices pass the cost of labor onto their clients. Overall, our findings provide initial evidence on the role of audit salary and its impact on audit quality and audit fees.

Key Words: Audit Personnel Salary; Audit Quality; Salary Determinants; Audit Fees; PCAOB

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I. INTRODUCTION

In recent years, the auditing profession has undergone significant changes and the work required to perform public company financial statement audits has increased substantially. Audit personnel bear increasing responsibilities, workloads, and pressures to perform high quality audits (Persellin et al. 2015; Hanson 2013). Despite these increased expectations and workloads, anecdotal evidence suggests auditors' real starting salaries have remained relatively unchanged and have underperformed alternative career options (e.g., consulting, tax, and corporate accounting). Given that audit personnel (e.g. associates, seniors, and managers) may play a critical role in the audit process, it is important to understand how the profession can incentivize and attract high quality audit personnel as this can have important implications for the quality of public company audits (DeFond and Zhang 2014). As in most labor markets, one of the most important incentives is compensation (Beck 2015). Yet, despite its importance, our understanding of whether and to what extent variation in audit personnel salaries within the public audit industry relates to audit quality is limited. Using a unique data set containing information on audit personnel salaries, we seek to understand the role that salaries play in influencing audit office quality and how the emergence of alternative career options has impacted audit quality.

Ex ante, the relationship between audit personnel salary and audit quality is not clear. On the one hand, efficiency wage theories suggest that higher wages should improve audit personnel productivity by motivating greater effort from existing audit personnel and/or by attracting higher quality audit personnel, because providing an above-market clearing wage makes it more costly for employees to switch to alternative lower-paying jobs (Akerlof 1984; Yellen 1984; Akerlof and Yellen 1986; Shapiro and Stiglitz 1984; Levine 1993).[1] Thus, if higher audit personnel salaries

[1] For additional theoretical studies examining the efficiency wage theory, please see (Malcomson 1981; Akerlof and Yellen 1990; Yellen 1995; Fehr and Gächter 2000; Chen and Sandino 2012). For additional empirical studies

help attract or retain higher quality audit personnel, we expect audit personnel salaries to be *positively* related to audit quality. This finding would also be consistent with regulatory claims that stagnant salaries in the audit profession are reducing worker quality in the audit industry.[2]

On the other hand, neoclassical views of the firm suggest that employees are homogenous and substitutable inputs into the production process, allowing little to no role for individuals to influence outcomes of the firm (Weintraub 2002; Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng et al. 2010). This claim might especially hold true in the audit industry as firms use a very standardized audit methodology, have uniform requirements for engagement teams to consult with national offices on complex audit/accounting issues, and maintain highly developed training programs to ensure consistency in audit delivery. To the extent that audit personnel, especially staff and associates, are relatively homogenous inputs and technologies within audit firms require little unique individual judgment, there may be no relation between audit personnel salaries and audit quality. Further, it may be the case that many entry-level auditors do not plan to remain in the auditing profession for their entire career, and, entry-level salary is less of a motivator than other aspects of a given audit firm/office combination (e.g., audit firm reputation). Ultimately, whether and to what extent audit personnel salaries are associated with audit quality is an empirical question.

While understanding this question is important to the audit profession, prior research has not examined the implications of audit personnel salary for audit quality because auditor salary

providing evidence consistent with the efficiency wage theory, please see (Levine 1993; Cappelli and Chauvin 1991; Fehr et al. 1993; Marti 1997; Fehr and Falk 1999; Hannan et al. 2002; Hannan 2005; Stevens and Thevaranjan 2010; Chen and Sandino 2012).

[2] The concern that uncompetitive salaries steer potential accountants into more lucrative careers is not new. For example, in 2000 it was noted that one reason why the quantity and quality of accounting students was reported to be falling was due to "starting salaries for accounting majors not increasing at the same rate as for other business majors (Albrecht and Sack 2000)."

information it is not readily available.[3] We overcome this data limitation by using 12,796 publicly available worker visa applications (henceforth, H-1B visas), provided by the Department of Labor, to proxy for the salaries offered to associates, seniors and managers (i.e. audit personnel) across 185 local U.S. offices of Big 4 audit firms over the period 2004 to 2013.[4] H-1B visa applications provide the application year, audit firm identity, office location, service line, rank and salary. Although H-1B visas are issued to non-U.S. citizens, it is important to note that the H-1B visa program prohibits audit firms from offering salaries that are less than the wage offered to domestic graduates (Aobdia et al. 2017). Consequently, the salary data used from these visa applications provide a reasonable proxy for the prevailing wage offered to *all* entering personnel for each audit-firm office.[5] We also restrict our analysis to Big 4 firms as they consistently employee foreign labor across all audit offices, thus allowing us to construct salary measures necessary for our analysis (Aobdia et al. 2017). Furthermore, focusing on Big 4 firms also ensures that the level of audit quality and resources is relatively homogeneous across the sample firms (Reynolds and Francis 2000; Francis 2011; DeFond and Zhang 2014).

We begin our analyses by examining factors associated with variation in audit personnel salaries. The average associate in our sample earns $54,356 per year, while seniors and managers earn substantially higher average salaries of $71,663 and $86,730, respectively. While we

[3] While rank-and-file audit personnel salaries have not been examined in prior literature, there are studies that have examined the implications of audit partner compensation (Carcello et al. 2000; Knechel et al. 2013). As partners are the residual claimants of the audit firms (i.e. owners), we do not examine partner salaries. These studies are described in more detail in Section 2.

[4] The vast majority of our sample includes H-1B temporary, non-immigrant visa applications. The data also includes a small number of permanent worker visa applications. We refer to all of these applications as H-1B visa applications throughout the remainder of the study.

[5] We provide more discussion in Section 3 about the advantages and limitations of these data. In addition, to ensure the validity of the H-1B salary data, we compare the data with proprietary data obtained from three top-tier accounting undergraduate and graduate university programs and confirm similar starting salaries and trends for associate/staff levels at the Big Four firms. In addition, we have had discussions with national recruiters of two of the Big 4 audit firm that confirm the assumptions we make regarding the H-1B salary data.

document that salaries have risen from 2004 to 2013, we find that inflation adjusted salaries have remained stagnant, and in some cases, have actually declined, consistent with anecdotal evidence. In multivariate analyses, we further explore economic factors related to variation in audit personnel salaries across the Big 4 offices. We find that salaries are positively associated with MSA-level characteristics, including home prices, population, and education. This suggests that cost of living and the availability of talented human capital, in part, explain some of the variation in audit personnel salaries across MSAs (Beck et al. 2015). We also examine audit-office specific characteristics and find that the MSA market leaders are associated with lower salaries, while audit offices with more diverse client mixes are associated with higher salaries. This suggests that MSA audit market leaders are able to attract labor at a lower cost, but increased job complexity requires higher salaries to attract personnel. Overall, these initial analyses shed initial insight on the factors related to variation in audit personnel salaries at Big 4 audit firms.

We next examine the implications of audit salaries for audit office quality. We measure audit office quality as the percentage of clients within the audit office's portfolio that release misstated financial statements as evidenced by the current period financial statements being restated in future periods (Christensen et al. 2015; Aobdia 2016).[6] Our results indicate that, after controlling for MSA characteristics related to salary, MSA audit offices that pay higher audit salaries are associated with client portfolios with higher audit quality. In sub-sample analyses, we find that our results are generally consistent across all three ranks of audit personnel, although they appear to be more pronounced among Associates and Managers. These findings are robust to including MSA fixed effects and MSA-year fixed effects to control for unobserved local

[6] Christensen et al. (2015) provide survey evidence that partners believe financial statement restatements to be a key indicator of low audit quality. Aobdia (2016) validates financial statement restatements as a measure of audit quality using PCAOB inspection findings data.

heterogeneity that can potentially correlate with audit personnel salary and audit quality. Furthermore, our results are also robust to alternative aggregation levels, including aggregating audit personnel salary to the MSA level and disaggregating audit quality to the client level.[7]

While the above analyses establish a robust relationship between audit personnel salary and audit office quality, we also note that Big 4 audit firms have recently began to emphasize their more profitable consulting and tax practices. In doing so, these firms have invested heavily in attracting talent into these alternative service lines, often times offering higher salaries than those offered for audit positions.[8] We contend that, as alternative career options such as consulting or tax become more attractive in terms of higher salaries, accounting undergraduate students that would normally enter the audit profession may instead shift to these alternative career options. To the extent that audit personnel have an impact on audit quality, this shift in talent would have implications for overall audit quality. Accordingly, we next examine how relative differences between audit salaries and the salaries offered from these alternative career options impact audit office quality.

We re-estimate our audit quality models and replace our measure of audit personnel salary with a relative salary measure. Our measure of relative salaries reflects the attractiveness of alternative career options and is computed as the difference between the individual wage offered at the MSA individual audit office and the average salary offered for Big 4 non-audit careers (i.e. consulting, tax and information technology) in the local MSA. We refer to this difference as the wage gap. We find evidence that as this wage gap increases (i.e., alternative career path salaries become more attractive), audit-office quality declines. These findings are robust to the additional

[7] In untabulated analyses, we also confirm the validity of the H-1B visa data by examining the relationship between the salaries obtained from proprietary school placement data and audit quality. Although this significantly limits our sample, we continue to find that audit personnel salary and audit quality are positively related.
[8] See, for example, http://www.big4guide.net/who-are-the-big-4/salaries/.

specifications discussed above. Taken together, our findings are consistent with both the absolute and relative wage offered to audit personnel having implications for the quality of public audits.

Finally, we conduct supplemental analyses that examine whether audit firms are able to pass on the costs of higher audit personnel salaries to their clients via higher audit fees. To the extent that clients view audits as a commodity, increased competition among Big 4 firms and the emergence of the Tier 2 firms as viable alternative options may result in audit fee compression, thus limiting the ability of Big 4 firms to pass along increased salaries to their clients (Hogan and Martin 2009). This may in turn limit audit firms ability to hire higher quality talent. However, to the extent clients perceive value in audit firms with higher quality audit personnel, they may be willing to pay a premium equal to higher audit personnel salaries (Ball et al. 2012).

Our supplemental analyses indicate several interesting findings. First, we document a positive and significant association between audit personnel salaries and audit fees suggesting that, on average, audit firms appear to be able to pass some costs of their marginal labor onto their clients. Moreover, we find that this relationship is most pronounced among associates and is less pronounced for the senior and manager ranks. Finally, we also find that the positive relationship between salary and fees is most pronounced for audit firms that command greater MSA market share, consistent with these audit firms having greater audit pricing power. Overall, these analyses provide evidence consistent with the notion that audit firms are able to pass on at least some of the cost of labor to their clients.

Our paper makes several contributions to the auditing and accounting quality literatures. Audit quality is a function of the audit process and the personnel employed by the audit firms (Francis 2011). Historically, audit research has examined how a variety of audit firm characteristics relate to the quality of financial statement audits, but has been unable to distinguish

between process and personnel effects (DeAngelo 1981; Ferguson et al. 2003; Carey and Simnett 2006; Francis and Yu 2009; Choi et al. 2010; Ghosh and Moon 2005; Venkataraman et al. 2008; Skinner and Srinivasan 2012). Recent research has started to advance our understanding of the implications of audit personnel by focusing on aspects such as education and foreign labor in the audit profession (Barrios 2017; Beck et al. 2015; Aobdia et al. 2017; Stice et al. 2017). We extend this emerging literature, by shedding new insights on how audit personnel salaries, a potential indicator of personnel quality, relates to office-level audit outcomes. Furthermore, we extend the understanding of how audit employee compensation impacts audit quality from the partner level (e.g. Knechel et al. 2013) to the rank-and-file audit personnel level.

Our study is also important for practitioners and regulators. Public company audits are of vital importance to the public interest and labor is a key input in the audit process that has important implications for audit quality. The increasing responsibilities of audit personnel due to PCAOB standards along with audit fee compression may have impacted the profitability of Big 4 audit firms. A potential consequence of this is the stagnation of salaries for audit personnel, which may affect audit firms' ability to attract high quality labor into the audit profession. Our evidence suggests that audit offices that offer higher audit salaries and salaries that are closer to (or exceed) alternative career options provide higher audit quality. This should be of interest to regulators and practitioners as both continue to balance the importance of regulation, high quality audits, and factors that attract the "best and brightest" to the audit profession.

The remainder of our study proceeds as follows. Section II discusses the related literature and develops our hypotheses. Section III discusses our data and provides descriptive results. Sections IV and V provide determinants and audit quality analyses, respectively. Section VI provides supplemental analyses examining audit fees. Finally, Section VII concludes.

II. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

Prior Studies Examining Audit Personnel and Audit Quality

A large literature in accounting seeks to understand the factors that determine audit quality. Audit quality improves financial reporting by enhancing the credibility of financial reports (DeFond and Zhang 2014). In turn, higher quality financial reporting improves resource allocation and contracting efficiency (e.g., Biddle et al. 2009). Accordingly, understanding the factors related to audit quality is a vital concern to audit firms, regulators, and investors and is a fundamental issue in the accounting literature as well as in practice.

Conceptually, audit quality can be viewed as a function of accounting processes (e.g., accounting systems, internal controls, economic transactions, regulations) and the personnel employed by both audit-firms and clients to carry out those processes (e.g., auditors, accountants, managers) (Francis 2011). The role of audit personnel is of particular importance given that these individuals have the potential to play a critical role in the audit process. Moreover, one of the fundamental activities of the audit profession is to hire and train audit personnel (Francis 2011). This point is highlighted in a recent report in which PwC notes that "Our reputation depends on hiring the most talented professionals available and, in turn, our reputation for quality enables us to attract the best candidates (PwC 2015, 9)." Despite the importance of these issues, the questions of "what role do audit personnel play in impacting audit quality?" and "how can audit firms attract and incentivize higher quality audit personnel?" remain largely unanswered.

A large number of prior studies examine how audit quality relates to audit firm characteristics such as size, tenure, industry specialization, and reputation as well as client characteristics such as competency and business transaction complexity (DeAngelo 1981; Ferguson et al. 2003; Carey and Simnett 2006; Francis and Yu 2009; Choi et al. 2010; Ghosh and

Moon 2005; Venkataraman et al. 2008; Skinner and Srinivasan 2012; DeFond and Zhang 2014). These studies generally cannot isolate the role of audit personnel or how firms attract and incentivize them because these factors relate to both accounting processes and personnel as well as other aspects of the auditing profession such as audit firm market power and litigation risk. An alternative stream of literature seeks to isolate the role of audit personnel using experimental research designs. These studies find that auditors with higher expertise, knowledge, and ability perform better in isolated audit tasks (e.g., Bonner and Lewis 1990; Nelson and Tan 2005), consistent with the notion that the individuals employed by audit-firms can have significant influence on audit quality. However, these studies do not specifically address the role of audit personnel salary and it is not clear whether and to what extent these results generalize to real-world environments (Libby et al. 2002). Thus, we specifically seek to address this gap by examining the relationship between audit personnel salaries and audit quality.

Audit Personnel Salary and Audit Quality

We argue that audit personnel salaries can have potentially important effects on the quality of audit personnel attracted to or retained within audit-firms, or the level of auditor effort, which ultimately affects the quality of audits. The issue of audit personnel salaries has become an important concern in recent years as the public accounting industry has undergone significant changes that have increased the responsibilities, task complexity, and workloads on auditors (Persellin et al. 2015).[9] New accounting standards and regulations, such as fair value accounting and internal control reporting, demand higher levels of subjective and judgmental decision making

[9] In a 2012 speech about the state of the audit profession, PCAOB Board Member Jay Hanson expressed concerns that PCAOB inspections and standards may have affected the work-life of auditors stating "one result of our activities…is that the best and brightest auditors become frustrated and leave the profession (Hanson 2012)." Later in 2013, Jay Hanson in a speech at the Baruch College's 2013 Financial Reporting Conference further stated "One exceptionally troubling issue that I sense is getting worse is the sheer number of hours that audit teams are expected to work….How do you function is you are working 16 hours per day on a continual basis?.....If audit teams are working excessive hours, there is a problem (Hanson 2013)."

(e.g., Laux and Leuz 2009) that potentially require more skilled auditors. Moreover, increased regulatory pressures from organizations like the PCAOB have also increased the burden associated with conducting a typical audit. Despite these increased demands, anecdotal evidence suggests that starting salaries over the past decade have underperformed alternative career options (e.g., tax, consulting, advisory services, and corporate accounting).

While audit personnel salaries can potentially have important implications for audit quality, there are few studies that consider audit personnel salaries in their own right or with regards to its relation to audit quality, largely as a result of data constraints. Prior studies generally focus on partner compensation as opposed to lower level rank-and-file employees' compensation. For example, Knechel et al. (2013) find that partners' compensation in Sweden is positively associated with client size, the number of clients, and the partner's ability to retain and attract new clients. Carcello et al. (2000) find no evidence of a relationship between partner compensation and going concern decisions. While these studies enhance our understanding of audit compensation, they do not speak directly to the role of rank-and-file audit personnel salary within the U.S. market. This issue is particularly important given that lower-level audit personnel are responsible for conducting a vast majority of the audit task.[10] For example, according to a recent PwC report, one hour of partner time on an audit engagement is equivalent to approximately 20.2 hours of associate time and 3.9 hours of manager time. Thus, rank-and-file employees can potentially play a significant role in shaping the outcome of an audit.

[10] Messier et al. (2010) finds evidence that partners tend to overestimate the ability of lower level personnel to detect fraud and other complex errors. While understanding partner compensation is important, it is also important to understand the relationship between audit personnel compensation and audit quality at the associate, senior and manager level given they play an important role in the external audit, and yet partners tend to over-estimate their ability.

Ex ante, the relationship between audit personnel salary and audit quality is not clear. On the one hand, efficiency wage theories suggest that higher levels of wage will improve audit personnel productivity by motivating greater effort from existing audit personnel and/or by attracting higher quality audit personnel (Malcomson 1981; Akerlof 1984; Yellen 1984; Akerlof and Yellen 1986; Shapiro and Stiglitz 1984; Akerlof and Yellen 1990; Yellen 1995; Fehr and Gächter 2000; Chen and Sandino 2012). The basic premise for these theories is that when the quality of an employee's output is not perfectly observable (i.e., information asymmetry exists between the firm and the employee), offering above-market clearing wages can improve employee output by making it costly for the employee to leave as alternative jobs pay less. By offering above-market clearing wages, audit firms can motivate increased effort from audit personnel and/or attract higher quality audit personnel, which ultimately improves the quality of the audit.

Prior empirical studies provide evidence consistent with this theory and suggest that higher wages encourage higher employee effort, less shirking, greater employee satisfaction, less employee turnover, and more honest behavior (Levine 1993; Cappelli and Chauvin 1991; Fehr et al. 1993; Marti 1997; Fehr and Falk 1999; Hannan et al. 2002; Hannan 2005; Stevens and Thevaranjan 2010; Chen and Sandino 2012). Efficiency wage theories also help to explain audit-firms' and regulators' concerns about the industry's ability to seek and retain high quality labor and reduce turnover (PwC 2015; Hanson 2012; Hanson 2013).[11] Thus, if higher audit personnel salaries help attract or retain higher quality audit personnel, we expect audit personnel salaries to be positively related to audit quality.

[11] PwC (2015, 10) comments on the problem of retention in public accounting by noting that "Retention is critical to achieving sustained audit quality. Our strategies for hiring and developing the best and the brightest in the profession become irrelevant if our professionals choose to leave the firm… Keeping …highly talented individuals within our own organization is, therefore, a priority. Our voluntary turnover rates have increased over the past two years. As is discussed in more depth below, we seek to address the factors that we believe are contributing to increased turnover…"

On the other hand, there are also potential explanations for why audit personnel salary may not be associated with audit quality. First, the neoclassical view of the firm views employees as homogenous inputs into the production process that are perfectly substitutable, thus allowing no role for individuals to influence outcomes of the firm (Weintraub 2002; Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng et al. 2010). Thus, if audit personnel are a relatively homogeneous group or if processes and procedures within audit-firms are standardized and allow for little judgment, there may be no relation between audit personnel salaries and audit quality.

Second, audit firms may compete for high quality labor not only on salary, but also on less tangible aspects of the job such as the quality of the experience offered to the job applicant and potential future career opportunities afforded to applicants working at certain audit offices (Almer et al. 2005). For example, individuals in the San Francisco market may value the opportunity to work at an audit office that specializes in the tech industry, as this will have a positive impact on individuals' future career prospects.[12] Indeed, as PwC (2015, 10) notes, "part of the appeal of a career in public accounting… is the significant opportunities available to individuals on our staff." In such a framework, total audit compensation may be viewed as a function of salary and non-salary components, such as deferred compensation and other non-pecuniary benefits. To the extent that individuals are willing to trade-off salary for these other components of compensation, there may be no association between salary and audit quality. Thus, the association between salary and audit quality is an empirical question. This leads to our first hypothesis (in null form):

H1: Absolute audit personnel salaries are not associated with audit quality.

[12] Other examples include non-monetary or non-salary perks, such as flexible seating arrangements (France 2015), free lactation kits (EY 2016), less formal dress codes (Tysiac 2015), and more engaging training facilities that resemble an amusement park (McGinn 2015).

The above arguments consider the relationship between audit personnel salaries and audit office quality. However, it is also important to note that the Big 4 public accounting firms have other, often more profitable, service lines, including tax, consulting, and information systems. These other service lines have recently been expanding. In growing their non-audit service lines, public accounting firms have invested heavily in attracting talent into these alternative service lines, often times offering higher salaries than those offered for audit positions, inducing a "wage gap" in the audit profession. Thus, as alternative career options become more attractive in terms of higher salaries, high quality personnel that would normally enter the audit profession may instead shift to these alternative career options.

This shifting may be more pronounced if the end career goal of an entry-level worker in the audit industry is not to ultimately be an auditor, but, to work for an individual company's in-house accounting or finance department. This can be achieved by working in Big 4 accounting, or, Big 4 consulting, tax, etc., and, if these other service lines offer initially higher starting salaries, they may be more attractive to accounting graduates. To the extent that audit personnel have an impact on audit quality, this shift in talent would have implications for overall audit quality. Accordingly, our second hypothesis considers the association between relative audit personnel salary (i.e., wage gap) and audit quality (in null form):

H2: Relative audit personnel salaries are not associated with audit quality.

III. DATA AND DESCRIPTIVE ANALYSIS

Audit Personnel Salary Data

We construct proxies for individual salaries for audit personnel in the Big 4 audit offices using data collected from visa applications. We use both H-1B and permanent worker visa

applications, although our data primarily consists of H-1B visa applications. The H-1B visa is a non-immigrant visa that non-permanent workers in the U.S. apply for, under the Immigration and Nationality Act.[13] The H-1B visa application process is required for all foreign employees relocating from a remote country, graduating and obtaining their first job, renewing their visa at their current job, or, moving from job to job within the United States (as long as they have not obtained permanent status). Accordingly, even individuals working at the same firm over time may have to re-apply for a visa to keep their employment status at a firm. They may also apply for a permanent worker visa (permanent resident status), and we capture these applications in our data as well. Portions of the visa application become public record. Included in the public access visa application data are the applicant's job title, employer, employer location, job code, and starting salary.

We obtain the public portion of the visa application data from the U.S. Department of Labor. Since we are interested in examining auditor salaries across multiple ranks and over time, we retain only observations from the Big 4 audit firms (i.e., PwC, EY, Deloitte, and KPMG) as data for these firms are consistently available for a large number of US offices for our sample period. Across the Big 4 Audit firms, we manually examine approximately 4,000 different job titles and retain only those applicants in which the job title indicates that the individual worked in an audit division of a Big 4 Audit Firm (as opposed to working in tax, consulting, information systems, etc.) for our audit salaries, and, worked for a Big 4 firm outside of audit for our analysis which examines the difference between auditor and non-auditor pay within the Big 4.

[13] There are many different types of visas, depending on whether the applicant is an immigrant or a non-immigrant, the relationship of the applicant to a U.S. citizen, the country of origin of the applicant, and the type of work being performed. An H-1B visa is for an alien in a "specialty occupation," where a specialty occupation is one that, among other things, may require "attainment of a bachelor's or higher degree in the specific specialty (or its equivalent) as a minimum for entry into the occupation in the United States (Immigration and Nationality Act 214(h)(i)(1)(B))", which will generally include financial statement auditors.

We also require the data to contain information regarding the relative rank of the individual at the audit firm (i.e., associate, senior, manager). One useful feature of the Big 4 audit setting is that there is significant conformity with regards to the use of titles to designate employee rank across these firms as well as with respect to the tasks these ranks perform. We require the rank to be noted in the title, and restrict our sample to Associates, Seniors, and Managers in the audit firm, omitting senior managers and partners. A typical audit team has more associates than seniors and more seniors than managers. For example, in 2015, for every audit partner hour worked at PwC, there were 20.2 associate hours worked, and 3.9 manager hours (PwC 2015). Thus, restricting to titles held by more individuals (i.e., lower-level employees) allows us to focus on a population with sufficient data to answer our research questions, as very few partners or senior managers are H-1B applicants.

From this sample, we obtain the applicant's salary which we use as a proxy for audit personnel salary for a given individual employed at an audit office in a given year. We recognize that using H-1B visa data to proxy for audit personnel salary carries with it certain caveats. One potential concern is that H-1B visa applicants (i.e., foreign workers) may be paid differently than other employees in a systematic way, *and* that this difference may vary with the constructs we are investigating, thus questioning the validity of our measures. However, for employers to obtain H-1B visas they must file a Labor Condition Application with the U.S. Secretary of Labor stating that the wages they are offering are at least the greater of "the actual wage paid by the employer to all other individuals with similar experience and qualifications for the specific employment in question or the prevailing wage level for the occupational classification in the area of employment" (INA § 212(n)-(p); 8 U.S.C. 1182(n)-(p)). It is also important to note that there is no strong evidence that foreign audit personnel are paid less than domestic audit personnel (Aobdia et al.

2017). Moreover, even if international audit personnel were paid differently, that difference would have to vary systematically across local audit firm offices to raise concerns - e.g., if foreign auditors were always paid 10% more (or less) than domestic auditors, the proxy would still be a valid measure to capture variation in auditor pay across firms.

We further confirm these assertions by consulting with national HR/recruiting managers from two Big 4 firms. These discussions confirm that Big 4 firms provide the same starting salaries for domestic and international employees with H-1B visas. Furthermore, these discussions provide more insight on how salaries are determined across the various Big 4 audit offices. There is a base salary that is determined for a given year, which is then adjusted for cost-of-living at the various audit offices. Additional adjustments occur based on the specific MSA market factors in order to ensure that the audit office is competitive in obtaining personnel. For example, it is possible that PwC in Indianapolis would offer a higher salary than EY (market leader) in order to attract higher quality candidates into their office. In short, HR/recruiting managers Big 4 firms indicate that there is variation in pay across audit offices within a given audit firm and across audit firm MSA locations based on specific market factors.

Nevertheless, in order to validate our measure, we obtain placement data from three large accounting programs in the U.S. that regularly place students into Big 4 audit offices across the United States. Our placement data indicate the accounting firm, location, and job title, for 1,796 graduates over a 10 year sample period for 46 different MSA locations. We then compare these salaries with those of H-1B applicants at the associate level, and find that the correlation is 66%. It is important to note that this comparison is not perfect as H-1B visa applicant Associates may be first, second, or even third year auditors, while recent graduates from MAcc and BS programs will almost universally be first year Associates. Further, the schools we obtained data from are all

frequently ranked as some of the best accounting programs, and, their salaries may not reflect the salaries offered by lower tier schools. However, even given these potential discrepancies, the relatively high correlation helps assuage concerns that H-1B visa applicants' salaries are dissimilar from starting salaries in general.[14] We further validate our use of H-1B visa data to proxy for general auditor salaries in the additional analysis section 5.4, where we use the data collected from these accounting programs to partially replicate our results based on visa data.

We combine our visa data with data from Compustat in order to create our control variables, and data from Audit Analytics to obtain the audit firm identification, restatement measures, and audit fee measures. We also obtain data from a variety of other sources to measure MSA or city-level constructs (Zillow, Bureau of Labor Statistics (BLS), etc.). As the dependent variable in our primary tests is an aggregate measure of audit office quality (i.e., percentage of restatements in an audit office), we aggregate all control variables to this level. For example, we sum the total number of restatements across all of the EY clients in the McLean, VA office and scale by the total number of clients to obtain the percentage of EY McLean, VA clients that had a restatement. Our sample ranges from 2004 to 2013, as 2004 is the first year for which we are able to obtain visa data and we require at least two years of data to determine if the current year financial statements contain a misstatement that will be subsequently restated in future periods. After requiring the data for our control variables, our final sample consists of 12,796 auditor office/year observations.

[14] Some H-1B applicants graduate from these three universities, and will in fact be included in our sample. But, in these three universities, the majority of graduates are domestic students that will not be H-1B applicants. The three universities that gave us graduate salary data did not provide us with the visa status of their graduates.

Descriptive Analysis of Data

We begin our analysis by examining the properties of audit personnel salary in order to provide initial descriptive evidence about auditor pay trends. Figure 1 plots average annual auditor salary over the sample period for Associates, Seniors, and Managers. Not surprisingly, the figure indicates that the mean salary for Associates is reliably lower than that of Seniors, which, in turn, is always lower than salaries for Managers. The figure also indicates that, on average, nominal auditor salaries appear to rise over our sample period with initial salaries rising from approximately $47,000 to $56,000 for Associates (1.8% average annual increase), $57,000 to $74,000 for Seniors (2.7% average annual increase) and $73,000 to $89,000 for Managers (2.1% average annual increase). Salaries also appear to decline around the Financial Crisis and towards the end of the sample period. However, in untabulated analyses we use CPI to inflation adjust and convert all salaries in to 2016 dollars and find that these nominal salary increases often end up being near zero in terms of annual average increases, consistent with anecdotal evidence that auditor pay increases have been relatively small in recent years.

Table 1 further explores salary trends for the pooled sample and across the Big 4 audit firms. The average salary across all ranks and years in our sample is $65,419.[15] The average Associate earns $54,356 per year, while Seniors and Managers earn substantially higher salaries ($71,663 and $86,730, respectively). Across the Big 4 audit firms, in our sample, KMPG appears to pay the highest average salary ($67,618 per year), while Deloitte pays the lowest average salary ($62,467). This trend is similar for Associates. However, for higher-ranked personnel such as Managers, KPMG appears to pay the highest salary ($97,538).

[15] This value is invariably affected by the fact that as we progress to more experienced job positions, we have fewer visa applications, both because there are fewer people in these positions, and because people who advance may achieve permanent status, and not need to file for a visa. These data also represent our oversampling of larger cities, where the cost of living is higher (assuming the cost of living affects salaries, which we verify in Section 4).

Table 2 provides the frequency of audit-salary observations in our sample. Panels A and B provide the frequency by location (City and MSA, respectively). Not surprisingly, hiring is more likely to occur in major cities and MSAs. New York City and the New York City MSA account for 24.3% and 27.1% of our sample, respectively. Importantly, the table also indicates heterogeneity across cities and MSAs within our sample. Major audit-offices including Chicago, IL, Boston, MA, Los, Angeles, CA, Mclean, VA (just outside of Washington DC), and San Francisco, CA are well-represented in the sample, and constitute 25.9% of the sample. Panel C presents the distribution across auditors. EY constitutes the greatest portion of our sample (39.9% of observations). Similar to Aobdia et al. (2017), the statistics also indicate that PwC constitutes a small portion of the visa sample (9.7% of observations). Panel D provides the frequency by year. The table indicates that observations are generally well distributed across years.

In Figure 2, we examine cross-sectional variation in audit personnel salaries across states. To do so, we produce "heat maps" that illustrate salary ranges, where darker values indicate higher salaries. Panel A illustrates geographic variation in Associate salary, and Panel B and C illustrate geographic variation in Senior and Manager salaries, respectively. Notably, the heat maps indicate that California, New York and Illinois consistently have the highest salaries across all three ranks, perhaps due to the high costs of living and high demand for auditing services in metropolitan areas in these states. Smaller states not well-known for their public auditing services, such as Kentucky, Mississippi, West Virginia, Idaho, and Nebraska, have the lowest salary levels.[16]

Table 3 provides descriptive statistics for the variables used in the sample. All variables are defined in the Appendix. On average, 9.2% of the clients at a typical audit office experience future restatements related to their financial accounting for the current fiscal year (*Restate%*).

[16] As indicated previously, since our H-1B visa data is most available for lower level employees, there is data available for fewer states as the rank of the salary increases.

Audit-offices in our sample (which are only Big 4 firms) also tend to have large market share (mean *Audit Market Share* = 23.1%, the ratio of MSA audit office fees to total audit fees for a given MSA) and diverse client sets (mean *Job Complexity* =41.9%, the number of unique industries (two digit SIC) that an audit office covers, scaled by the total number of clients). The median home price for cities in our sample is $493,183 and the average population is approximately 2.9 million. These figures tend to be above the national averages indicated in census data since the audit-offices in our sample tend to be located in major metropolitan areas.[17]

IV. DETERMINANTS OF AUDIT PERSONNEL SALARIES

Our first analysis examines the economic factors associated with audit personnel salaries. As there is limited research examining determinants of auditor salary due to a lack of data on auditor pay at the firm or individual level, we begin our empirical analyses by providing important descriptive evidence on the factors that relate to auditor salaries. This analysis is also valuable to help us determine the explanatory power of control variables used in subsequent regression analyses. In order to examine what factors are associated with the level of audit personnel salaries, we begin by estimating the following regression model:

$$LNSALARY_{i,a,m,t} = \beta_1 RANK_{i,a,m,t} + \beta_2 JOBCOMPLX_{a,m,t} + \beta_3 AUDMKTSHR_{a,m,t} + \beta_4 LNHOMEP_{m,t} + \beta_5 LNPOP_{m,t} + \beta_6 EDUCATION_m + Year\ FE + \epsilon_{i,a,m,t} \quad (1)$$

where *LNSALARY* is the natural log of salary earned by individual *i* employed by audit firm *a* in MSA *m* in year *t*. *Rank*, is a variable coded to equal 1 for Associate, 2 for Senior, and 3 for manager, and represents the incremental effect, in logged dollars, of obtaining one higher rank.

[17] See, for example, https://www.census.gov/construction/nrs/pdf/uspricemon.pdf.

We identify office and geographical characteristics that we expect relate to the trade-offs auditors make when accepting a given wage. We include a measure of job complexity (*JOBCOMPLX*) that is the number of unique industries that an audit office covers scaled by total number of clients in an office. If an audit office represents a diverse set of industries, the task of the auditor may be more complex and thus might result in a higher salary offered to compensate for the additional complexity. We measure the audit market share (*AUDMKTSHR*) as the fraction of audit fees generated by a given audit office to the total audit fees for the MSA. Individuals might trade-off salary for the opportunity to work at a leading audit firm (i.e., high market share) if they obtain better skills or experience leading to better future career prospects. Accordingly, we predict a negative relation between audit market share and salary.

We include three measures of MSA characteristics that are likely to influence audit personnel salaries in a particular city. Individuals may demand higher salary to compensate for working in MSAs with high cost of living or highly populated regions. We measure the cost of living using the natural log of the MSA median home price (*LNHOMEP*) obtained from Zillow. We measure city size as the natural log of the number of people residing in a given MSA (*LNPOP*). Finally, we include the level of education in a MSA (*EDUCATION*) as a proxy for the level of human capital in a city and is measured as the percentage of the population with graduate degrees (Beck et al. 2015). Individuals with higher levels of human capital may demand higher salaries to compensate for the initial investment in human capital, thus resulting in a positive correlation between education and salary.

Table 4 reports the results of the salary determinants analysis. In Column 1, we present the baseline results that only includes Rank, MSA fixed effects and year fixed effects. Not surprisingly, *Rank* is positively and significantly correlated with *LNSALARY* ($p<0.01$). The results

of this analysis also suggest that rank, year and MSA fixed effects, explain a substantial portion of the variation in audit personnel salary, as the model indicates an Adjusted R-Squared of 57.1%.

While Column 1 demonstrates that city characteristics generally explain a substantial portion of the variation in audit personnel salary, it is limited in that it sheds little insight as to which characteristics matter. Accordingly, in Column 2 we estimate Equation 1 (without MSA fixed effects) to provide more insight on what observable characteristics explain cross-sectional variation in audit personnel salaries. Regarding audit-office characteristics, we find a positive and significant coefficient on *JOBCOMPLX* ($p<0.01$), consistent with audit personnel receiving higher salaries when they are at offices with a more diverse set of clients. We also find a negative and significant coefficient on *AUDMKTSHR* ($p<0.01$), consistent with audit market leaders paying lower salaries, possibly due to the audit personnel being willing to trade-off salary for the benefits of working for the market leader. We also find that characteristics of the region relate to the level of salary. Regions with higher home prices and higher population are associated with higher levels of salary, as evidenced by positive and significant coefficients on *LNHOMEP* and *LNPOP* ($p<0.01$), respectively. Moreover, consistent with human capital being an important factor in the auditing industry (Beck et al. 2015), we find a positive and significant coefficient on *EDUCATION* ($p<0.01$).

In Column 3, we disaggregate *Rank* into indicators for *Senior* and *Manager*. The incremental effect of *Rank* may not be symmetric (i.e., moving from *Associate* to *Senior* may not have the same impact on salary as moving from *Senior* to *Manager*.) This analysis indicates, unsurprisingly, that Seniors earn more than Associates (coefficient = 0.238) and Managers earn more than Seniors and Associates (coefficient = 0.420), as should be expected.

In Panel B of Table 4, we re-estimate the determinants analysis for the associate, senior and manager subsamples in Columns 1, 2 and 3, respectively. We find that job complexity, audit market share, and cost of living are all significant determinants of audit personnel salaries across the three ranks. We also note some interesting differences across the groups. First, Associate salaries appear to be most sensitive to the size of the city as the coefficient on *LNPOP* is only significant in the associate subgroup. Second, the positive association between *Education* and salary appears to be more pronounced in lower-level labor, as it monotonically decreases as we move from Associates (coefficient=0.7264, $p<.01$) to Seniors (coefficient=0.6403, $p<.05$) to Managers (coefficient=0.3075, $p>0.1$). This suggests that the payoff for higher investments in human capital are most pronounced in the early stages of an auditor's career. Third, the relationships between audit personnel salary and job complexity and audit market share vary monotonically from lower to higher ranked employees.

While the above analyses provide interesting insights regarding the relationship between audit personnel salary and MSA and office characteristics, it is important to note that they are descriptive and do not explain the mechanisms underlying the associations. For example, the positive and significant association between job complexity and audit personnel salaries indicated in Panel A of Table 4 might represent audit firms providing extra compensation for auditors that work in a complex work environment or audit firms providing additional compensation in order to draw talented candidates who are better able to work in complex work environments. Nevertheless, these results provide some of the first evidence regarding the factors associated with audit personnel salaries.

V. AUDIT PERSONNEL SALARIES AND AUDIT QUALITY

Relationship between Audit Personnel Salaries and Audit Quality

We next test H1, which examines the relationship between audit personnel salaries and audit quality. To test H1, we estimate the following regression model with variable definitions found in the Appendix:

$$\begin{aligned} Restate\%_{a,m,t} = {} & \beta_1 LNSALARY_{i,a,m,t} + \beta_2 LNASSETS_{a,m,t} + \beta_3 MW_{a,m,t} + \beta_4 LEVERAGE_{a,m,t} \\ & + \beta_5 QRATIO_{a,m,t} + \beta_6 ROA_{a,m,t} + \beta_7 LNFEES_{a,m,t} + \beta_8 LOSS_{a,m,t} \\ & + \beta_9 FNDSRED_{a,m,t} + \beta_{10} MERGER_{a,m,t} + \beta_{11} MTB_{a,m,t} + \beta_{12} IINTCOV_{a,m,t} \\ & + \beta_{13} JOBCOMPLX_{a,m,t} + \beta_{14} AUDMKTSHR_{a,m,t} + \beta_{15} LNHOMEP_{m,t} \\ & + \beta_{16} LNPOP_{m,t} + \beta_{17} EDUCATION_m + Rank\ FE \\ & + Year\ FE + \epsilon_{i,a,m,t} \end{aligned} \quad (2)$$

We measure MSA audit office quality using the percentage of clients within the client portfolio in a given year that will release financial statements that contain a misstatement (*RESTATE%*), which will be restated in future periods. Misstatements are a strong indicator of poor audit quality as they represent instances where the auditor issued an unqualified opinion on misstated financial statements (DeFond and Zhang 2014). Furthermore, survey evidence indicates that partners believe financial statement restatements to be a key indicator of low audit quality (e.g. Christensen et al. 2015) and Aobdia (2016) validates the measure using PCAOB inspection finding results. To the extent audit salaries attract and retain high quality personnel leading to higher quality outcomes, then we expect a negative coefficient on *LNSALARY*. However, to the extent salary is not a key driver of audit office quality, we may find either a positive or no significant relationship.

We include a number of control variables that have been shown to be indicative of restatements in the prior literature (e.g. Palmrose and Scholz 2004; Efendi et al. 2007; Scholz 2008; Blankley et al. 2012; Files et al. 2014; Boland et al. 2015). All control variables are the average of all clients within the given audit office in the MSA in a year. We include *LNASSETS* to control for the client's size and include *LOSS* and *ROA* to control for financial performance as poor

performing firms have an incentive to boost their current year financial performance resulting in an increased likelihood of misstatement. As capital market pressures and M&A accounting, respectively are associated with increased likelihood of restatement, we include a measure that captures the need for financing (*FNDSRED*) and merger and acquisition activity (*MERGER*). We include the market-to-book ratio to control for growth. We include the quick ratio (*QRATIO*), inverse interest coverage ratio (*IINTCOV*) and the ratio of total liabilities to total assets (*LEVERAGE*). We also include an indicator for number of material weaknesses in the portfolio as prior research demonstrates a positive association between internal weaknesses and audit quality. We also include the determinants variables from equation 1 shown to affect audit salaries: *JOBCOMPLEX, AUDMKTSHR, LNHOMEP, LNPOP, and EDUCATION*. Finally, we include rank fixed effects and year fixed effects.

Table 5 reports the results from estimating Equation 2. Each individual observation is an employee wage contract for a given audit firm office in a given year. Standard errors are clustered by the interaction of audit office and year to account for the fact that each office can have multiple observations in a given year. Column 1 presents the results for the full sample of auditor positions (i.e., Associates, Seniors, and Managers). Columns 2 through 4 present the results for Associates, Seniors and Managers, respectively. The results for the full sample indicate a negative and significant relationship between *LNSALARY* and *RESTATE%,* suggesting that salary is positively correlated with audit quality. In Columns 2 through 4, we examine each rank separately, and find that Associate, Senior and Manager salaries are all negatively correlated with *RESTATE%* ($p<0.01$) The economic magnitude appears to be highest for Managers (coefficient=-0.0399). Overall, these findings provide evidence to suggest that salary has a positive impact on audit quality, even after controlling for trade-offs individuals make when accepting a given level of

wage. These findings are consistent with higher levels of salary attracting (or retaining) more talented auditors.

Relationship between Alternative Career Opportunities and Frequency of Restatements

Our second hypothesis considers how audit quality varies with the difference in pay between auditors and alternative career opportunities. Specifically, we measure *LNALT*Δ as the natural logarithm of audit personnel salary less the natural logarithm of the average salaries for Big 4 tax, IT, and consulting professionals in an MSA for a given year. We obtain this alternative career salary data from the H-1B visas, retaining all positions from the Big 4 auditors that are not financial statement auditors and specifically list tax, IT and consulting. We predict that as the wage gap increases, potential audit recruits are more likely to forgo a career in auditing for more attractive alternative career options. This would ultimately reduce audit office quality as evidenced by a negative association between the wage gap and the percentage of clients with a material misstatement restated in future periods. We test this prediction by replacing *LNSALARY* in equation (2) with *LNALT*Δ. Table 6 reports the results.

Overall, we find that *LNALT*Δ is negatively associated with *RESTATE%* (Column 1, $p < 0.01$), consistent with audit quality being higher when an audit firm pays auditors closer to (or higher than) the prevailing wage of alternative career opportunities. In Columns 2 through 4, we also find that this result is consistent across auditor ranks (p values are less than 0.01 in all cases). These findings suggest that auditor salary and its relation to alternative career opportunities relates to audit firms' ability to attract higher quality auditor talent.

Robustness and Alternative Specifications

We next consider the robustness of our audit quality results across three dimensions. First, we test the robustness of our findings to the inclusion of MSA fixed effects. It is possible that time-

invariant, unobservable characteristics of an MSA are correlated with both audit salary and audit quality, and, that our results are documenting a spurious correlation. In our baseline model, we explicitly control for some MSA characteristics (some of which are fixed, and, which preclude including MSA fixed effects). For example, we follow Beck et al. (2015) and control for education based on data from the U.S. Census, but this variable is only available for one time frame in our sample period. Furthermore, the results from Table 4, Panel A suggest that the MSA characteristics that we explicitly control for explain a significant amount of the variation in salary within our sample. However, it may be the case that our analyses do not control for other relevant MSA characteristics. Accordingly, we re-examine the estimates in Tables 5 and 6 after including MSA fixed effects. Table 7, Panels A and B presents the results for audit salary (*LNSALARY*) and relative audit salary (*LNALT*Δ) with MSA fixed effects. The results from these tests are similar to those in Tables 5 and 6 in both economic and statistical magnitude and confirm our previous results.

We further consider the robustness of our results to the inclusion of MSA x Year fixed effects in order to consider whether our results are confounded by unobservable time-varying characteristics of MSAs. Panels C and D of Table 7 report these results. Consistent with the previous results, we continue to find evidence of similar magnitude and statistical significance after augmenting our models with MSA x Year fixed effects.

Our second and third robustness tests vary the sample and aggregation of both restatement frequency (i.e., the dependent variable) and the audit personnel salary measures (i.e., the independent variables *LNSALARY* and *LNALT*Δ). Our analyses in Tables 5 and 6 consider a regression of audit-office level restatement frequency on individual audit-office salaries, clustering on audit-office interacted with year fixed effects to adjust for correlation between errors within an audit-office-year. Since the independent variable in the baseline model is measured at the audit-

personnel level, our baseline has the benefit of allowing us to partition our sample by rank (i.e., Associate, Senior, Manager). Furthermore, the baseline model is a natural extension of the determinants analysis in Table 4, which examines the economic factors associated with individual auditor's salary. Nevertheless, it is possible that the aggregation used in the baseline model might introduce bias into the coefficient estimates if, for example, offices in which there are more auditors are systematically different from other offices, and these offices are overrepresented in our sample.[18]

Accordingly, we consider two alternative specifications to our audit quality model. First, we aggregate the data to the audit-office level, conducting the analysis separately for each rank. In this specification, *LNSALARY* represents the average of the natural log of salary for associates, seniors and managers, respectively at the MSA audit office level. *LNALT*Δ is calculated similarly. Table 8, Panels A through C present regressions of audit office restatement frequency on average audit-office salary by rank (i.e., Associate, Senior and Manager). Columns 1 and 4 of each panel present regression results excluding MSA fixed effects, Columns 2 and 5 include MSA fixed effects, and Columns 3 and 6 include MSA x Year fixed effects. Sample sizes vary due to variation in the number of offices with audit personnel in the various ranks. In Panel A (Associates), the coefficients on *LNSALARY* (Columns 1 to 3) and *LNALT*Δ (Columns 4 to 6) are all negative and significant, consistent with our previously reported results. In Panel B (Seniors), most of the coefficients are negative, but only the coefficient on *LNSALARY* in Column 2 is significant ($p < 0.10$). In Panel C (Managers), the coefficients on *LNSALARY* (Columns 1 to 3) and *LNALT*Δ

[18] We also alleviate this concern by dropping the most populous city, New York, and find our results are robust to eliminating New York. Another way to understand this concern is that how the analysis is currently conducted is equivalent to value weighting the cities by the number of visas (which, if visa applications are constant as a percentage of the population across cities, reflects the economic reality of the importance of those cities). Condensing each city down to a single observation per firm/year is equivalent to equal weighting observations, so that the Boise office of EY can influence the estimates as much as the New York City office can.

(Columns 4 to 6) are all negative and significant. Overall, our results are largely robust to aggregation at the MSA audit office level.

Our second aggregation robustness test considers potential bias in the audit-office level restatement frequency variable (i.e., dependent variable) and aggregated audit-office level controls. Specifically, we disaggregate these measures and examine firm-level regressions of restatement occurrence on the average audit-office salary variables from above and include firm-level controls (instead of office-level controls). This allows more precision in the inclusion of controls (as we are able to include firm-level controls) and the calculation of the dependent variable, but, less precision in the salary measures (as a given firm audited by a given office might not have a specific rank of auditor on the team, especially a rank with the observed salary). Table 8, Panels D through F provide the results from this analysis. Columns 1 and 4 of each panel present regression results excluding MSA fixed effects, Columns 2 and 5 include MSA fixed effects, and Columns 3 and 6 include MSA x year fixed effects.

In Panel D (Associates) we find that most of the coefficients on *LNSALARY* and *LNALT*Δ are negative and significant, with most *p*-values ranging from less than 0.10 to less than 0.01. In Panel E (Seniors) we find results similar to Table 8, Panel B in that coefficients are negative, but not always statistically significant. Finally, in Panel F we find that all of the coefficients on *LNSALARY* and *LNALT*Δ are negative and significant ($p < 0.05$ or less). Overall, the evidence in Table 8 suggests that our main results are generally robust to differences in aggregation.

Robustness Analyses using College Placement Data

In untabulated analyses, we also corroborate our data using undergraduate/graduate placement data from 2004 to 2013 from three nationally recognized accounting programs. To provide further confidence of the link between audit personnel salaries and office level audit

quality, we reconstruct the *LNSALARY* measures using the placement data for those entering an audit career at the Big 4 firms. We caution that this analysis is very limited as we only have 1,087 observations available for this analysis, across a ten year sample period. However, even within this limited sample, we continue to find a negative and significant coefficient on *LNSALARY* (coef. = -0.0775; t-stat = -1.73; p-value = 0.083). Thus, we continue to find support with H1 of a positive association between audit personnel salaries and audit quality in this reduced sample.

VI. ADDITIONAL ANALYSES: AUDIT PERSONNEL SALARY AND AUDIT FEES

Our primary findings indicate that there is significant variation in salary across the Big 4 auditors and that this variation can impact accounting quality. A natural follow-up question to these results is whether audit firms have the ability to pass on the cost of labor to their clients by increasing audit fees. Although a profit-maximizing audit firm should, in theory, try to increase audit fees (i.e., revenues) as salaries (i.e., costs) are increasing, it is not clear whether clients will be willing to accept and incur increased costs of labor beyond some industry benchmark. On the one hand, it is possible that clients derive benefit from (or even demand) auditors to pay higher wages as they view this as a signal of higher quality labor. This possibility is consistent with prior studies that demonstrate that management, boards of directors, and external providers of capital value high quality audits (Minnis 2011). Thus, audit personnel salaries may be positively correlated with audit fees if auditors are able to pass on the increased cost of labor to their clients.

On the other hand, recent empirical evidence suggests that the audit industry is becoming more competitive and commoditized (IFIAR 2014). This suggests that audit fees are highly price elastic and clients may be unwilling to bear increased costs of labor as Tier 2 audit firms such as Grant Thorton and BDO become viable substitutes to Big 4 audits (IFIAR 2014) and the costs of

switching auditors declines. Indeed, anecdotal evidence suggests that audit fees have grown at a relatively slow pace in recent years, while audit costs are likely to have increased due to increased regulatory requirements imposed by the PCAOB (Ettredge et al. 2008; Krishnan and Yang 2009; Reason 2010; Bronson et al. 2011). In addition, audit firms are placing significant emphasis on their consulting and advisory services, consistent with their clients placing less value on high quality audits and audit firms seeking alternative sources of profit. Thus, whether and to what extent audit salary impacts audit fees beyond client characteristics and industry circumstance is an empirical question.

To examine the effects of salary on audit fees we estimate the following regression model:

$$\begin{aligned} LNFEES_{a,m,t} = \; & \beta_1 LNSALARY_{i,a,m,t} + \beta_2 LNASSETS_{a,m,t} + \beta_3 LNBSEG_{a,m,t} + \beta_4 ARINV_{a,m,t} \\ & + \beta_5 FOREIGN_{a,m,t} + \beta_6 LEVERAGE_{a,m,t} + \beta_7 QRATIO_{a,m,t} + \beta_8 ROA_{a,m,t} \\ & + \beta_9 AGROWTH_{a,m,t} + \beta_{10} MERGER_{a,m,t} + \beta_{11} LOSS_{a,m,t} + \beta_{12} GC_{a,m,t} \\ & + \beta_{13} YE_{a,m,t} + \beta_{14} OP\_404b_{a,m,t} + \beta_{15} MW_{a,m,t} + \beta_{16} ANCRST_{a,m,t} \\ & + \beta_{17} JOBCOMPLX_{a,m,t} + \beta_{18} AUDMKTSHR_{a,m,t} + \beta_{19} LNHOMEP_{m,t} \\ & + \beta_{20} LNPOP_{m,t} + \beta_{21} EDUCATION_m + Rank\ FE \\ & + Year\ FE + \epsilon_{i,a,m,t} \end{aligned} \quad (3)$$

where *LNFEES* is the natural log of office level audit fees. To the extent audit firms are able to pass along higher salaries to their clients, we would expect a positive and significant coefficient on *LNSALARY*. We include a set of control variables that are common in the audit fee literature to control for size, complexity and risk (e.g. Hay et al. 2006). We also include the determinants variables from equation 1 shown to affect audit salaries: *JOBCOMPLEX, AUDMKTSHR, LNHOMEP, LNPOP, and EDUCATION*. Finally, we include rank fixed effects and year fixed effects.

Panel A of Table 9 reports the results from estimating Equation 3. Column 1 provides the results for the full sample of auditors (i.e., Associates, Seniors, and Managers). Column 2-4 present the results for Associates, Seniors and Managers, respectively. The coefficient on *LNSALARY* is

positive and significant for the full sample in Column 1 ($p<0.05$), indicating that higher salaries are associated with higher fees. This finding is consistent with clients being willing to accept higher fees for higher quality talent, and with audit firms passing on this higher cost of labor to their clients. The results in the subsamples based on rank are noteworthy as well. The coefficient on *LNSALARY* is monotonically declining as the sample changes from Associates (coefficient = 0.085) to Seniors (coefficient = 0.030) to Managers (coefficient = -0.025). These findings suggest that it is potentially more difficult for audit firms to pass the higher cost of senior labor (such as Seniors and Managers) on to their clients. It is also likely to be the case that audit firms are able to bill more hours related to the work of Associates and Seniors as they constitute a higher portion of the audit labor costs.

We further consider whether audit firms with greater market share have greater ability to pass on their costs to their clients by including an interaction term between audit salary and audit market share. Panel B of Table 9 presents these results. We find that the interaction term is positive and statistically significant ($p < 0.05$) in all regression specifications, consistent with market share enabling audit firms to have greater pricing power. This suggests audit offices that are not market leaders are constrained on their ability to pass along higher salaries to their clients, which could potentially explain the stagnant salaries over the past decade.

VII. CONCLUSION

This study provides initial insight regarding the role of salary in the public accounting industry. Specifically, we conduct three types of analyses to explore the factors that relate to variation in audit personnel salaries, whether audit salaries relate to audit quality, and the extent to which audit firms can pass on audit salaries to their clients. We conduct these analyses using

unique data collected from H-1B visa applications to create proxies for salary across Associates, Seniors and Managers employed by Big 4 audit offices in the United States from 2004 to 2013.

Our study offers several important insights. First, we provide important descriptive evidence regarding the factors related to audit personnel salary. We show that individuals that work for firms with greater local audit market share receive lower salaries. We also find that salaries tend to be higher for offices with more diverse clients and for offices in locations in which the cost of living is higher and there are more educated workforces. Second, we demonstrate that salary has a positive impact on audit quality. We find that higher levels of salary are associated with reduced restatement frequency after controlling for factors related to restatements as well as the trade-offs that audit personnel appear to make when accepting a given level of wage. Finally, we show that audit offices do not bear all of the costs of increased costs of labor, as they appear to be able to pass some of the costs onto their client. We document positive and significant associations between salary and office level fees. Importantly, the association between salary and audit fees is declining in rank and increasing in an audit office's market power, suggesting that it is more difficult to pass the costs of senior talent onto clients but less difficult to pass the costs of labor onto clients when the audit office is a dominant market player.

These findings offer important insights for academics, regulators and market participants. Prior archival research has not examined the impact of individual auditor characteristics on audit outcomes due to the lack of data. We attempt to fill this gap by examining how salary relates to audit quality. Moreover, we address an important regulatory debate regarding the quality of talent in the public accounting industry. Our results suggest that, at least to some extent, higher levels of salary can help attract and obtain higher quality labor and have a positive impact on the quality of public audits.

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APPENDIX

Variable Definitions

Note: Variables definitions are for the specific variable. For the salary aggregation level, all dependent and control variables are aggregated at the MSA audit office level. For the MSA audit office aggregation, all variables are aggregated at the audit office level. For the firm level analysis, only the LNSALARY variable and MSA specific variables are aggregated at the MSA audit office level.

Test Variable	
LNSALARY	Natural log of the salary as obtained from the H-1B Visa data. Measure is calculated separately for the associate, senior and manager rank.
LNFEES	Natural log of total audit fees as obtained from the Audit Analytics database.
LNALTΔ	Natural logarithm of audit personnel salary less the natural logarithm of the average salaries for Big 4 tax, IT, and consulting professionals in an MSA for a given year
Dependent Variable	
RESTATE%	An indicator variable equal to 1 if the current year financial statements are restated in the future and 0 otherwise. Classification is based on restatement data available in Audit Analytics. Restatements related to option backdating and leases are classified as non-restatements for purposes of variable construction. For purposes of aggregation at the MSA audit office level, the variable represents the percentage of clients that experience a future restatement of the current year financial statements.
LNFEES	Natural log of total audit fees as obtained from the Audit Analytics database.
Control Variables	
JOBCOMPLX	Total number of unique industries (e.g. SIC2) that an audit office covers in their client portfolio in a given year scaled by total clients in the audit office. SIC codes obtained from Compustat.
AUDMKTSHR	The ratio of total MSA audit office fees to total audit fees for a given MSA. Audit fee data obtained from Audit Analytics. MSA classifications consistent with Reichelt and Wang (2010).
LNHOMEP	Natural log of the median home value in a city, based on data obtained from Zillow.
LNPOP	Natural log of the number of people residing in a given region.
VCRIME	The number of violent crimes per capita based on FBI data.
EDUCATION	Education is a proxy for the level of human capital in a city and is measured as the percentage of the population with graduate degrees (Beck et al. 2016).
LNASSETS	Natural log of total assets (AT).
MW	An indicator variable equal to 1 if the client discloses a Section 302, 404(a) and/or 404(b) material weakness, and 0 otherwise.
LEVERAGE	Total liabilities (LT) divided by total assets (AT).
QRATIO	Current assets (ACT) less inventory (INVT) divided by total liabilities (LT).

ROA	Income before extraordinary items (IB) divided by average total assets (AT) for the fiscal year.
LOSS	An indicator variable equal to 1 if ROA is negative, and 0 otherwise.
FNDSRSED	An indicator variable equal to 1 if the sum of new long-term debt (DLTIS) plus new equity (SSTK) exceeds 20 percent of total assets (AT), and 0 otherwise.
MERGER	An indicator variable equal to 1 if the client disclosures merger or acquisition activity, and 0 otherwise. Obtained from the Compustat footnote file.
MTB	Market value of equity divided by book value of equity.
IINTCOV	Interest expense (XINT) divided by operating income before depreciation (OIBDP) with the ratio capped at a value of 2.0.
LNBSEG	Natural log of total business segments as available from the Compustat Segment File.
ARINV	Inventory (INVT) plus receivables (RECT) divided by end of year assets (AT).
FOREIGN	An indicator variable equal to 1 if the client discloses foreign sales, and 0 otherwise. Obtained from the Compustat footnote file.
AGROWTH	End of year assets less beginning of year assets divided by beginning of year assets (AT).
GC	An indicator variable equal to 1 if the audit opinion contains a going concern paragraph, and 0 otherwise. Obtained from Audit Analytics Opinion File.
YE	An indicator variable equal to 1 if the client has a calendar year end, and 0 otherwise (FYR).
OP_404b	An indicator variable equal to 1 if the client receives a Section 404(b) internal control audit opinion, and 0 otherwise.
ANCRST	An indicator variable equal to 1 if the client announces a restatement during the current year, and 0 otherwise.

Figure 1
Average Auditor Salaries Over Time

This figure displays average audit salaries from 2004-2013, based on data obtained from H-1B visa applications. The bottom line presents the average salary for Associates. The middle line presents the average salary for Seniors. The top line presents the average salary for Managers.

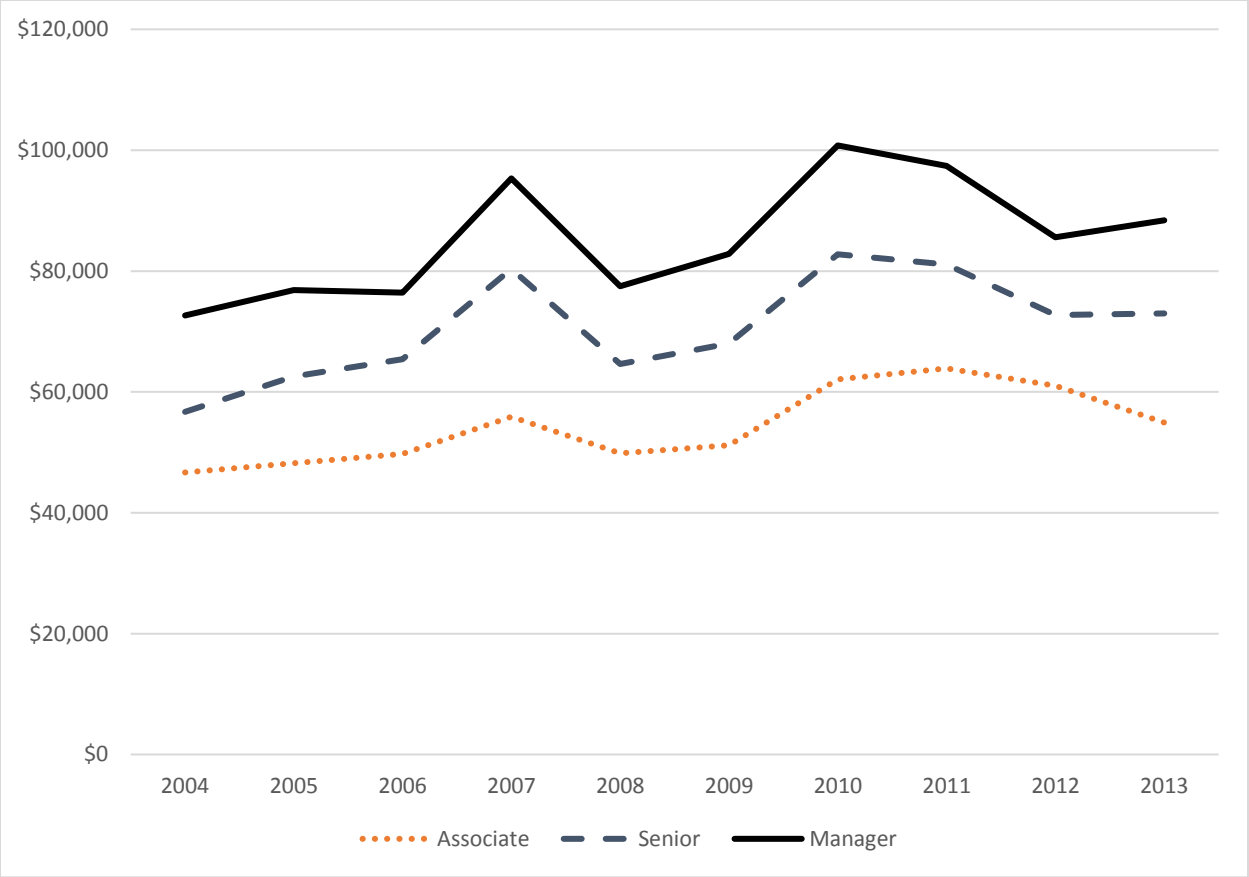
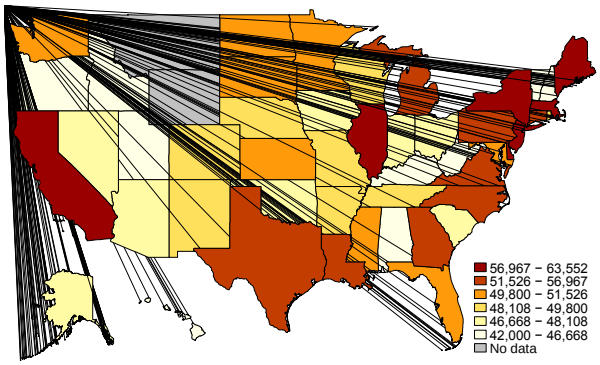


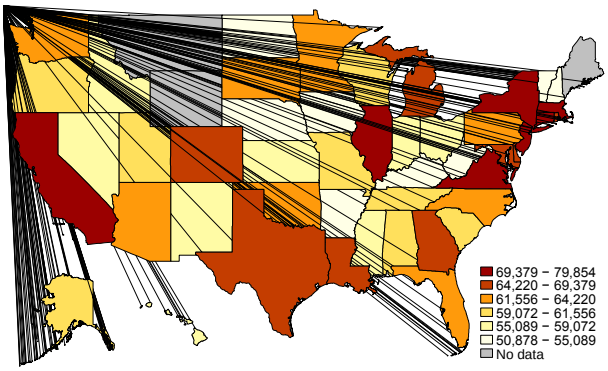
Figure 2
Geographic Variation in Auditors' Salaries

This figure displays audit salaries across the United States from 2004-2013, based on data obtained from H-1B visa applications. Panel A presents Associates' salaries. Panel B presents Seniors' salaries. Panel C presents Managers' salaries.

Panel A. Associates' Salaries



Panel B. Seniors' Salaries



Panel C. Managers' Salaries

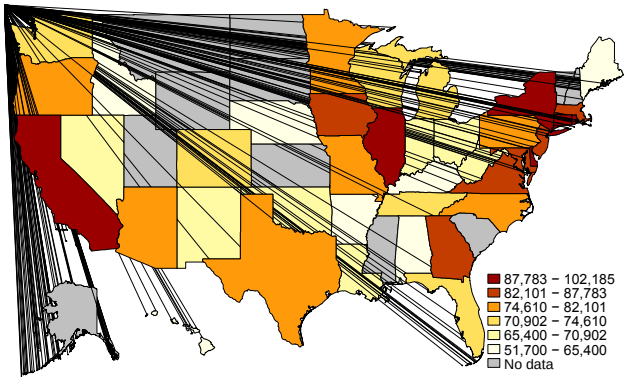


TABLE 1
Audit Salary Descriptive Statistics

This table presents descriptive statistics for auditor salaries within the sample. Data is summarized for the full sample (pooled sample) and individually for each of the Big 4 Auditors: PwC, EY, Deloitte, and KPMG.

	N	Mean	SD	P25	P50	P75
Pooled Sample						
All	12,796	65,419	21,126	50,885	59,000	74,000
Associate	6,237	54,356	11,755	47,000	51,500	57,000
Senior	4,698	71,663	21,100	58,000	65,603	79,083
Manager	1,861	86,730	22,790	70,541	82,000	98,000
PwC						
All	1,241	66,841	22,076	49,608	61,677	78,500
Associate	630	57,372	17,520	45,198	51,000	64,100
Senior	428	71,124	20,509	56,282	66,143	77,886
Manager	183	89,429	20,154	73,986	86,700	95,300
EY						
All	5,106	65,354	21,303	50,050	58,510	73,891
Associate	2,918	55,068	11,711	48,000	52,000	58,500
Senior	1,685	74,652	21,496	60,500	67,650	87,500
Manager	503	93,878	23,400	75,296	87,786	112,700
Deloitte						
All	3,032	62,467	17,884	51,000	57,000	69,250
Associate	1,156	51,473	8,880	46,045	51,000	55,000
Senior	1,142	65,756	18,304	55,300	61,331	70,000
Manager	734	74,666	17,897	61,000	71,700	85,000
KPMG						
All	3,417	67,618	22,792	51,010	61,000	78,039
Associate	1,533	53,938	10,233	47,363	51,750	57,699
Senior	1,443	73,007	21,929	59,093	67,250	80,375
Manager	441	97,538	21,165	82,000	94,600	112,866

TABLE 2
Frequency of Audit Salary

This table presents the frequency of audit salary observations in our sample. Panel A presents the frequency by city. Panel B presents the frequency by MSA. Panel C presents the frequency by Auditor. Panel D presents the frequency by year.

Panel A: Frequency by City

City	# of Obs	% of Sample
New York City, NY	3,109	24.3%
Chicago, IL	830	6.5%
Boston, MA	670	5.3%
Los Angeles, CA	647	5.1%
Mclean, VA	607	4.7%
San Francisco, CA	548	4.3%
San Jose, CA	536	4.2%
Houston, TX	531	4.2%
Philadelphia, PA	423	3.3%
Atlanta, GA	420	3.3%
Dallas, TX	402	3.1%
Detroit, MI	283	2.2%
Stamford, CT	255	2.0%
Minneapolis, MN	216	1.7%
Mountain View, CA	202	1.6%
Other Cities	3,117	24.2%
Total	12,796	100.0%

Panel B: Frequency by MSA

MSA	# of Obs	% of Sample
New York-Newark-Edison, NY-NJ-PA (Metro Area)	3,468	27.1%
Chicago-Merrillville-Schaumburg, IL-IN (Metro Area)	837	6.5%
San Jose-Sunnyvale-Santa Clara, CA (Metro Area)	837	6.5%
Los Angeles-Long Beach-Santa Ana, CA (Metro Area)	819	6.4%
Boston-Cambridge-Quincy, MA-NH (Metro Area)	673	5.3%
Washington-Arlington-Alexandria, DC-VA-MD-WV (Metro Area)	621	4.9%
San Francisco-Oakland-Fremont, CA (Metro Area)	599	4.7%
Houston-Baytown-Sugar Land, TX (Metro Area)	531	4.2%
Dallas-Fort Worth-Arlington, TX (Metro Area)	450	3.5%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD (Metro Area)	429	3.4%
Atlanta-Sandy Springs-Marietta, GA (Metro Area)	426	3.3%
Other MSA	3,106	24.2%
Total	12,796	100.0%

Panel C: Frequency by Auditor

Audit Firm	**# of Obs**	**% of Sample**
PricewaterhouseCoopers	1,241	9.7%
Ernst & Young	5,106	39.9%
Deloitte	3,032	23.7%
KPMG	3,417	26.7%
Total	12,796	100.0%

Panel D: Frequency by Year

Year	**# of Obs**	**% of Sample**
2004	897	7.0%
2005	1,018	8.0%
2006	1,239	9.7%
2007	1,714	13.4%
2008	1,492	11.7%
2009	1,292	10.1%
2010	1,034	8.1%
2011	1,379	10.8%
2012	1,442	11.3%
2013	1,289	10.1%
Total	12,796	100.0%

TABLE 3
Descriptive Statistics Main Sample

Panel A: Main Sample (n=12,796)

Variables	Mean	25%	Median	75%	SD
RESTATE%	0.092	0.043	0.078	0.130	0.078
LNFEES	14.190	13.940	14.230	14.391	0.402
JOBCOMPLX	0.419	0.343	0.424	0.500	0.121
AUDMKTSHR	0.231	0.149	0.209	0.282	0.120
Home Price	523,339	194,922	493,183	863,450	335,679
Population	2,897,651	575,816	1,228,613	3,878,725	3,183,196
EDUCATION	0.146	0.113	0.153	0.153	0.035
LNASSETS	7.180	6.651	7.311	7.678	0.750
MW	0.152	0.077	0.138	0.205	0.109
LEVERAGE	0.605	0.547	0.602	0.663	0.108
QRATIO	2.448	1.620	2.061	2.602	1.836
ROA	0.002	-0.032	0.009	0.035	0.101
LOSS	0.285	0.188	0.267	0.366	0.142
FNDSRED	0.244	0.160	0.235	0.313	0.123
ACQESS	0.031	0.000	0.024	0.048	0.040
MTB	1.840	1.023	1.783	2.378	5.871
IINTCOV	0.106	0.069	0.152	0.214	0.257
LNBSEG	1.098	1.011	1.096	1.197	0.155
ARINV	0.250	0.202	0.238	0.292	0.072
FOREIGN	0.273	0.200	0.283	0.333	0.126
AGROWTH	1.986	0.070	0.145	0.281	9.117
MERGER	0.164	0.114	0.154	0.206	0.094
GC	0.024	0.000	0.014	0.032	0.040
YE	0.750	0.692	0.753	0.829	0.129
OP_404b	0.809	0.766	0.833	0.882	0.129
ANCRST	0.081	0.029	0.071	0.111	0.076

The above table provides descriptive statistics for the dependent, independent and control variables used in the levels analysis. All variables are defined in the Appendix.

TABLE 4
Characteristics Associated with Auditor Salary (DV=*LNSALARY*)

Panel A: Full Sample

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)	
RANK	+	0.2142	***	0.2181	***		
		(39.05)		(41.09)			
SENIOR	+					0.2396	***
						(27.46)	
MANAGER	+					0.4223	***
						(44.0)	
JOBCOMPLX	+			0.1680	***	0.1663	***
				(4.92)		(4.89)	
AUDMKTSHR	+/-			-0.1857	***	-0.1837	***
				(-4.95)		(-4.92)	
LNHOMEP	+			0.0738	***	0.0734	***
				(10.88)		(10.71)	
LNPOP	+			0.0145	***	0.0145	***
				(4.07)		(4.09)	
EDUCATION	+			0.6047	***	0.6158	***
				(4.04)		(4.10)	
Intercept		10.5729	***	9.4184	***	9.6343	***
		(196.35)		(103.39)		(104.49)	
MSA FE		Yes		No		No	
Year FE		Yes		Yes		Yes	
Observations		12,796		12,796		12,796	
R^2		0.571		0.559		0.561	

(Table Continued on Next Page)

TABLE 4 – (CONTINUED)
Characteristics Associated with Auditor Salary (DV=*LNSALARY*)

Panel B: By Auditor Rank

		Associates		Seniors		Managers	
		(1)		(2)		(3)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
JOBCOMPLX	+	0.1240	***	0.1750	***	0.2830	***
		(3.86)		(3.68)		(3.15)	
AUDMKTSHR	+/-	-0.1087	***	-0.2091	***	-0.4200	***
		(-3.02)		(-3.90)		(-4.09)	
LNHOMEP	+	0.0644	***	0.0853	***	0.0695	***
		(7.08)		(10.03)		(5.53)	
LNPOP	+	0.0206	***	0.0105		0.0088	
		(6.79)		(1.98)		(1.42)	
EDUCATION	+	0.7264	***	0.6403	**	0.3075	
		(4.92)		(2.68)		(1.31)	
Intercept		9.6469	***	9.7769	***	10.2481	***
		(83.86)		(90.06)		(54.95)	
Year FE		Yes		Yes		Yes	
Observations		6,237		4,698		1,861	
R^2		0.411		0.301		0.251	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013.

TABLE 5
Auditor Salary and Accounting Quality (DV=*RESTATE%*)

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
LNSALARY	+/-	**-0.0271**	***	**-0.0345**	***	**-0.0203**	***	**-0.0399**	***
		(-4.10)		**(-3.42)**		**(-3.04)**		**(-3.39)**	
LNASSETS		-0.0049		0.0032		-0.0136	*	-0.0076	
		(-0.73)		(0.44)		(-1.81)		(-0.82)	
MW		0.0756	***	0.0401		0.0924	***	0.1628	***
		(2.86)		(1.48)		(2.90)		(2.92)	
LEVERAGE		-0.0322		-0.0200		-0.0323		-0.0576	
		(-0.90)		(-0.51)		(-0.83)		(-1.49)	
QRATIO		-0.0034	***	-0.0027	***	-0.0043	**	-0.0031	**
		(-3.08)		(-2.71)		(-2.88)		(-2.28)	
ROA		0.0347	**	0.0268		0.0451	**	0.0276	
		(1.97)		(1.47)		(2.11)		(0.92)	
LNFEES		0.0195	*	0.0078		0.0325	**	0.0249	
		(1.69)		(0.63)		(2.32)		(1.44)	
LOSS		-0.0038		-0.0068		0.0061		-0.0253	
		(-0.16)		(-0.26)		(0.23)		(-0.64)	
FNDSRED		0.0196		0.0316		0.0199		-0.0206	
		(0.96)		(1.33)		(0.93)		(-0.73)	
MERGER		0.0050		0.0135		-0.0143		0.0407	
		(0.09)		(0.17)		(-0.29)		(0.46)	
MTB		-0.0009	***	-0.0009	***	-0.0009	***	-0.0009	***
		(-4.14)		(-2.70)		(-4.11)		(-5.12)	
IINTCOV		-0.0012		0.0004		0.0038		-0.0154	
		(-0.10)		(0.03)		(0.37)		(-0.91)	
JOBCOMPLX		0.0198		0.0087		0.0293		0.0390	
		(0.92)		(0.34)		(1.32)		(1.25)	
AUDMKTSHR		0.0056		0.0101		-0.0016		-0.0015	
		(0.23)		(0.38)		(-0.05)		(-0.03)	
LNHOMEP		0.0177	***	0.0193	***	0.0180	***	0.0137	**
		(3.87)		(3.95)		(3.52)		(2.39)	
LNPOP		-0.0049	***	-0.0061	***	-0.0047	**	-0.0022	
		(-2.78)		(-2.83)		(-2.54)		(-1.13)	
EDUCATION		-0.2964	***	-0.2962	***	-0.3710	***	-0.1861	
		(-3.22)		(-2.93)		(-3.86)		(-1.43)	
Intercept		0.1096		0.2933	*	-0.1483		0.1625	
		(0.83)		(1.90)		(-0.97)		(0.73)	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		12,796		6,237		4,698		1,861	
R^2		0.151		0.142		0.180		0.193	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013.

TABLE 6
Alternative Career Opportunities and Accounting Quality (DV=*RESTATE%*)

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
***LNALT*Δ**	**-**	**-0.0237**	*******	**-0.0267**	*******	**-0.0203**	*******	**-0.0343**	*******
		(-3.57)		**(-2.94)**		**(-2.86)**		**(-2.91)**	
LNASSETS		-0.0121		-0.0043		-0.0206	***	-0.0117	
		(-1.56)		(-0.50)		(-2.61)		(-1.15)	
MW		0.1294	***	0.1095	***	0.1450	***	0.1482	***
		(4.05)		(3.30)		(4.02)		(3.42)	
LEVERAGE		-0.0435		-0.0277		-0.0547		-0.0505	
		(-1.11)		(-0.63)		(-1.43)		(-1.16)	
QRATIO		-0.0037	***	-0.0034	***	-0.0041	***	-0.0030	***
		(-3.19)		(-3.15)		(-3.11)		(-2.62)	
ROA		0.0251		0.0138		0.0366	*	0.0197	
		(1.39)		(0.76)		(1.75)		(0.70)	
LNFEES		0.0233	*	0.0075		0.0433	***	0.0216	
		(1.71)		(0.52)		(2.97)		(1.15)	
LOSS		-0.0449	*	-0.0479	*	-0.0352		-0.0685	*
		(-1.70)		(-1.68)		(-1.19)		(-1.83)	
FNDSRED		0.0411	*	0.0707		0.0249		-0.0070	
		(1.71)		(2.71)		(0.99)		(-0.23)	
MERGER		-0.0335		-0.0661		-0.0245		0.0258	
		(-0.49)		(-0.76)		(-0.42)		(0.27)	
MTB		-0.0010	***	-0.0012	***	-0.0010	***	-0.0009	***
		(-3.64)		(-3.37)		(-3.11)		(-3.30)	
IINTCOV		-0.0048		-0.0049		-0.0000		-0.0138	
		(-0.38)		(-0.38)		(-0.00)		(-0.80)	
JOBCOMPLX		0.0185		0.0092		0.0315		0.0172	
		(0.80)		(0.38)		(1.31)		(0.51)	
AUDMKTSHR		0.0079		0.0276		-0.0130		-0.0115	
		(0.26)		(0.90)		(-0.40)		(-0.25)	
LNHOMEP		0.0158	***	0.0179	***	0.0148	***	0.0124	**
		(3.34)		(3.65)		(2.89)		(2.11)	
LNPOP		-0.0042	**	-0.0047	**	-0.0045	**	-0.0017	
		(-2.51)		(-2.45)		(-2.59)		(-0.93)	
EDUCATION		-0.2954	***	-0.2882	***	-0.3772	***	-0.1572	
		(-3.06)		(-2.80)		(-3.84)		(-1.24)	
Intercept		-0.2407		-0.1077		-0.4213	**	-0.1981	
		(-1.63)		(-0.71)		(-2.60)		(-0.93)	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		11,791		5,631		4,401		1,759	
R^2		0.198		0.195		0.221		0.201	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013.

TABLE 7
Audit Quality Robustness Analyses (DV=*RESTATE%*)

Panel A: Audit Salary and Audit Quality with Metropolitan Statistical Area Fixed Effects

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0239**	***	**-0.0343**	***	**-0.0194**	***	**-0.0299**	***
		(-3.83)		**(-3.71)**		**(-3.04)**		**(-2.77)**	
Controls		Yes		Yes		Yes		Yes	
MSA FE		Yes		Yes		Yes		Yes	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		12,796		6,237		4,698		1,861	
R^2		0.255		0.286		0.284		0.388	

Panel B: Alternative Careers and Audit Quality with Metropolitan Statistical Area Fixed Effects

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
***LNALT*Δ**	**-**	**-0.0219**	***	**-0.0294**	***	**-0.0163**	**	**-0.0276**	**
		(-3.46)		**(-3.32)**		**(-2.36)**		**(-2.56)**	
Controls		Yes		Yes		Yes		Yes	
MSA FE		Yes		Yes		Yes		Yes	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		11,791		5,631		4,401		1,759	
R^2		0.275		0.271		0.314		0.342	

(Table Continued on Next Page)

TABLE 7 – (CONTINUED)
Audit Quality Robustness Analyses (DV=*RESTATE%*)

Panel C: Audit Salary and Audit Quality with Metropolitan Statistical Area-Year Fixed Effects

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0192**	***	**-0.0306**	***	**-0.0125**	**	**-0.0240**	***
		(-3.49)		**(-4.11)**		**(-2.05)**		**(-2.37)**	
Controls		Yes		Yes		Yes		Yes	
MSA-Year FE		Yes		Yes		Yes		Yes	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		12,796		6,237		4,698		1,861	
R^2		0.549		0.601		0.573		0.694	

Panel D: Alternative Careers and Audit Quality with Metropolitan Statistical Area-Year Fixed Effects

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
***LNALT*Δ**	**-**	**-0.0184**	***	**-0.0279**	***	**-0.0136**	**	**-0.0241**	**
		(-3.20)		**(-3.80)**		**(-2.11)**		**(-2.34)**	
Controls		Yes		Yes		Yes		Yes	
MSA-Year FE		Yes		Yes		Yes		Yes	
Rank FE		Yes		N/A		N/A		N/A	
Observations		11,791		5,631		4,401		1,759	
R^2		0.462		0.483		0.510		0.622	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013.

TABLE 8
Quality Analysis Alternative Aggregation Levels (DV=*RESTATE%*)

Panel A: Aggregation at the MSA Audit Office Level (Associates)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0749**	**	**-0.0923**	***	**-0.1396**	***						
		(-2.01)		**(-2.76)**		**(-2.81)**							
***LNALT*Δ**	-							**-0.058**	**	**-0.0711**	**	**-0.1344**	**
								(-2.02)		**(-2.48)**		**(-2.55)**	
Controls		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		1,292		1,292		1,292		878		878		878	
Adjusted R^2		0.086		0.258		0.648		0.131		0.232		0.446	

Panel B: Aggregation at the MSA Audit Office Level (Seniors)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0190**		**-0.0359**	*	**0.0002**							
		(-0.97)		**(-1.86)**		**(0.01)**							
***LNALT*Δ**	-							**-0.0238**		**-0.0213**		**0.0035**	
								(-1.13)		**(-1.00)**		**(0.11)**	
Controls		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		972		972		972		735		735		735	
Adjusted R^2		0.112		0.246		0.628		0.170		0.297		0.519	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013. Panel A aggregates at the MSA audit office level, while Panel B aggregates at the client level.

TABLE 8 – CONTINUED
Quality Analysis Alternative Aggregation Levels (DV=*RESTATE%*)

Panel C: Aggregation at the MSA Audit Office Level (Managers)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0780**	*******	**-0.0710**	*******	**-0.0643**	******						
		(-3.85)		**(-3.41)**		**(-1.98)**							
***LNALT*Δ**	-							**-0.0738**	*******	**-0.0715**	*******	**-0.0664**	******
								(-3.79)		**(-3.50)**		**(-2.10)**	
Controls		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		589		589		589		488		488		488	
Adjusted R^2		0.176		0.428		0.754		0.175		0.321		0.629	

Panel D: Aggregation at the Client Level (Associates)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0407**	*****	**-0.0416**	*****	**-0.0898**	*******						
		(-1.66)		**(-1.67)**		**(-3.04)**							
***LNALT*Δ**	-							**-0.0492**	******	**-0.0336**		**-0.0859**	*******
								(-2.04)		**(-1.37)**		**(-2.69)**	
Controls & Industry FE		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		18,538		18,538		18,538		16,362		16,362		16,362	
Adjusted R^2		0.048		0.057		0.082		0.051		0.056		0.072	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013. Panel A aggregates at the MSA audit office level, while Panel B aggregates at the client level.

TABLE 8 – CONTINUED
Quality Analysis Alternative Aggregation Levels (DV=*RESTATE%*)

Panel E: Aggregation at the Client Level (Seniors)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0266**		**-0.0332**	**	**-0.0129**							
		(-1.63)		**(-2.05)**		**(-0.66)**							
***LNALT*Δ**	**-**							**-0.0360**	**	**-0.0296**	*	**-0.0150**	
								(-2.15)		**(-1.81)**		**(-0.76)**	
Controls & Industry FE		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		16,034		16,034		16,034		14,782		14,782		14,782	
Adjusted R^2		0.050		0.057		0.078		0.051		0.056		0.071	

Panel F: Aggregation at the Client Level (Managers)

	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)		(5) Coef. (t-stat)		(6) Coef. (t-stat)	
LNSALARY	**+/-**	**-0.0662**	***	**-0.0625**	***	**-0.0646**	**						
		(-3.17)		**(-2.98)**		**(-2.43)**							
***LNALT*Δ**	**-**							**-0.0675**	***	**-0.0627**	***	**-0.0668**	**
								(-3.34)		**(-3.10)**		**(-2.52)**	
Controls & Industry FE		Yes		Yes		Yes		Yes		Yes		Yes	
MSA FE		No		Yes		No		No		Yes		No	
Year FE		Yes		Yes		No		Yes		Yes		No	
MSA-Year FE		No		No		Yes		No		No		Yes	
Observations		11,293		11,293		11,293		10,852		10,852		10,852	
Adjusted R^2		0.051		0.061		0.079		0.053		0.060		0.075	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013. Panel A aggregates at the MSA audit office level, while Panel B aggregates at the client level.

TABLE 9
Auditor Salary and Accounting Fees Passed on to Client (DV=*LNFEES*)

		Full Sample		Associates		Seniors		Managers	
		(1)		(2)		(3)		(4)	
	Pred. Sign	Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)		Coef. (t-stat)	
LNSALARY	+/-	**0.0334**	**	**0.0848**	***	**0.0296**	*	**-0.0249**	
		(1.96)		**(3.24)**		**(1.69)**		**(-0.87)**	
LNASSETS		0.4032	***	0.3949	***	0.4104	***	0.4139	***
		(28.56)		(25.24)		(26.12)		(20.53)	
LNBSEG		0.2759	***	0.2560	***	0.3072	***	0.2268	***
		(5.34)		(4.22)		(5.29)		(2.83)	
ARINV		-0.6070	***	-0.5029	***	-0.7006	***	-0.7148	***
		(-6.16)		(-4.67)		(-6.34)		(-5.18)	
FOREIGN		0.6374	***	0.5853	***	0.7000	***	0.6966	***
		(10.07)		(8.45)		(10.40)		(8.76)	
LEVERAGE		0.0105		0.0400		-0.0379		0.0991	
		(0.14)		(0.44)		(-0.52)		(0.89)	
QRATIO		-0.0055	**	-0.0041		-0.0073	**	-0.0063	**
		(-2.08)		(-1.59)		(-2.20)		(-2.08)	
ROA		0.0895	*	0.0311		0.1496	***	0.1077	
		(1.84)		(0.56)		(3.03)		(1.67)	*
AGROWTH		-0.0003		-0.0006		-0.0002		0.0000	
		(-0.57)		(-1.24)		(-0.19)		(0.02)	
MERGER		0.2702	***	0.3048	***	0.2516	***	0.1909	*
		(3.78)		(3.89)		(3.25)		(1.69)	
LOSS		0.3403	***	0.3044	***	0.3748	***	0.3981	***
		(5.73)		(4.21)		(5.86)		(4.25)	
GC		0.0367		-0.0625		0.2566		0.0479	
		(0.25)		(-0.40)		(1.44)		(0.19)	
YE		-0.2639	***	-0.1760	**	-0.3444	***	-0.4320	***
		(-4.38)		(-2.60)		(-5.17)		(-5.48)	
OP_404b		0.3740	***	0.3898	***	0.3705	***	0.3797	***
		(5.40)		(4.51)		(5.30)		(3.98)	
MW		0.2741	***	0.3009	***	0.2828	***	0.1852	*
		(3.60)		(2.99)		(3.81)		(1.84)	
ANCRST		0.0551		-0.0097		0.0791		0.1783	
		(0.62)		(-0.10)		(0.77)		(1.29)	
JOBCOMPLX		-0.3700	***	-0.4143	***	-0.3215	***	-0.3358	***
		(-6.74)		(-6.63)		(-5.80)		(-4.32)	
AUDMKTSHR		0.3858	***	0.3269	***	0.4282	***	0.5178	***
		(7.78)		(6.16)		(7.16)		(5.59)	
LNHOMEP		0.0727	***	0.0674	***	0.0734	***	0.0865	***
		(6.77)		(6.09)		(6.39)		(6.50)	
LNPOP		0.0157	***	0.0183	***	0.0143	***	0.126	**
		(3.07)		(3.04)		(2.72)		(2.33)	

(Table continued on Next Page)

TABLE 9 – (CONTINUED)
Auditor Salary and Accounting Fees Passed on to Client (DV=*LNFEES*)

		Full Sample		Associates		Seniors		Managers	
	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)	
EDUCATION		1.8404	***	1.9637	***	1.7002	***	1.3190	***
		(6.65)		(6.53)		(6.10)		(3.96)	
Intercept		8.9078	***	8.3505	***	8.9515	***	9.4662	***
		(41.91)		(29.44)		(36.56)		(28.26)	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		12,796		6,237		4,698		1,861	
R^2		0.813		0.803		0.828		0.831	

Panel B: Moderating effect of audit market share

		Full Sample		Associates		Seniors		Managers	
	Pred. Sign	(1) Coef. (t-stat)		(2) Coef. (t-stat)		(3) Coef. (t-stat)		(4) Coef. (t-stat)	
LNSALARY	+/-	-0.1008	***	-0.0353		-0.1007	**	-0.2255	***
		(-3.31)		(-0.63)		(-2.56)		(-3.21)	
AUDMKTSHR	+/-	-6.2408	***	-4.9796	**	-6.2084	***	-9.8061	***
		(-5.10)		(-2.31)		(-3.42)		(-3.39)	
LNSAL*AMKTSHR	**+**	**0.6051**	*******	**0.4903**	******	**0.6005**	*******	**0.9151**	*******
		(5.39)		**(2.46)**		**(3.64)**		**(3.60)**	
Rank FE		Yes		N/A		N/A		N/A	
Year FE		Yes		Yes		Yes		Yes	
Observations		12,796		6,237		4,698		1,861	
R^2		0.816		0.804		0.830		0.835	

*, **, ***: p<0.10, p<0.05, p<0.01, respectively, two-tailed tests. Standard errors are clustered by audit-office interacted with year to compute t-statistics. Variable definitions can be found in the appendix. The sample period includes years 2004 to 2013.