Do Accounting Firms Benefit from Human Capital Investments? Evidence from Centralized Training Facilities

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Abstract: This study evaluates the impact of human capital investments by accounting firms, with a specific focus on Deloitte's establishment of Deloitte University (DU). Using a difference-in-differences research design, we find that audit quality improves for Deloitte clients after DU's launch, relative to other clients. We find similar improvements in client attraction and retention for Deloitte. Our analysis of employee Glassdoor reviews reveal a relatively increased favorability for Deloitte's training and development practices and increased organizational identification for Deloitte employees, providing direct evidence of DU's impact on Deloitte's human capital. We find similar audit quality and contracting results using Deloitte's establishment of another training campus in Canada (DU North) and KPMG's establishment of the Lakehouse as alternative empirical settings. Finally, we find a relative post-DU increase in Deloitte's firm-level consulting revenues, suggesting the impacts of DU extend beyond Deloitte's audit practice. In total, our results highlight the importance of human capital for accounting firms.

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1. Introduction

The competition for talent is intense in all industries. In response, companies are identifying innovative ways of attracting, developing, and retaining employees. For instance, Amazon has pledged over a billion dollars in "upskilling" opportunities for employees (Confino 2023). In similar vein, two of the largest accounting firms have made substantial investments in state-of-the-art employee training and development facilities in recent years. Specifically, Deloitte opened Deloitte University (DU) near Dallas, TX in 2011, which cost the firm approximately $300 million (Gingiss 2019). A few years later, KPMG invested $450 million in the KPMG Lakehouse (the Lakehouse)—its largest investment ever—which opened in 2020 near Orlando, FL (Quito 2020).[1] To put these investments into perspective, they are comparable to one year of expenditures for the Public Company Accounting Oversight Board (PCAOB) (Blann et al. 2023; PCAOB 2023).

In addition to centralizing many support operations and (potentially) saving costs, these facilities are meant to improve employee recruitment and retention efforts, foster collaboration, and provide opportunities for enhanced, centralized employee training. Given these investments were made by accounting firms, they provide a unique setting to attempt to understand the potential impacts of investments in human capital since we can use the quality of the audits provided by the accounting firms as measures of the quality of the work product produced by their human capital. This is our research question—do significant investments in human capital provide benefits to accounting firms?

To date, most accounting research on human capital focuses on benefits to public companies (e.g., Guo et al. 2016; Call et al. 2017). As Aobdia and Petacchi (2023, p. 1) note, human capital also represents "the most important asset of accounting firms." The market for

[1] After adjusting for inflation as of November 2023, DU cost approximately $420 million, and the Lakehouse cost approximately $535 million.

accounting talent within the U.S. is extremely competitive, so accounting firms' training and recruiting practices play an important role in developing employees and differentiating the accounting firms from competitors (Tokarsky 2023). Consistent with this, Deloitte and KPMG specifically point to their development facilities as means to improve their firms' operational effectiveness. Deloitte states that DU is "one of the most visible and important investments" the firm has made (Deloitte 2023a). The firm further suggests that DU's "collaborative environment brings [their] best thought leaders together, fosters conversation, and builds cutting-edge capabilities" and helps the firm build its talent pipeline (Deloitte 2023a). KPMG makes similar claims about its own facility. The Lakehouse is "the cornerstone of a strategic learning transformation at KPMG designed to ensure it will attract and retain the best talent, equip its professionals to help clients meet the challenges of a dynamic marketplace, and support innovation throughout the firm" (KPMG 2019). If, as the firms claim, their training facilities allow the firms to improve their staff training and recruitment efforts, compared to other firms, then we expect this to manifest into relative improvements in audit quality for the firms. Additionally, we expect the establishment of central training facilities to increase organizational identification (i.e., employee bonding and buy-in) among the firms' employees, which may also lead to relative improvements in the quality of audits provided.

Although the preceding discussion clearly suggests that Deloitte and KPMG believe the establishment of their respective facilities provides significant benefits in terms of employee development, there are reasons to question whether these investments translate into improved audit quality. In addition to the initial investment, these facilities operate at significant ongoing costs. It is possible that such large outlays on these facilities have led the firms to cut back on other quality-enhancing expenditures, such as investments in information technology, that could adversely

impact audit quality (e.g., Banker et al. 2002). Additionally, the other accounting firms routinely spend tens of millions of dollars on other forms of staff training events and employee enrichment activities. If other firms have kept pace, then DU and the Lakehouse may fail to yield detectable benefits. Finally, if the establishment of these facilities was just meant to attract clients or facilitate consulting projects, then we may not observe improvements in audit quality.

Our primary analyses focus on the launch of DU.[2] Because DU's opening only directly affected Deloitte and its clients, we address our research question using a difference-in-differences research design using clients of the other Big 4 firms as controls.[3] Additionally, because we can observe audit firm-client relationships and outcomes more cleanly than tax or consulting engagements, we focus our analyses on the audit market impacts of the opening of DU. We begin by examining whether there is a change in audit quality for Deloitte clients around the establishment of DU, relative to other Big 4 clients. We primarily rely on financial misstatements to capture audit quality (Christensen et al. 2016; Aobdia 2019). Consistent with an improvement in audit quality, our evidence suggests a decrease in misstatement rates for Deloitte clients after the opening of DU, relative to other Big 4 firms. Our estimates suggest that this decrease is economically meaningful; we find that misstatements decrease by over four percentage points (which corresponds to approximately a 43 percent reduction based on the sample misstatement

[2] We focus on DU rather than the Lakehouse because i) DU's establishment came first, offering a cleaner treatment setting, ii) the Lakehouse's establishment in 2020 was recent, which limits our ability to observe misstatements in its post-establishment period, iii) the Lakehouse's rollout was confounded by COVID-19, which led to the cancellation (or online administration) of most activities in its first two years, and iv) the usage of one event avoids the issues introduced by usage of a staggered difference-in-differences design (Barrios 2021; Baker et al. 2022). Nonetheless, as discussed in more detail below, we find consistent results when we consider the impacts of the establishment of the Lakehouse as part of our analyses.

[3] Although we acknowledge that, like most archival accounting studies, our treatment group is not as-if randomly assigned, this design choice maximizes comparability across our treatment and control groups since prior research suggests that Big 4 firms have similar resources and provide similar service quality (e.g., Hoopes et al. 2018). However, as we discuss below, our results are consistent if we include clients of all other firms in our control group.

rate) for Deloitte clients, relative to clients of other auditors. These results are consistent with the establishing firm meaningfully improving the effectiveness of its audit practices.

We next examine potential channels through which the establishment of this type of facility would positively impact audit quality. More specifically, we investigate whether DU's opening plausibly affected two aspects of Deloitte's human capital: training effectiveness and organizational identification. If DU allows Deloitte to develop talent more effectively and increases organizational identification, we expect to see noticeable changes in employee's perceptions of the firm. Using employee reviews from Glassdoor, we find that Deloitte employees experience relative increases in their perceptions of their firm's training and development practices. Additionally, we observe that the language in Deloitte employees' reviews are consistent with relatively higher organizational identification in the post-DU period. Finally, we find relative increases in benefits-specific and overall ratings for Deloitte employees after DU's establishment. Overall, these results suggest that DU's establishment impacted Deloitte's human capital by increasing the firm's training quality and organizational identification, which are likely channels through which audit quality improved for Deloitte's clients.

We also examine whether DU's establishment produced differences in auditor-client contracting decisions. If clients perceive Deloitte to be higher quality after DU's establishment, we expect relatively more clients to select Deloitte as their financial statement auditor. In addition, as discussed above, Deloitte markets DU as a facility where clients can receive training and enrichment, and where relationships between Deloitte employees and client employees can be fostered. This also suggests that Deloitte could be more likely to retain current clients and attract new clients after the opening of DU. We perform two analyses related to this logic. First, we find that, following the establishment of DU, existing Deloitte clients are significantly less likely to

switch to a new auditor relative to clients of other firms. Second, we find that, among non-Deloitte clients that do choose to switch auditors post-DU, these clients are significantly more likely to switch to Deloitte following DU's opening. Together, these results provide evidence that DU's establishment affected current and potential clients' contracting preferences.

We perform several additional analyses to reinforce the inferences from our primary audit market tests. First, we use "Big R" misstatements, abnormal discretionary accruals, just meeting earnings benchmarks, and PCAOB inspection findings as alternative audit quality proxies and find similar results to those from our main tests. Second, we re-estimate our primary analysis using the establishment of two other training facilities. We rely on Deloitte's 2017 establishment of DU North in Toronto and KPMG's 2020 establishment of the Lakehouse. Using both events, we find similar results to those using the opening of DU, which provides comfort that the impacts we observe are not limited to Deloitte clients or U.S.-based facilities. Third, although our primary research design includes audit firm fixed effects to hold time-invariant audit firm characteristics constant, we find similar results with the inclusion of client fixed effects. Finally, we consider clients of all non-Deloitte (instead of only the other Big 4) auditors as the control group and find similar results.

Our final analysis explores the impact of DU's establishment on Deloitte's consulting practice. In recent years, the Big 4 firms' consulting revenue has grown much more quickly than other areas of practice (e.g., Cowle et al. 2022), and Deloitte's consulting revenue represented almost 45 percent of the firm's total revenue in 2022 (Deloitte 2023b). While we are unable to observe consulting engagements directly, we are able to examine the firms' aggregate consulting revenues because the firms disclose this information. Using a difference-in-differences research design with accounting firm-year level data on consulting revenues, we find a larger increase in

Deloitte's consulting revenues (both in terms of level of consulting revenues and proportion of consulting to total revenues) after DU's establishment, relative to the other Big 4 firms. These results suggest that the benefits of DU's establishment extend beyond Deloitte's audit practice.

Our study adds to the growing human capital literature. Due at least partially to historically low unemployment rates and the Great Resignation, the competition for talent within the U.S. is at an all-time high (Feist 2023). In response, many notable companies have publicly announced major investments in human capital (e.g., Amazon), including investments in training facilities (e.g., American Airlines, Waste Management). Despite the increasing prevalence of these outlays, critics question the necessity and effectiveness of many human capital investments (Rossett 2012; Hoffman 2020). Prior academic research provides limited evidence on the impacts of these investments, likely due to a lack of measurable outcomes, a lack of information on the investments, and a lack of a counterfactual for statistical analyses. Our analyses focus on large human capital investments in an economically meaningful setting with publicly observable outcomes (e.g., audit failures). Because of the relatively homogenous nature of the Big 4 accounting firms (e.g., Hoopes et al. 2018), our setting also provides an appropriate counterfactual group for archival analyses. Accordingly, our evidence that human capital investments in training facilities are beneficial for accounting firms uniquely informs the debate on the effectiveness of such investments.

Our study should especially interest accounting practitioners and regulators given the importance of human capital in accounting (Aobdia and Petacchi 2023; Tokarsky 2023). Our results provide empirical evidence that accounting firms' investments in training and development facilities have been beneficial, which could help inform accounting firms seeking to assess the net benefits of these types of investments. This evidence is especially timely because Deloitte is currently considering an additional expansion to DU that is estimated to cost the firm another $100

million (Skores 2022), and the firm just announced its intentions to establish a new DU campus in Japan (Deloitte Tohmatsu 2023). Additionally, our findings could be informative to other accounting and financial services firms. These firms—the largest of which routinely spend dozens or hundreds of millions of dollars on employee training and development activities—could be considering similar investments. Our study also provides relevant evidence to audit regulators because these bodies are considering factors related to audit staff training as potential audit quality indicators (PCAOB 2022). Our results are broadly consistent with the notion that cross-firm differences in staff training opportunities translate to meaningful differences in audit quality.

Finally, this paper adds to a growing literature examining the operational decisions of public accounting firms. The papers most related to our study examine how accountants (especially auditors) learn within firms. Dierynck et al. (2023) review this literature and conclude that "future research could consider the effectiveness of different delivery methods for auditor training programs" (p. 7). Our study answers this call by examining firms' centralized training facilities. Our study also relates to research on other aspects of firms' operational decisions. For instance, recent evidence suggests the importance of office-level salary levels and diversity for audit personnel retention and audit quality (Hoopes et al. 2018; Condie et al. 2023). Additionally, other recent research examines the impact of audit office location, which represents another important operational decision. These studies find that audit quality increases with geographic proximity to entities including audit clients, large offices within the firm, the Securities and Exchange Commission, the PCAOB, and more talented labor market pools (Choi et al. 2012; DeFond et al. 2018; Beck et al. 2018; Beck et al 2019; Lee et al. 2022; Blann et al. 2023). Our findings contribute to this broader literature by providing evidence that decisions related to employee training and development meaningfully impact audit markets.

2. Background and Hypothesis

2.1 Background and Research on Human Capital

While not recorded on companies' balance sheets, many argue that successful companies' most valuable asset is human capital, or the collective knowledge and skills developed and held by the workforce. For example, a study conducted by consulting firm McKinsey suggests that the biggest determinant of positive ROI is talent (McKinsey 2011). Tesla's most recent sustainability report includes the statement "Our greatest asset is our people" (Tesla 2022, pg. 101). Further, a recent survey of CEOs revealed that "73 percent of CEOs say that a labor/skills shortage is the most likely external issue to disrupt their business in the next 12 months" and over 50 percent of CEOs say attracting and retaining talent are among their organization's biggest challenges (Lambert 2021). In response, 47 percent of CEOs state that they have recently increased employee training and development activities in their organization.

In accounting research, there is a growing interest in whether higher quality human capital translates to superior reporting outcomes, though much of this evidence relies on the inherent quality of a workforce or responses to corporate accounting failures. For instance, Call et al. (2017) examine whether companies with a more educated workforce produce superior disclosures. Using a variety of proxies derived from both mandated and voluntary disclosures (e.g., accruals quality, misstatements, forecast accuracy), the evidence suggests this is the case. In a similar vein, research suggests that firms experiencing internal control failures seek out accounting knowledge, either through specific skills job postings (Gao et al. 2023) or increases in internal audit hiring (Ege, et al. 2023a).

In addition to companies' human capital, other research considers whether attributes of accounting firm human capital that meaningfully contribute to audit quality. Using a setting similar

to Call et al. (2017) but instead focusing on auditors, Beck et al. (2018) suggest audit quality improves with the education level of the MSA in which the audit office is located. Contemporaneous work by Ham et al. (2023) suggests that audit offices targeting specific cognitive and social skills in hiring deliver superior audit quality, and Ege et al. (2023b) suggest that audit quality suffers in areas where experienced auditors are likely to be hired away during busy season.

A common thread in this research is that it generally focuses on employee characteristics that are effectively fixed at the time of hiring (e.g., education, skills). In contrast, we study whether investments in facilities meant to improve the quality of accounting firms' workforces translate to benefits to clients. This question is analogous to the classic "returns to schooling" question in economics (e.g., Weisbrod 1962; Johnson 1970; Angrist and Krueger 1991). In essence, this research asks whether superior education and development translates into economic benefits for individuals. The literature studying this question is vast and inferences depend heavily on the population studied and type of education. For instance, increases in early childhood education appear to translate to greater career earnings (e.g., Jenkins et al. 2020). At the other end of the spectrum, Barrios (2022) suggests that the 150-hour rule does little to improve the quality of licensed accountants (though it does restrict the supply). Examining another group of financial professionals, De Franco and Zhou (2009) provide mixed evidence on the benefits of Chartered Financial Analyst training for sell-side equity analysts.

For the same reasons that quantifying returns to schooling is challenging, measuring whether investing in a workforce garners significant benefits for employers is challenging. For one, the firms most able to make these investments tend to be performing well already and likely attract high quality individuals. Additionally, data on specific development efforts is sparse.

Companies' Sustainability Reports may mention initiatives that reflect a commitment to bettering their workforce (see, for example, pg. 38 of Home Depot (2023)), but much of this information is subjective, difficult to verify, and hard to link to specific company outcomes.[4] Investments in employee development by Big 4 accounting firms, however, overcome several of these challenges. First, investments like DU and the Lakehouse were widely publicized and opened on specific dates. Second, prior research suggests that the Big 4 accounting firms generally offer very similar services and quality, allowing for reasonable counterfactuals (e.g., Hoopes et al. 2018). Third, accounting firms' relationships with audit clients are observable, and the presence of observable audit outcomes (e.g., audit failures) allows us to evaluate whether investments in human capital translate to enhancements in audit quality.

2.2 Background and Research on Accounting Firms' Training Practices

Although archival research on accounting firm human capital is relatively scarce, several experimental and qualitative studies examine training and development for accounting firm employees.[5] Although much of this research focuses on on-the-job learning, we next discuss the existing studies with a particular focus on off-the-job training (e.g., firm-wide group training programs that would occur at centralized training facilities).

Experimental evidence suggests that the design of auditors' training programs impacts training effectiveness. Bonner and Walker (1994) suggest that explanatory feedback is necessary for procedural training to be effective. Additionally, self-explanation increases learning from problem solving (Moreno et al. 2007), and combining explanatory feedback and self-explanation leads to more effective learning in general (Earley 2001). For inexperienced auditors, pre-training

[4] As noted earlier, Amazon has publicly committed to spending over $1.2 billion in "upskilling" its workforce. However, little is known about the timing of these investments, and even if timing were known, it is difficult to identify a clean counterfactual to evaluate the impact of these investments.
[5] See Dierynck et al. (2023) for a complete review of this literature.

category knowledge and existing knowledge structures facilitate learning (Bonner et al. 1997; Borthick et al. 2006). Finally, Plumlee et al. (2015) suggest that auditors benefit from training in divergent thinking (alone and combined with convergent thinking).

Westermann et al. (2015) survey Big 4 audit partners to provide insights into learning within audit firms. When asked about the formal training practices (e.g., new hire training) at their firm, the partners emphasized several prevailing themes. First, firms are increasingly emphasizing non-technical "soft" skills (e.g., teambuilding) in formal training sessions. This focus likely relates to the importance of client relations for auditors and the "commercialization" of audit firms (Malsh and Gendron 2013; Westermann et al. 2015). Second, relative to former regimes, formalized training programs are much shorter in recent years (e.g., one week) compared to decades ago (e.g., three weeks). One partner remarked that training is now "fundamentally different" than the "boot camp" previous cohorts endured (Westermann et al. 2015, p. 874). Finally, technological advances have fundamentally changed auditor training practices. Perhaps unsurprisingly, the firms are offering more trainings in an online-only format.

2.3 Hypothesis Development

There are at least two, non-mutually exclusive, reasons to expect DU's establishment to impact Deloitte's audit quality. First, Deloitte's investment in DU likely allows the firm to attract, retain, and develop its human capital more effectively (Deloitte 2023a). Given the importance of human capital for accounting firms (Aobdia and Petacchi 2023), we expect better human capital to translate into better audit outcomes for Deloitte's clients.

Second, we expect DU's establishment to increase organizational identification among Deloitte's employees. Organizational identification is "the degree to which a member defines him- or herself by the same attributes that he or she believes define the organization" (Dutton et al.

1994, p. 239). Employees identify strongly with organizations that have unique characteristics (Dutton et al. 1994; Bartel 2001), so Deloitte's establishment of DU, which preceded any similar investment by other Big 4 firms, likely increased their employees' organizational identification.[6] Importantly, the impact of organizational identification on individuals depends on the salience of the identity (e.g., Haslam et al. 2000; van Knippenberg 2000). In other words, workers buy into the organizational norms and expectations as they are reminded of the organization's identity through cues and events. In our setting, we expect Deloitte's identity to be especially salient after the firm established DU given the widespread media attention (e.g., Gingiss 2019) and Deloitte's own promotion of the facility (e.g., Deloitte 2023a). Moreover, the facility itself features prominent firm branding and a "swag store," suggesting that Deloitte staffers likely experience a renewed sense of organizational identification after experiencing a training program at DU, relative to, for instance, staff completing a training program at a hotel conference center. Given the importance of teamwork on audit engagements and the well-established relation between organizational identification and employee performance (e.g., Lin et al. 2017), we expect that increased organizational identification from DU's establishment will lead to better performance for Deloitte employees. This reasoning, along with our supposition that DU improves Deloitte's hiring and training practices, leads us to our primary hypothesis:

Hypothesis: Following the opening of DU, Deloitte clients experienced improvements in audit quality relative to changes in audit quality for other Big 4 clients.

As noted above, our main tests focus on DU given it was first and provides a reasonable time series both before after its opening. However, in additional analyses we also consider other facilities.

[6] Arthur Andersen established a training facility in the 1970s, but this facility ceased to host Arthur Andersen trainings in 2002 when the firm collapsed (Q Center 2023). As such, we expect that Deloitte employees viewed DU as unique within the Big 4.

While we predict a positive impact for Deloitte clients following the opening of DU, there are several reasons to suspect this may not happen. First, if Deloitte reduced other quality-enhancing expenditures to fund DU, we may not observe audit quality improvements for Deloitte clients. Similarly, if other firms have kept pace with Deloitte by making other human capital investments, we may fail to observe a relative improvement in quality for Deloitte clients. Finally, if DU primarily serves as a marketing ploy to attract and retain *clients* rather than employees or as a venue for enhancing the firm's consulting offerings, it is unlikely that we will observe benefits from DU in the firm's audit practice.[7]

3. Research Design and Sample

3.1 Research Methodology

To examine the audit quality impacts of DU establishment, we estimate the following equation using ordinary least squares (OLS) regression:[8]

$$Misstate = \beta_0 + \beta_1 DeloittePost + \beta_N Controls + Auditor\ Fixed\ Effects + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon. \quad (1)$$

The variable of interest in Equation (1) is *DeloittePost*, which is an indicator variable equal to one for Deloitte clients after DU establishment in 2011, and zero otherwise. The dependent variable is *Misstate*, which is an indicator variable equal to one if the client's current financial statements are subsequently restated, and zero otherwise. We rely on financial statement misstatements to capture audit quality because prior research indicates that investors and auditors

[7] We suspect that the opening of DU did affect the composition of DU's audit client portfolio. As discussed below, we evaluate whether any change in audit quality is driven by shifts in composition versus improvements for clients of Deloitte prior to DU's opening.

[8] We use OLS because it allows for a direct interpretation and comparison of average treatment effects (Wooldridge 2010), and non-linear models face potential complications when using fixed effects (e.g., the incidental parameters problem (Greene 2004)). However, our inferences are unchanged if we instead use logistic regression (untabulated).

view misstatements as appropriate signals of low audit quality (Christensen et al. 2016) and that misstatements correlate with PCAOB inspection findings (Aobdia 2019).[9]

Our model is a difference-in-differences estimation, with *DeloittePost* as the difference-in-differences estimator; the "main effects," *Deloitte* and *Post*, are absorbed by the auditor and year fixed effects, respectively (Bertrand et al. 2004). More specifically, the coefficient on *DeloittePost* estimates the differential change in audit quality for Deloitte clients, relative to other clients, after DU establishment. Importantly, the inclusion of auditor fixed effects ensures that any results are not attributable to time invariant differences across audit firms. Additionally, the inclusion of industry fixed effects and year fixed effects should ensure that any results are not driven by time invariant differences across client industries or overall time trends across years. We include several additional control variables for potentially confounding factors. Specifically, we control for company size (*Assets*), growth (*AssetGrowth*, *MTB*), cash holdings (*Cash*), leverage (*Leverage*), and the ratio of inventory and receivables to total assets (*InvRec*). We also control for cash flows from operations (*CashFlowOps*), performance (*Loss*, *ROA*), external financing activity (*ExFinance*), merger and acquisition activity (*M&A*), and whether the company's fiscal year ends in December (*DecFYE*). We winsorize all continuous variables at the 1st and 99th percentiles and cluster standard errors by company.[10]

3.2 Sample Selection

Table 1 presents the sample selection procedure for this study. We begin with all observations at the intersection of Compustat and Audit Analytics for fiscal years 2006 through 2016, with 2011 excluded. We choose this sample period to surround the opening of DU in 2011,

[9] We find similar results using alternative audit quality proxies. We discuss these results in section 4.5.
[10] Our inferences are similar if we instead cluster standard errors by auditor (untabulated).

which thus provides balanced pre- and post-DU samples.[11] We exclude observations in 2011 to ensure clean pre- and post-DU samples. This sample period also allows us to avoid two major shocks to the auditing profession: i) the Sarbanes-Oxley Act, which established the PCAOB (among other changes), and ii) the COVID-19 pandemic, which altered the operational execution of audits. We limit the sample to observations with Big 4 auditors, making non-Deloitte Big 4 auditors our control in our main analyses. We make this choice given the substantial differences between Big 4 and non-Big 4 firms' training and recruiting processes.[12] After removing observations with missing data needed to construct our variables and observations with less than one million dollars in total assets (e.g., Lamoreaux et al. 2020), our primary sample consists of 29,646 company-year observations.

4. Empirical Results

4.1 Descriptive Statistics

Table 2 presents the descriptive statistics for our primary sample of observations. As indicated by the mean value of *DeloittePost*, 10.6 percent of the sample represents Deloitte observations after the opening of DU. The mean misstatement rate in the sample is 9.6 percent (*Misstate*), which is consistent with other studies using a similar sample period (e.g., Beck et al. 2019), and the distributions of the remaining variables are also consistent with expectations.

4.2 Main Audit Quality Results

Table 3 presents the results of estimating several specifications of Equation (1). In column (1), we estimate Equation (1) with the inclusion of only *DeloittePost* and year, auditor, and industry fixed effects. In column (2), we include the additional control variables described in section 3.1.

[11] We find consistent results using several different sample formations, including using several more confined sample periods surrounding the opening of DU (e.g., 2007-2015, 2008-2014, 2009-2013).
[12] We find similar results retaining all non-Deloitte observations as the control group in a supplemental analysis. We discuss these results in section 4.5.

While, as discussed earlier, the inclusion of year and auditor fixed effects in our primary specification of Equation (1) subsumes the traditional difference-in-differences "main effects" (e.g., *Deloitte* and *Post*) we estimate alternative specifications of the model in columns (3) and (4) where we include *Deloitte* and *Post* and remove year and auditor fixed effects.

As shown, the coefficient on *DeloittePost* is negative and significant in each specification ($p < 0.01$). These results provide support for H1 and suggest that, relative to clients of other Big 4 audit firms, Deloitte's clients experienced higher audit quality on average following the opening of DU. This effect is also economically meaningful. The coefficient of –0.0408 in the full Equation (1) specification in column (2) indicates approximately a 4.1 percentage point lower likelihood of misstatement for Deloitte clients post-DU, which represents approximately 42.7 percent of the sample mean of *Misstate*.[13] Additionally, the positive and significant coefficients on *Deloitte* and *Post* in columns (3) and (4) suggest that audit quality was relatively lower for Deloitte's clients (relative to non-Deloitte clients) in the pre-DU period and that audit quality for non-Deloitte clients was relatively lower in the post-DU period (relative to the pre-DU period).[14]

4.3 Mechanisms for Audit Quality Improvement

Next, we consider mechanisms for the observed audit quality improvements for Deloitte's clients following the opening of DU. Specifically, we examine differences in employee reviews for Deloitte employees relative to other Big 4 employees pre- vs. post-DU. To do this, we collect data from reviews posted on Glassdoor by employees of the Big 4 firms. Glassdoor is perhaps the most popular employee review website, and usage of its data is becoming increasingly prevalent in accounting research (e.g., Hales et al. 2018; Dube and Zhu 2021; Lee et al. 2021; deHaan et al.

[13] Logistic estimates yield a similar effect size. Specifically, the treatment effect corresponds to a decrease in misstatement likelihood of approximately 39 percent in these estimates (untabulated).
[14] In untabulated analyses, we evaluate whether any change in audit quality is driven by shifts in composition versus improvements for clients of Deloitte prior to DU's opening and find evidence of both effects.

2023). The sample for these tests begins in 2008, the year Glassdoor reviews begin (Dube and Zhu 2021). The unit of observation for these tests is the accounting firm-year level (with Glassdoor-related variables averaged within the accounting firm-year). Like our client-year-level analyses, we exclude the year of DU establishment (2011). Additionally, to increase the statistical power of these tests, we extend the sample period to 2018, which results in a sample of 40 observations.[15]

As discussed in section 2.3, our prediction that DU's establishment leads to improved audit quality is because we expect DU to i) improve Deloitte's hiring and training effectiveness and ii) increase organizational identification among Deloitte employees. We construct outcome variables based on the Glassdoor employee reviews data to provide insights into these (non-mutually exclusive) mechanisms. First, we define *TrainingDevel* as the accounting firm-year average of an indicator equal to one (negative one) [zero] for observations where the employee discussed training or development as a "pro" ("con") ["pro" and a "con"] of working for the firm, and zero otherwise. In other words, this measure is increasing in employees' satisfaction in their firm's training and development practices, which is meant to capture firm-level training effectiveness. Our second Glassdoor variable follows related research (e.g., Abernethy et al. 2019) and captures the extent to which employees use "we" and its variants in their reviews because employees with high organizational identification use these words more often to refer to their organization (Boivie et al. 2011; Abernethy et al. 2019). Specifically, we define *WeWords* as the accounting firm-year average of an indicator equal to one for observations where the employee uses the word "we," "us," "our," "ours," or "ourselves" in the discussion of "pros" or "cons" of the firm, and zero otherwise. Our third and fourth proxies do not necessarily distinguish between the training effectiveness and organizational identification explanations, but we examine them to provide

[15] The results of our tests are similar if we exclude 2017 and 2018 (untabulated).

further insights into the broader impacts of DU on Deloitte's human capital. Third, we define *CompBenefitsRating* as the accounting firm-year-level average of an employee's rating of the firm's compensation and benefits (from 1 to 5, with 5 indicating the highest level of satisfaction). Given that DU is often marketed to employees as a benefit of working at Deloitte relative to working at the other firms, we expect potential differences in employees' perceptions in this category pre- vs. post-DU. Fourth, we define *OverallRating* as the accounting firm-year-level average of an employee's overall rating of the firm (from 1 to 5, with 5 indicating the highest level of satisfaction). If Deloitte's increased training effectiveness, organizational identify, benefits quality, and overall quality partially explain the observed improvements in audit quality post-DU, then we would expect to observe relatively higher values for *TrainingDevel*, *WeWords*, *CompBenefitsRating*, and *OverallRating* for Deloitte employees in the post-DU period.

To test this, we estimate the following OLS regression:

$$Outcome = \beta_0 + \beta_1 DeloittePost + Auditor\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon. \quad (2)$$

Because this analysis is at the accounting firm level, *DeloittePost* equals one for reviews of Deloitte employees after 2011, and zero otherwise. *Outcome* equals one of the four outcome variables described above. We regress each outcome on *DeloittePost*, year fixed effects, and auditor fixed effects. Similar to Equation (1), the inclusion of year and auditor fixed effects means that *DeloittePost* again is the difference-in-differences estimator, and thus captures any relative difference between Deloitte and non-Deloitte employee reviews in the pre- and post-DU periods. The results of these estimations are presented in Table 4. Consistent with expectations, the coefficients on *DeloittePost* in columns (1) through (4) are positive and significant. Overall, these results suggest that Deloitte employees' organizational identification and impression of training and benefits increased more post-DU relative to employees of the other Big 4 firms. This evidence

is consistent with the view that DU's establishment impacted Deloitte's training effectiveness and organizational identification, which are likely channels through which audit quality improved for Deloitte's clients in the post-DU period.

4.4 Auditor-Client Contracting Effects

Another plausible outcome of DU's establishment is differences in auditor-client contracting decisions. We expect the opening of DU to influence auditor-client contracting for two primary reasons. First, supported by the evidence from our primary audit quality tests, any improvements in audit quality provided by Deloitte following the establishment of DU could help Deloitte retain existing clients and attract new clients. Second, Deloitte markets DU directly to current and prospective clients as a place for these companies to receive training and engage in enriching activities and as a venue where relationships can be fostered between Deloitte employees and these companies' employees. Based on these two reasons, we expect that following the opening of DU: i) existing Deloitte clients are significantly less likely to switch to a new auditor relative to clients of other firms and ii) among non-Deloitte clients that do choose to switch auditors post-DU, these clients are significantly more likely to switch to Deloitte.

We perform two tests to assess the potential auditor-client contracting effects of DU's opening. First, we estimate a difference-in-differences analysis using a modified form of Equation (1) where we replace the dependent variable with an indicator for subsequent-year auditor switches ($Switch_{t+1}$). If Deloitte is better able to retain clients post-DU relative to other audit firms, we would expect a negative coefficient on *DeloittePost*. Second, we perform an alternative analysis where we limit the sample to observations where there is auditor switch (i.e., where $Switch_{t+1} = 1$) and we test whether switching clients are more likely to subsequently contract with Deloitte in the post-DU period. Specifically, we define an indicator for switches to Deloitte ($SwitchToDeloitte_{t+1}$)

as the dependent variable, and the test variable is an indicator for post-2011 observations (*Post*). If Deloitte is better able to attract new clients after the opening of DU, we expect the coefficient on *Post* to be positive.

The results of each of these estimations are presented in Table 5. As shown, each result is consistent with expectations. Specifically, the coefficient on *DeloittePost* in column (1) is negative and significant ($p < 0.05$), and the coefficient on *Post* in column (2) is positive and significant ($p < 0.05$). Economically, the coefficient estimate of 0.0142 in column (1) indicates a relative decrease in auditor switching for Deloitte clients of approximately 1.4 percentage points post-DU, which represents approximately 32.3 percent of the sample mean of $Switch_{t+1}$ (0.044, untabulated).[16] Together, these results provide evidence that, after the establishment of DU, Deloitte is better able to retain existing clients and attract new clients relative to the other Big 4 firms.

4.5 Additional Analyses and Robustness Tests

4.5.1 Alternative Audit Quality Proxies

Next, we perform several additional analyses and robustness tests to strengthen our primary inferences. First, we consider four alternative audit quality proxies and re-estimate Equations (1) and (2) using these alternative proxies. Specifically, we consider three client-level audit quality proxies: i) only "Big R" restatements (*MisstateBig*), ii) abnormal accruals (*AbnAccruals*), and iii) just meeting the zero earnings threshold (*SmallProfit*) (e.g., Aobdia 2019) and one audit firm-level audit quality proxy: PCAOB inspection deficiencies (*Deficiencies*). The results of these estimations are presented in Table 6. As shown and consistent with the main results, the coefficient

[16] A logistic estimate yields a similar effect size. Specifically, the treatment effect corresponds to a decrease in switching likelihood of approximately 30 percent in this estimate (untabulated).

on *DeloittePost* is negative and significant in each test ($p < 0.01$ in columns (1) and (4); $p < 0.10$ in columns (2) and (3)).

4.5.2 Alternative Settings

Second, we consider two alternative settings beyond the opening of DU: i) the opening of KPMG's Lakehouse in 2020 and ii) the opening of DU North in Toronto, Canada in 2017. We expect to observe similar effects surrounding the openings of these additional facilities as we observed surrounding the opening of DU in 2011. First, to test the effects of the opening of KPMG's Lakehouse, we form a new sample covering years 2018 through 2021, with 2020 excluded as this was the year the Lakehouse opened. We end the sample in 2021 to ensure adequate time to observe misstatements and auditor switches. We also exclude Deloitte clients from the sample to ensure a clean control group (i.e., the control group includes observations where the auditor never had access to a training/development facility). Second, to test the effects of Deloitte's establishment of DU North in Canada, we form a new sample of Canadian companies listed in the U.S. covering years 2015 through 2019, with 2017 excluded as this was the year DU North opened.

Using each of these alternative samples, we then re-estimate our primary audit quality and auditor-client contracting tests. The results of these tests are reported in Table 7, with the Lakehouse tests reported in columns (1) and (2) and the DU North tests reported in columns (3) and (4). As shown, the results are all directionally consistent with our main results, and three of the four effects (including both audit quality results) are statistically significant.[17] Collectively, these results provide additional evidence supporting our primary inferences.

[17] Given that the KPMG tests rely on a single post-Lakehouse year, it is not necessarily surprising that we fail to observe a significant effect in column (2). This data constraint related to the opening of the Lakehouse was one of the primary reasons we focused on the U.S. opening of DU in our primary tests.

4.5.3 Additional Robustness Tests

We also consider two additional robustness tests. First, to control for any potential company-specific, time-invariant factors that could influence our relations of interest, we re-estimate our two main tests after include company fixed effects. Second, to ensure that our main results are not driven by our choice of control group, we re-estimate the two main tests after including non-Big 4 observations. The results of these robustness tests are presented in Table 8, with the company fixed effects tests reported in columns (1) and (2) and the tests with all non-Deloitte auditor observations as the control group reported in columns (3) and (4). As shown, the results are all directionally consistent with our main results, and three of the four effects (including both audit quality results) are statistically significant. Together, these results provide additional support for our main inferences related to the effects of DU's opening on audit quality and auditor-client contracting.

4.5.4 Consulting Revenues

Finally, we consider another potential impact of DU on Deloitte's operations. Specifically, we consider whether DU's establishment positively impacted Deloitte's consulting/advisory practice relative to other Big 4 firms. Recent academic research indicates that Big 4 firms' consulting revenues have grown much more quickly in recent years compared to other practice areas (e.g., Cowle et al. 2022), and aggregate consulting revenues now make up the largest proportion of these firms' total revenues (e.g., Deloitte 2023b). While we are unable to observe revenue earned from specific consulting engagements, we are able to examine differences across firms and time in aggregate annual consulting revenues. Thus, in our final analysis, we examine whether Deloitte's annual consulting revenues are relatively higher post-DU compared to annual consulting revenues of the other Big 4 firms.

To do this, we collect accounting firm-reported annual consulting revenues and total revenues from 2006 through 2016 (excluding 2011) for each of the Big 4 firms. We then use this sample to re-estimate Equation (2). Specifically, we separately regress i) aggregate consulting revenues (in $Billions) (*Consulting Revenues*) and ii) the ratio of consulting revenues to total revenues (*Consulting Rev / Total Rev*) on *DeloittePost*, year fixed effects, and accounting firm fixed effects. The coefficient on *DeloittePost* is the difference-in-differences estimator, similar to our main research design. The results of these estimations are reported in Table 9, with column (1) reporting the results using *Consulting Revenues* as the dependent variable and column (2) reporting the results using *Consulting Rev / Total Rev* as the dependent variable. As shown, the coefficient on *DeloittePost* in each test is positive and significant. These results suggest that, following the opening of DU, the level and proportion of Deloitte's consulting revenues were relatively higher than that of the other Big 4 firms. More broadly, these results provide evidence that the establishment of DU had impacts beyond Deloitte's audit practice.

5. Conclusion

Motivated by the growing importance of human capital in capital markets and the intense competition for talent among accountants, we rely on the establishment of DU to evaluate the impacts of accounting firms' investments in human capital. We find that establishment of DU leads to increased audit quality and stronger client contracting for Deloitte. These results, along with our Glassdoor review analysis, support the notion that Deloitte's investment in DU improved human capital for the firm's employees. Additionally, our evidence involving Deloitte's consulting revenues and the opening of DU North and the KPMG Lakehouse supports the generalizability of our inferences. Our study is one of the first large-sample archival analyses of the impacts of human capital investments, especially within accounting academia. As such, our evidence informs

practitioners, regulators, and other stakeholders interested in these investments, especially as Deloitte considers an expansion of its U.S. facility and the establishment of a new training facility in Japan.

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Appendix A: Variable Definitions

Variable	Definition
AbnAccruals	The absolute value of the company's discretionary accruals, calculated according to the Modified Jones Model (Dechow et al. 1995).
Assets	The natural logarithm of the company's total assets.
AssetGrowth	Year-over-year percentage growth in the company's total assets.
Cash	The company's cash and cash equivalents scaled by the company's total assets.
CashFlowOps	The company's cash flow from operations scaled by the company's total assets.
CompBenefitsRating	The accounting firm-year-level average of an employee's rating of the firm's compensation and benefits (from 1 to 5, with 5 indicating the highest level of satisfaction.
Consulting Revenues	The accounting firm's total consulting revenue.
Consulting Rev / Total Rev	The accounting firm's total consulting revenue divided by the accounting firm's total revenue.
DecFYE	Indicator variable equal to one if the company's fiscal year ends in December, and zero otherwise.
Deloitte	Indicator variable equal to one for Deloitte clients, and zero otherwise.
DeloittePost	Indicator variable equal to one for Deloitte clients after 2011, and zero otherwise.
Deficiencies	The number of Part I PCAOB deficiencies for the audit firm in the year.
ExFinance	The sum of the company's new long-term debt, common stock, and preferred stock issuances scaled by the company's total assets.
Inv&Rec	The sum of the company's accounts receivable and inventory scaled by the company's total assets.
KPMGPost	Indicator variable equal to one for KPMG clients after 2020, and zero otherwise.
Leverage	The company's total debt divided by the company's total assets.
Loss	Indicator variable equal to one if the company reports a loss during the year, and zero otherwise.

M&A	Indicator variable equal to one if the company reports merger and acquisition activity, and zero otherwise.
Misstate	Indicator variable equal to one if the company's current fiscal year financial statements are subsequently restated, and zero otherwise.
MisstateBig	Indicator variable equal to one if the company's current fiscal year financial statements are subsequently restated in an 8-K Item 4.02 filing, and zero otherwise.
MTB	The company's market value of equity divided by book value of equity.
Post	Indicator variable equal to one for clients after 2011, and zero otherwise.
ROA	The company's return on assets, defined as net income before extraordinary items divided by average total assets.
SmallProfit	Indicator variable equal to one if the company reports income before extraordinary items (divided by total assets) between zero and three percent, and zero otherwise.
$Switch_{t+1}$	Indicator variable equal to one if the company changes auditors in the next fiscal year, and zero otherwise.
$SwitchtoDeloitte_{t+1}$	Indicator variable equal to one if the company changes auditors in the next fiscal year, and zero otherwise.
TrainingDevel	The accounting firm-year average of an indicator equal to one (negative one) [zero] for observations where the employee discussed training or development as a "pro" ("con") ["pro" and a "con"] of working for the firm, and zero otherwise.
WeWords	The accounting firm-year average of an indicator equal to one for observations where the employee uses the word "we," "us," "our," "ours," or "ourselves" in the discussion of "pros" or "cons" of the firm, and zero otherwise

Table 1: Sample Selection

This table outlines the sample selection process for the primary tests.

	Observations
Intersection of Compustat and Audit Analytics for years 2006-2016 (2011 excluded)	67,313
Less:	
Observations with non-Big 4 auditors	(24,612)
Observations with missing data necessary to create our test variables	(13,033)
Remaining observations with less than $1 million in total assets	(22)
Total observations meeting primary sample criteria	29,646

Table 2: Descriptive Statistics

This table presents descriptive statistics for the primary sample. All variables are defined in Appendix A.

Variable	N	Mean	Std. Dev.	p(25)	Median	p(75)
Misstate	29,646	0.096	0.294	0.000	0.000	0.000
DeloittePost	29,646	0.106	0.308	0.000	0.000	0.000
Assets	29,646	7.289	2.037	5.882	7.270	8.601
AssetGrowth	29,646	0.186	0.753	-0.033	0.050	0.173
Cash	29,646	0.200	0.231	0.037	0.107	0.272
CashFlowOps	29,646	0.042	0.223	0.020	0.071	0.123
DecFYE	29,646	0.783	0.412	1.000	1.000	1.000
ExFinance	29,646	0.197	0.366	0.007	0.055	0.224
InvRec	29,646	0.228	0.202	0.067	0.174	0.327
Leverage	29,646	0.566	0.331	0.363	0.551	0.730
Loss	29,646	0.293	0.455	0.000	0.000	1.000
M&A	29,646	0.406	0.491	0.000	0.000	1.000
MTB	29,646	2.776	7.539	1.100	1.866	3.332
ROA	29,646	-0.018	0.252	-0.013	0.028	0.070

Table 3: Audit Quality Tests

This table presents the results of OLS estimations of Equation (1). All variables are defined in Appendix A. Auditor, industry, and year specific intercepts are excluded for brevity. Cluster (company) robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	(1)	(2)	(3)	(4)
	DV: *Misstate*			
DeloittePost	***-0.0421******	***-0.0408******	***-0.0421******	***-0.0408******
	(-3.745)	***(-3.639)***	***(-3.743)***	***(-3.629)***
Deloitte			0.0168*	0.0153*
			(1.944)	(1.771)
Post			0.0186***	0.0183***
			(3.364)	(3.302)
Assets		-0.0025		-0.0016
		(-1.513)		(-0.945)
AssetGrowth		0.0004		0.0009
		(0.156)		(0.345)
Cash		-0.0834***		-0.0809***
		(-5.265)		(-5.099)
CashFlowOps		-0.0044		-0.0055
		(-0.433)		(-0.533)
DecFYE		-0.0069		-0.0065
		(-0.976)		(-0.902)
ExFinance		0.0104		0.0096
		(1.583)		(1.440)
InvRec		-0.0130		-0.0151
		(-0.569)		(-0.661)
Leverage		0.0202**		0.0191**
		(2.350)		(2.241)
Loss		0.0219***		0.0202***
		(3.739)		(3.482)
M&A		0.0054		0.0041
		(1.062)		(0.801)
MTB		0.0000		0.0000
		(0.110)		(0.090)
ROA		0.0227***		0.0257***
		(2.627)		(2.959)
Observations	29,646	29,646	29,646	29,646
Adj. R-squared	0.016	0.020	0.007	0.010
Year FE	Yes	Yes	No	No
Auditor FE	Yes	Yes	No	No
Industry FE	Yes	Yes	Yes	Yes

Table 4: Employee Satisfaction Tests

This table presents the results of OLS estimations of modified versions of Equation (2). *TrainingDevel* is the dependent variable in column (1), *WeWords* is the dependent variable in column (2), *CompBenefitsRating* is the dependent variable in column (3), and *OverallRating* is the dependent variable in column (4). Auditor and year specific intercepts are excluded for brevity. All variables are defined in Appendix A. Robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	(1)	(2)	(3)	(4)
Dependent Variable:	*TrainingDevel*	*WeWords*	*CompBenefits Rating*	*OverallRating*
DeloittePost	***0.0477****	***0.0002****	***0.1085****	***0.0812****
	(2.072)	***(1.789)***	***(2.038)***	***(1.736)***
Observations	40	40	40	40
Adj. R-squared	0.508	0.358	0.808	0.885
Year FE	Yes	Yes	Yes	Yes
Auditor FE	Yes	Yes	Yes	Yes

Table 5: Auditor-Client Contracting Tests

This table presents the results of OLS estimations of modified forms of Equation (1). $Switch_{t+1}$ is the dependent variable in column (1), and $SwitchToDeloitte_{t+1}$ is the dependent variable in column (2). *Post* replaces *DeloittePost* in column (2). The sample in column (2) is limited to the sample of observations where there is an auditor switch (i.e., where $Switch_{t+1} = 1$) for a non-Deloitte client. All variables are defined in Appendix A. Auditor, industry, and year specific intercepts are excluded for brevity. Cluster (company) robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	(1)	(2)
Dependent Variable:	$Switch_{t+1}$	$SwitchTo\ Deloitte_{t+1}$
DeloittePost	***-0.0142****	
	(-2.427)	
Post		***0.1333****
		(2.268)
Assets	-0.0101***	0.0215***
	(-11.668)	(2.631)
AssetGrowth	-0.0006	-0.0130
	(-0.290)	(-1.183)
Cash	-0.0376***	0.0918
	(-4.580)	(1.395)
CashFlowOps	-0.0199	0.0170
	(-1.566)	(0.561)
DecFYE	-0.0039	0.0350
	(-1.214)	(1.168)
ExFinance	-0.0044	0.0195
	(-0.999)	(0.613)
InvRec	0.0150	0.0793
	(1.575)	(0.868)
Leverage	-0.0018	0.0008
	(-0.350)	(0.029)
Loss	0.0202***	-0.0493*
	(5.541)	(-1.658)
M&A	0.0023	0.0063
	(0.869)	(0.220)
MTB	-0.0005***	0.0034**
	(-2.798)	(2.383)
ROA	-0.0175	0.0054
	(-1.569)	(0.123)
Observations	29,646	969
Adj. R-squared	0.017	0.052
Year FE	Yes	Yes
Auditor FE	Yes	Yes
Industry FE	Yes	Yes

Table 6: Alternative Audit Quality Proxies

This table presents the results of OLS estimations of modified forms of Equations (1) and (2). *MisstateBig* is the dependent variable in column (1), *AbnAccruals* is the dependent variable in column (2), *SmallProfit* is the dependent variable in column (3), and *Deficiencies* is the dependent variable in column (4). All variables are defined in Appendix A. Auditor, industry, and year specific intercepts are excluded for brevity. Cluster (company) robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	(1)	(2)	(3)	(4)
Dependent Variable:	*MisstateBig*	*AbnAccruals*	*SmallProfit*	*Deficiencies*
DeloittePost	***-0.0138******	***-0.0107****	***-0.0218****	***-28.4667*****
	(-2.759)	***(-1.825)***	***(-1.798)***	***(-5.537)***
Assets	-0.0012**	-0.0058***	0.0068***	
	(-1.982)	(-5.586)	(2.800)	
AssetGrowth	0.0000	0.0056**	0.0126***	
	(0.038)	(2.096)	(3.915)	
Cash	-0.0047	0.0009	-0.1243***	
	(-0.657)	(0.088)	(-6.293)	
CashFlowOps	0.0015	0.0028	-0.0848**	
	(0.319)	(0.108)	(-2.469)	
DecFYE	-0.0026	-0.0014	0.0351***	
	(-0.858)	(-0.412)	(4.163)	
ExFinance	0.0054*	0.0086	0.0018	
	(1.698)	(1.524)	(0.188)	
InvRec	0.0026	0.0212*	-0.0267	
	(0.253)	(1.834)	(-0.889)	
Leverage	0.0086**	0.0311***	0.0338**	
	(2.091)	(3.091)	(2.337)	
Loss	0.0059**	-0.0414***	-0.3467***	
	(2.363)	(-6.513)	(-35.520)	
M&A	-0.0013	0.0007	-0.0123**	
	(-0.653)	(0.292)	(-1.996)	
MTB	-0.0001	0.0011***	-0.0021***	
	(-0.407)	(4.315)	(-6.974)	
ROA	0.0052	-0.0876***	-0.2262***	
	(1.341)	(-3.355)	(-4.586)	
Observations	29,646	28,216	29,646	40
Adj. R-squared	0.011	0.333	0.312	0.787
Year FE	Yes	Yes	Yes	Yes
Auditor FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No

Table 7: Alternative Settings

This table presents the results of OLS estimations of modified forms of Equation (1). *Switch*$_{t+1}$ replaces *Misstate* as the dependent variable in columns (2) and (4). *KPMGPost* replaces *DeloittePost* in columns (1) and (2). The sample in columns (1) and (2) is limited to non-Deloitte Big 4 clients in years 2018, 2019, and 2021. The sample in columns (3) and (4) is limited to U.S.-listed Canadian Big 4 clients in years 2015, 2016, 2018, and 2019. All variables are defined in Appendix A. Auditor, industry, and year specific intercepts are excluded for brevity. Cluster (company) robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	KPMG Lakehouse		**Deloitte North**	
	(1)	(2)	(3)	(4)
Dependent Variable:	*Misstate*	*Switch*$_{t+1}$	*Misstate*	*Switch*$_{t+1}$
KPMGPost	***-0.0181****	***-0.0065***		
	(-1.931)	***(-0.593)***		
DeloittePost			***-0.0915****	***-0.1097****
			(-2.586)	***(-2.360)***
Assets	-0.0013	-0.0089***	-0.0049	-0.0134**
	(-0.705)	(-4.218)	(-1.073)	(-2.204)
AssetGrowth	0.0052	-0.0055**	0.0064	0.0013
	(1.444)	(-2.097)	(0.418)	(0.206)
Cash	-0.0278*	-0.0394***	-0.0759*	-0.0895**
	(-1.924)	(-2.676)	(-1.968)	(-1.988)
CashFlowOps	-0.0058	0.0143	-0.1363	-0.0159
	(-0.432)	(0.686)	(-1.274)	(-0.244)
DecFYE	0.0141**	0.0059	0.0027	-0.0192
	(2.105)	(0.881)	(0.121)	(-0.748)
ExFinance	0.0040	0.0088	0.0206	-0.0125
	(0.498)	(1.011)	(0.546)	(-0.356)
InvRec	-0.0089	0.0541**	-0.0542	0.0848
	(-0.409)	(2.321)	(-0.868)	(0.677)
Leverage	0.0237**	0.0041	0.0263	-0.0278
	(2.521)	(0.426)	(1.070)	(-0.931)
Loss	0.0318***	0.0108	0.0018	0.0210
	(4.065)	(1.368)	(0.082)	(0.958)
M&A	0.0044	0.0021	0.0228	0.0144
	(0.787)	(0.376)	(1.109)	(0.741)
MTB	0.0001	-0.0005***	0.0014	-0.0036*
	(0.615)	(-2.846)	(1.268)	(-1.793)
ROA	0.0211*	-0.0444*	0.1235*	-0.0261
	(1.947)	(-1.753)	(1.756)	(-0.483)
Observations	6,642	6,642	615	615
Adj. R-squared	0.025	0.019	0.190	0.008
Year FE	Yes	Yes	Yes	Yes
Auditor FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Table 8: Additional Robustness Tests

This table presents the results of OLS estimations of modified forms of Equation (1). The estimations in columns (1) and (2) include company fixed effects. The sample in columns (3) and (4) is expanded to include clients of all auditors. All variables are defined in Appendix A. Client, auditor, industry, and year specific intercepts are excluded for brevity. Cluster (company) robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	Company Fixed Effects		**All Auditors as Control**	
	(1)	(2)	(3)	(4)
Dependent Variable:	*Misstate*	*Switch$_{t+1}$*	*Misstate*	*Switch$_{t+1}$*
DeloittePost	***-0.0474******	***-0.0083***	***-0.0324******	***-0.0174******
	(-3.206)	***(-1.053)***	***(-2.999)***	***(-2.971)***
Assets	0.0219***	-0.0275***	0.0021	-0.0087***
	(2.869)	(-5.788)	(1.459)	(-10.947)
AssetGrowth	0.0023	0.0017	0.0052***	0.0077***
	(0.705)	(0.532)	(2.815)	(4.220)
Cash	-0.0153	-0.0286	-0.0718***	-0.0371***
	(-0.492)	(-1.357)	(-6.671)	(-5.152)
CashFlowOps	-0.0351**	0.0039	0.0039	-0.0122
	(-2.521)	(0.277)	(0.666)	(-1.633)
DecFYE	0.0035	0.0441	-0.0014	0.0029
	(0.073)	(1.380)	(-0.276)	(1.007)
ExFinance	0.0020	-0.0070	0.0099**	-0.0114***
	(0.209)	(-1.001)	(2.086)	(-3.012)
InvRec	-0.0306	-0.0555*	-0.0203	-0.0044
	(-0.541)	(-1.711)	(-1.372)	(-0.522)
Leverage	-0.0067	0.0058	0.0009	-0.0051***
	(-0.477)	(0.524)	(0.394)	(-3.465)
Loss	0.0137*	0.0104**	0.0193***	0.0217***
	(1.949)	(2.187)	(4.423)	(7.272)
M&A	0.0003	0.0026	0.0097**	0.0025
	(0.057)	(0.698)	(2.303)	(0.993)
MTB	0.0001	-0.0003	-0.0002	-0.0004***
	(0.317)	(-1.252)	(-1.033)	(-2.689)
ROA	0.0079	-0.0217	0.0007	-0.0038
	(0.694)	(-1.553)	(0.201)	(-0.837)
Observations	29,646	29,646	46,475	46,475
Adj. R-squared	0.233	0.123	0.032	0.099
Year FE	Yes	Yes	Yes	Yes
Auditor FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Company FE	Yes	Yes	No	No

Table 9: Consulting Revenues Tests

This table presents the results of OLS estimations of modified forms of Equation (2). *Consulting Revenues* is the dependent variable in column (1), and *Consulting Rev / Total Rev* is the dependent variable in column (2). All variables are defined in Appendix A. Auditor and year specific intercepts are excluded for brevity. Robust *t*-statistics are presented in parentheses below the corresponding coefficients. *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, based on two-tailed tests.

	(1)	(2)
Dependent Variables:	*Consulting Revenues*	*Consulting Rev / Total Rev*
DeloittePost	***2.1687***	***0.0258****
	(6.187)	***(2.584)***
Observations	40	40
Adj. R-squared	0.962	0.925
Year FE	Yes	Yes
Auditor FE	Yes	Yes