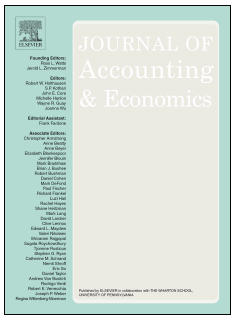

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Labor Supply and M&A in the Audit Market*

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Abstract

Using labor supply shocks from the 150-Hour Rule, I find that a reduction in the labor supply of accountants increases audit firms' mergers and acquisitions (M&A) and the audit market concentration. These M&A deals connect audit firms serving clients in the same states and lead to greater industry specialization of the merging firms. Although both small and large auditors generally engage in labor supply–driven M&A deals, large audit firms' engagement in M&A is restricted to markets with a tight supply of accounting labor. Attenuations of the labor supply restrictions tend to limit the heightened M&A activities and mitigate the rise in the audit-market concentration from the 150-Hour Rule. I conclude that labor supply reductions affect the boundaries of audit firms, potentially changing the structure of the entire audit market.

Keywords: mergers and acquisitions, M&A, labor supply, audit firms, accounting firms, accounting labor, 150-Hour Rule, Mobility Provision

JEL Classification: G34, G38, J44, J61

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1. Introduction

Accounting firms critically depend on their ability to recruit and retain a professional workforce, yet the supply of newly certified public accountants (CPAs) has declined in recent years due to entry barriers to the profession from occupational licensing (Barrios, 2022; AICPA, 2023b; Maurer, 2023; Mutoh, 2023; Sutherland et al., 2024; Burke and Polimeni, 2023). The talent shortage is especially severe for smaller audit firms, and auditors are advocating for relaxing the profession's educational standard (Foley, 2023b; Mintz et al., 2023). Moreover, some states are considering dropping the annual audit requirement for local government agencies due to massive delays in filings (Foley, 2023a; Mintz et al., 2023). Yet AICPA is not ready to abandon its two decades of work on the alignment of standards across the U.S. states and has formed the National Pipeline Advisory Group to address the talent shortage (AICPA, 2023a; Gonzalez, 2023). This paper informs the current debate about the role of occupational licensing in the accounting pipeline by studying the effects of a regulation-induced reduction in the CPA supply on audit firms' M&A activity and on the structure of the affected audit markets.

Prior research shows that the 150-Hour Rule, which imposed higher educational requirements for CPA candidates, decreased the supply of new CPAs in the adopting states and reduced the ability of audit firms in the affected states to hire locally certified accountants (Lee et al., 1999; Franz and Schroeder, 2004; Barrios, 2022). I hypothesize that this reduction in labor supply affected audit firms' optimal size, increased their M&A activity as part of the strategy to shift to a more optimal size, and consequently affected the structure of the audit market.

Like any other firm, audit firms strategically set their size based on a variety of factors including their production function, control process, and environmental influences (Kumar et al., 2001). At the optimum level, the marginal benefits from increasing the firm size (e.g., lower

average fixed labor costs) are equal to the marginal costs of doing so (e.g., higher coordination costs and the direct costs of expansion). I conjecture that a reduction in labor supply induced by the 150-Hour Rule increases the labor costs for audit firms, which motivates them to increase their size to partly offset the elevated labor costs.

As labor costs in an industry are determined by the demand and supply of qualified labor, the reduction in the supply of accountants due to the 150-Hour Rule should lead to higher accountant wages. Several studies provide empirical evidence of wage increases following labor supply reductions, including the effect of the 150-Hour Rule on accountant wages (Card, 2001; Borjas, 2003; Barrios, 2022). As accountant wages are a predominant expense for audit firms, an increase in labor costs following the 150-Hour Rule likely decreases local audit firms' ability to generate profit unless auditors pass on the higher costs to their clients or find a way to change their cost structure. Because the audit market is highly competitive, it is difficult for audit firms—especially small ones—to pass on these higher costs to their clients.[1]

I propose that firms can at least partially limit the overall cost increases arising from the 150-Hour Rule by shifting to a larger size. An increase in audit firm size, which may not have been cost-effective before the increase in accountant wages, allows firms to benefit from greater economies of scale and, thus, larger cost savings. The audit production function has a high ratio of labor value-added to non-labor costs, and the number of accountants employed by audit firms is largely fixed in the short term (Jensen and Meckling, 1979; Rosenberg, 2013b). These fixed costs, when spread across a larger client pool through economies of scale to team production, can enable

[1] This study does not rule out strategies unrelated to M&A that auditors may use to mitigate labor cost pressures. While a full pass-through of the cost increase to the clients is unlikely, audit firms can pass a portion of it to their clients through higher fees (Gerakos and Syverson, 2015). Audit firms can also substitute other factors of production for certified accountants (e.g., offshore employees, non-certified labor, or software) when it comes to low-complexity tasks. Consistent with these alternatives, I report in the online appendix that the 150-Hour Rule led to higher audit fees, lower growth in professionals' employment, and higher growth in non-professionals' employment by auditors.

audit firms to reduce audit costs (Banker et al., 2003). Therefore, increasing firm size can help auditors curb the labor cost increase following the supply reductions.

M&A is a practical strategy to increase firm size quickly.[2] As CPAs at audit firms conduct most of the administrative functions on top of their audit tasks, the merging firms can centralize their non-billable activities (e.g., preparing training materials, developing technical guidance, engaging in recruiting) and free up the CPAs' time to work on engagements (Rosenberg, 2012). The merging auditors can also increase the specialization of the combined workforce and reduce the time spent per task by forming more focused accountant teams (Becker and Murphy, 1992; West, 1999; Chaney and Ossa, 2013).[3] Other potential benefits of M&A include spreading the combined workload more evenly across the joint workforce by staggering the peak workloads over time and increasing the reliance on specialists, software, automation, and technologies (Prawitt, 1995). Investments in the latter can be too expensive for small audit firms, which increases their incentives to pursue M&A. Therefore, reductions in labor supply and the resulting increases in labor costs create incremental incentives to engage in M&A to change the firm's cost structure and curb the elevated input costs.

However, these benefits of M&A can be offset by several costs that may discourage firms from merging. It is difficult to evaluate the synergies and integration challenges during a merger negotiation (Chatterjee, 2007). As a result, M&A can create lower-than-expected growth and

[2] Though organic growth can bring similar economies of scale, it might be cheaper and faster to grow via M&A when labor supply decreases. Publications in practitioner journals note that the need to add depth of staff is among the top drivers of M&A (Putney and Sinkin, 2017; Hood, 2019).

[3] This is in line with theoretic models that predict cost reductions for merging firms. It is also consistent with empirical evidence showing that M&A lead to cost reductions for audit firms and public firms in industries experiencing shocks to input costs (Mitchell and Mulherin, 1996; Ivancevich and Zardkoohi, 2000). Evidence in the labor economics literature also shows that in response to supply shocks, firms adjust the intensity with which they use workers within their production units. Workers generate higher output per hour when their firms face increased labor costs (Obenauer and von der Nienburg, 1915; Dustmann and Glitz, 2015; Horton, 2018; Clemens and Strain, 2020; Clemens et al., 2021; Ku, 2022).

profits. Moreover, disagreements between partners on how to share losses and gains and the failure to integrate the disparate corporate cultures of the merging firms can cause partners to leave for other audit firms (Esposito, 2018; Gow and Kells, 2018). To the extent that these costs outweigh the benefits of M&A, audit firms might prefer not to engage in M&A.

The 150-Hour Rule provides a valuable setting for testing the effect of labor supply on firms' M&A. This regulation took effect in a staggered pattern at the state level, which led to time-series and cross-sectional variation in auditors' exposure to changes in the accounting labor supply. Moreover, I find no significant difference in states' M&A activity before the 150-Hour Rule took effect; thus, the timing of state adoptions is likely unrelated to firm M&A activity. This reduces concerns that factors endogenous to firm growth contributed to the adoption schedules.

One obstacle to analyzing M&A in the audit market setting has been the lack of data covering the small audit firms that are involved in most M&A transactions. Prior research on M&A in the audit industry focuses primarily on small samples of M&A or foreign markets (Sullivan, 2002; Chan and Wu, 2011; Gong et al., 2016; Choi et al., 2017; Christensen et al., 2023; Sellers et al., 2022; Jiang et al., 2019). I overcome this challenge by using data provided by the U.S. Department of Labor, which discloses the auditors of employee benefit plans and includes over 14,000 audit firms. I combine these data with the auditor M&A list from Audit Analytics Firm Events database to create a sample of 117,491 auditor-year observations with 1,528 M&A deals from 2000 to 2017. The final sample consists of a wide range of large and small audit firms.

The main analyses in this paper are based on auditor-year logistic regressions and a state-year OLS approach.[4] For each year, I measure an audit firm's exposure to the 150-Hour Rule based on the number of 150-Hour Rule states in which the firm has clients. I model the auditor

[4] I also use correlated random effects logit, OLS, and Cox hazard analyses for the auditor-year sample and find similar results.

M&A activity as a function of the audit firm's exposure to the 150-Hour Rule, size, geographic reach, time-varying proxies for local economic growth and competitive environment, year fixed effects, and state or audit firm fixed effects (depending on the level of the analysis).

I find that the first exposure to the 150-Hour Rule increases the firm's probability of M&A activity by 18.8 percent relative to the mean M&A probability of 1.6 percent in the sample. This is consistent with my hypothesis that M&A become more beneficial when labor supply decreases. Mergers driven by labor supply reductions connect audit firms that serve clients in the same states. Intuitively, joining forces with a team of accountants already certified to serve local clients allows the combined firm to share the workload faster than in combinations with out-of-state teams because some states require a local license to perform attestation services. I also find that M&A driven by reductions in labor supply connect audit firms that serve clients in the same industries. In this case, the merging firms likely minimize the need for additional training before the two teams of accountants begin sharing the combined workload. In turn, an increase in M&A among auditors with similar expertise results in higher industry specialization among the affected auditors.

To understand the market-level consequences of the reduced supply of accountants and the role of local market conditions in these consequences, I run state-level analyses of M&A activity and audit market concentration, allowing the role of labor supply reductions to vary by the size of the local labor market. Using a difference-in-difference approach, I find that the increase in M&A activity from the 150-Hour Rule is concentrated in tight labor markets (those with a low ratio of locally employed accountants to the number of establishments). This result suggests that larger accounting labor markets better absorb the labor supply shocks caused by the regulation. While small audit firms engage in labor supply–driven M&A regardless of labor market tightness, large firms do so only in tight markets. This finding is consistent with the idea that the labor cost pressure

from the reduced supply is higher for small auditors; consequently, they benefit more from M&A even in less tight labor markets. In contrast to small auditors, large auditors have deeper pockets, typically offer better pay packages, and are better able to attract larger and more profitable clients (Rosenberg, 2016; Half, 2017). Higher salaries and better career growth opportunities are among the top priorities of young accounting professionals (AICPA, 2011). In larger markets of accountants, large audit firms can respond to the 150-Hour Rule by poaching staff from small firms.[5] At the same time, large auditors might turn to more costly M&A activities in tighter labor markets as options to attract talent from smaller firms diminish.

I also show that the reduced accountant supply induced by the 150-Hour Rule increases audit market concentration, primarily in industries with high levels of tangible assets.[6] Audits of firms with high levels of tangible assets require more labor for on-site verification of fixed assets. High tangibility is also likely associated with greater audit complexity due to the added intricacy of cost accounting (as in the manufacturing industry) and long-term customer contracts (as in the oil and gas production industry).

To study whether the above-documented effects on auditors' M&A activity and audit-market concentration are attenuated by forces that counteract the effect of the 150-Hour Rule, I incorporate an interaction between the 150-Hour Rule and the Mobility Provision in the Uniform Accountancy Act (UAA) into the analyses. The Mobility Provision decreased the barriers for out-of-state CPAs to work for local audit firms (Cascino et al., 2021) and thereby partly counteracted

[5] After a local labor supply shock, all affected firms must compete for labor. For small auditors, the cost of doing so can be prohibitively high and may motivate them to engage in M&A.

[6] In this paper, I take the first step towards providing evidence on the effects of labor shocks on M&A and audit market concentration. I refrain from drawing inferences about audit market competition and audit quality because most of the auditors in my sample serve only private clients; thus, I do not have data on their audit quality and fees. The effect of M&A on competition is unclear. On the one hand, the higher frequency of M&A between small auditors and those between a small and a large auditor can facilitate competition between the merged auditors and large auditors. On the other hand, if the higher frequency of M&A between a large and a small auditor is driven by Big N auditors, this can further increase their share of the market and decrease competition.

the reductions in labor supply caused by the 150-Hour Rule. I find a negative interactive effect between the two regulations on state-level M&A activity and on audit-market concentration at the state-industry level. This finding suggests that the Mobility Provision partially offsets the supply constraints caused by the 150-Hour Rule.

This paper informs the ongoing debate on the challenges imposed by the 150-Hour Rule on audit firms and suggests that smaller firms face disproportionate pressures amidst talent shortages. The consequences of the Rule go beyond the accounting talent crisis: lack of access to qualified labor changes the structure of the whole audit market and boosts specialization and concentration among auditors (Lee et al., 1999; Barrios, 2022; Sutherland et al., 2024). Thus, policymakers considering amendments to the 150-Hour Rule should take labor supply implications into account (Gong et al., 2016; Kitto, 2024). This paper is also one of a few M&A studies that focus on a large population of auditors without limiting the sample to auditors serving public clients. It is important to study small auditors that serve private clients because private companies comprise a large part of the economy (Chaney et al., 2004; Minnis and Shroff, 2017; The Office of Advocacy of the SBA, 2019; Lisowsky and Minnis, 2020).

The underlying mechanisms identified in this study are likely generalizable to other industries that rely on highly skilled labor (e.g., other professional services firms or technology companies). Thus, the evidence on the role of labor supply in firms' M&A activity also contributes to the vast literature on M&A drivers that shows competitive considerations, efficiency gains and synergies, resource reallocation, market valuation, industry shocks, and political and regulatory uncertainty to be among the M&A determinants (Stigler, 1950; Manne, 1965; Gort, 1969; Maksimovic and Phillips, 2001; Harford, 2005; Devos et al., 2009; Alimov, 2015; Bonaime et al., 2018; Chen et al., 2021; Ouimet and Zarutskie, 2020; Tian and Wang, 2021). The idea that human

capital investment is central to the formation of firm boundaries dates back to at least the 1990s, and practitioners place labor considerations among the top M&A drivers (Hart and Moore, 1990; Putney and Sinkin, 2017; Hood, 2019; Chen et al., 2023). Yet the existing academic literature has largely overlooked the importance of labor supply for M&A. This paper's findings speak to the effect of systematic local labor supply shifts on firm M&A, complementing the recent evidence on the role of idiosyncratic changes in skilled labor from H-1B lotteries in firm M&A (Chen et al., 2023).

2. Hypothesis Development: Labor Supply and M&A

At the core of the paper's hypothesis are the optimal size of audit firms, the adjustments in this optimal size when firms face a labor supply reduction, and the corresponding decision to increase their size through M&A engagement.

Prior studies connect firm size to country institutions (Zimmerman, 1983; Kumar et al., 2001; Claessens and Laeven, 2003; Laeven and Woodruff, 2007), industry specifics (Kumar et al., 2001), economies of scale (Shen, 1970), financial constraints (Angelini and Generale, 2008), and the costs of coordination and expansion (Baumol, 1962). In professional partnerships like audit firms, human capital plays a key role in the production function (Huddart and Liang, 2003), which makes their revenue highly susceptible to changes in labor supply. Audit firms typically maintain the same number of accountants in the short term unless they face a recession or substantial continuous growth (Rosenberg, 2013b). Furthermore, accountants at audit firms often carry a non-billable load (e.g., preparing training materials, developing technical guidance and audit methods, and recruiting) in addition to their assurance tasks. Therefore, the reduced supply of accountants and the corresponding increase in their wages likely harm audit firms' profitability due to the fixed-cost nature of the wages, the high labor value added relative to all non-labor costs, and the non-

billable hours that become especially costly in this context (Jensen and Meckling, 1979; Prawitt, 1995).

I hypothesize that reduced accountant supply and rising wages increase audit firms' optimal size because they create larger potential economies of scale. A reduction in the accountant supply increases accountant wages and, hence, the input costs for audit firms (Barrios, 2022). Economies of scale in the production function allow audit firms to spread the increased labor costs across a larger pool of clients and reduce overtime work by staggering their peak workloads over time (Jensen and Meckling, 1979; Banker et al., 2003). This is important because labor economics studies show that firms push their workers to generate higher output per hour when facing a shock to labor costs (Obenauer and von der Nienburg, 1915; Horton, 2018; Clemens and Strain, 2020; Clemens et al., 2021; Ku, 2022). Such expectations placed on workers can present challenges for firms as workers feel "under constant pressure from their supervisors to work harder" (Obenauer and von der Nienburg, 1915).

Professional services firms can facilitate economies of scale by allocating non-billable tasks to designated professionals to free up their accountants' time for billable tasks that generate revenue. In other words, larger size allows firms to improve the division of labor by creating more specialized accountant teams (Becker and Murphy, 1992; West, 1999). Lower task variability within the specialized accountant teams allows workers to concentrate on a narrower range of skills and thus spend less time per task (Chaney and Ossa, 2013). Adjustments in the intensity of skilled workers' schedules are particularly important when the supply of skilled labor declines (Dustmann and Glitz, 2015).

This change in the optimal firm size may prompt some audit firms to expand if the economies of scale and the resulting cost savings are greater than the costs of expansion and

increased coordination. Though a shift to a larger firm size may not have been cost-effective before the increase in accountant wages, the cost savings become larger when labor becomes more expensive. As a result, I predict increased M&A activity among auditors because mergers are a viable strategy for increasing firm size in the face of labor supply shocks. The theoretical literature predicts that there will be more M&A when firms can economize on their costs; it also predicts that merging firms will have lower costs when the supply of a crucial input factor, such as human capital, is fixed (Perry and Porter, 1985; Rodrigues, 2001). These predictions are confirmed by empirical findings that the 1989 auditor megamergers resulted in cost reductions (Ivancevich and Zardkoohi, 2000). In addition, M&A result in cost savings when public firms' industries experience economic shocks related to their input costs (Mitchell and Mulherin, 1996). Anecdotally, a growing number of audit firms "view M&A as a realistic way to enhance staff recruiting, staff retention and to develop economies of scale" (Hood, 2019).

I summarize the above arguments in the hypothesis below:

H_1: *A reduction in local labor supply increases M&A activity among auditors.*

Though this paper focuses on the M&A strategy that audit firms use to increase their size and address labor supply reductions, it is worth noting that firms can engage in any combination of strategies to mitigate the impact of labor input shocks. They could increase audit fees, although firms are unlikely to pass on the full cost increase to their clients because audit demand is plausibly elastic.[7] Another potential response to the cost increase is substituting other factors of production for CPAs (e.g., offshoring work, using more non-certified labor, or increasing reliance on software). This can partially address the cost pressure and allow audit firms to outsource low-

[7] Gerakos and Syveron (2015) estimate the demand for audit services among publicly listed firms and the resulting price elasticities. The average audit price elasticities range between -1.8 and −2.2.

complexity tasks. However, this strategy can reduce the quality of audit work if the tasks are carried out by employees with less experience and training (Aubin and Chatterjee, 2012). Outsourcing also involves a high upfront fixed cost in setting up the services and may not be a viable option for smaller audit firms. Organic growth can also increase firm size, but this strategy might be more challenging than M&A when labor supply decreases (e.g., price wars become more taxing when labor costs increase).[8]

3. Data and Research Design

3.1. Data and sample construction

I summarize the sample construction steps in Table 1. I use the list of audit firms' M&A from Audit Analytics Firm Events database which includes both auditors with public clients and smaller auditors with only private clients. To determine the set of clients served by auditors on the M&A list, I use employee benefit plan (EBP) data (Form 5500) disclosed by the Department of Labor, which include private and public clients.[9] I match the auditor names from Form 5500 filings to the auditor names on the M&A list to get the auditor-year-level sample.[10] The final sample has 117,491 auditor-year observations for more than 14,000 audit firms over 2000-2017.

Constructing the sample based on the client data in Form 5500 filings rather than Audit

[8] In the online appendix, I study professional fees paid by auditors' clients and find that auditors pass on some of the cost increases to their clients when the auditors' exposure to the 150-Hour Rule increases. I also collect data on the top 100 auditors' employment numbers from Accounting Today Magazine between 2004 and 2017. I find that the percentage change in professionals (non-professional employees) decreases (increases) with the auditor's exposure to the 150-Hour Rule.

[9] Appendix B provides more details about Form 5500 data. By using the EBP data to proxy for auditors' client locations, I assume that for a given auditor, the set of the U.S. states where the auditor serves its EBP clients is representative of the set of the states where this auditor serves all of its clients that require CPA work. I find that more than 96% (92%) of the states where auditors have offices according to the Opinion (Fees) database in Audit Analytics are among the states where these auditors serve their EBP clients. Therefore, EBP client locations proxy well for locations where the auditor provides more general services.

[10] I adjust *auditor_fkey* to preserve the same auditor identifier after a name change or registration/de-registration with PCAOB.

Analytics' Audit Fees or Audit Opinions datasets provides better coverage of the audit firm population. While Audit Analytics contains data on only the public clients of auditors, Form 5500 filings allow me to proxy for private as well as public client audits. Thus, my sample includes more than three times as many auditors with M&A deals as the Audit Analytics datasets. For this larger population of firms, Figure 1 shows a steep increase in M&A over the sample period, indicating the increasing importance of understanding the drivers of this growth strategy.

3.2. Labor supply shocks

To study the effect of labor supply changes on auditors' propensity to merge, I focus on certified public accountants and the 150-Hour Rule. Compared to the previous education criteria for CPA certification, the 150-Hour Rule increased the number of credit hours of coursework from 120 (the standard bachelor's degree in the U.S.) to 150 credit hours (an additional year of full-time study). These 30 incremental hours can be accumulated through a master's degree, 30 more credit hours through an accelerated bachelor's degree program, or 30 hours of non-degree courses. Barrios (2022) shows that the 150-Hour Rule decreased the local supply of new CPAs, likely because candidates chose to abstain from a CPA career to begin work sooner. In addition, Franz and Schroeder (2004) show that the decrease in CPA candidates takes place in the regulation's first year; over the next few years, the number of CPA candidates gradually recovers to 50%-60% of the baseline period. Therefore, within a short period, the 150-Hour Rule created a sizeable decrease in the local supply of CPAs that lasted multiple years.[11] I study how auditors respond to labor regulations affecting the supply of CPAs regardless of whether the 150-Hour Rule aims to

[11] The effect of the labor supply reductions created by the 150-Hour Rule can be further exacerbated by the low unemployment of accountants (below two percent in recent years; CPA Practice Advisor [2018]). In addition, any effect of the 150-Hour Rule on the demand for accountants is likely not of first-order importance because Barrios (2022) does not find that CPAs who qualified after the regulation are of higher quality. If the quality of new CPAs does increase, then the demand can potentially increase as well, further raising the wages of new CPAs.

improve attestation services or whether it has a rent-seeking nature.[12]

In the U.S., the title of CPA is granted by 55 separate U.S. jurisdictions instead of a single centralized federal agency. Each State Board of Accountancy made an independent decision about whether and when to adopt the 150-Hour Rule. The staggered adoption of these requirements across states creates variation in audit firm exposure to the labor supply reductions, allowing me to examine them over time and cross-sectionally. Figure 2 shows the timing of the 150-Hour Rule adoptions by state.

3.3. Measures of auditor exposure to reductions in labor supply

CPAs who hold a license in a state where the auditor serves clients are essential to the auditor's workforce because only a CPA can sign audited or reviewed financial statements. Moreover, CPAs likely produce higher-quality work than non-certified accountants due to their training and continuing education requirements. Therefore, reductions in CPA supply might not be easily mitigated with non-certified accountants.

Audit firms exposed to the 150-Hour Rule face a decrease in labor supply. To measure an audit firm's exposure to the 150-Hour Rule within the states where it produces attestation services, I create a list of states where the auditor served clients during the previous two years. For each auditor-year, I then calculate the total number of these states that adopted the 150-Hour Rule and log-transform this number as described in Appendix A. This proxy for auditors' exposure to the 150-Hour Rule avoids the assumption that the distribution of the auditor's entire set of clients across the states coincides with the distribution of the auditor's EBP clients. In other words, proportionally, the *EBP clients* in one state might outnumber the *EBP clients* in another state, even

[12] The rent-seeking aspect of occupational licensing promotes the private interests of the profession's incumbent members rather than the interests of society. Occupational licensing creates barriers to entry into the profession, thereby facilitating monopoly rent extraction by the incumbent professionals (Friedman, 1962; Stigler, 1971; Maurizi, 1974; Barrios, 2022).

though this same disproportion might not apply to *all the auditor's clients*. Therefore, I infer from the presence of EBP clients in a given state that the auditor needs certified accountants to serve clients in that state. At the same time, I do not infer the proportion of the auditor's clients (and the proportional demand for certified accountants) in a given state from the proportion of the auditor's EBP clients in this state, because EBP clients are only a subset of the auditor's clients.

3.4. Research design

3.4.1. Analysis at the auditor-year level

I model the M&A probability at the auditor-year level using a logistic approach to study whether labor supply reductions increase audit firms' M&A engagement:

$$Log\left(\frac{P\{M\&A_{i,t}\}}{1-P\{M\&A_{i,t}\}}\right) = \alpha + \beta_1 R150\ Exp_{i,t} + \beta_2 \#\ Clients_{i,t-1} + \beta_3 \#\ Client\ States_{i,t-1} + \beta_4 Client\ States' GDP_{i,t-1} + \beta_5 \#\ Other\ Auditors_{i,t-1} + \gamma_t, \quad (1)$$

where $P\{M\&A\}$ is the probability of an audit firm engaging in M&A in a given year, and $R150\ Exp$ is the logarithm of one plus the number of states that adopted the 150-Hour Rule among the states where the auditor has clients. If hypothesis H1 is correct, I expect β_1 to be significantly positive.

Audit firms' growth decisions plausibly depend on their size and geographic reach (Rosenberg, 2013a). Thus, I control for the logarithm of the number of clients the auditor serves in a given year, $\#Clients$, and the logarithm of the number of states where the auditor serves clients, $\#\ Client\ States$. Local economic growth also contributes to auditors' M&A. I control for the average real GDP (in trillions of chained 2012 dollars) across all the states where the auditor serves clients, $Client\ States' GDP$. In addition, to allow the local competitive environment to play a role in auditors' decisions to engage in M&A, I control for the average number of other audit firms (in hundreds) serving clients in the same states as the auditor does (the average across all

states where the auditor has clients), $\#\ OtherAuditors$. Appendix A provides variable definitions.

Year fixed effects, γ_t, absorb common variation across audit firms in the same period. Audit firm fixed effects, included in the conditional logit regressions, control for time-invariant auditor characteristics that could explain some of the variation in M&A. The staggered adoption of the regulations, combined with controls for local economic growth, the competitive environment, auditor geographic reach and size, and year and auditor fixed effects, decrease concerns that other M&A drivers can explain the results of my analyses. Nevertheless, I run a set of robustness tests, including correlated random effects logit, OLS, and Cox hazard analyses.

I also convert equation (1) into a set of multinomial logit regressions to study auditor engagement in various types of M&A. In these multinomial logit regressions, the left-hand side allows M&A outcomes to vary based on the relative size, industry specialization, and geographic characteristics of the M&A counterparties, and the right-hand side includes the same variables as equation (1).

3.4.2. Analyses at the state-year level

To better understand the M&A dynamics and concentration at the local market level and incorporate the labor market size into the study, I switch to state-level analyses. This also allows me to test the parallel trends assumption with respect to the states' adoptions of the 150-Hour Rule. I use the following specification to study the state share of firms engaging in M&A:

$$M\&A\ Share_{s,t} = \alpha + \beta_1 R150_{s,t} + \beta_2 GDP_{s,t-1} + \beta_3 \#\ Auditors_{s,t-1} + \beta_4 Acct.Employment_{s,t-1} + \gamma_t + \delta_s + \varepsilon_{s,t}, \quad (2)$$

where $M\&A\ Share$ is the number of audit firms serving clients in the state that engage in M&A in a given year, scaled by the number of audit firms in that state in the previous year; $R150$ is an

indicator that equals one if the state has adopted the 150-Hour Rule; $\#\,Auditors$ is the logarithm of the number of audit firms serving clients in the state; $Acct.Employment$ is the number of accountants (in millions) employed in the state. I also include year and state fixed effects to control for common shocks within a given year and state-specific characteristics. As in the auditor-level analysis, I predict a positive β_1 coefficient.

The tightness of the local labor market plausibly matters for the effects of the 150-Hour Rule on the audit firms' M&A activity because finding qualified accountants is more challenging in tight markets. I calculate the tightness of the accountant labor market, *Labor Tightness*, as a ratio of the total employment of accountants and auditors in a given state-year to the number of establishments in the state-year. I use the BLS Occupational Employment Statistics data on the total employment of accountants and auditors and the Census data on establishments. I then split the state sample based on the median value of this tightness measure, and I estimate equation (2) separately for the states with tight labor markets of accountants (*Tight Labor Market* equals one for below-median values of *Labor Tightness*) and those with less tight markets (*Tight Labor Market* equals zero for above-median values of *Labor Tightness*). Intuitively, less tight accounting labor markets can better absorb the labor supply fluctuations caused by the 150-Hour Rule, mitigating the effect of this regulation on auditor M&A.

I study the consequences of the M&A activity resulting from the labor supply changes by repeating the above analysis with state concentration as the dependent variable:

$$Concentration_{st} = \alpha + \beta_1 R150_{s,t} + \beta_2 GDP_{s,t-1} + \beta_3 \#\,Auditors_{s,t-1} + \beta_4 Acct.Employment_{s,t-1} + \gamma_t + \delta_s + \varepsilon_{s,t}. \quad (3)$$

For each year, I create two versions of the audit market concentration measure: one at the state level and one at the state-industry level. I measure the state-year audit market concentration using

a Herfindahl-Hirschman Index (HHI), where I proxy for the market share served by each auditor based on the size of its clients.[13] I also calculate a state-industry-year version of this concentration measure using the two-digit NAICS code to define industries. To analyze the concentration at the state-industry level, I drop observations with less than three audit firms in the state-industry in a given year.

3.4.3. Descriptive statistics

Table 2, Panel A presents the descriptive statistics for the full auditor-year sample. The sample average for the M&A probability is 1.6%. The mean and median values for auditor exposure to the 150-Hour Rule are 0.723 and 0.693, respectively. Since I log-transform the number of 150-Hour Rule states when measuring audit firms' exposure to the Rule, the median auditor-year in my sample is exposed to the Rule through one state. The mean and median values for the logged number of EBP clients are 1.043 and 0.693, respectively, corresponding to a mean of 6.285 and a median of 2 clients.[14] The mean and median logged number of states where an auditor serves clients are 0.307 and 0, respectively, corresponding to a mean of 1.758 and a median of 1 state. The mean and median average real GDP (in trillions of chained 2012 dollars) across all states where an auditor has clients are 0.671 and 0.502, respectively. Finally, the mean and median values (in hundreds) for the average number of other audit firms serving clients in the same states as the auditor are 4.713 and 4.020, respectively.

I report the summary statistics for the conditional auditor-year sample and the state-year sample in Panels B and C of Table 2, respectively. On average, the conditional sample of auditors

[13] Not having a measure of sales at my disposal, I use the number of employees working for local clients of the auditor to determine the size of the market served by the auditor. Thus, the ratio of the auditor's market size to the total number of employees working for all clients in that state-year proxy for the market share of the auditor. I use these market shares to calculate audit market HHI values for a given state-year.

[14] The Big Six auditors represent a small portion of my sample, and the mean number of clients per year for these auditors is 1,300.

has higher M&A probability, more extensive exposure to the 150-Hour Rule, and more clients and states where the clients are served than the full sample of auditors. For the state-level sample, 7.1 percent of audit firms serving clients in a given state-year engage in M&A. On average, the state-level concentration is 0.139, and the state-industry-level concentration is 0.274.[15]

4. Results

4.1. Auditor-year analysis

I begin by describing the variation in the M&A likelihood and audit firms' exposure to the 150-Hour Rule over the sample period. For each year, Figure 3 reports the size-weighted average of M&A engagement across the sample firms in black. M&A engagement equals one in years when the auditor engages in M&A and zero otherwise. In this figure, the grey dashed line reports the size-weighted average number of states that adopted the 150-Hour Rule among the states where the auditor has clients. The figure shows the gradual increase in the M&A likelihood and the extent to which the average firm's locations are affected by the 150-Hour Rule.

To provide univariate evidence on the role of labor supply reductions in audit firms' M&A, I align firms in event time based on their first exposure to the 150-Hour Rule and plot the average M&A engagement for each of the four years before and four years after this initial exposure. I classify firms into three groups based on their ex-post exposure to the Rule: firms that reach above-median exposure, firms that face below-median exposure, and firms without exposure increase. Figure 4 shows the average M&A engagement for each of the three types of firms around the first increase in exposure to the 150-Hour Rule. This figure is a version of the parallel trends test outside the regression framework. There are no stark differences in M&A trends prior to the first exposure. At the same time, the first exposure to the Rule is associated with increased M&A activity and a

[15] I report the correlation matrices for the auditor-level and state-level samples in the online appendix.

more pronounced M&A boost for firms with above-median ex-post exposure to the Rule. This is comforting and provides a foundation for auditor-year-level analyses that contrast M&A engagement between high-exposure and low-exposure auditors.

Table 3, Panel A reports the results of the analysis of the regulation-induced labor supply changes on audit firm M&A activity. Columns 1-3 present the results for the logit regression in equation (1). Columns 4-6 show the results for the conditional logit regression with auditor fixed effects added to the specification in equation (1) estimated on the sample of auditors with variation in M&A activity over the sample period (at least one M&A and at least one year without an M&A).[16] Columns 2 and 5 (Columns 3 and 6) show the change in the M&A probability when auditor exposure to the corresponding regulation increases from no state to one state (from the sample minimum to the sample maximum of auditor exposure to the corresponding regulation).

Based on the marginal effect calculated in Column 2 of Table 3, Panel A for the logit model results, the first exposure to the 150-Hour Rule increases an auditor's M&A probability by 18.75% of the sample mean M&A probability. In addition, the marginal effects for the conditional logit regression (reported in Column 5 of Table 3, Panel A) suggest that as auditor exposure to the 150-Hour Rule increases from no state to one state, the M&A probability rises by 37.5% of the sample mean M&A probability.[17]

The general consistency of the findings between the full and conditional samples (Columns 1-3 and Columns 4-6) suggests that auditors dynamically change their M&A strategy in response to labor supply shocks. Therefore, the findings cannot be explained by a mere cross-sectional

[16] To add audit firm fixed effects, I run a conditional logit analysis. Conditional logit studies the distribution of M&A activity conditional on the total number of M&A per auditor. This analysis allows me to consistently estimate the coefficients in the model that includes auditor fixed effects for the sample of auditors with variation in M&A activity.
[17] The 18.75% (37.5%) change in the M&A probability in response to an increase in auditor exposure to the 150-Hour Rule is calculated as follows. I divide the estimate of 0.003 (0.045), reported in Column 2 (Column 5) of Table 3, Panel A, by the sample mean M&A probability of 0.016 (0.12) for the full (conditional) sample, reported in Panel A of Table 2, and then multiply by 100. The control variables are held at their mean values.

difference between auditors that both are highly exposed to the regulation and have a high M&A activity and auditors with low exposure to the regulation and low M&A activity. In other words, the results in Columns 4-6 show that when time-invariant auditor characteristics are held fixed, auditors change their M&A strategy over time as their exposure to the 150-Hour Rule increases.

In Panel B of Table 3, I report the results from robustness checks using alternative approaches, including correlated random effects logit, OLS, and Cox hazard model. The correlated random effects model reported in Column 1 has the advantage of estimating the coefficient on the 150-Hour Rule without making the conditional independence assumption embedded in the conditional logit estimation in Column 4 of Panel A (Wooldridge, 2019). The OLS model reported in Column 2 estimates the linear probability model with audit firm and year fixed effects included in the specification. Finally, the Cox hazard analysis simultaneously examines factors affecting M&A occurrences and their timing.[18] Across all methodologies, there is consistent evidence of an increase in audit firms' M&A when their exposure to the 150-Hour Rule increases.

4.2. Client location and M&A

M&A driven by decreases in labor supply likely connect audit firms that serve clients in the same states. Joining the accountant teams that are already licensed to serve local clients allows the merging audit firms to share the combined workload faster. I separate M&A between auditors into two groups: M&A with geographic overlap (at least one 150-Hour Rule state in common among the locations where the auditors serve clients) and M&A between auditors that do not have such overlap.

[18] To factor in potential heterogeneity in the baseline hazard with respect to firm size and firm geographic coverage, I estimate a stratified Cox hazard model by allowing the baseline hazard to vary depending on the number of states where the firm has clients and the number of other audit firms serving clients in the same states. I calculate the Schoenfeld residuals to test the validity of the proportional-hazards assumption and find that this assumption cannot be rejected (p-value of 0.52).

The first three columns of Table 4 present the results of this multinomial logit regression with the following outcomes for each year: no M&A, M&A with a geographic overlap in the affected states, and M&A without such an overlap. Column 1 compares M&A with a geographic overlap in the affected states to a no-M&A outcome, and Column 2 compares M&A without such a geographic overlap to a no-M&A outcome. Column 3 reports the statistical differences between the first two columns. I find more M&A joining auditors with a geographic overlap when auditors face a reduced labor supply. At the same time, other types of M&A are negatively associated with exposure to labor supply reductions. The difference between the effects of the 150-Hour Rule on these two types of M&A is statistically significant at the one percent level, as indicated in Column 3. Overall, these findings suggest that locally certified labor is important to achieve the benefits from M&A driven by labor supply shortages, as it allows the merging accountants to quickly share the combined workload without the delays caused by obtaining a local license.

4.3. Client industry and M&A

Another important factor that likely allows the merging audit firms to share the combined workload faster is an overlap in the accountants' expertise.[19] Merging with another auditor that serves clients in the same industries plausibly limits delays from employee training. I separate M&A into two categories: M&A increasing industry specialization (the merging auditors have at least one client industry in common) and M&A increasing industry diversification (the merging auditors do not share any client industries). I measure auditors' clients' industries based on the three-digit NAICS industry code reported by the clients.

Columns 4 and 5 of Table 4 show the results for a multinomial logit regression with the

[19] Tate and Yang (2024) and Lee et al. (2018) suggest that the relatedness of the human capital between the merging firms is an important aspect of M&A.

following outcomes for each year: no M&A, M&A increasing industry specialization, and M&A increasing industry diversification. The smaller sample size in these columns relative to columns 1-3 results from missing information on the M&A counterparties' client industries. Column 4 shows the coefficients comparing M&A that increase industry specialization to the no-M&A outcome, and Column 5 shows the coefficients comparing M&A that increase industry diversification to a no-M&A outcome. The findings suggest that reductions in labor supply are associated with M&A that increase audit firm specialization. I do not find a significant association between the 150-Hour Rule and diversifying M&A. However, the differences between the coefficients in Columns 4 and 5 are not statistically significant.

4.4. State-year analysis

To understand how labor supply reductions affect the local markets and the role of the local labor market tightness in firms' M&A incentives, I run state-level analyses.

4.4.1. Parallel trends analysis

I start the state-level analyses by testing the parallel trends assumption, which is critical to establishing the validity of the difference-in-difference analyses in this section. Figure 5 shows the state-level trends in M&A activity, measured as the share of audit firms in a state that engage in M&A, around the 150-Hour Rule adoption years. Consistent with Figure 4, which reports trends at the audit firm level, the leads and lags for the states' share of local auditors that engage in M&A show no significant differences in the pre-regulation M&A trends between the adopting states and the other states.[20] At the same time, after the adoption of the 150-Hour Rule, I find a significant

[20] I follow Barrios (2021) and report robustness tests for the staggered difference-in-difference design in the online appendix to address the potential bias in my estimates. In Figure OA 1, I plot each of the 2×2 DiD estimates and their weights in the Goodman-Bacon (2021) decomposition, the nonparametric approach in Callaway and Sant'Anna (2021) that reweights controls for each treated group, the weighted average of the cohort-specific estimates in an event-study

increase in the share of audit firms that serve clients in that state and engage in M&A.

4.4.2. The tightness of the accountant labor market and M&A

Table 5 presents the results for the state-year analysis of the labor supply changes and audit firm M&A activity using equation (2). Column 1 shows an increase in the share of audit firms that serve clients in a state and engage in M&A after the state adopts the 150-Hour Rule (t-statistic of 1.9). This result echoes the audit firm–level findings in Table 3. In columns 2 and 3, I split the sample based on how tight the accountant labor market is in the state.[21]

Column 2 of Table 5 shows the findings for the subsample of states with tight accountant labor markets (the number of local accountants and auditors relative to the number of local establishments is below the median). Column 3 presents the results for the subsample of states with less tight accountant labor markets (the number of local accountants and auditors relative to the number of local establishments is above the median). The findings in Columns 2 and 3 suggest that the labor supply–driven M&A activity among auditors is concentrated in states with tight accountant labor markets. The difference between the coefficients on the 150-Hour Rule indicator in columns 2 and 3 is statistically significant at the one percent level. These results are consistent with larger accounting labor markets absorbing the labor supply fluctuations caused by the labor supply reductions. At the same time, smaller accounting labor markets are more likely to experience a strong increase in accountant wages and shortages of accountants, increasing the attractiveness of the M&A strategy to audit firms.

design from Sun and Abraham (2021), and the "stacked regression" design in the spirit of Cengiz et al. (2019). The results consistently suggest that audit firms engage in more M&A after the 150-Hour Rule adoption.

[21] I lag the tightness measure for the sample split in columns 2 and 3 to prevent the 150-Hour Rule from confounding these values.

4.4.3. Audit firm size and M&A

Exposure to the labor reductions from the 150-Hour Rule can place a disproportionate burden on small auditors because CPAs in these firms often have limited access to specialized software and take on a considerable load of non-billable tasks due to the lack of designated administrators. I classify audit firms as large or small based on their PCAOB registration. Audit firms must register with PCAOB to prepare or play a substantial role in preparing an audit report for large companies (issuers, brokers, or dealers). As auditors of large companies likely have more resources than auditors serving only private clients, this size classification provides a reliable proxy of auditor size that does not rely on the number of EBP clients.

I categorize M&A into three groups: M&A between two small audit firms, M&A between a small and a large audit firm, and M&A between two large audit firms. Table 6 shows how the occurrences of these three types of M&A within a state depend on the state's adoption of the 150-Hour Rule and the tightness of the local labor market. The findings suggest that small audit firms engage in labor supply–driven M&A regardless of the local labor market's tightness. In other words, even in less tight labor markets, the pressure created by the 150-Hour Rule is significant enough to motivate small audit firms to merge. At the same time, large audit firms engage in labor supply–driven M&A only in tight labor markets. Therefore, unlike small audit firms, large audit firms appear to successfully address labor supply shortages in large markets of accountants. However, finding high-quality employees is likely more challenging in tight labor markets, which increases the attractiveness of M&A to large auditors.[22]

[22] Chaney et al. (2004) suggest that the differences in the structure of large and small firms contribute to the cost structure differences. This can add to the variation in these firms' optimal sizes.

4.4.4. Audit market concentration

Higher M&A activity among auditors resulting from a reduction in labor supply increases the market share served by the combined audit firm, likely adding to the local market concentration. In addition, higher accountant wages, resulting from a lower local labor supply, can become prohibitively costly for some auditors and cause them to exit the market. This can further increase local audit market concentration. This concentration increase will be particularly large at the state-industry level if economies of scale are larger for M&A that combine auditors with similar expertise. However, transitions and frictions taking place during M&A can result in a loss of clients, thinning out the combined market share of the merging auditors and increasing the market shares of non-merging auditors. Moreover, auditors facing reductions in labor supply can deliberately discontinue their relationship with some of their clients to address the shortage. Thus, whether the market concentration increases or decreases with a reduction in labor supply depends on the market shares of the merging auditors, auditors' exit from the market, and the extent of discontinuations in the client-auditor relationships for the merging auditors.

Table 7, Column 1 presents the results for the audit market concentration at the state level. In columns 2-4, I study concentration at the state-industry level.[23] Column 2 reports the results for the sample of state-industry markets. The findings in columns 1 and 2 show that the 150-Hour Rule has a positive effect on state and state-industry concentration within the audit markets. In economic terms, Column 1 of Table 7 suggests that after the 150-Hour Rule adoption, state concentration increases by 0.189 (0.438) of the (within-group) standard deviation of the state-level concentration. Column 2 shows that the adoption of the 150-Hour Rule increases state-industry

[23] I run the concentration analyses at the state-industry level for the sample of state-industries that include at least three audit firms to maintain a good power of the test. Small markets likely introduce greater noise because a single M&A in these markets can considerably boost the volatility in the outcome variable and thus decrease the power of the test.

concentration by 0.082 (0.108) of the (within-group) standard deviation of state-industry concentration.[24]

To understand whether industry tangibility matters for the effect of labor supply reductions on auditors' M&A, I split the state-industry sample based on the industry tangibility of the auditors' clients (columns 3 and 4 in Table 7).[25] The findings suggest that an increase in concentration resulting from the 150-Hour Rule is present in highly tangible industries, and the concentration increases by 0.210 (0.243) of the (within-group) standard deviation after the 150-Hour Rule adoption.[26] The coefficients on the 150-Hour Rule indicator in columns 3 and 4 are statistically different (t-statistic of 1.91). The importance of industry tangibility for the labor supply–driven concentration changes might reflect the extensive labor resources required for the on-site verification of fixed assets that firms in tangible industries often have. High tangibility can also be related to intricate cost accounting (as in the manufacturing industry) and long-term customer contracts (as in the oil and gas production industry), which further increase audit complexity.

4.4.5. The interaction between the 150-Hour Rule and the Mobility Provision

I incorporate the *interaction* between the 150-Hour Rule and the Mobility Provision in the UAA into the analysis. In 2006, AICPA and NASBA amended the UAA, allowing CPAs with a license from an equivalent state, or with individual qualifications substantially equivalent to those

[24] I divide the estimated coefficient of 0.021 (reported in Column 1) by 0.111 (the standard variation of the state-year concentration variable in Table 2, Panel C) to calculate this effect for state-year concentration. Similarly, I divide the coefficient of 0.012 (reported in Column 2) by 0.146. I also interpret the findings in terms of the within-group standard deviations, adjusting the concentration variables for state and year (state, industry, and year) fixed effects in Column 1 (Column 2) of Table 7, following Breuer and deHaan (2023).

[25] I allocate the following industries to the high-tangibility subsample: Manufacturing; Construction; Utilities; Transportation and Warehousing; Mining, Quarrying, and Oil and Gas Extraction; Waste Management; and Agriculture. The remaining industries comprise the low-tangibility subsample.

[26] To calculate this effect, I divide the estimated coefficient of 0.026 (reported in Column 3 of Table 7) by 0.124 (the standard deviation of the state-industry concentration variable for the tangible industry subsample). The number in parentheses is based on the within-group standard deviation of 0.107 in the denominator.

in the UAA, to practice out of state without obtaining another license, making a formal notification, or paying fees. The CPA certification criteria considered as the basis for comparison across states are as follows: 150 hours of education, the Uniform CPA Examination, and at least one year of experience. The Mobility Provision also subjects out-of-state CPAs to the automatic jurisdiction of the corresponding board of accountancy.[27]

The ability of CPAs to work for an employer outside their licensure state without obtaining an additional license facilitated their mobility across states. The Mobility Provision was adopted by states in a staggered pattern, which created time-series and cross-sectional variation in auditors' exposure to changes in accountants' mobility across the states. I describe the relative timing of the two regulations and the variation in the sample periods covered by each of the two regulations in Table OA4 of the online appendix.[28]

The Mobility Provision likely reduces the impact of the 150-Hour Rule on the local labor market. Thus, there is an interactive effect between the two regulations. As the Mobility Provision decreased the barriers for out-of-state CPAs to work for local audit firms, it effectively expanded the boundaries of the local labor market to include out-of-state CPAs. Therefore, the constraints imposed by the 150-Hour Rule are plausibly attenuated by the Mobility Provision, which likely reduces the attractiveness of the labor supply–driven M&A strategy to local audit firms.

Consistent with this prediction, I find a negative coefficient on the *interaction* between the two regulations. In Table 8, I include the Mobility Provision indicator and the interaction between the two regulations in the specifications from equations (2) and (3). In Column 1, I study the share of local audit firms that engage in M&A and report the negative coefficient on the interaction between the two regulations (t-statistic of 1.83). In Columns 2 and 3, I study concentration. While

[27] See Cascino et al. (2021) for more details about the staggered adoption of the Mobility Provision.
[28] I do not find a significant difference in states' M&A activity before the Mobility Provision becomes effective.

the coefficient on the interaction between the two regulations in the state-year analysis is insignificant (Column 2), the state-industry-year analysis results in a negative interactive effect between the 150-Hour Rule and the Mobility Provision (Column 3). Overall, I find that the expansion of the labor market boundaries caused by the Mobility Provision partially mitigates the effects of the 150-Hour Rule on the auditors' M&A activity and on the market concentration at the state-industry level.

I do not focus on the main effect of the Mobility Provision because it has two countervailing effects on the M&A activity of audit firms, which makes ex-ante predictions difficult. On the one hand, the Mobility Provision plausibly lowered labor costs and led to a decrease in optimal firm size. This effect would lower M&A activity after the Mobility Provision adoption. On the other hand, when the labor market boundaries expand, local firms might consolidate their power in the expanded market by merging. This relates to the recent literature on labor market concentration and monopsony, as M&A likely allow local firms to improve job differentiation and increase their monopsonistic power (Azar et al., 2022). The Mobility Provision's positive main (non-interactive) effect on auditors' M&A indicates that the latter effect dominates. Thus, facilitation of labor mobility can lower labor share by affecting employer concentration and making large firms even larger (Autor et al., 2020; Azar et al., 2020; Barkai, 2020; Benmelech et al., 2022). The importance of this topic is also reflected in the nascent literature arguing that 1) concentration in the labor market can decrease earnings and increase inequality, and 2) M&A oversight should factor the merging firms' monopsonistic power into the equation (Naidu et al., 2018; Hemphill and Rose, 2018; Marinescu and Hovenkamp, 2019; Rinz et al., 2022).

5. Conclusion

This paper informs the ongoing debate about the role of the 150-Hour Rule in the current accounting talent shortage and provides a more comprehensive understanding of this rule's implications. I show that labor supply reductions change the structure of the audit market, increasing audit firms' M&A activity and concentration in the market. Large auditors increase their M&A activity in tight labor markets when facing reductions in accountant supply. In contrast, small auditors experience greater challenges when dealing with talent shortages, and they engage in M&A even in less tight labor markets. Therefore, the 150-Hour Rule strongly affects small audit firms that serve private companies, which comprise a large part of the economy. Moreover, labor supply reductions increase the merging auditors' industry specialization and geographic concentration. Understanding these consequences of labor regulation is important for policymakers, and I show that attenuations of the labor supply reductions can mitigate the increases in auditors' M&A and concentration (GAO, 2003).

This paper adds to the broad literature on M&A drivers by showing that firm M&A decisions depend on labor supply. In addition, this analysis adds to the emerging literature on auditor growth by demonstrating that labor supply is an important factor to consider (Gong et al., 2016; Kitto, 2024). Moreover, the large sample of audit firms allows me to study the structural shifts in the whole audit market, including the small auditors that serve the large segment of the economy comprised of private companies (Minnis and Shroff, 2017; The Office of Advocacy of the SBA, 2019; Lisowsky and Minnis, 2020).

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Appendix A. Variable Definitions

Variable	Definition
Analysis at the auditor-year level	
$M\&A_{it}$	An indicator equal to one if audit firm *i* engaged in M&A in year *t*, zero otherwise.
$R150\ Exp_{it}$	The logarithm of one plus the number of states that adopted the 150-Hour Rule by year *t* among the states where auditor *i* has clients. For each auditor-year, the list of states where the auditor has clients is based on the states the auditor's clients reported in their Forms 5500 for the two previous years.
$\#Clients_{it-1}$	The logarithm of the total number of clients served by auditor *i* in year *t-1*.
$\#Client\ States_{it-1}$	The logarithm of the total number of states where auditor *i* served clients in years *t-1* and *t-2* (based on the states the auditor's clients reported in their Forms 5500).
$Client\ States'GDP_{it-1}$	The average real GDP (in trillions of chained 2012 dollars) across the states where auditor *i* serves clients. For each auditor-year, the list of states where the auditor has clients is based on the states the auditor's clients reported in their Forms 5500 for the two previous years. The data on Real Total Gross Domestic Product by state are collected by the U.S. Bureau of Economic Analysis and retrieved from FRED, the Federal Reserve Bank of St. Louis.
$\#OtherAuditors_{it-1}$	The average number of other audit firms (in hundreds) serving clients in the same states as auditor *i* in year *t-1* (the average is calculated across the states where auditor *i* serves clients). For each auditor-year, the list of states where the auditor has clients is based on the states the auditor's clients reported in their Forms 5500 for the two previous years.
$Small$	An indicator variable equal to one for audit firms not registered with PCAOB in any year of the sample period, zero otherwise.
$Large$	An indicator variable equal to one for audit firms that are registered with PCAOB in any year of the sample period, zero otherwise.

Analysis at the state-year level	
$M\&A\ Share_{st}$	The number of audit firms serving clients in state *s* that engaged in M&A in year *t*, scaled by the number of audit firms serving clients in state *s* in year *t-1*. For each auditor-year, the list of states where the auditor has clients is based on the states the auditor's clients reported in their Forms 5500 for the two previous years.
$Concentration_{st}$	I use two concentration measures: state-year concentration and state-industry-year concentration. Since I do not have a measure of sales, I use the number of employees working for local clients to determine the size of the market the auditor serves. State-year audit market concentration is the Herfindahl-Hirschman Index, where for a given state-year, I proxy for the market share of an auditor using the number of employees working for the auditor's local clients relative to the total number of employees working for all clients in that state-year. I use a similar approach to calculate state-industry-year concentration values, with industries defined by two-digit NAICS codes.
$R150_{st}$	An indicator equal to one if state *s* adopted the 150-Hour Rule by year *t*.
$Mobility_{st}$	An indicator equal to one if state *s* adopted the Mobility Provision by year *t*.
GDP_{st-1}	Real GDP (in trillions of chained 2012 dollars) in state *s* and year *t-1*. Data on Real Total Gross Domestic Product by state are collected by the U.S. Bureau of Economic Analysis and retrieved from FRED, the Federal Reserve Bank of St. Louis.
$\#Auditors_{st-1}$	The logarithm of the number of audit firms serving clients in state *s* and year *t-1*.
$Labor\ Tightness_{st-1}$	The ratio of the total employment of accountants and auditors to the number of establishments. I use the BLS Occupational Employment Statistics data on the total employment of accountants and auditors (code 13-2011) and the Census data on the number of establishments. The Occupational Employment Statistics collected by the U.S. Bureau of Labor Statistics can be found here: https://www.bls.gov/oes/current/oessrcst.html. The data on establishments collected by the Census Bureau can be found here: https://www.census.gov/programs-surveys/susb.html.
$Tight\ Labor\ Market_{st-1}$	An indicator equal to one if *Labor Tightness* is above the sample median and zero otherwise.
$Acct.Employment_{st-1}$	The number of accountants and auditors (in millions) employed in state *s* in year *t-1*. The source of these data is the Bureau of Labor Statistics.

Appendix B. Form 5500 Data

Under the Employee Retirement Income Security Act of 1974 (ERISA) and the Internal Revenue Code, the employee benefit plan (EBP) sponsor is required to file an annual report of the plan's financial condition, investments, and operations.[29] ERISA requires sponsors of employee plans that cover 100 or more plan participants at the beginning of the plan year to file Form 5500 annually; sponsors of "funded" employee plans are required to file Form 5500 annually, regardless of the number of participants.[30] Generally speaking, for any employee plan with more than 100 participants at the beginning of the plan year, ERISA requires the sponsor to attach separate audited financial statements to Form 5500. Moreover, under certain plan investment and bonding conditions, a plan with fewer than 100 participants may still require an audit. An independent CPA conducts this audit to check that the financial statements prepared by plan management are presented fairly using generally accepted auditing standards.

The annual report consists of Form 5500, schedules, financial statements, and the auditor's report in accordance with the U.S. GAAP, if applicable. Form 5500 includes (but is not limited to) the sponsor's address, the NAICS industry, the number of plan participants, and the plan's auditor. EBP types subject to ERISA include (but are not limited to) profit-sharing plans; 401(k) plans; money purchase plans; stock bonus plans; certain annuity arrangements; individual retirement arrangements established by employers; church pension plans that elect to be covered by ERISA; and certain welfare benefit plans that provide benefits, including medical, dental, life insurance, and severance pay.

[29] The deadline for filing an annual report is 7 months after the plan year end.

[30] A "funded" plan is one where funds are set aside in a custodial account or trust fund for the exclusive benefit of the plan participants. Most welfare plans covered under ERISA, however, are not funded. If the plan sponsor of a self-insured welfare plan simply funds the plan out of its general assets and covers fewer than 100 participants, then no Form 5500 filing is required.

The Department of Labor uses a computerized line-by-line check to identify errors and omissions in Forms 5500. Furthermore, the Employee Benefits Security Administration reviews the audit reports of selected plans to ensure the quality of ERISA audits. If there are deficiencies, the Department of Labor can reject the filing. To enforce the filings' timeliness, the maximum penalty for a missing or deficient auditor report is $1,100 a day (with an overall maximum per filing of $50,000).

Figure 1. The trend in M&A over the sample period

This figure shows the trend in M&A from 2000 to 2017. The numbers reported on the light grey (upper) part of the bars reflect the number of M&A deals between similarly sized auditors (two small auditors or two large auditors). The numbers reported on the dark grey (lower) part of the bars reflect the number of M&A deals connecting a small and a large auditor. I classify an auditor as large if it is registered with PCAOB in any year of the sample period.

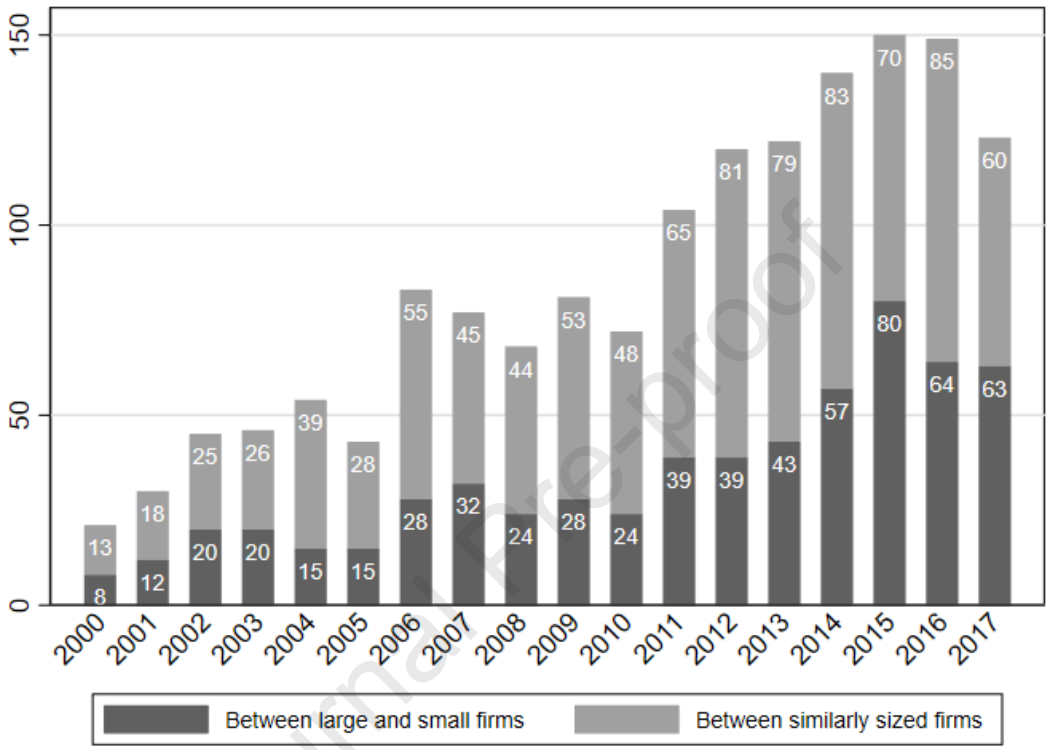


Figure 2. Adoption years for the 150-Hour Rule

This figure shows the timing of 150-Hour Rule adoptions by states.

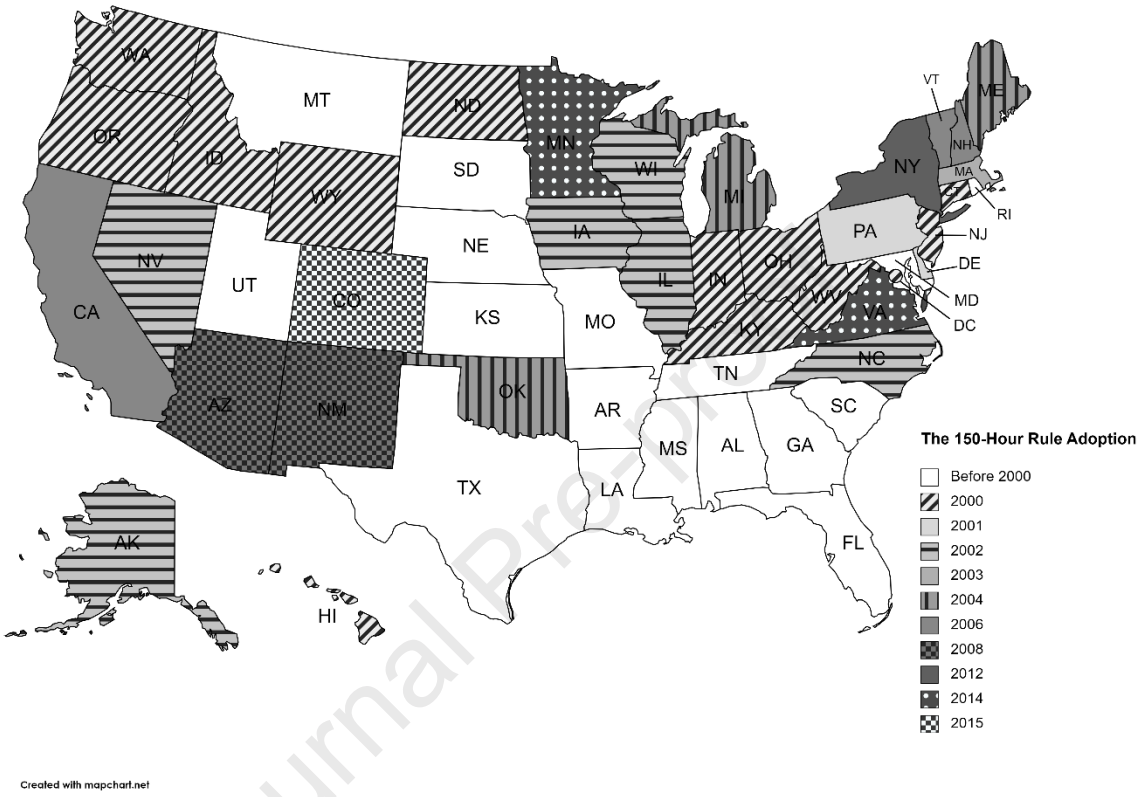


Figure 3. M&A likelihood and the number of R-150 states with clients

This figure shows the trends in audit firms' M&A likelihood and the number of states with the 150-Hour Rule among the states where auditors serve clients. The black line reports the size-weighted average engagement in M&A across the sample firms for a given year, multiplied by 100. A firm's M&A engagement equals one in a given year if the firm engaged in M&A that year and zero otherwise, and the size reflects the number of clients. The grey dashed line reports the size-weighted average across the sample audit firms for the number of states where the 150-Hour Rule is in effect and where the auditor has clients.

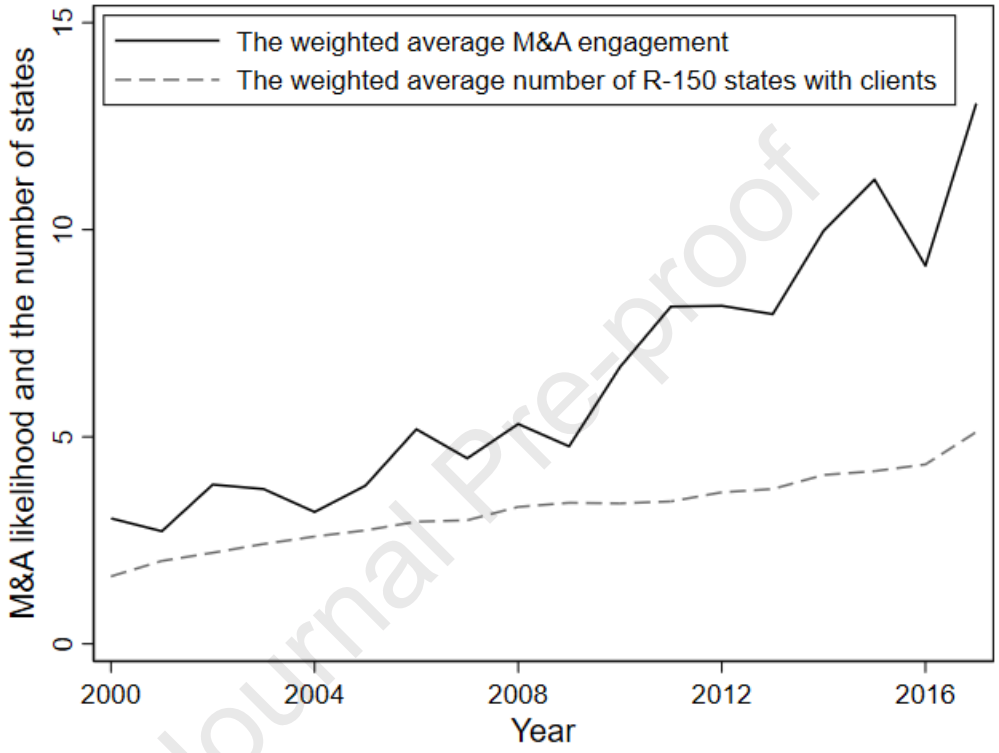


Figure 4. M&A likelihood around the first exposure to the 150-Hour Rule

This figure uses audit firm-year-level data to show firms' M&A engagement trends around their first exposure to the 150-Hour Rule. The horizontal axis reports the years relative to the first exposure to the 150-Hour Rule. The vertical axis reflects the average M&A engagement by audit firms in the sample. I align firms in event time based on their first exposure to the 150-Hour Rule and calculate the average M&A engagement for three groups of audit firms based on the ex-post level of exposure to the Rule: firms that reach above-median exposure (the black line), firms that reach below-median exposure (the grey dashed line), and firms without exposure increases (the grey short dashed line). The middle of the sample period serves as year 0 for the latter group. While there are no stark differences in M&A trends before the first exposure to the 150-Hour Rule, the first exposure to the Rule is associated with increased M&A activity. Moreover, firms with above-median exposure seem to increase M&A activity more than those with below-median exposure.

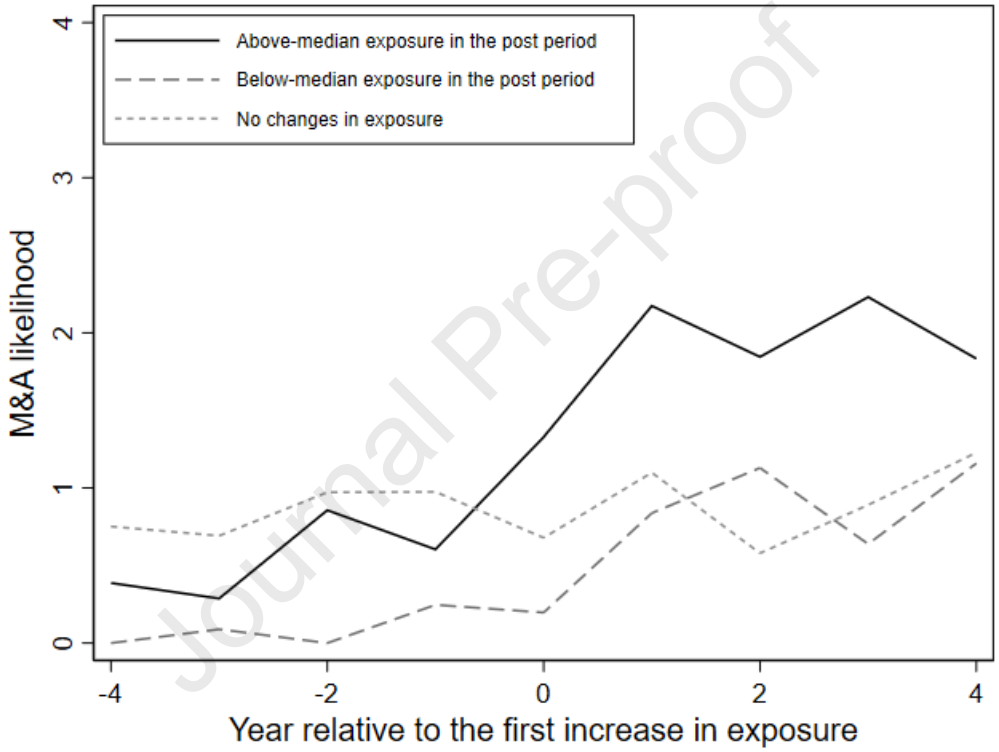


Figure 5. Parallel trends analysis

This figure tests the parallel trends assumption for the state-level difference-in-difference analyses. The points reflect the coefficients on the leads and lags of the 150-Hour Rule adoption years. The bands extending from the markers reflect the 90% confidence intervals. The lack of significance of the coefficients in the pre-adoption period suggests that the adopting states and the non-adopting states have similar M&A activity trends. This finding mitigates concerns that intrinsic differences in M&A activity across the states affect the adoption timing.

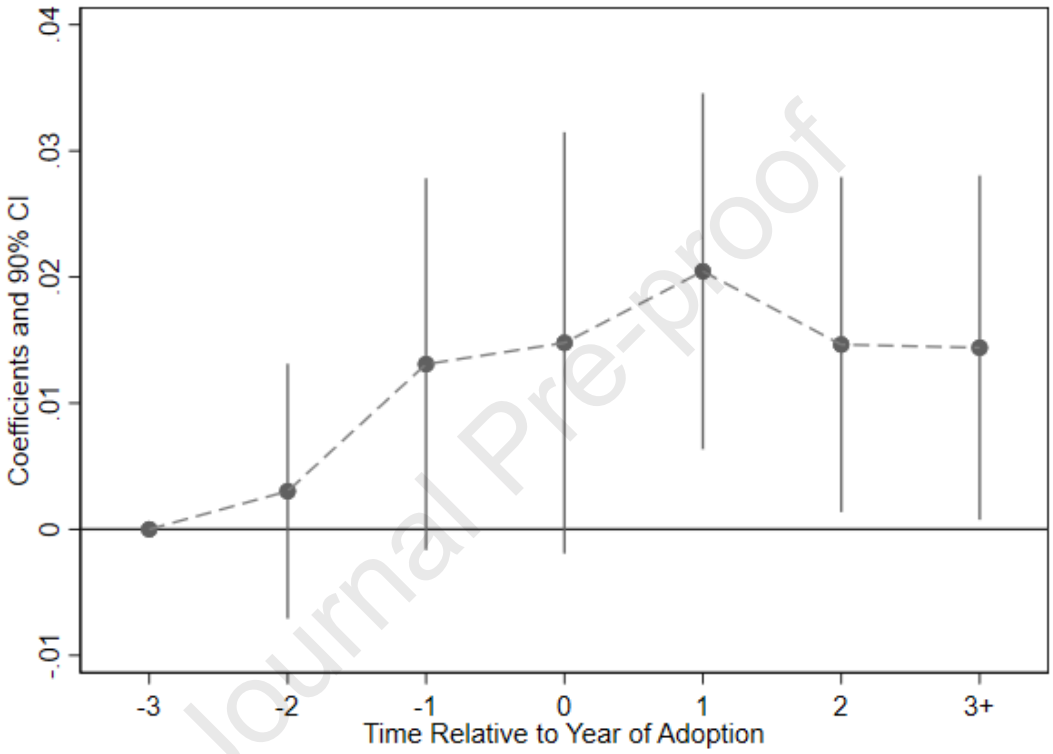


Table 1. Sample selection

This table presents the sample selection steps used to construct the final sample of 117,491 auditor-year observations from 2000-2017; the conditional sample of 15,433 observations, which consists of auditors with variation in their M&A activity (at least one year with M&A and at least one year without M&A); and the state-year sample of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. The list of auditor names in Audit Analytics, which I match to the Form 5500 data, includes both auditors with public clients and auditors with only private clients.

Panel A: ***Auditor-year sample***	*N obs.*
Auditor-years from F5500 forms matched by auditor name to Audit Analytics	142,512
Observations with a single record of a client-auditor relationship	- 2,546
Observations with missing controls	-24,987
Full sample:	*117,491*
The number of audit firms:	*14,657*
The number of auditor-years with an M&A deal:	*1,878*
Observations for auditors without variation in M&A activity over the sample period	-102,058
Conditional sample (auditors with variation in M&A activity):	*15,433*
The number of audit firms:	*1,360*
The number of auditor-years with an M&A deal:	*1,855*
Panel B: ***State-year sample***	
Full auditor-year sample collapsed to state-years with non-missing previous year data on auditors	*867*

Table 2. Summary statistics

This table provides summary statistics for the variables used in the analyses. Panel A shows the statistics for the full auditor-year sample of 117,491 observations. Panel B reflects the conditional sample of 15,433 observations and includes auditors with variation in their M&A activity (at least one year with M&A and at least one year without M&A). Panel C corresponds to the state-year sample of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. See Appendix A for variable definitions.

Panel A: *Full sample*

	N	*Mean*	*S.D.*	*Min*	*P25*	*Median*	*P75*	*Max*
M&A	117,491	0.016	0.125	0	0	0	0	1
R-150 Exp	117,491	0.723	0.464	0	0.693	0.693	0.693	2.303
# Clients	117,491	1.043	1.099	0	0	0.693	1.609	4.466
# Client States	117,491	0.307	0.534	0	0	0	0.693	3.219
Client States' GDP	117,491	0.671	0.543	0.022	0.274	0.502	0.865	2.501
# Other Auditors	117,491	4.713	2.926	0.47	2.28	4.02	6.315	11.52

Table 2. *(continued)*

Panel B: *Conditional sample*								
	N	*Mean*	*S.D.*	*Min*	*P25*	*Median*	*P75*	*Max*
M&A	15,433	0.120	0.325	0	0	0	0	1
R-150 Exp	15,433	1.004	0.613	0	0.693	0.693	1.386	2.303
# Clients	15,433	2.023	1.330	0	1.099	1.946	2.996	4.466
# Client States	15,433	0.729	0.765	0	0	0.693	1.099	3.219
Client States' GDP	15,433	0.617	0.437	0.024	0.322	0.51	0.765	2.501
# Other Auditors	15,433	4.522	2.499	0.47	2.65	3.993	5.96	11.52
Panel C: *State sample*								
	N	*Mean*	*S.D.*	*Min*	*P25*	*Median*	*P75*	*Max*
M&A Share	867	0.071	0.042	0.016	0.038	0.061	0.094	0.182
Concentration (state)	867	0.139	0.111	0.039	0.073	0.106	0.164	0.770
Concentration (state-industry)	14,886	0.274	0.146	0.056	0.155	0.256	0.379	0.856
R-150	867	0.879	0.326	0	1	1	1	1
GDP	867	0.282	0.293	0.028	0.072	0.178	0.38	1.388
# Auditors	867	5.058	0.883	2.996	4.443	5.124	5.737	6.683
Acct. Employment	867	0.019	0.019	0.002	0.005	0.012	0.026	0.071
Labor Tightness	867	0.138	0.060	0.060	0.110	0.131	0.154	0.545
Mobility	867	0.559	0.497	0	0	1	1	1

Table 3. M&A probability and labor supply

This table presents the results of the logit (Columns 1-3) and conditional logit (Columns 4-6) regressions in equation (1). The sample used in the conditional logit regression is restricted to auditors with at least one year with M&A and at least one year without M&A. Columns 2 and 5 (Columns 3 and 6) show the change in the M&A probability when auditor exposure to the corresponding regulation increases from no state to one state (from the sample minimum to the sample maximum of auditor exposure to the regulations). The constant is not reported. See Appendix A for variable definitions. Reported below the M&A probability changes in Columns 2-3 and 5-6 are z-statistics calculated using the delta method. Standard errors are clustered by auditor. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

Panel A: *Main results and marginal effects*

	Logit Coefficient	*ΔPr{M&A}: Exposure change*		*Conditional Logit Coefficient*	*ΔPr{M&A}: Exposure change*	
		no state to one state	*sample Min to Max*		*no state to one state*	*sample Min to Max*
R-150 Exp	0.612***	0.003***	0.019***	0.999***	0.045**	0.085***
	(4.11)	(5.23)	(2.95)	(3.55)	(2.27)	(2.68)
# Clients	0.331***			-0.108		
	(8.94)			(-1.38)		
# Client States	0.385***			-0.526**		
	(3.44)			(-2.41)		
Client States' GDP	-0.520***			0.133		
	(-3.21)			(0.47)		
# Other Auditors	0.151***			-0.006		
	(5.04)			(-0.12)		
N	117,491			15,433		
Pseudo R2	0.129			0.162		
P-value for Wald $\chi 2$	0.000			0.000		
Auditor FE	No			Yes		
Year FE	Yes			Yes		

Panel B: *Robustness tests*

	Correlated Random Effects Logit	*OLS*	*Hazard Model*
R-150 Exp	0.627***	0.005*	0.690***
	(4.29)	(1.71)	(5.54)
# Clients	0.292***	-0.006***	0.517***
	(7.70)	(-3.57)	(14.79)
# Client States	0.363***	0.016***	0.071
	(3.29)	(5.61)	(0.60)
Client States' GDP	-0.449***	0.000	-0.530***
	(-2.91)	(0.08)	(-3.39)
# Other Auditors	0.134***	-0.000	0.147***
	(4.65)	(-0.06)	(5.05)
N	117,491	116,041	101,128
Pseudo R^2	-	0.115	0.031
P-value for Wald $\chi 2$	0.000	0.000	0.000
Auditor FE	No	Yes	No
Year FE	Yes	Yes	Yes

Table 4. Overlap in client locations and industries between merging auditors

Columns 1-3 correspond to a multinomial logit regression with three outcomes: no M&A, M&A with geographic overlap (at least one 150-Hour Rule state in common among the locations where the auditors serve clients), and M&A between auditors that do not have such overlap. Columns 4-6 correspond to the multinomial logit regressions with three outcomes: no M&A, M&A that join auditors with clients in the same industries (industry specialization), and M&A that join auditors with no overlap in their clients' industries (industry diversification). Column 3 (6) reports the statistical difference between the coefficients in Columns 1 and 2 (4 and 5). The smaller sample size in columns 4-5 results from missing information on M&A counterparties' client industries. See Appendix A for variable definitions. Standard errors are clustered by auditor. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	Geographic overlap in affected states	*No geographic overlap in affected states*	*Difference*	*Industry overlap (Specialization)*	*No industry overlap (Diversification)*	*Difference*
R-150 Exp	2.038***	-1.601***	3.639***	0.443***	0.448	-0.005
	(10.90)	(-7.16)	(12.82)	(2.66)	(1.09)	(-0.01)
# Clients	0.301***	0.410***		0.346***	0.012	
	(7.53)	(5.42)		(8.12)	(0.09)	
# Client States	-0.504***	1.661***		0.602***	0.042	
	(-3.45)	(9.57)		(4.68)	(0.13)	
Client States' GDP	-0.513***	-0.439		-0.470***	-0.722	
	(-2.82)	(-1.29)		(-2.63)	(-1.12)	
# Other Auditors	0.129***	0.181***		0.133***	0.188*	
	(3.76)	(2.95)		(3.95)	(1.69)	
N		117,491			117,127	
Pseudo R^2		0.142			0.122	
P-value for Wald $\chi 2$		0.000			0.000	
Auditor FE		No			No	
Year FE		Yes			Yes	

Table 5. State M&A activity and the size of the accountant labor market

This table presents the results for the OLS state-year analysis in equation (2). Column 1 models the share of auditors that engage in M&A and serve clients in a state. Columns 2 and 3 repeat the analysis in Column 1 for the subsample of states with tight labor markets of accountants (below-median values of *Labor Tightness*) and those with non-tight markets of accountants (above-median values of *Labor Tightness*), respectively. The sample consists of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. The constant is not reported. See Appendix A for variable definitions. t-statistics are reported below the estimated coefficients. Standard errors are clustered by state. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	M&A	*M&A in tight markets of accountants*	*M&A in non-tight markets of accountants*	*Difference*
R-150	0.012*	0.052***	-0.000	0.052***
	(1.90)	(10.04)	(-0.06)	(9.10)
GDP	-0.144***	-0.092	-0.085***	
	(-4.98)	(-0.56)	(-5.04)	
# Auditors	0.036***	0.048***	0.029**	
	(2.83)	(2.85)	(2.16)	
Acct. Employment	-0.892***	-1.464	-0.420	
	(-3.16)	(-1.60)	(-1.50)	
N	867	442	424	
R^2	0.80	0.81	0.84	
State FE	Yes	Yes	Yes	
Year FE	Yes	Yes	Yes	

Table 6. Size of audit firms engaged in M&A and local labor market tightness

This table presents the results of the OLS state-year analyses that classify M&A into groups based on the auditors' size. Columns 1, 2, and 3 reflect M&A dynamics for three types of M&A: M&A between two small audit firms, M&A between a small and a large audit firm, and M&A between two large audit firms, respectively. The sample consists of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. The constant is not reported. See Appendix A for variable definitions. t-statistics are reported below the estimated coefficients. Standard errors are clustered by state. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	M&A between two small firms	*M&A between a small and a large firm*	*M&A between two large firms*
R-150	0.002***	0.001	-0.002
	(2.71)	(0.25)	(-0.58)
R-150×Tight Labor Market	0.001	0.023**	0.018**
	(0.60)	(2.32)	(2.65)
Tight Labor Market	0.001	-0.024**	-0.022***
	(0.37)	(-2.34)	(-3.19)
N	867	867	867
R^2	0.42	0.76	0.77
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 7. Labor supply changes and audit market concentration

This table presents the results of the OLS state-year analysis of audit market concentration in equation (3). Column 1 models the state-level audit market concentration, and Column 2 models the state-industry-level concentration, using the two-digit NAICS sector classification. Column 3 shows the results of state-industry concentration analysis for the subsample of highly tangible industries, while Column 4 shows the results for the subsample of low-tangibility industries. The subsample of highly tangible industries includes Manufacturing; Construction; Utilities; Transportation and Warehousing; Mining, Quarrying, and Oil and Gas Extraction; Waste Management; and Agriculture. The remaining industries comprise the subsample of industries with low tangibility. The state-level sample consists of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. The constant is not reported. See Appendix A for variable definitions. t-statistics are reported below the estimated coefficients. Standard errors are clustered by state. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	State Concentration	*State-industry Concentration*		
		Full Sample	High-tangibility Industries	Low-tangibility Industries
R-150	0.021**	0.012**	0.026***	0.005
	(2.28)	(2.19)	(2.78)	(0.71)
GDP	-0.100*	-0.183***	-0.153**	-0.198***
	(-1.74)	(-4.85)	(-2.59)	(-4.75)
# Auditors	-0.003	-0.012	-0.015	-0.010
	(-0.06)	(-0.94)	(-0.81)	(-0.64)
Acct. Employment	-0.341	0.397	0.369	0.407
	(-0.46)	(0.99)	(0.51)	(1.00)
N	867	14,886	5,245	9,641
R^2	0.82	0.42	0.48	0.42
State FE	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 8. M&A activity and attenuations of labor supply reductions

This table presents the results of the OLS analyses that include the interaction between the Mobility Provision and the 150-Hour Rule and the main effect of the Mobility Provision in the specification. Column 1 reports the state-year analysis of the M&A activity, column 2 reports the state-year analysis of concentration, and column 3 reports the state-industry-year analysis of concentration. The state-year sample consists of 867 state-year observations with available prior-year data on auditors for the 50 U.S. states and Washington D.C. The constant is not reported. See Appendix A for variable definitions. t-statistics are reported below the estimated coefficients. Standard errors are clustered by state. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	M&A	*State Concentration*	*State-industry Concentration*
R-150	0.015**	0.021*	0.014**
	(2.08)	(1.72)	(2.46)
R-150 × Mobility	-0.009*	0.001	-0.009**
	(-1.83)	(0.05)	(-2.18)
Mobility	0.014**	0.007	0.005
	(2.54)	(0.49)	(1.06)
N	867	867	14,619
R^2	0.80	0.82	0.36
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Industry FE	No	No	Yes
Year FE	Yes	Yes	Yes

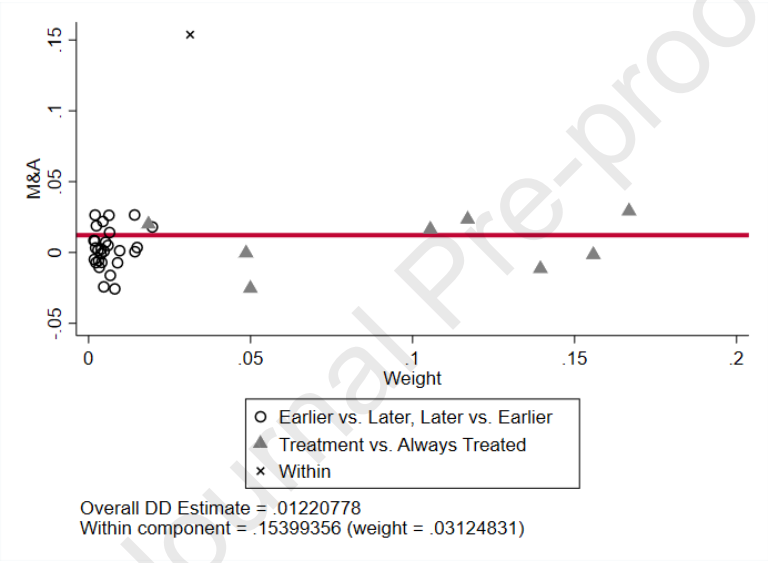
Online Appendix

Labor Supply and M&A in the Audit Market

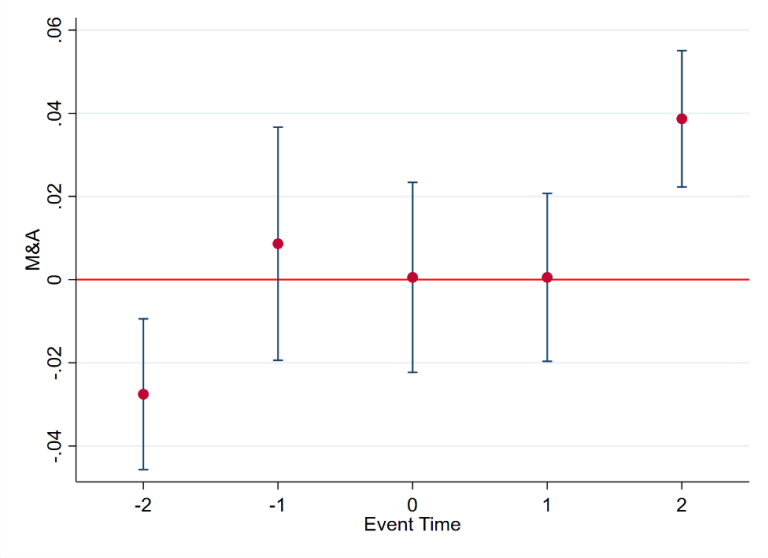
Figure OA1. Robustness tests for the staggered difference-in-difference analysis

Panel A plots each of the 2×2 difference-in-difference estimates and their weights in the Goodman-Bacon (2021) decomposition. Panel B shows the findings for the nonparametric approach in Callaway and Sant'Anna (2021) that reweights controls for each treated group. Panel C reports the weighted average of the cohort-specific estimates in an event-study design from Sun and Abraham (2021). Panel D shows the results for the "stacked regression" design following Cengiz et al. (2019).

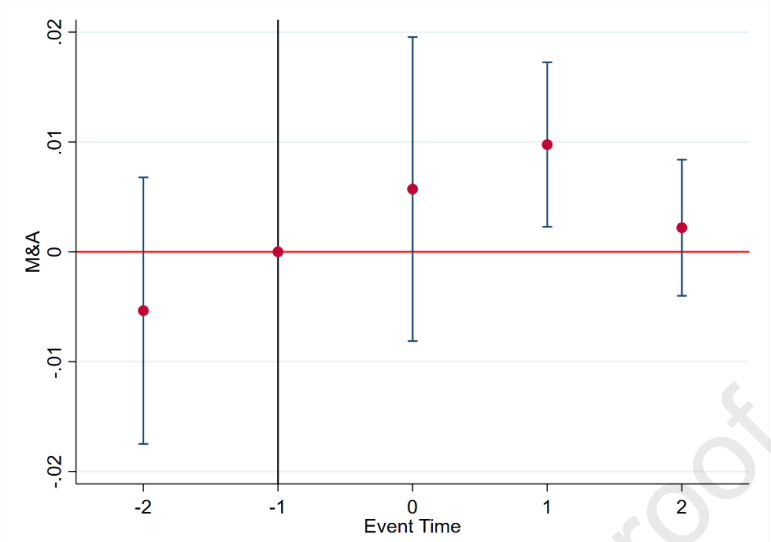
Panel A: Goodman-Bacon (2021)



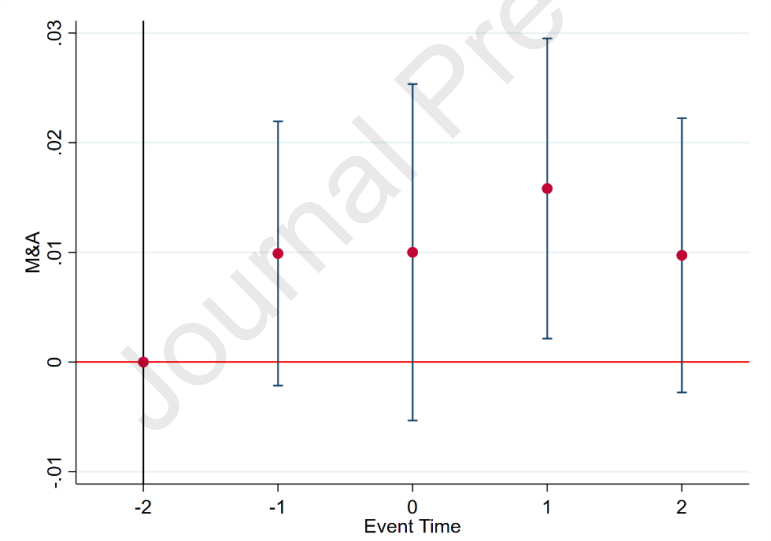
Panel B: Callaway and Sant'Anna (2021)



Panel C: Sun and Abraham (2021)



Panel D: Cengiz et al. (2019)



With respect to the Goodman-Bacon (2021) decomposition presented in Panel A, the components contributing to the two-way fixed effects (TWFE) difference-in-difference estimate are as follows:

	DiD	*Weight*
Timing groups (Earlier vs. Later, Later vs. Earlier)	0.005	0.167
Treatment vs. Always Treated	0.008	0.802
Within	0.154	0.031

The TWFE difference-in-difference estimate is 0.012. Most of this estimate (80.2%) comes from the comparisons between the states that adopt the 150-Hour Rule during the sample period against the always-treated states (many states adopt the 150-Hour Rule before the beginning of my sample period). The average difference-in-difference estimate for this type of comparison is 0.008.

Timing effects stemming from the comparisons of two states treated at different points in time during the sample period account for 16.7% of the TWFE estimate. The average difference-in-difference estimate for this type of comparison is 0.005.

The variation in the always-treated group (the "within" residual) contributes to 3.1% of the TWFE estimate. The average difference-in-difference estimate is 0.154.

The large standard errors in Panels B, C, and D might reflect the uncertainty regarding the timing of M&A occurrences. Completion of M&A takes at least a few months and might reach a year for some deals (Greenwood et al., 1994; Putney and Sinkin, 2015). Therefore, disaggregation of M&A in the event time analyses might contribute to the measurement issues.

Table OA1. Correlation matrices

This table presents the correlation matrices for the full auditor-year sample and the state-year sample.

Panel A: *Full sample*

	M&A	*R-150 Exp*	*# Clients*	*# Client States*	*Client States' GDP*	*# Other Auditors*
M&A	1	0.11	0.10	0.12	0.01	0.00
R-150 Exp	0.14	1	0.48	0.77	-0.25	-0.28
# Clients	0.14	0.56	1	0.60	-0.01	-0.04
# Client States	0.16	0.79	0.70	1	-0.04	-0.07
Client States' GDP	-0.01	-0.36	-0.06	-0.14	1	0.95
# Other Auditors	-0.01	-0.37	-0.08	-0.12	0.92	1

Panel B: *State sample*

	M&A Share	*Concent-ration*	*R-150*	*Mobility*	*GDP*	*# Auditors*	*Acct. Employ-ment*
M&A Share	1	0.18	0.20	0.55	-0.37	-0.41	-0.35
Concentration	0.17	1	0.07	-0.17	-0.56	-0.58	-0.55
R-150	0.17	0.10	1	0.20	-0.03	-0.05	-0.05
Mobility	0.49	-0.10	0.20	1	0.13	0.08	0.13
GDP	-0.35	-0.35	-0.13	0.06	1	0.96	0.98
# Auditors	-0.48	-0.42	-0.07	0.07	0.82	1	0.95
Acct. Employment	-0.35	-0.38	-0.13	0.08	0.97	0.85	1

Table OA2. Labor supply changes and professional fees

This table presents the results of the OLS auditor-year analyses explaining professional fees that auditors' clients report in their Forms 5500 with the auditors' 150-Hour Rule exposure and the controls from equation (1). Column 1 models the maximum level of professional fees across the auditor's clients and shows that they increase by 18.6% of the mean value of this variable (a $12,732 increase relative to the $68,570 mean value). This translates into an $8,825 increase in maximum professional fees following the auditor's first exposure to the 150-Hour Rule. Column 2 models the total professional fees across the auditor's clients and suggests that these fees increase by 33.9% of the total fees' mean value (a $58,179 increase relative to the $171,534 mean value). This translates into a $40,326 increase in total professional fees from the first exposure to the Rule. One caveat of these analyses is that professional fees reported in Form 5500 filings include not only the auditor's fees but also the actuarial, legal, and valuation service fees. Therefore, interpreting these findings as evidence that auditors exposed to the 150-Hour Rule pass on some of the increased costs to their clients hinges on the assumption that changes in actuarial, legal, or valuation services costs do not drive the results. The sample consists of the firm-year observations with available data on professional fees as reflected in the clients' Form 5500 filings. The constant is not reported. See Appendix A for the definitions of the control variables. t-statistics are reported below the estimated coefficients. Standard errors are clustered by auditor. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	Professional Fees	
	Max(Fees)	*Total(Fees)*
R-150 Exp	12.732***	58.179***
	(2.64)	(4.53)
# Clients	32.241***	105.238***
	(12.18)	(11.85)
# Client States	19.925***	56.566***
	(3.90)	(4.06)
Client States' GDP	5.307	16.444
	(0.94)	(1.24)
# Other Auditors	-0.357	-1.951
	(-0.30)	(-0.64)
N	98,059	98,059
R^2	0.73	0.79
Firm FE	Yes	Yes
Year FE	Yes	Yes

Table OA3. Top 100 audit firms' employment changes and the 150-Hour Rule exposure

This table presents the results of the OLS auditor-year analyses explaining the top 100 auditors' employment numbers with their exposure to the 150-Hour Rule and the controls from equation (1). Column 1 models the percentage change in professionals employed by the top 100 auditors, and column 2 models the percentage change in other employees (I back up the employment changes for other employees from the numbers reported in Accounting Today's top 100 tables). The findings suggest that the first exposure to the 150-Hour Rule is associated with a lower percentage change in professionals by 0.54 of the standard deviation or 0.7 of the within-group standard deviation (taking into account the fixed effects structure). At the same time, the first exposure to the 150-Hour Rule is associated with a higher percentage change in other employees by 0.35 of the standard deviation or 0.45 of the within-group standard deviation (taking into account the fixed effects structure). The intersection of my sample with the employment data in the Accounting Today tables determines the sample size in columns 1 and 2. The constant is not reported. See Appendix A for variable definitions. t-statistics are reported below the estimated coefficients. Standard errors are clustered by auditor. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively.

	Change in Professionals, %	*Change in Other Employees, %*
R-150 Exp	-20.106***	4.865**
	(-3.44)	(2.45)
# Clients	3.104	-0.551
	(1.16)	(-0.61)
# Client States	11.945**	-2.751
	(2.49)	(-1.59)
Client States' GDP	-17.107**	4.713
	(-2.46)	(1.58)
# Other Auditors	1.992	-0.271
	(1.38)	(-0.60)
N	1,035	986
R^2	0.42	0.40
Auditor FE	Yes	Yes
Year FE	Yes	Yes

Table OA4. Summary statistics for the number of years that the two regulations were in place

In this table, I report the summary statistics describing the relative timing of the adoptions for the 150-Hour Rule and the Mobility Provision. Within my sample period, 2000-2017, most states adopted the 150-Hour Rule first:

- 42 states adopted the 150-Hour Rule before the Mobility Provision: FL, TN, UT, AL, MS, LA, TX, SC, KS, MT, AR, GA, SD, NE, RI, MD, MO, IN, CT, ID, KY, WA, WV, ND, NJ, OR, WY, DC, WI, IL, IA, NC, NV, AK, MA, ME, MI, OK, AZ, NM, MN, NY,
- Eight states adopted the Mobility Provision before the 150-Hour Rule: OH, CA, PA, DE, NH, VT, VA, and CO.
- Hawaii adopted the 150-Hour Rule but did not adopt the Mobility Provision.

In Panel, I report the summary statistics for the 42 states that adopted the 150-Hour Regulation before they adopted the Mobility Provision. In Panel B, I report the summary statistics for the eight states that adopted the Mobility Provision first. The rows in Panel A (B) correspond to the number of years during my sample period with only the 150-Hour Rule (the Mobility Provision) and the number of years with both regulations.

Panel A: 42 states that adopted the 150-Hour Rule before the Mobility Provision

	N	***Mean***	***S.D.***	***Min***	***P25***	***P50***	***P75***	***Max***
150-Hour Rule	42	7.6	2.0	2	7	8	9	12
Both regulations	42	9.4	1.15	6	9	9	10	12

Panel B: 8 states that adopted the Mobility Provision before the 150-Hour Rule

	N	***Mean***	***S.D.***	***Min***	***P25***	***P50***	***P75***	***Max***
Mobility	8	4	2.4	0	2.5	4.5	5.5	7
Both regulations	8	7.1	5.2	3	4	5	9	18

On average, across the 42 states that adopted the 150-Hour Rule before the Mobility Provision (Panel A), there are 7.6 years with only the 150-Hour Rule. For these states, the number of years before the Mobility provision varies from two (Minnesota) to twelve (D.C.).

On average, across the eight states that adopted the Mobility Provision first (Panel B), there are four years with only the Mobility Provision before the 150-Hour Rule gets adopted. For these states, the number of years before the 150-Hour Rule varies from zero (Ohio) to seven (Colorado).