

# Individual Auditor Turnover and Audit Quality—Large Sample Evidence from U.S. Audit Offices

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**ABSTRACT:** We examine the relationship between audit quality and office-level auditor turnover. Using resumes of over 106,000 Big 4 auditors, we find that audit offices with higher turnover have a greater likelihood of client annual report restatements. This detrimental effect is more pronounced when the departing auditors are more experienced and when the office faces tighter human capital constraints and is primarily attributable to voluntary turnover. Further, such negative effect is borne mostly by complex clients and intangible-intensive clients but is weakened for clients with greater product similarity to the client portfolio of the audit office. Last, the impact of office-level turnover on audit quality persists after controlling for firm-level turnover. Our findings inform the current policy debate on whether and to what extent audit firms should disclose auditor turnover as a potential indicator of audit quality.

**Data Availability:** Data are available from the public sources cited in the text.

**JEL Classifications:** M42.

**Keywords:** auditor turnover; auditor human capital; audit quality; audit quality indicators; financial restatements.

## I. INTRODUCTION

Auditor human capital plays a critical role in audit quality ([Advisory Committee on the Auditing Profession of the U.S. Department of Treasury \(ACAP\) 2008](#); [PCAOB 2015b](#)). The traditional “up or out” business model in the public accounting industry is characterized by high auditor turnover ([Johnson and Pike 2018](#); [Nouri and](#)

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Parker 2020; Vozza 2022). As a result, only a small proportion of auditors prevail and eventually make partners as the majority leave the audit firm within three to five years (Hiltebeitel and Leauby 2001; Downar, Ernstberger, and Koch 2021). The turnover rate in the public accounting industry far exceeds that of other industries, making high turnover and short employee tenure hallmarks of the profession. Although this business model helps reduce costs and could potentially enhance audit firms' bottom line (PCAOB 2015j), little is known about the impact of high auditor turnover on audit quality. Motivated by recent regulatory and practitioners' concerns about the potential impact of high turnover in audit firms and the accounting profession (IAASB 2014; European Union 2014; PCAOB 2015b; Duong and Jiles 2023) and prior evidence on the important role played by audit employees in audit quality,<sup>1</sup> we examine whether turnover of audit employees affects the audit quality of U.S. Big 4 audit offices.

The potential impact of auditor turnover on audit quality is unclear. On the one hand, auditor turnover could disrupt the buildup of auditor human capital by impeding the auditors' accumulation of industry expertise and client-specific knowledge. Thus, auditor turnover could undermine audit quality. Consistent with this view, the Public Company Accounting Oversight Board (PCAOB) perceives that a comparatively high rate of turnover may adversely affect audit quality (PCAOB 2015b). Some audit engagement deficiencies identified by PCAOB inspections are attributable to audit employee turnover and insufficient supervision (PCAOB 2015a). Consequently, in 2015, the PCAOB issued the Concept Release on Audit Quality Indicators (AQIs) (hereafter, "Concept Release"), in which it proposed the disclosure of auditor turnover as one of 28 audit quality indicators to aid the public in assessing audit quality (PCAOB 2015b). In 2023, the PCAOB included the AQI initiative on its short-term agenda, and it is expected to take further action soon.

On the other hand, the potential negative impact of auditor turnover could be mitigated through established firm training and mentoring of new auditors. The high turnover model has been the norm of public accounting for several decades (PCAOB 2015j), and thus, audit firms have had time to structure firm training and mentoring of new auditors to compensate for this high turnover. Additionally, auditor turnover may also help replace poor-performing auditors with new auditors who likely bring fresh perspectives to previously overlooked problems. Hence, auditor turnover may not compromise audit quality. In addition, as argued by audit firms, the high turnover model has been the norm of the public accounting profession over several decades (PCAOB 2015j), suggesting that audit firms may not consider high turnover as a threat to audit quality. Audit firms' strong objections to the proposed mandatory disclosure of auditor turnover bolster this conjecture.<sup>2</sup> As such, whether and to what extent auditor turnover impacts audit quality is an empirical question.

In this study, we focus on audit office turnover of Big 4 firms.<sup>3</sup> To assemble data on office-level auditor turnover, we construct auditor employment histories from their profiles posted to two leading professional networking platforms—Indeed.com and LinkedIn.com. Our final auditor sample used to calculate auditor turnover comprises 417,959 individual auditor-years for 106,092 unique auditors and 257 Big 4 offices over the period of 2002–2018. Our main measure of office-level turnover is the number of auditors who left the office by the end of the year scaled by the number of auditors at the beginning of the year, which we then demean by the average turnover of the same office over the past three years. We conduct comprehensive tests to boost the confidence that our sample of auditors is a good representation of the Big 4 auditor population and that our turnover measure has strong construct validity.<sup>4</sup>

Practitioners and investors view financial restatements as the most reliable public signal of audit quality (PCAOB 2015b; Christensen, Glover, Omer, and Shelley 2016). Our first proxy for audit quality is income-decreasing restatements of annual reports.<sup>5</sup> We use all annual report restatements as our second measure of audit quality. This is consistent with the expectation that auditors are responsible for detecting all material misstatements, regardless of their impact on net income (PCAOB 2010).

<sup>1</sup> Based on Article 13 of Regulation (EU) No. 537/2014 of the European Parliament and the Council, audit firms carrying out statutory audits of annual and consolidated financial statements must disclose the firm's turnover information in their transparency reports (European Union 2014).

<sup>2</sup> For example, BDO commented, "We are uncertain as to how the audit committee or others could appropriately apply a historical turnover percentage to the consideration of audit quality in the current year" (PCAOB 2015i). Similarly, McGladrey LLP (now called RSM) noted that "disclosure of calculated turnover percentages of audit personnel is not an indicator of audit quality for a particular engagement. Likewise, disclosure of firm-level turnover percentages is not a meaningful indicator of audit quality" (PCAOB 2015g).

<sup>3</sup> We focus on Big 4 firms because they are more homogenous with respect to audit technology, human capital, turnover, etc. Further, there is greater uniformity in auditor rank and the associated responsibilities across Big 4 firms, increasing the test power for our auditor rank analysis.

<sup>4</sup> Auditors who do not post resumes to Indeed.com or LinkedIn.com are mostly senior managers, directors, and partners, as they may rely on private channels for employment opportunities. Because the relative size of this group normally does not vary significantly over time, we have no obvious reason to expect that the measurement error in turnover varies significantly over time. In an untabulated test, we find that the proportion of auditors in each job rank group in our sample is highly consistent with that disclosed by Big 4 firms.

<sup>5</sup> Auditors primarily focus on detecting income-increasing earnings management (Francis and Krishnan 1999; Lennox, Wu, and Zhang 2016) due to the associated higher litigation and reputation costs (Hennes, Leone, and Miller 2008, 2014; Lennox and Li 2020). Upon detection, income-increasing earnings management that violates U.S. GAAP will manifest as income-decreasing restatements.

We find that the average audit office turnover rate is 23.6 percent based on 3,756 office-years during 2002–2018. More importantly, after controlling for various fixed effects, we find robust evidence that auditor turnover has a significant detrimental effect on audit quality. In economic terms, a one-standard-deviation increase in abnormal auditor turnover results in a 14.37 percent and 7.01 percent increase in the sample mean value of income-decreasing restatements and general restatements, respectively.

Next, we analyze whether the negative impact of turnover varies with departing auditor experience measured by auditor rank. We categorize auditors into four ranks based on their job titles: staff auditors, senior auditors, managers, and directors/partners. We find that turnover of senior auditors and managers has the most detrimental effects on audit quality, consistent with their rich experience and important roles they play in audits. The effects of turnover are insignificant for staff auditors. This result can be explained by the lack of experience of staff auditors. We also find an insignificant impact of director or partner turnover on audit quality, potentially due to their limited direct involvement in the execution of audits (Aobdia 2018; Aobdia, Choudhary, and Newberger 2024) and/or their rich general audit expertise neutralizing the impact of turnover. Overall, these results suggest the detrimental impact of turnover is primarily attributable to departing auditors who possess more valuable human capital and play a central role in audits.

Further tests show that the negative impact is more salient for turnover that occurs during busy seasons, and it is attenuated for offices with a closer neighboring office of the same audit firm. These results support the notion that the impact of turnover is intensified when an office faces tight human capital constraints but is eased when such constraints are alleviated through interoffice resource sharing. Auditor turnover can be either involuntary, owing to layoffs or downsizing, or voluntary due to outside job opportunities. We find evidence suggesting that the detrimental impact of turnover is more (less) pronounced for voluntary (involuntary) turnover. In addition, we find that turnover has a more detrimental impact on complex clients and intangible-intensive clients, whose audits require deep client- and industry-specific knowledge acquired over the years. On the other hand, the adverse consequence of turnover is weakened for clients with product offerings more similar to other clients of the office; this allows remaining auditors to easily transfer their expertise across different engagements.

Importantly, in untabulated tests, we find that the impact of office-level turnover continues to hold after controlling for firm-level turnover, whereas the impact of firm-level turnover on audit quality is sensitive to the measure of audit quality used. Our main result is robust to using alternative measures of turnover and audit quality.

We make the following contributions to literature. First, we extend prior research on auditor human capital and audit quality. Auditor characteristics are arguably the most important determinants of audit quality (PCAOB 2015b; Christensen et al. 2016). Due to data limitations, prior research primarily focuses on how audit partners affect audit quality (Lennox and Wu 2018) and largely ignores the role of audit employees, which is the largest part of the audit workforce. Recent research has started to shed light on the role of audit employees and documents higher audit quality in cities with a better educated labor force (Beck, Francis, and Gunn 2018), when audit employees are better compensated (Hoopes, Merkley, Pacelli, and Schroeder 2018), when audit offices are closer to recruitment target schools that supply entry-level auditors (Lee, Naiker, and Stewart 2022), when audit firms hire more employees with expertise in artificial intelligence (A. Fedyk, Hodson, Khimich, and T. Fedyk 2022), and when midlevel managers have greater client expertise (Aobdia et al. 2024). We extend prior studies by examining how office-level audit employee turnover affects audit quality.

Second, existing research has extensively examined how audit quality is shaped by various audit office characteristics, including office size, industry expertise, reputation, growth, and location (Francis and Yu 2009; Reichelt and Wang 2010; Francis, Michas, and Yu 2013; Swanquist and Whited 2015; Bills, Swanquist, and Whited 2016; Beck et al. 2018; Beck, Gunn, and Hallman 2019). We extend this literature by focusing on how audit office turnover affects audit quality. In response to the proposed disclosure of auditor turnover as one of the audit quality indicators (PCAOB 2015b, 2015d), audit firms support voluntary disclosure of firm-level turnover. However, our evidence suggests that disclosure at the office level, in addition to the firm level, could be incrementally useful for investors and audit committees to evaluate audit quality.

Third, high employee turnover has been the norm in the public accounting industry for decades (PCAOB 2015j). Prior behavioral research extensively studies the determinants of individual auditor turnover (Nouri and Parker 2020), but little is known about its consequences. Related to our study, Van Linden, Vandenhaute, and Zimmerman (2022) examine the impact of audit firm turnover in Belgium. Although this study provides useful insights, it is unclear whether its results are generalizable to office turnover or to the U.S. audit market. Christensen, Newton, and Wilkins (2021b) examine the impact of audit team continuity on audit quality. Their sample is based on an anonymous firm with a small clientele. Importantly, their measure of team continuity is distinctively different from our measure of office turnover.

We provide large sample office-level evidence on the consequences of turnover in the U.S. audit market using publicly available data.<sup>6</sup>

The rest of the paper is structured as follows. [Section II](#) discusses background information. [Section III](#) develops the hypothesis. [Section IV](#) discusses data and empirical models. [Section V](#) presents the results of the main and additional tests. [Section VI](#) concludes.

## II. BACKGROUND INFORMATION

### The PCAOB Audit Quality Indicators Project

The audit process traditionally remains a black box to outsiders, as minimal information is publicly available regarding indicators of audit quality ([ACAP 2008](#)). Hence, the quality of an audit is either unobservable or can only be observed at substantial cost to investors, such as through subsequent financial restatements. To help audit committees and the general public evaluate audit quality and to stimulate competition among audit firms for better audit quality, in 2015, the PCAOB issued the Concept Release, which proposed 28 quantitative measures as potential “audit quality indicators,” including auditor turnover ([PCAOB 2015b](#)).<sup>7</sup> The PCAOB believes that these indicators “may provide new insights about how to evaluate the quality of audits and how high-quality audits are achieved” ([PCAOB 2015b](#), 1) and sought public comments on the disclosure and possible uses of these indicators.

The PCAOB received 47 comments on the Concept Release ([PCAOB 2015d](#)). Investors generally perceived that the proposed indicators would enhance transparency and stimulate competition in audit quality and supported mandatory public disclosure of all AQI data.<sup>8</sup> In stark contrast, audit firms and board members of audit clients preferred voluntary disclosure only to audit committees ([PCAOB 2015c](#), [2015f](#)). Further, commenters also disagreed on the appropriate level of disclosure (i.e., engagement level, office level, and audit firm level).

In particular, the PCAOB proposed using the turnover of audit personnel as an indicator of the competence of audit professionals. Of the 13 letters commenting on auditor turnover, seven supported mandatory disclosure and six opposed it. Despite the wide divergence in opinions, all commenters agreed that further investigation on the usefulness of AQIs was needed before any policy could be prescribed ([PCAOB 2015d](#)). After the Concept Release, some audit firms started to voluntarily disclose certain AQI data, including turnover, at the audit firm level as recommended by the Center for Audit Quality (CAQ) ([Center for Audit Quality \(CAQ\) 2016](#), [2019](#)). Nonetheless, during the several years thereafter, the PCAOB set aside the AQI project due to a lack of support from accounting firms. Recently, the AQI project gained renewed momentum amidst continued investor demand for more transparent audit firm disclosures and the PCAOB’s leadership change in 2022.<sup>9</sup> On May 16, 2023, the PCAOB announced that the AQI project, now labeled as “Firm and Engagement Performance Metrics,” was included on its short-term agenda, which it intended to act on within 12 months ([PCAOB 2023](#)). Our study provides large-sample empirical evidence informing this ongoing policy debate on the usefulness of auditor turnover as an indicator of audit quality.

### Auditor Turnover at Public Accounting Firms and Its Causes and Consequences

Employees are the backbone of public accounting firms for the delivery of high-quality professional services. The U.S. Treasury Department’s Advisory Committee on the Auditing Profession considers “human capital” as one of the three key elements of audit quality ([ACAP 2008](#)). Indeed, human capital costs are by far the largest cost for public accounting firms. Most audit firms compete primarily on costs ([PCAOB 2015h](#), [2015j](#)). Driven by the incentive to minimize human capital costs, accounting firms adopt the business model of understaffing, heavy workloads, high overtime, and high leverage

<sup>6</sup> In a concurrent paper, [Khavis and Szerwo \(2022\)](#) find that higher audit office turnover is associated with lower audit quality, higher audit fees, shorter audit delay, and a higher likelihood of subsequently switching auditors. Our paper complements [Khavis and Szerwo \(2022\)](#) but provides a more in-depth analysis, specifically on the impact of auditor turnover on audit quality.

<sup>7</sup> These indicators are categorized into three groups: audit professionals (12 indicators), audit process (eight indicators), and audit results (eight indicators).

<sup>8</sup> In its response to the Concept Release, the California Public Employees’ Retirement System (CalPERS), stated, “Currently, there are audit quality assessments, but investors have little insight into what is being analyzed. AQIs would create a more common language when discussing audit quality and eventually enhance transparency at the investor level” ([PCAOB 2015h](#), 5), and that “implementing AQIs could improve audit quality which would be great for audit firms, audit committees and shareowners. We support moving forward swiftly with the AQI project” ([PCAOB 2015h](#), 3).

<sup>9</sup> For example, when commenting on the PCAOB’s agenda at the Investor Advisory Group (IAG) meeting on June 8, 2022, former SEC chief accountant Lynn Turner, who is a current IAG member, stated “I was surprised that the AQIs were not on there at all,” and “[t]hat seemed to have been the single thing that investors had focused on the most in the past. To not even see it on there did surprise me because, again, I think the agenda has to be evaluated against the mission that SOX created for the board. It’s right there in Section 101 of SOX. And are you fulfilling that mission?” (Please see <https://pcaobus.org/news-events/events/event-details/pcaob-investor-advisory-group-meeting-2022>.)

(PCAOB 2015j; Persellin, Schmidt, Vandervelde, and Wilkins 2019). This business model inevitably results in low job satisfaction and high turnover (Fogarty, Singh, Rhoads, and Moore 2000). According to the 2015 Inside Public Accounting National Benchmarking Report, the turnover rate in large accounting firms (firms with more than \$75 million in annual revenue) averaged 17 percent, with one in every six firms exceeding 20 percent (CPA Firm Management Association (CPAFMA) 2015).<sup>10</sup> Managing employee turnover and recruiting and retaining qualified employees remain long-term challenges for the public accounting industry (Brundage and Koziel 2010; Johnson and Pike 2018; AICPA 2019).

Prior research on accounting firm employee turnover primarily focuses on the underlying causes of turnover using a survey approach. An early survey finds that the number one reason for employee turnover is excessive overtime, followed by low salary, high pressure, and family concerns (Carcello, Copeland, Hermanson, and Turner 1991). Extensive behavioral research explains public accounting employee turnover through the framework of various theories, including expectancy theory (Dillard and Ferris 1979), psychological attachment theory (Parker and Kohlmeyer 2005), and role theory (Fogarty et al. 2000). Other studies examine how turnover is shaped by mentoring, organizational justice, gender, ethnicity, and organizational culture.<sup>11</sup>

In sharp contrast to the extensive studies on the determinants of auditor turnover, there is scarce evidence on the associated consequences, due to data limitations. Christensen et al. (2021b) use proprietary data obtained from an anonymous U.S. audit firm during 2008–2015 to examine the impacts of audit team workload and staff continuity on audit quality. They find that heavy workloads lead to burnout and distraction effects, both of which decrease audit quality. They also find that greater team staff continuity is associated with improved audit quality, lower audit hours, and higher audit fees. We complement Christensen et al. (2021b) in the following key areas.

First, audit team continuity could be caused by auditor rotation, which results in no human capital loss to the audit office, as well as by turnover, which will result in human capital loss. There could be a significant variation in audit team continuity, even in an audit office with zero turnover. Therefore, it is unclear to what extent the results in Christensen et al. (2021b) are driven by turnover, which is the focus of the current policy debate.

Second, audit team continuity may result from strategic engagement management. For example, audit offices may choose to shuffle top managers in response to the priorities assigned to different clients (Hoang, Jamal, and Tan 2019). This strategic matching between audit teams and clients could give rise to endogeneity bias. In contrast, audit office turnover primarily stems from voluntary departures rather than human resource management and is more likely to be exogenous to client characteristics. Third, the results of Christensen et al. (2021b) are derived from one anonymous non-Big 4 firm with a small clientele.<sup>12</sup> It is unclear whether their findings are generalizable to Big 4 firms that could more effectively neutralize the negative impacts of turnover through enhanced employee learning and robust quality controls (Jiang, K. Wang, and I. Wang 2019; Che, Hope, and Langli 2020; Aobdia 2020).

Fourth, we compare the impact of audit firm turnover with audit office turnover. This insight is particularly important for the current debate on the appropriate level of disclosure of turnover as an audit quality indicator. Fifth, in contrast to the proprietary data in Christensen et al. (2021b), we use publicly available data that cover a much larger number of auditors and thus are more representative of the broader U.S. auditor population. The new data sources offer the opportunity for future research to advance our understanding of this important area.<sup>13</sup>

<sup>10</sup> Since 1991, the CPA Firm Management Association (CPAFMA) has conducted annual surveys of the financial and operational performance of more than 500 public accounting firms in the United States, ranked by revenue. The survey results are reported in the Inside Public Accounting (IPA) National Benchmarking Report, which provides the most thorough, complete, and accurate view of accounting firms in the country. Based on an IPA benchmarking report, the average audit firm employee turnover rate for the top 500 accounting firms from 2013 to 2020 were 14.8 percent (2013), 15.10 percent (2014), 17.0 percent (2015), 17.2 percent (2016), 16.1 percent (2017), 16.3 percent (2018), 16.1 percent (2019), and 16.4 percent (2020) (Inside Public Accounting (IPA) 2020).

<sup>11</sup> See Nouri and Parker (2020) for a comprehensive review of prior behavior literature on the determinants of employee turnover in public accounting firms.

<sup>12</sup> In their Footnote 2, Christensen et al. (2021b) state that, due to confidentiality concerns, they cannot disclose their sample size, but their sample size is more than 1,000 firm-year observations and they use the entire portfolio of public company clients of the anonymous audit firm during 2008–2015. Assuming their sample size is 1,000–2,000, that implies that the audit firm in their study has about 125–250 clients each year. To put this in context, based on Audit Analytics in 2008, PwC, EY, Deloitte, and KPMG had 1,817, 2,094, 1,748, and 1,318 public company clients, respectively. Mid-sized audit firms Grant Thornton, BDO, McGladrey and Pullen, and Crowe Chizek & Company had 381, 253, 153, and 104 public company clients, respectively.

<sup>13</sup> In a concurrent study using mandatory audit firm turnover disclosures in Belgium, Van Linden et al. (2022) find a negative association between audit firm turnover and audit quality. Our paper differs from Van Linden et al. (2022) in several key aspects. First, we focus on office-level turnover since audit offices make many important audit decisions and are a more appropriate level of analysis (Francis, Stokes, and Anderson 1999; Reynolds and Francis 2000). Second, auditors in the United States face much higher litigation risk than auditors in other jurisdictions (Seetharaman, Gul, and Lynn 2002; Choi, Kim, Liu, and Simunic 2008). If litigation risk motivates U.S. audit firms to proactively manage the negative impact of turnover, it is unclear whether findings from Van Linden et al. (2022) generalize to the U.S. audit market. Third, under the mandatory audit firm turnover disclosure regime, clients committed to high financial reporting quality may select audit firms with low turnover and relatively long employee experience, leading to a selection bias. In contrast, the lack of either mandatory or voluntary office-level turnover disclosure in the United States attenuates such bias.

### III. HYPOTHESES DEVELOPMENT

Employee turnover has significant ramifications for a firm's performance (Hancock, Allen, Bosco, McDaniel, and Pierce 2013). Human capital theory posits that more experienced personnel perform better due to their accumulated knowledge and skills (Strober 1990). Hence, based on organization research, an important channel through which employee turnover affects firm performance is the loss of valuable knowledge, skills, and talent (the human-capital channel) (Staw 1980; Shaw, Gupta, and Delery 2005).<sup>14</sup>

In the audit context, engagement team personnel and audit-testing procedures are the two primary inputs to audit process (Francis 2011). Consequently, changes in audit personnel could significantly impact audit quality. Echoing the important role of audit personnel, in their survey of auditors and investors, Christensen et al. (2016) find a consensus that auditor characteristics, such as experience and training, are the most important determinants of audit quality. Prior audit research finds that audit quality is higher for audit firms and offices with industry expertise (Gul, Fung, and Jaggi 2009; Reichelt and Wang 2010) or task-specific expertise, such as detecting deficiencies in timely disclosure of contingencies, internal controls, or fair value accounting (Chen, Hou, Richardson, and Ye 2018; Anantharaman and Wans 2019; Ahn, R. Hoitash, and U. Hoitash 2020). At the individual auditor level, more experienced auditors demonstrate more complete and accurate knowledge of financial statement errors, are more likely to identify plausible explanations for audit findings (Libby and Frederick 1990), are more likely to recognize atypical errors (Tubbs 1992), and on average outperform less experienced auditors (Bonner and Lewis 1990). Experienced auditors are also more likely to detect management persuasion attempts and to render judgment that is less influenced by management bias (Kaplan, O'Donnell, and Arel 2008).

Due to heterogeneity across clients, a high-quality audit also requires auditors to possess rich client-specific knowledge about a client's business, industry, and accounting and control systems, among other things. Therefore, in addition to general auditing or industry experience, client-specific experience also plays a critical role in audit quality. Indeed, prior research finds that audit partners' client-specific experience plays a more important role in audit quality and risk assessment than their general experience (Chi, Myers, Omer, and Xie 2017; Contessotto, Knechel, and Moroney 2019). Further, client-specific experience of midlevel managers improves audit quality (Aobdia et al. 2024). This implies that individual auditors' general experience cannot fully compensate for the lack of client-specific experience.

High auditor turnover alters audit personnel as a primary input to the audit process through the loss of both general and client-specific experience. Such losses cannot be easily mitigated by new hires who usually have neither quality. New auditors need time to acquire both types of experience, which can be costly and time consuming (Gipper, Hail, and Leuz 2021). Further, given that the lack of client-specific knowledge may not be fully compensated by general experience, departing auditors may not be immediately replaced by remaining auditors who have general experience but no client-specific experience. Consequently, we anticipate auditor turnover will adversely affect audit quality.

On the other hand, auditor turnover may not adversely affect audit quality because accounting firms, especially Big 4 firms, have vigorous professional development and mentoring programs. Thus, extensive training, onboarding, and collaboration among new and remaining auditors likely mitigates any potential negative impact of auditor turnover. Further, each Big 4 firm has an expansive network of audit offices and could alleviate staffing shortages in a particular office by reallocating employees from nearby offices (Beck et al. 2019). Further, auditors' objectivity and independence can be compromised after a long relationship with the clients, which negatively impacts audit quality (Davis, Soo, and Trompeter 2009). High turnover may revitalize the workforce by sorting out poor performers and bringing in new auditors with fresh eyes for previously overlooked problems (Singer and Zhang 2018). As a result, auditor turnover may increase audit quality. Consistent with this view, Crowe Horwath (PCAOB 2015e, 1) comments, "[I]t is not always self-evident which direction is a better measurement for a particular indicator." Therefore, the relationship between office auditor turnover and audit quality is an empirical question. Reflecting the stronger argument for the negative effect of turnover on audit quality, we formalize the following directional hypothesis:

**H1:** Higher office-level auditor turnover rate is associated with lower audit quality.

### IV. DATA SELECTION AND EMPIRICAL MODEL

#### Auditor Data Collection

We obtain resumes for individual auditors from two popular professional social networking websites: Indeed.com and LinkedIn.com. Indeed.com is an online job listing platform that started in 2004 and has been the largest job website

<sup>14</sup> Another channel is the disruption of established patterns of interaction and coordination (flux-in-coordination channel) (Staw 1980; Summers, Humphrey, and Ferris 2012). Due to limitations on data about the interaction and coordination among auditors, we focus on the human capital channel in this study.

**TABLE 1**  
**Descriptive Statistics of Auditor Resume Data and Validation of Sample Coverage**

**Panel A: Auditor Resumes from Indeed.com and LinkedIn.com**

	<u>Indeed</u>	<u>LinkedIn</u>	<u>Duplicate Records</u>	<u>Merged Sample</u>
Number of unique auditors	53,454	77,039	(24,401)	106,092
Number of auditor-years	218,867	286,863	(87,771)	417,959
Number of auditor departures	43,014	63,806	(22,709)	84,111

**Panel B: Correlations between Office-Level Number of Auditors and Number of Clients/Total Audit Fees**

Year	Office-Years	Correlation between Number of Auditors and		Year	Office-Years	Correlation between Number of Auditors and	
		Number of Clients	Total Audit Fees			Number of Clients	Total Audit Fees
2002	196	0.64	0.75	2011	227	0.69	0.87
2003	208	0.65	0.84	2012	230	0.69	0.87
2004	221	0.69	0.87	2013	228	0.69	0.85
2005	229	0.74	0.89	2014	225	0.67	0.81
2006	226	0.71	0.88	2015	222	0.72	0.84
2007	222	0.70	0.89	2016	217	0.73	0.85
2008	222	0.70	0.85	2017	222	0.71	0.83
2009	218	0.69	0.83	2018	224	0.70	0.83
2010	219	0.69	0.85				

In this table, Panel A reports the number of auditor resumes collected from Indeed.com and LinkedIn.com. Panel B presents the annual correlations between the number of auditors in the audit office and the total number of clients and between the number of auditors in the office and the total audit fees of the same audit office. All correlation coefficients in Panel B are significant at the 1 percent level.

in the United States since 2010; it has 250 million active monthly users (Schonfeld 2010; Morgan 2021). LinkedIn.com is the world's largest online professional network with more than 645 million users worldwide (Microsoft 2019); prior research uses it as the main data source for individual auditor profiles (Lee et al. 2022; Hendricks, Landsman, and Peña-Romera 2022). Each resume hosted by these websites provides a complete professional employment history with job location information, enabling us to match each auditor with a specific audit office. Further, resumes from these sources are the same as those accessed by potential employers, ensuring the accuracy and integrity of the information. As the largest job searching and professional networking websites, these two platforms attract the most auditors compared with other websites, increasing our sample coverage of auditors.

We manually collect auditor resumes from Indeed.com through keyword searches and acquire LinkedIn.com auditor data from Bright Data Inc.<sup>15</sup> Based on the audit firm name, office location, and the starting and ending years of the employment of each auditor, we compile a list of auditors for each audit office over our sample period (2002–2018). After merging resumes from the two websites and deleting duplicates, we obtain 417,959 auditor-years for 106,092 unique Big 4 auditors and a total of 84,111 departures. Table 1, Panel A presents the number of auditors collected from each data source.

### Sample Construction

We obtain all audit-related data from Audit Analytics and financial and stock returns data from Compustat and CRSP, respectively, for 2002–2018. Using the advanced restatement database of Audit Analytics, we identify financial report restatements disclosed through the end of 2022. We require that each audit office has at least one public client with available financial and stock return information for the main analysis. After merging auditor resumes with Audit

<sup>15</sup> The Online Appendix contains the detailed procedures for the collection of resumes from Indeed.com. Bright Data Inc. is a commercial data company whose privacy policy complies with various privacy laws, including the European Union's General Data Protection Regulation (GDPR) and California Consumer Privacy Act Regulations (CCPA). See details at <https://brightdata.com/privacy>

Analytics, our final sample includes 3,756 office-years for 257 unique Big 4 offices and 44,291 firm-year observations. These 257 offices account for 91 percent of the 283 Big 4 offices in Audit Analytics with valid Compustat data during the sample period. The sample size varies for different tests depending on data availability.

### Validation of Auditor Data

To ensure the representativeness of the sample of auditors we collected, we compare the audit office headcount in our sample with that reported in the Book of Lists (BOL).<sup>16</sup> Based on the 63 office-years with available BOL auditor headcounts (951 office-years with available BOL professional staff headcounts), we calculate the sample coverage rate as the number of auditors (professional staff) in our sample scaled by the number of auditors (professional staff) reported by the BOL for the same office-year. We find that the mean (median) coverage rate for auditors is 77 percent (73 percent) and is 58 percent (58 percent) for professional staff. Please see the [Online Appendix](#) for more detail of the validation process using BOL. Given the large Big 4 auditor population, these coverage rates appear reasonable.<sup>17</sup>

To further validate our data, in [Table 1](#), Panel B, we present the correlations between the number of sample auditors and two commonly used measures of office size: the number of clients and total audit fees ([Francis and Yu 2009](#); [Francis et al. 2013](#)). A large positive correlation is consistent with the expectation that larger offices have more auditors. The correlation coefficients between the auditor counts and client counts (total audit fees) vary between 64 percent and 74 percent (75 percent and 89 percent), with all correlations being significant at the 1 percent level, adding additional confidence that our auditor count is a valid measure of relative auditor size across office-years. Further, both correlation coefficients stay relatively constant during the sample period. As such, we do not expect the measurement error in turnover to vary significantly over time.

Overall, these comprehensive tests support that our sample auditors are representative of the Big 4 auditor population and that our measure of turnover is a valid proxy for the actual auditor turnover rate.

### Empirical Model

To test the effect of auditor turnover on audit quality (H1), we estimate the following probit regression at the client-year level:

$$REST\_DEC_{it}/REST_{it} = \alpha + \beta ABNTURNOVER_{jt} + \gamma Office_{jt} + \delta Client_{it} + \theta MSA_{it} + \varphi_{it} + \tau_t + \omega_f + \mu_m + \varepsilon_{it}. \quad (1)$$

Office turnover ( $TURNOVER_{jt}$ ) is the number of auditors who left office  $j$  by the end of year  $t$  scaled by office  $j$ 's total number of auditors at the beginning of year  $t$ .<sup>18</sup> Because auditor turnover is highly persistent and subject to the impact of office characteristics, we remove the expected turnover by calculating abnormal turnover ( $ABNTURNOVER_{jt}$ ), which is the turnover for office  $j$  in year  $t$  minus the average turnover of the same office during the past three years (i.e., years  $t-1$  to  $t-3$ ). Benchmarking against historic turnover of the same office helps capture the component of turnover unanticipated by the office in the human resource planning process; in addition, it facilitates removing the component of turnover that could be correlated with certain unobservable office characteristics.

$REST\_DEC_{it}$  ( $REST_{it}$ ) equals 1 if the annual report for client firm  $i$  in year  $t$  has a subsequent income-decreasing restatement (a restatement) and 0 otherwise ([Lobo and Zhao 2013](#); [Pittman and Zhao 2021](#)). Both measures capture the failure to detect material misstatements and align with the auditor's responsibilities to opine on the fairness of financial reports. Given prior evidence on negative market reaction to financial restatements ([Palmrose, Richardson, and Scholz 2004](#)), this dimension of audit quality is critical for investor protection.

<sup>16</sup> The *Book of Lists* is a local annual business journal published for major U.S. cities by American City Business Journals or Crain's Business Journals. The BOL conducts annual surveys and reports the annual rank of top accounting firms in the city and various information about the audit offices, including the number of professionals and the number of CPAs. Prior studies that use the BOL include [Keune, Mayhew, and Schmidt \(2016\)](#) and [Sherwood, Nagy, and Zimmerman \(2020\)](#).

<sup>17</sup> Our coverage rate is conceptually analogous to the response rates from prior survey studies. In the [Online Appendix](#), we compare our coverage rate with the response rates reported in 12 audit-related survey studies published in *The Accounting Review* since 2000. We find that our average auditor coverage rate of 77 percent compares favorably with the average response rate of 28.7 percent for these 12 studies. We also benchmark against five influential accounting and finance survey studies that utilize large survey pools, and the average response rate for the five studies is 5.5 percent. In the [Online Appendix](#), we provide more complete evidence on the representativeness of auditors in our sample.

<sup>18</sup> We measure auditor turnover based on calendar years shown on resumes. We match office turnover in calendar year  $t$  with the audit quality of fiscal year  $t$  to account for the fact that about 75 percent of sample firms have a December fiscal year-end and about 83 percent of all departures in our sample occur during the non-busy season (i.e., April through December). For December year-end clients, non-busy season turnover in calendar year  $t$  mostly affects the audit quality of fiscal year  $t$ , as the audit for fiscal year  $t-1$  should be finished by March of year  $t$ . Therefore, most departures in year  $t$  should match well with the audit quality of fiscal year  $t$ . In untabulated tests, we re-estimate the main regressions after removing all firms with a non-December fiscal year-end. The main results continue to hold.



**TABLE 2**  
**Auditor Turnover Descriptive Statistics**

**Panel A: Descriptive Statistics of Audit Office Turnover by Audit Firm**

Variable	Office-Years	Mean	Std. Dev.	P25	Median	P75
<i>TURNOVER</i>	3,756	0.236	0.113	0.173	0.230	0.294
Deloitte	861	0.221	0.102	0.167	0.214	0.271
EY	981	0.242	0.114	0.181	0.235	0.300
KPMG	1,064	0.240	0.125	0.167	0.232	0.300
PwC	850	0.241	0.105	0.182	0.237	0.300
Number of auditors per office-year		111	196	23	59	121

**Panel B: Turnover by Auditor Rank**

	Junior Auditors	Senior Auditors	Managers	Directors/Partners
Turnover attributable to each group	0.099	0.071	0.054	0.014
Cumulative turnover	0.099	0.170	0.223	0.236

**Panel C: Turnover by Audit Season**

	Busy Season	Nonbusy Season
Turnover attributable to each season	0.048	0.188

In this table, Panel A presents the descriptive statistics of auditor turnover at the office-year level. *TURNOVER* is calculated as the number of auditors who left the office by the end of the year scaled by the total number of auditors at the same office at the beginning of the year. Panel B presents the turnover attributable to each auditor rank group. Panel C presents the turnover during the busy season (January to March) and the nonbusy season (April to December).

We include a set of controls at the level of office ( $Office_{it}$ ), client ( $Client_{it}$ ), and MSA ( $MSA_{it}$ ) following prior research (Francis and Yu 2009; Reichelt and Wang 2010; Lobo and Zhao 2013; Czerney, Schmidt, and Thompson 2014). The variables  $\varphi_{it}$ ,  $\tau_t$ ,  $\omega_f$ , and  $\mu_m$  denote Fama-French 48 industries, year, audit firm, and MSA fixed effects, respectively. Appendix A provides variable definitions. We cluster standard errors at the client-firm level, Winsorize all continuous variables at the 1st and 99th percentiles, and present two-tailed significance for all regressions.

## V. EMPIRICAL RESULTS

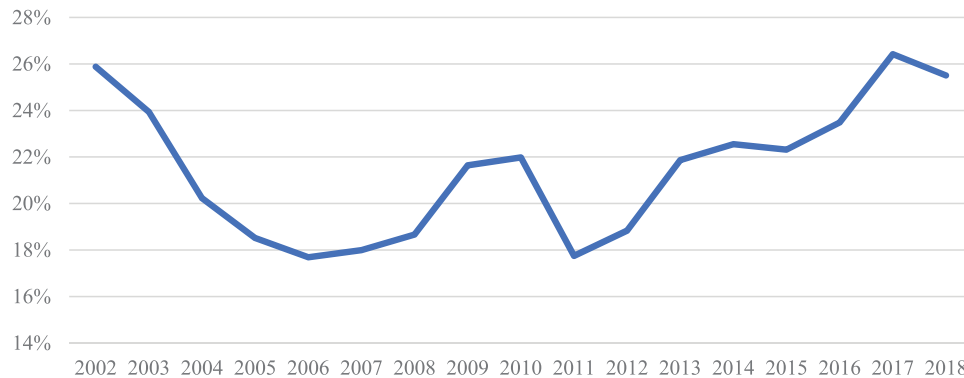
### Descriptive Statistics of Auditor Turnover

Table 2, Panel A shows that the mean (median) value of raw turnover (*TURNOVER*) for the 3,756 Big 4 office years is around 23.6 percent (23.0 percent), comparable to the mean (median) audit firm-level turnover of 26.3 percent (23.0 percent) in Van Linden et al. (2022) based on mandatory disclosures in Belgium during 2009–2014. The mean (median) number of auditors per office is 111 (59), suggesting the distribution is right skewed due to the influence of large offices.

To put auditor turnover into context, we compare it with the turnover in three other sectors of the economy—nonfarm, financial activities, and professional and business services, the data for which we obtain from the U.S. Bureau of Labor Statistics. During 2018, the turnover rate was 3.8 percent, 2.5 percent, and 5.5 percent for nonfarm, financial activities, and professional and business services, respectively; this is in stark contrast to the 25 percent turnover for auditors in our sample. The drastic differences in turnover persist in the last decade and support the narrative that the “up or out” business model in the public accounting industry leads to exceptionally high turnover compared with other professions. In Table 2, Panel B, we break down the turnover by auditors’ job ranks. We collect auditors’ job titles from their resumes and group all auditors into four ranks: staff auditors, senior auditors, managers, and directors/partners.<sup>19</sup> The

<sup>19</sup> Please see the Online Appendix for the construction and validation of the auditor rank variable. We find that, in our sample, senior and staff auditors, managers, and partners/directors account for 64.53 percent, 23.22 percent, and 12.24 percent of all auditors, respectively. The corresponding statistics are 66.46 percent, 23.06 percent, and 10.48 percent based on the disclosures by Big 4 firms in their audit quality reports. This high similarity suggests our auditor rank classification is reasonably accurate. It also suggests that our sample coverage of auditors does not appear to vary systematically with auditor rank.

**FIGURE 1**  
**Office-Level Auditor Turnover Distribution by Year**



This figure graphs the temporal distribution of office-level auditor turnover during the sample period of 2002–2018. Auditor turnover is calculated as the number of auditors who left the office by the end of the year scaled by the total number of auditors at the same office at the beginning of the year.

(The full-color version is available online.)

turnover rate attributable to staff auditors, senior auditors, managers, and directors/partners is 9.9 percent, 7.1 percent, 5.4 percent, and 1.4 percent, respectively. This inverse relationship between turnover and rank is in line with survey results showing that low-level auditors feel much less engaged in their job than high-level auditors (Johnson and Pike 2018). Table 2, Panel C reports that the turnover rate is 4.8 percent and 18.8 percent during the busy season (January through March) and the non-busy season, respectively.

In Figure 1, we present the annual distribution of auditor turnover. The temporal pattern is consistent with expectations. For example, the turnover rate trended downward during 2002–2006 when there was a sharp increase in the demand for auditors to implement the audit-related provisions enacted by the 2002 Sarbanes-Oxley Act (SOX), and the turnover rate trended upward amidst the recession of 2007–2009. Turnover climbed sharply in 2015, consistent with the survey finding that recruiting and retaining talent has been the top concern for accounting firms since 2015 (AICPA 2019). Figure 2 depicts the frequency and percentage of turnover for each month. The overall pattern suggests that turnover remains low during the busy season but spikes in March when the busy season ends. Turnover stays high during the summer months and then declines as December approaches. In sum, the annual and monthly distribution of turnover matches well with expectations, strengthening confidence about the construct validity of our turnover measure.

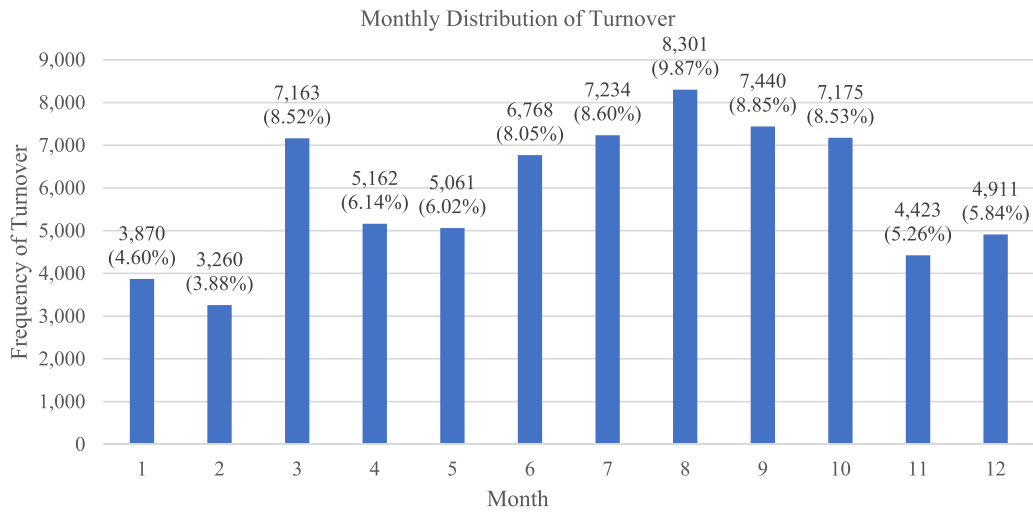
In Table 3, we present the statistical distributions for all other variables. For the two main measures of audit quality, we find the mean values for *REST\_DEC* and *REST* are 0.050 and 0.107, respectively, which is consistent with prior studies (Lobo and Zhao 2013; Francis et al. 2013; Pittman and Zhao 2021).

### Auditor Turnover and Audit Quality

In Table 4, we present the main results on the relationship between audit quality and turnover. In column (1), where *REST\_DEC* is the dependent variable, the coefficient on *ABNTURNOVER* is 1.342 and significant at the 1 percent level. In column (2), where *REST* is the dependent variable, the coefficient on *ABNTURNOVER* is 0.749 and significant at the 1 percent level. Therefore, higher auditor turnover significantly increases the probability of financial misstatements, resulting in lower audit quality. In economic terms, a one-standard-deviation increase in abnormal auditor turnover results in a 14.37 percent and 7.01 percent increase in the sample mean value of *REST\_DEC* and *REST*, respectively. The pseudo  $R^2$  is 0.088 and 0.060 in columns (1) and (2), respectively, which is comparable to prior studies (Bills et al. 2016; Aobdia 2020; Beardsley, Imdieke, and Omer 2021).

The results of the control variables are largely consistent with expectations. The likelihood of a restatement increases for large firms (*LOG\_CLIENTSIZE*) and firms with weak internal controls (*MW\_302*) and decreases

**FIGURE 2**  
**Monthly Distribution of Auditor Turnover**



This figure plots the frequency and relative proportion of auditor turnover in each month for the sample period of 2002–2018 based on departures that have information available on the departure month through auditor resumes or online profiles. Among the 84,111 total auditor departures in our final sample, 13,343 (15.86 percent) of them have no information on the departure month and 70,768 (84.14 percent) of them have detailed information on the departure month. (The full-color version is available online.)

for firms that incur a loss (*LOSS*), older firms (*LOG\_AGE*), and firms with a December year-end (*DECEMBER*).<sup>20</sup>

**The Experience Level of Departing Auditors and Audit Quality**

The impact of turnover depends on not only the overall turnover rate but also the experience and expertise of departing employees (Li and Guthrie 2016). Indeed, the context-emergent turnover theory defines turnover as comprising both the quantity and quality of knowledge, skills, and abilities depleted through the loss of employees (Nyberg and Ployhart 2013). Further, the organization theory suggests that the impact of turnover varies with the centrality of the particular departing employee to the organization (Staw 1980). We thus investigate whether the main result varies with the experience of departing auditors. We measure the experience of auditors with auditor rank. As discussed earlier, we collect auditors’ job titles from their resumes and categorize them into four ranks: staff auditors, senior auditors, managers, and directors/partners. We decompose the overall *ABNTURNOVER* into the turnover rates for each of the above four rank groups using the same approach as that for *ABNTURNOVER* but at the auditor rank level.

In Table 5, column (1), where the dependent variable is *REST\_DEC*, the coefficients on *ABNTURNOVER\_JUNIOR*, *ABNTURNOVER\_SENIOR*, *ABNTURNOVER\_MANAGER*, and *ABNTURNOVER\_PARTNER* are 0.153 (p-value > 0.1), 0.800 (p-value < 0.01), 0.717 (p-value < 0.05), and -0.226 (p-value > 0.1), respectively. The results remain qualitatively similar in column (2). More importantly, based on the six pairwise tests of coefficient equality at the bottom of Table 5, we find that the turnover of senior auditors and managers impacts audit quality more than the turnover of staff auditors and directors/partners; we fail to find any difference between senior auditors and managers.<sup>21</sup>

Overall, this analysis reveals the following insights. First, although staff auditors have the largest headcounts, perform the most audit field work, and contribute the most to auditor turnover, their departures only have a

<sup>20</sup> In an untabulated test, we re-estimate both regressions of Table 4 at the office-year level. Specifically, we average all dependent and control variables at the office-year level. The sample size is reduced to 3,756 office-years. The coefficients for *ABNTURNOVER* are 0.487 (p-value = 0.075) and 0.585 (p-value = 0.037) for columns (1) and (2), respectively. In another untabulated test, we limit the sample to the post-SOX period (2004–2018) and find similar results.

<sup>21</sup> To triangulate our evidence from the rank-based grouping, we categorize auditors into four groups based on their years of experience with the audit firm: 0–2 years, 3–5 years, 6–8 years, and 9 or more years of experience. In untabulated tests, we find that the negative impact on audit quality from turnover is mainly attributable to the turnover of auditors with 3–8 years of experience, consistent with the results by auditor ranks.

**TABLE 3**  
Descriptive Statistics

Variable	n	Mean	Std. Dev.	P25	Median	P75
<b>Test Variables</b>						
<i>TURNOVER</i>	44,291	0.232	0.079	0.188	0.226	0.273
<i>ABNTURNOVER</i>	44,291	0.003	0.055	-0.026	0.004	0.030
<b>Dependent Variables</b>						
<i>REST_DEC</i>	44,291	0.050	0.218	0.000	0.000	0.000
<i>REST</i>	44,291	0.107	0.309	0.000	0.000	0.000
<b>Control Variables</b>						
<i>LOG_OFFICE_FEE</i>	44,291	17.692	1.251	16.926	17.867	18.621
<i>EXPERT</i>	44,291	0.123	0.329	0.000	0.000	1.000
<i>CLIENT_IMP_OFFICE</i>	44,291	0.070	0.131	0.009	0.024	0.068
<i>SHORT_TENURE</i>	44,291	0.231	0.422	0.000	0.000	0.000
<i>LONG_TENURE</i>	44,291	0.350	0.477	0.000	0.000	1.000
<i>LOG_CLIENTSIZE</i>	44,291	7.059	1.995	5.709	7.057	8.370
<i>SALES_GROWTH</i>	44,291	0.022	0.420	-0.022	0.064	0.158
<i>SALES_VOLATILITY</i>	44,291	0.169	0.283	0.030	0.084	0.193
<i>CFO_VOLATILITY</i>	44,291	0.074	0.145	0.021	0.040	0.075
<i>LOSS</i>	44,291	0.185	0.388	0.000	0.000	0.000
<i>ROA</i>	44,291	-0.020	0.276	-0.010	0.028	0.068
<i>LEVERAGE</i>	44,291	0.576	0.341	0.374	0.556	0.737
<i>MB</i>	44,291	2.875	6.116	1.185	1.961	3.422
<i>LOG_NBSEG</i>	44,291	0.930	0.566	0.693	0.693	1.386
<i>MA</i>	44,291	0.380	0.485	0.000	0.000	1.000
<i>FINANCING</i>	44,291	0.168	0.300	0.007	0.047	0.207
<i>LOG_AGE</i>	44,291	2.872	0.712	2.303	2.833	3.401
<i>MW_302</i>	44,291	0.056	0.229	0.000	0.000	0.000
<i>DECEMBER</i>	44,291	0.751	0.432	1.000	1.000	1.000
<i>ACCTJOBS</i>	44,291	9.388	3.051	8.637	9.621	11.164
<i>POPCHG%</i>	44,291	0.844	0.798	0.272	0.687	1.341

This table presents the descriptive statistics of variables used in the main regression analyses. All continuous variables are Winsorized at the top and bottom 1 percent level.

[Appendix A](#) provides detailed variable definitions.

**TABLE 4**  
Baseline Regression—Auditor Turnover and Audit Quality

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	1.342*** (7.024)	0.749*** (5.421)
<i>LOG_OFFICE_FEE</i>	-0.033 (-1.383)	-0.030 (-1.498)
<i>EXPERT</i>	-0.049 (-1.430)	-0.028 (-1.222)
<i>CLIENT_IMP_OFFICE</i>	-0.066 (-0.418)	-0.056 (-0.434)

(continued on next page)

TABLE 4 (continued)

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>SHORT_TENURE</i>	−0.030 (−0.770)	−0.059* (−1.892)
<i>LONG_TENURE</i>	−0.074 (−1.463)	−0.039 (−1.052)
<i>LOG_CLIENTSIZE</i>	0.044*** (3.719)	0.035*** (3.584)
<i>SALES_GROWTH</i>	0.037 (1.168)	0.001 (0.060)
<i>SALES_VOLATILITY</i>	−0.019 (−0.395)	0.003 (0.079)
<i>CFO_VOLATILITY</i>	−0.232 (−1.335)	−0.252* (−1.744)
<i>LOSS</i>	−0.143*** (−2.783)	−0.068* (−1.718)
<i>ROA</i>	0.001 (0.012)	0.044 (0.877)
<i>LEVERAGE</i>	−0.073 (−1.330)	0.042 (1.011)
<i>MB</i>	0.001 (0.241)	−0.001 (−0.681)
<i>LOG_NBSEG</i>	0.032 (0.854)	0.037 (1.280)
<i>MA</i>	0.043 (1.413)	0.046* (1.952)
<i>FINANCING</i>	0.064 (1.318)	0.039 (1.095)
<i>LOG_AGE</i>	−0.084*** (−2.869)	−0.051** (−2.129)
<i>MW_302</i>	0.391*** (8.288)	0.414*** (10.925)
<i>DECEMBER</i>	−0.118*** (−2.872)	−0.095*** (−2.809)
<i>ACCTJOBS</i>	−0.000 (−0.027)	0.004 (0.356)
<i>POPCHG%</i>	−0.076** (−2.251)	−0.040 (−1.417)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.088	0.060
n	44,291	44,291

\*, \*\*, \*\*\* Denote two-tailed significance levels at 10 percent, 5 percent, and 1 percent, respectively.

This table reports the probit regression results on the baseline effects of auditor turnover on audit quality. Office turnover is calculated as the number of auditors who left the office by the end of the year scaled by the total number of auditors in the same office at the beginning of the year. The z-statistics are reported in parentheses. Standard errors are clustered at the client firm level.

Variable Definitions:

*ABNTURNOVER* = the difference between the office's turnover and the average turnover of the same office in the past three years; and

*REST\_DEC (REST)* = 1 if the client's current year annual report has a subsequent income-decreasing restatement (a restatement) and 0 otherwise.

Appendix A provides detailed variable definitions.

**TABLE 5**  
**Auditor Turnover and Audit Quality—The Role of the Auditor Experience**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER_JUNIOR</i>	0.153 (0.612)	0.228 (1.073)
<i>ABNTURNOVER_SENIOR</i>	0.800*** (3.335)	0.425** (2.289)
<i>ABNTURNOVER_MANAGER</i>	0.717** (2.142)	0.367** (2.139)
<i>ABNTURNOVER_PARTNER</i>	-0.226 (-1.512)	-0.232 (-1.499)
<b>Test of Coefficient Equality</b>	$\chi^2$	$\chi^2$
<i>JUNIOR = SENIOR</i>	3.269**	2.531*
<i>JUNIOR = MANAGER</i>	3.121**	3.019**
<i>JUNIOR = PARTNER</i>	0.551	1.081
<i>SENIOR = MANAGER</i>	0.052	0.337
<i>SENIOR = PARTNER</i>	3.911**	6.749**
<i>MANAGER = PARTNER</i>	2.858*	4.280**
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.089	0.060
n	44,291	44,291

\*, \*\*, \*\*\* Denote two-tailed significance levels at 10 percent, 5 percent, and 1 percent, respectively.

This table reports the probit regression result on the role of auditor experience on the impact of auditor turnover on audit quality. We measure auditor experience by auditors' job rank. *ABNTURNOVER\_JUNIOR* (*ABNTURNOVER\_SENIOR*, *ABNTURNOVER\_MANAGER*, and *ABNTURNOVER\_PARTNER*) is the turnover for staff auditors (senior auditors, managers, and directors/partners) calculated as the number of staff auditors (senior auditors, managers, and directors/partners) who left the office by the end of the year scaled by the total number of auditors in the same office at the beginning of the year, minus the average turnover of staff auditors (senior auditors, managers, directors/partners) in the same office over the past three years. The control variables are the same as those in Table 4 and are omitted for brevity. The z-statistics are reported in parentheses. Standard errors are clustered at the client firm level.

Variable Definitions:

*REST\_DEC* (*REST*) = 1 if the client's annual report for the current year has a subsequent income-decreasing restatement (a restatement) and 0 otherwise.

Appendix A provides detailed variable definitions.

negligible impact on audit quality. This finding is consistent with the fact that staff auditors have very limited audit experience and thus can be easily replaced. Second, directors and partners have extensive professional experience that can help mitigate the impact of turnover. In addition, they have limited direct involvement in audit field work (Aobdia 2018).<sup>22</sup> As a result, their departure does not cause any tangible impact on audit quality. Third, senior auditors and managers have both rich audit experience and extensive direct involvement in audit field work. In addition, they are the primary supervisors of staff auditors and function as the most important liaison between clients and audit partners as well as between audit team members and partners. Their departures result in a loss of valuable human capital, a breakdown in the monitoring of staff auditors, and a disruption in communication with clients and among auditors.

<sup>22</sup> Aobdia (2018) reports that the sum of engagement partner hours and quality review partner hours is only 6.3 percent of total engagement hours. Christensen, Newton, and Wilkins (2021a) show that, on average, audit staff account for at least 65 percent of total audit hours and audit partners and audit managers account for less than 35 percent.

### Audit Office Human Capital Constraints, Turnover, and Audit Quality

In this section, we examine how the impact of turnover varies with audit office human capital constraints. Severe human capital constraints lead to heavy workloads, long hours, and a higher likelihood of burnout for auditors (Persellin et al. 2019; Christensen et al. 2021b). Hence, the loss of human capital arising from turnover will make the constrained human capital even worse, leading to deteriorated auditor performance. Therefore, we expect the negative consequences of turnover to be exacerbated for offices facing tight human capital constraints.

Our first measure of human capital constraints is the busy season. About 75 percent of sample firms have a December fiscal year-end, and all public firms must file their 10-K form with the SEC within 90 days of their year-end (Doyle and Magilke 2013). Thus, we consider January through March as the busy season. Prior research finds that the heavy workload during the busy season leads to job burnout and dysfunctional auditor behaviors (López and Peters 2012; Sweeney and Summers 2002). Therefore, the detrimental effect of turnover will be more pronounced during busy seasons. However, as revealed in Figure 2, busy-season turnover is far less frequent than non-busy season turnover. Therefore, the impact on audit quality may not vary with the timing of the departure. We break down *ABNTURNOVER* into busy season and non-busy season turnover, denoted by the suffix *BUSY* and *NONBUSY*, respectively.<sup>23</sup>

Table 6, Panel A shows that the coefficients on *ABNTURNOVER\_BUSY* are positive and significant at the 1 percent level in both columns. The coefficients on *ABNTURNOVER\_NONBUSY* are insignificant in both columns. In both columns, the magnitude of the coefficient on *ABNTURNOVER\_BUSY* is significantly larger than that on *ABNTURNOVER\_NONBUSY*. The analysis suggests that, despite their lower frequency, busy season turnover is more harmful to audit quality than non-busy season turnover. Therefore, audit offices could implement more effective procedures to discourage busy season turnover.

Our second measure of human capital constraints is the office's proximity to the nearest office of the same audit firm. Prior research implies that geographical proximity to other offices of the same audit firm facilitates resource sharing (Seavey, Imhof, and Westfall 2018; Beck et al. 2019). Hence, the negative impact of turnover can potentially be alleviated by leveraging auditors from the nearby office. We measure the geographic distance between two offices based on Google Map API with each office city's latitude and longitude obtained from freemaptools.com.

We transform the continuous measure of distance into tercile ranks following the spirit of prior research (Kubick, Lynch, Mayberry, and Omer 2015; Li, Lou, Otto, and Wittenberg-Moerman 2021). To facilitate the interpretation, we normalize the tercile ranks so that the variable *OFFICE\_CLOSENESS* equals 1 (0.5, 0) for observations in the bottom (middle, top) tercile. Under this specification, the interaction *ABNTURNOVER \* OFFICE\_CLOSENESS* captures the difference in the impact of turnover on audit quality between offices in the bottom tercile and offices in the top tercile of distance to the nearest office of the same audit firm. In Table 6, Panel B, the coefficients on *ABNTURNOVER \* OFFICE\_CLOSENESS* are negative and significant at the 1 percent level in both columns. The results imply that the negative impact of turnover is eased when the human resources from a nearby peer office are more accessible.

### The Underlying Reasons for Turnover and the Impact of Turnover on Audit Quality

In this section, we provide insights into the underlying reasons for auditor turnover and the impact of turnover on audit quality. Auditor turnover stems from either involuntary separations due to layoffs, job cuts, or downsizing inside the office or voluntary separations due to outside job opportunities. Involuntary separations may reflect the audit office's human resource management to improve performance, and underperforming employees usually make up most of involuntary separations (Dalton, Todor, and Krackhardt 1982). Hence, voluntary and involuntary turnovers do not result in the same loss of human capital (Staw 1980; Hausknecht and Trevor 2011; Heavey, Holwerda, and Hausknecht 2013). However, recent organization research finds that the impact of voluntary and involuntary turnover is quite similar (Batt and Colvin 2011; Hancock et al. 2013), possibly because involuntary turnover could still lead to operational disruption (Hausknecht and Trevor 2011). Because we do not observe the actual reason for turnover in our data,<sup>24</sup> we differentiate the two types of turnover by identifying office-years with a strong factor for involuntary or voluntary turnover.

To identify office-years with a strong factor for involuntary turnover, we follow recent studies that rely on employee disclosures to measure firm inside information (Huang, Li, and Markov 2020; Campbell and Shang 2022). Specifically,

<sup>23</sup> We take the following steps to alleviate the concerns of mismatching between the timing of turnover and the timing of audits in this test. First, we remove all non-December year-end firms so that the busy season falls between January and March for all firms in this test. Second, we remove separations that do not disclose the month of departure when measuring the timing of the departure. Third, we match the audit quality for year *t* with busy season turnover in year *t*+1 and with non-busy season turnover in year *t*.

<sup>24</sup> Based on the subsample of 13–14 audit firms with such disclosures in Belgium, Van Linden et al. (2022) report that the average voluntary and involuntary turnover rates are 23.5 percent and 3.9 percent (i.e., a ratio of 6.01:1), respectively, suggesting that auditor turnover is predominantly voluntary in Belgium. Based on a recent survey of U.S. public accounting firms, the voluntary and involuntary turnover ratio for professional staff is 4.2:1 (IPA 2020).

**TABLE 6**  
**Auditor Turnover and Audit Quality—The Role of Human Capital Constraints**

**Panel A: Turnover during Busy Season versus Nonbusy Season**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER_BUSY</i>	1.232*** (6.789)	0.573*** (4.149)
<i>ABNTURNOVER_NONBUSY</i>	0.073 (0.230)	0.210 (0.980)
<b>Test of Coefficient Equality</b>	$\chi^2$	$\chi^2$
<i>BUSY = NONBUSY</i>	11.077***	3.116**
Controls	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Audit Firm Fixed Effects	Yes	Yes
MSA Fixed Effect	Yes	Yes
Pseudo R <sup>2</sup>	0.092	0.062
n	33,250	33,250

**Panel B: The Moderating Role of Closeness to Other Offices**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	1.962*** (6.420)	1.293*** (5.984)
<i>ABNTURNOVER * OFFICE_CLOSENESS</i>	-1.290*** (-2.816)	-1.125*** (-3.457)
<i>OFFICE_CLOSENESS</i>	-0.097 (-0.882)	-0.103 (-1.190)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.093	0.066
n	43,351	43,351

\*, \*\*, \*\*\* Denote two-tailed significance levels at 10 percent, 5 percent, and 1 percent, respectively.

This table reports the probit regression results on the role of human capital constraints on the impact of auditor turnover on audit quality. In Panel A, *ABNTURNOVER\_BUSY* (*ABNTURNOVER\_NON\_BUSY*) is auditor turnover during the busy (nonbusy) season. It equals the number of auditors who left the office during the busy (nonbusy) season of the year scaled by the total number of auditors in the office at the beginning of the year, minus the average busy (nonbusy) season turnover of the same office over the past three years. We label January through March as the busy season and the rest of the year as the nonbusy season. We include only firms with a December fiscal year-end in this test. In Panel B, *OFFICE\_CLOSENESS* is the normalized tercile rank of the geographic distance to the nearest audit office of the same audit firm. Observations in the bottom (middle, top) tercile of this distance measure take the value of 1 (0.5, 0). *ABNTURNOVER* is calculated as the difference between the office's turnover and the average turnover of the same office over the past three years. Both dependent variables are the same as those in Table 4. The control variables in both panels are the same as those in Table 4 and are omitted for brevity. The z-statistics are reported in parentheses. Standard errors are clustered at the client firm level.

Appendix A provides detailed variable definitions.

we search auditors' reviews of their employers on the employer rating website Glassdoor.com and identify office-years with auditor reviews containing the keywords "layoff," "downsize," or "job cut." We expect the turnover in such office-years to be more likely involuntary. Our sample period for this analysis starts in 2008, the first year that the rating data from Glassdoor.com became available. We set *LAYOFF* to 1 if an office-year is associated with any of the above comments and 0 otherwise. We then interact *LAYOFF* with *ABNTURNOVER*. In Table 7, Panel A, the coefficients on



TABLE 7

## Reasons Underlying Auditor Turnover and Audit Quality—Involuntary and Voluntary Turnover

## Panel A: Involuntary Auditor Turnover—Office Layoffs

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	1.116*** (2.599)	0.648** (2.171)
<i>ABNTURNOVER * LAYOFF</i>	-1.119** (-2.302)	-0.953** (-2.368)
<i>LAYOFF</i>	0.107** (2.417)	0.081*** (2.589)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.072	0.061
n	26,811	26,811

## Panel B: Voluntary Auditor Turnover—Outside Job Opportunities

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	0.559 (0.888)	0.530 (0.960)
<i>ABNTURNOVER * OUTSIDE_JOBS</i>	2.685*** (3.202)	1.831*** (2.693)
<i>OUTSIDE_JOBS</i>	0.319* (1.790)	0.319*** (2.590)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.116	0.082
n	21,940	21,940

\*, \*\*, \*\*\* Denote two-tailed significance levels at 10 percent, 5 percent, and 1 percent, respectively.

This table reports the probit regression results on the moderating effects of the underlying reason of turnover (involuntary versus voluntary) on the impact of auditor turnover on audit quality. In Panel A, *LAYOFF* equals 1 if an audit office's employees comment at Glassdoor.com using any of the keywords "layoff," "downsize," or "job cut" and 0 otherwise. In Panel B, *OUTSIDE\_JOBS* is the normalized tercile rank of outside job opportunities for auditors in the office, measured as the natural logarithm of the number of nonaudit-related accounting jobs posted by other employers in the same MSA as the office, excluding jobs posted by the clients of the focal auditor, scaled by the total number of auditors in the same MSA. We obtain job postings from Burning Glass Technologies. Observations in the top (middle, top) tercile of outside job opportunities take the value of 1 (0.5, 0). *ABNTURNOVER* is calculated as the difference between the office's turnover and the average turnover of the same office over the past three years. Both dependent variables are the same as those in Table 4. The control variables in both panels are the same as those in Table 4 and are omitted for brevity. The z-statistics are reported in parentheses. Standard errors are clustered at the client firm level. Appendix A provides detailed variable definitions.

*ABNTURNOVER \* LAYOFF* are negative and significant at the 5 percent level in both columns, consistent with the expectation of a weakened impact on audit quality when the turnover is more likely involuntary.

To identify office-years with a strong factor for voluntary turnover, we consider the number of accounting-related jobs in the same MSA of the audit office. Because auditors with more valuable skills and better performance have a higher chance of securing outside jobs, greater outside job opportunities could attract more voluntary departures. Hence, we expect the negative impact of turnover to be more pronounced for offices in an MSA with more outside job

opportunities. We obtain all archived job postings between 2010 and 2018 from Burning Glass Technologies Inc. (BGT),<sup>25</sup> which prior research uses to measure employment opportunities (Babina, Fedyk, He, and Hodson 2024). We identify non-audit-related accounting job postings using a dictionary approach. We then calculate the rate of the total number of such jobs in an MSA over the total number of Big 4 auditors in the same MSA. This variable intends to capture the average number of accounting jobs available per auditor in the area and should be free from the effect of city size or growth. We then set *OUTSIDE\_JOBS* to 1 (0.5, 0) for observations with top (middle, bottom) tercile rank of available jobs per auditor.

In Table 7, Panel B, the coefficients on *ABNTURNOVER* \* *OUTSIDE\_JOBS* are both positive and significant at the 1 percent level, indicating a more severe impact on audit quality from the departures of auditors who have more outside career options. This finding supports the notion that voluntary turnover exerts a harsher impact on audit quality, consistent with the fact that voluntary departures are associated with a greater loss of valuable auditor human capital.

### Client Characteristics and the Impact of Auditor Turnover on Audit Quality

In this section, we provide insights into what type of clients are more or less likely to bear the negative consequences of turnover. Prior research suggests that auditor judgment performance decreases as task complexity increases (Bonner 1994) and task complexity may have more impact on less experienced auditors (Abdolmohammadi and Wright 1987). Consistently, the results from Cassell, Hansen, Myers, and Seidel (2020) suggest a steeper learning curve for new auditors of more complex clients. Hence, we expect the loss of auditor human capital will have more adverse consequences for more complex clients, as industry- and client-specific knowledge for such clients plays a more critical role in audit quality but is harder to accumulate.

We focus on three dimensions of client complexity: the number of segments in which the client operates (Goncharov, Riedl, and Sellhorn 2014; Cassell et al. 2020), inventories and accounts receivable scaled by total assets (Carson, Simnett, Soo, and Wright 2012), and the number of subsidiaries (Hay, Knechel, and Wong 2006). We create a composite measure of complexity based on the aggregate tercile ranks of the three complexity metrics and normalize the aggregated tercile ranks so that the variable *CLIENT\_COMPLEXITY* equals 1 (0.5, 0) for observations with the top (middle, bottom) tercile rank of the composite complexity score. We then interact this complexity variable with office turnover. In Table 8, Panel A, the coefficients on *ABNTURNOVER* \* *CLIENT\_COMPLEXITY* are positive and significant at the 10 percent level or better in both columns. Hence, the negative impact of turnover is exacerbated for more complex clients.

Second, we examine how the impact of turnover on audit quality varies with the intangible intensity of clients. High intangible-intensity firms experience high volatility in revenue and cash flows and exhibit lower earnings quality (Srivastava 2014) and higher information asymmetry manifested in stock price crash risk (Wu and Lai 2020). Intangible-intensive firms normally operate under the knowledge-intensive business model that is characterized by fast-changing technologies, extensive forward-looking estimates, and greater valuation uncertainties. Such firms require more talented auditors to audit (Aobdia, Srivastava, and Wang 2018). We therefore expect a stronger impact of turnover on more intangible-intensive clients. We measure intangible intensity by capitalizing R&D expenditures over the past three years (Aobdia et al. 2018). *INTANGIBLE\_INTENSITY* equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank of intangible intensity among all clients of the office-year. In Table 8, Panel B, the coefficients on *ABNTURNOVER* \* *INTANGIBLE\_INTENSITY* are positive and significant at the 10 percent level or better in both columns. Thus, we find evidence that the impact of turnover on audit quality is stronger for clients who are more intangible-intensive.

Third, we examine how the impact of turnover varies with a client's product similarity to the client portfolio of the same office. Product similarity developed by Hoberg and Phillips (2010, 2016) captures the similarity between two firms' product descriptions in their 10-K filings and is distinct from traditional industry classifications. Offices with more similar clients are more likely to develop expertise in the clients' product market due to the homogeneity in clients' business models. Consistently, prior research finds improved audit effectiveness and efficiency for clients with greater product similarity to other clients of the same auditor (Bills, Cobabe, Pittman, and Stein 2020; Chang, Hsu, and Ma 2022). Because auditors could more easily transfer their expertise across the audits of clients who are more similar, we thus

<sup>25</sup> It is plausible that clients in need of accountants will post more jobs, and such clients may also have lower financial reporting quality due to the lack of accountants. To address this issue, we remove all observations for the focal office's clients who post any job during the year. We also use the outside job opportunities from nonclients as an instrumental variable for auditor turnover. Intuitively, more accounting-related job postings naturally make it easier for auditors to secure outside employment and increase auditor turnover, supporting the relevance condition. In the meantime, there is no reason to speculate that outside accounting job opportunities at nonclients could directly affect the audit quality of a particular client through channels other than turnover, satisfying the exogeneity condition. In untabulated tests, we find consistent inferences that higher turnover leads to lower audit quality.

**TABLE 8**  
**Auditor Turnover and Audit Quality—The Role of Client Characteristics**

**Panel A: Role of Client Complexity**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	0.241 (0.696)	−0.017 (−0.059)
<i>ABNTURNOVER * CLIENT_COMPLEXITY</i>	1.107* (1.653)	1.080** (2.223)
<i>CLIENT_COMPLEXITY</i>	0.084 (1.212)	0.149*** (2.627)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.096	0.066
n	44,291	44,291

**Panel B: Role of Client Intangible Intensity**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	0.633** (2.329)	0.428** (2.123)
<i>ABNTURNOVER * INTANGIBLE_INTENSITY</i>	0.936* (1.773)	0.788** (1.980)
<i>INTANGIBLE_INTENSITY</i>	0.034 (0.549)	0.055 (1.134)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes
Pseudo R <sup>2</sup>	0.092	0.065
n	41,365	41,365

**Panel C: Role of Client Product Similarity**

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
<i>ABNTURNOVER</i>	1.576*** (7.018)	0.875*** (5.379)
<i>ABNTURNOVER * PROD_SIMILARITY</i>	−1.025** (−2.227)	−0.571* (−1.915)
<i>PROD_SIMILARITY</i>	0.005 (0.122)	−0.006 (−0.177)
Control Variables	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Audit Firm FE	Yes	Yes
MSA FE	Yes	Yes

(continued on next page)

TABLE 8 (continued)

Variables	<i>REST_DEC</i> (1)	<i>REST</i> (2)
Pseudo R <sup>2</sup>	0.095	0.064
n	44,291	44,291

\*, \*\*, \*\*\* Denote two-tailed significance levels at 10 percent, 5 percent, and 1 percent, respectively.

This table reports the probit regression results on the moderating effects of client characteristics on the impact of auditor turnover on audit quality. In Panel A, *CLIENT\_COMPLEXITY* is the normalized tercile rank of the composite measure of client complexity based on aggregate tercile ranks of the number of segments in which the client operates, the magnitude of inventories and accounts receivable scaled by total assets, and the number of subsidiaries. Observations in the top (middle, bottom) tercile of the composite complexity measure take the value of 1 (0.5, 0). In Panel B, *INTANGIBLE\_INTENSITY* is the normalized tercile ranks of the firm's intangible intensity and equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank among all clients of the audit office for the year, where the intangible intensity is the capitalized R&D expenditures (Compustat-XRD) over the past three years (missing XRD replaced with 0), assuming a 15 percent yearly depreciation rate (following Aobdia et al. 2018), scaled by lagged total assets. In Panel C, *PROD\_SIMILARITY* is the normalized tercile rank of the client's product similarity to other clients of the office-year; it equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank of product similarity among all client firms of the audit office for the year, where product similarity is measured with the TNIC-3 database obtained from the Hoberg-Phillips Data Library (<https://hobergphillips.tuck.dartmouth.edu/industryclass.htm>). Both dependent variables are the same as those in Table 4. The control variables in all panels are the same as those in Table 4 and are omitted for brevity. The z-statistics are reported in parentheses. Standard errors are clustered at the client firm level.

Appendix A provides detailed variable definitions.

expect an attenuated impact of turnover for clients whose products offerings are more similar to those of other clients of the same office.

We measure the focal firm's similarity to client portfolio of the office by the mean value of product similarity between the focal firm and each of the other clients of the same office-year (Bills et al. 2020; Chang et al. 2022). The variable *PROD\_SIMILARITY* equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank of product similarity to other clients of the office-year. In Table 8, Panel C, the coefficients on *ABNTURNOVER \* PROD\_SIMILARITY* are negative and significant at the 10 percent level or better in both columns, consistent with a mitigated impact of turnover on audit quality when the client is more similar to other clients of the office.

### Audit Firm and Audit Office Turnover

Van Linden et al. (2022) document that audit firm turnover impairs audit quality. In previous sections, we include audit firm fixed effects to control for audit firm characteristics that can affect both audit quality and individual offices' turnover. To shed light on whether audit office turnover incrementally affects audit quality beyond firm-level turnover, we re-estimate the main regressions after including firm turnover (*ABNTURNOVER\_FIRM*), which is calculated using the same methodology as that for *ABNTURNOVER* but at the audit firm level. The correlation coefficient between *ABNTURNOVER* and *ABNTURNOVER\_FIRM* is 0.028 and insignificant (untabulated), suggesting that firm- and office-level turnover are distinct constructs.

In untabulated tests, when we include only audit firm turnover in the regressions, the coefficients on *ABNTURNOVER\_FIRM* are insignificant when *REST\_DEC* is the dependent variable and positive and significant at the 5 percent level when *REST* is the dependent variable, consistent with the inference of Van Linden et al. (2022). Importantly, after adding audit office turnover in the regressions, the coefficients on *ABNTURNOVER\_FIRM* remain qualitatively similar, whereas the coefficients on *ABNTURNOVER* are positive and significant at the 1 percent level in both regressions. In untabulated tests, we fail to find any significant difference between the coefficients on *ABNTURNOVER* and *ABNTURNOVER\_FIRM*. This result suggests that audit office turnover has persistent impacts on audit quality incremental to that of firm turnover, underscoring the importance of also disclosing turnover at the office level to facilitate the evaluation of audit quality.

### Robustness Tests

Thus far, we use the average historical turnover over the past three years as the benchmark to calculate abnormal turnover. In untabulated tests, we use historical turnover over the past year, past two years, and past five years as the alternative benchmark, and our main findings persist. Alternatively, we use the turnover of other Big 4 offices in the same MSA and year as another benchmark, and our results are robust to this alternative measure. Last, we use the raw value of turnover (*TURNOVER*) instead of abnormal turnover and the inferences remain unchanged.

Next, we use three alternative audit quality measures. The first one is signed discretionary accruals (*SIGNED\_DA*) following Aobdia (2019). As firms have a strong incentive to report higher earnings, higher values of *SIGNED\_DA* reflect lower audit quality. This measure is consistent with *REST\_DEC*, which captures auditors' failure to detect inflated earnings. The second measure captures whether a firm likely manipulates earnings to avoid a loss. We set *SMALL\_PROFIT* to 1 if ROA is between 0 and 0.03 and 0 otherwise (Francis and Yu 2009; Aobdia 2019). The tests using *SIGNED\_DA* and *SMALL\_PROFIT* are restricted to observations with nonmissing values in both variables. Our third proxy is auditors' failure to detect material weakness in internal controls over financial reporting (Rice and Weber 2012; Beardsley et al. 2021). We set *MISS\_MW* to 1 if the auditor fails to issue a material weakness audit opinion for internal control over financial reporting under SOX 404(b) and the client's current-year financial report is subsequently restated and 0 otherwise. The tests using *MISS\_MW* are restricted to only accelerated filers. The coefficients on *ABNTURNOVER* are positive and significant at the 5 percent level for all three models. Thus, our inferences remain unchanged using these alternative measures of audit quality.<sup>26</sup>

## VI. CONCLUSIONS

The audit profession is well known for its high turnover. Nevertheless, the impact of turnover on audit quality remains unclear. Turnover can undermine audit quality as it hinders the accumulation of industry- and client-specific knowledge, which are important factors for audit quality. To better assess audit quality, the PCAOB proposed the disclosure of auditor turnover, along with 27 other factors, as potential audit quality indicators. However, turnover facilitates the elimination of poor-performing auditors. Further, new auditors with fresh perspectives could identify previously overlooked issues. Hence, turnover may improve audit quality.

Using resumes collected from Indeed.com and LinkedIn.com, we compile a unique dataset of auditor turnover for U.S. Big 4 offices. We find that turnover has a detrimental impact on audit quality. This detrimental effect is primarily driven by the turnover of auditors with more valuable human capital and is more pronounced when audit offices face tighter human capital constraints. By analyzing the underlying reasons for turnover, we find that the impact of turnover weakens for turnover that is likely due to layoffs but intensifies for turnover potentially driven by voluntary auditor departures. The negative impact of turnover is mostly borne by complex clients and intangible-intensive clients but is eased for clients whose products offerings are more similar to those of other clients of the same audit office. Importantly, we find the impact of audit office turnover persists after controlling for audit firm turnover.

Our study provides office-level empirical evidence on the impact of auditor turnover on audit quality of Big 4 firms in the U.S. audit market. Our findings extend our knowledge of how auditor human capital affects audit quality. We primarily focus on how auditor turnover impacts audit quality due to the loss of human capital. Future research could explore how turnover impacts audit quality due to the disruption to the interaction and coordination among audit team members. Such research will deepen our understanding of the consequences of auditor turnover on audit quality. Last, our evidence is applicable only to the pre-COVID-19 pandemic period. Future research could explore whether the impact of individual auditor turnover on audit quality changes during the pandemic or postpandemic period when the shortage of accounting labor supply worsened.

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<sup>26</sup> As discussed earlier, we validate our sample coverage by benchmarking against the BOL auditor or professional headcount. We thus also examine whether the main results vary between office-years with and without BOL headcount. We set *NO\_BOL* to 1 if an office-year has no BOL headcount for auditor or professional staff and 0 otherwise. We then include *NO\_BOL* and the interaction *ABNTURNOVER* \* *NO\_BOL* in the regressions. We find no significant variation in the impact of turnover on audit quality between the two groups. Thus, our main results do not vary perceptibly with the presence of BOL headcount data.

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## APPENDIX A

### Variable Definitions

Variable Names	Definitions
<b>Test Variables</b>	
<i>TURNOVER</i>	Auditor turnover rate for the audit office. It equals the number of auditors who left the office by the end of year $t$ scaled by the total number of auditors in the same audit office at the beginning of year $t$ .
<i>ABNTURNOVER</i>	The abnormal turnover at the office level. It equals the office’s turnover for year $t$ minus the average turnover of the same office over the past three years (years $t-1$ to $t-3$ ).
<i>ABNTURNOVER_JUNIOR</i> ( <i>SENIOR</i> , <i>MANAGER</i> , <i>PARTNER</i> )	<i>ABNTURNOVER</i> for staff auditors (senior auditors, managers, and directors/partners). It is calculated as the number of staff auditors (senior auditors, managers directors/partners) who left the office by the end of the year scaled by the total number of auditors in the office at the beginning of the year, minus the average turnover of auditors with the same rank of the same office over the past three years (years $t-1$ to $t-3$ ).

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## APPENDIX A (continued)

Variable Names	Definitions
<i>ABNTURNOVER_BUSY (NONBUSY)</i>	<i>ABNTURNOVER</i> for auditor turnover during the busy (nonbusy) season. We label January through March as the busy season. Abnormal turnover during the busy (nonbusy) season equals the number of auditors who left the office during the busy (nonbusy) season of the year scaled by the total number of auditors in the office at the beginning of the year, minus the average busy (nonbusy) season turnover of the same office over the past three years (years $t-1$ to $t-3$ ).
<b>Dependent Variables</b>	
<i>REST_DEC</i>	Equals 1 if the current year's annual report has a subsequent income-decreasing restatement and 0 otherwise.
<i>REST</i>	Equals 1 if the current year's annual report has a subsequent restatement and 0 otherwise.
<b>Control Variables</b>	
<i>LOG_OFFICE_FEE</i>	Natural logarithm of total audit fee revenue of the audit office for the current year.
<i>EXPERT</i>	Equals 1 if the audit office is an expert in the client's industry at both the city level and the national level and 0 otherwise. An audit office is defined as a national (city) industry specialist if it has the largest annual market share of audit fees in an industry, based on the two-digit SIC category, and if its annual market share is at least 10 percentage points greater than its closest competitor in a national (city) audit market (Reichelt and Wang 2010).
<i>CLIENT_IMP_OFFICE</i>	Audit fees from the client divided by the total audit fees received by the same audit office from all clients in the same year.
<i>SHORT_TENURE</i>	Equals 1 if the client has employed the same auditor for three years or less and 0 otherwise.
<i>LONG_TENURE</i>	Equals 1 if the client has employed the same auditor for nine years or longer and 0 otherwise.
<i>LOG_CLIENTSIZE</i>	Natural logarithm of total book value of total assets of the audit client.
<i>SALES_GROWTH</i>	Percentage change in total sales of the client from year $t-1$ to $t$ .
<i>SALES_VOLATILITY</i>	Standard deviation of sales over lagged total assets from years $t-2$ through year $t$ .
<i>CFO_VOLATILITY</i>	Standard deviation of cash flow from operations over total assets from years $t-2$ through year $t$ .
<i>LOSS</i>	Equal to 1 if operating income after depreciation is negative and 0 otherwise.
<i>ROA</i>	Net income over total assets.
<i>LEVERAGE</i>	Total liabilities over total assets.
<i>MB</i>	Market value of equity over book value of equity.
<i>LOG_NBSEG</i>	Natural logarithm of the number of business segments of the client.
<i>MA</i>	Equals 1 if the client has an acquisition or merger during the current year and 0 otherwise.
<i>FINANCING</i>	Long-term debt issuances plus the sale of common and preferred stock divided by total assets.
<i>LOG_AGE</i>	Natural logarithm of the number of years the audit client is listed on Compustat.
<i>MW_302</i>	Equals 1 if the client discloses any material weakness in internal controls under SOX 302 and 0 otherwise.
<i>DECEMBER</i>	Equals 1 if the client has a December fiscal year-end and 0 otherwise.
<i>ACCTJOBS</i>	The ratio of accounting jobs per 1,000 jobs posted in the MSA of the audit office.
<i>POPCHG%</i>	The percentage change in population from the prior year in the MSA of the audit office.
<b>Moderating Variables</b>	
<i>OFFICE_CLOSENESS</i>	Normalized tercile rank of the geographic distance to the nearest audit office of the same audit firm. Observations in the bottom (middle, top) tercile of this distance measure take the value of 1 (0.5, 0).

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## APPENDIX A (continued)

Variable Names	Definitions
<i>LAYOFF</i>	Equals 1 if an audit office's employees comment on Glassdoor.com using any of the following keywords: "layoff," "downsize," or "job cut" and 0 otherwise.
<i>OUTSIDE_JOBS</i>	Normalized tercile rank of outside job opportunities for auditors in the office, measured as the natural logarithm of the number of nonaudit-related accounting jobs posted by nonclient employers in the same MSA of the office scaled by the total number of auditors in the same MSA. Observations in the top (middle, top) tercile of outside job opportunities take the value of 1 (0.5, 0).
<i>CLIENT_COMPLEXITY</i>	Normalized tercile rank of the composite measure of client complexity, measured based on aggregate tercile ranks of (1) the number of segments in which the client operates, (2) the magnitude of inventories and accounts receivable scaled by total assets, and (3) the number of subsidiaries. We obtain the number of business segments and geographic segments from the Compustat Segments database. Firms with missing values are treated as having a single segment. We calculate the number of subsidiaries using 10-K text disclosures following the method of <a href="#">García and Norli (2012)</a> . Observations in the top (middle, bottom) tercile of the composite complexity measure take the value of 1 (0.5, 0).
<i>INTANGIBLE_INTENSITY</i>	Normalized tercile ranks of firm's intangible intensity, equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank among all clients of the audit office for the year, where the intangible intensity is the capitalized R&D expenditures of the past three years (missing values replaced with 0), assuming a 15 percent yearly depreciation rate (following <a href="#">Aobdia et al. 2018</a> ), scaled by lagged total assets.
<i>PROD_SIMILARITY</i>	Normalized tercile ranks of the client's product similarity to other clients of the office-year. It equals 1 (0.5, 0) for observations in the top (middle, bottom) tercile rank of product similarity among all client firms of the audit office for the year, where product similarity is measured with the text-based network industry classifications (TNIC)-3 database obtained from the Hoberg-Phillips Data Library ( <a href="https://hobergphillips.tuck.dartmouth.edu/industryclass.htm">https://hobergphillips.tuck.dartmouth.edu/industryclass.htm</a> ).