

Building Human Capital: The Influence of Workplace Transparency*

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Abstract

This paper examines how greater workplace transparency affects firms' ability to attract talent. Leveraging state-level policies that limit the use of Non-Disclosure Agreements (NDAs) to suppress employee discussions of workplace issues, we show that after the enactment of these policies, workplace safety and other working conditions improve and that job vacancies are filled more quickly, indicating improvement in firms' ability to attract talent. Additional analyses document better firm performance among firms in affected states. Overall, our results are consistent with a lack of workplace transparency leading to underinvestment in workplace conditions, which hurts firms' ability to attract human capital and their financial performance.

Keywords: Workplace Transparency, Non-Disclosure Agreements, Human Capital

JEL codes: G10, J63, J81, M41

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1 Introduction

Information about employers is critical for job seekers to evaluate their employment options [Choi et al., 2023; deHaan et al., 2023; Sran, 2025]. Besides financial information, information about workplace issues, such as stress, harassment, and workplace safety concerns, is also important, as these issues negatively impact workers’ mental and physical health and, in turn, their productivity [Maestas et al., 2023]. Yet recent evidence indicates that many employers increasingly rely on Non-Disclosure Agreements (NDAs) to suppress negative employee disclosures about such conditions. This practice raises concerns that job seekers may be unable to observe a complete and accurate picture of their potential employment.¹ Such information frictions could have implications not just for job seekers, but for employers’ broader labor-market outcomes.

This study leverages state-level laws that restrict employers’ usage of NDAs to examine how increased workplace transparency affects employers’ ability to attract human capital. In response to the concern that employers use NDAs to suppress employee opinions, between 2018 and 2022, 13 states enacted legislation prohibiting employers from using NDAs to prevent employees from disclosing information about unlawful workplace issues such as sexual harassment, discrimination, retaliation, or other unlawful workplace practices.

Ex ante, it is unclear how narrowing the scope of NDAs influences employers’ ability to attract human capital. On one hand, narrowing the scope of NDAs could reduce employers’ ability to attract human capital. Job seekers are often limited in their attention and information processing capabilities. They might not consider the extent to which employee disclosures are suppressed by NDAs and, therefore, take the observable disclosures at their face value. Allowing employees

¹NDAs are one of the most common post-employment restrictive covenants. Approximately 57% of employees in the United States in 2017 were definitely or probably bound by an NDA, with 8.5% not knowing if they were bound (Balasubramanian et al. [2024]). Although NDAs are originally designed to protect trade secrets, employers increasingly use them to prevent workers from speaking out about workplace issues such as harassment, discrimination, and labor rights violations (See Appendix A for several NDA examples).

to more freely share negative information about workplace issues may draw job seekers' attention toward these issues without changing their assessment of favorable information. As such, their willingness to work for the employer may decrease.

On the other hand, narrowing the scope of NDAs may improve employers' ability to attract human capital. After the NDA law, employees are less likely to be bound by NDAs and, therefore, more likely to publicly share their opinions (e.g., on social media). More information about workplace conditions can reduce job seekers' uncertainty about these conditions and, in turn, increase their willingness to accept job offers because job seekers are generally risk averse.

Moreover, a decrease in the use of NDAs to suppress employee disclosure can enhance job seekers' trust over employee disclosure and, therefore, increase the weight they place on employee disclosure when evaluating their employment options. Consequently, more favorable employee disclosure will have a larger impact on employers' ability to attract workers, increasing the labor-market benefits of having more favorable employee disclosures. Anticipating these benefits, employers have stronger incentives to invest in workplace conditions. Better workplace conditions can, in turn, appeal to job seekers who value these conditions, allowing employers to better attract human capital.²

A necessary condition for narrowing the scope of NDAs to influence employers' ability to attract human capital is that the NDA law induces economically meaningful changes in employee disclosure. Consistent with this, Sockin et al. [2024] find that after the NDA law, employees are more likely to discuss workplace issues on Glassdoor, a popular job search website. Cheng et al. [2025] show that NDA restrictions trigger a substantial increase in whistleblower-initiated OSHA inspections. Build on these results, our empirical analyses start by examining changes in workplace

²Better workplace conditions can improve employers' ability to attract workers through two non-mutually exclusive mechanisms. First, they increase labor market participation. For example, individuals who do not participate in labor market (e.g., due to family reasons) might decide to work. Second, better workplace conditions can attract workers from competing employers (e.g., those located in other regions). However, intense labor market competition may attenuate any gains in workers through improved workplace conditions. For example, if all employers with a state improve work conditions to the same degree, workers may be indifferent between which employers to work for. In equilibrium, employers end up not gaining workers.

conditions. We expect workplace conditions improve following more employee disclosure about workplace conditions. Using a difference-in-differences design comparing states that narrowed the scope of NDAs (“treated”) with states that did not change their NDA law (“control”), we find that treated firms experience significant reductions in workplace injuries, safety-related violations, and employee-related violations after states narrow the scope of NDAs. These findings indicate improvement in workplace conditions following NDA restrictions.

Our main analyses examine the effects of the NDA law on employers’ ability to attract human capital and find that the effects are, on average, positive. Specifically, we use LinkUp job posting data to construct a measure of job vacancy duration, which serves as a proxy for firms’ ability to attract job seekers. The idea is that, when job seekers perceive a firm more positively and are more certain about its workplace conditions, they are more willing to accept job offers. This increase in labor supply, in turn, leads to a shorter time required to find qualified candidates and fill positions (e.g., Moen [1997], Davis et al. [2013] and Kuhn et al. [2021]).³ We find that, after the implementation of narrower NDAs, job postings in affected states experience shorter vacancy durations. This result is robust to (i) including granular firm–state-occupation and firm–year-occupation fixed effects, which control for time-invariant heterogeneity across firm, state, and occupation and time-varying unobserved heterogeneity across firms and occupations and (ii) alternative sample and research designs.⁴ Analyses of dynamic effects show no pre-trends, mitigating concerns that contemporaneous unobserved trends bias our estimations. Further supporting an increased willingness to look for jobs, we find that job-seeking activities rise significantly in treated areas after the implementation of NDA restrictions, accompanied by an increase in labor force participation.

³Job vacancy duration is an equilibrium outcome, influenced by both labor supply and labor demand. In Section 7, we show that narrowing NDAs do not significantly affect the number of job postings, which serves as a proxy for labor demand. This finding suggests that changes in labor demand are unlikely the primary driver of our results.

⁴Specifically, we examine job postings in counties near state borders, where firms are comparable except for NDA policy changes; exclude job postings with extreme vacancy durations; exclude data from 2020 to mitigate the influence of the Covid year; use alternative definitions of the treatment year; and adopt a stacked difference-in-differences design. Our results remain consistent under these alternative samples and model specifications.

Having established the overall effects, we next examine how the effects of narrowing NDAs vary across firms and labor market contexts. First, we expect that firms with high labor intensity are more impacted by the NDA law. For these firms, changes in employee disclosure can influence the employment decisions of a greater number of job seekers, implying a larger labor-market effect. Consistent with this prediction, the decrease in job vacancy duration is more pronounced for employers with high labor intensity. Second, we expect that the effect of the NDA law is less pronounced when competition for labor among employers is more intense. When competition for labor intensifies, competing employers will improve work conditions or offer other benefits, which will offset any effects from the focal employer's efforts in improving work conditions. We examine high- vs. low-skilled workers based on the idea that competition for high-skilled workers is more intense due to their scarcer supply. Consistent with our prediction, the decrease in job vacancy duration is less (more) pronounced for high- (low-)skilled workers.

Finally, to shed light on the overall effect on employers, we examine how narrowing the scope of NDAs affects firm performance. For employers with workplace issues, the revelation of these issues may reduce job seekers' willingness to work for them, hurting their profitability. In addition, the existence of workplace issues implies that the cost of improving work conditions outweighs the labor market benefits. For such firms, being pressured to improve workplace conditions can reduce profits. By contrast, as explained above, by reducing information asymmetry about workplace conditions, the NDA law increases the marginal benefits of improving workplace conditions, incentivizing firms to invest in workplace improvements. Better workplace conditions raise firms' ability to attract human capital, reducing the productivity loss from vacant positions, and improve the productivity of existing employees. If this mechanism dominates, firm performance could increase.

Our evidence suggests that the latter mechanism dominates: treated firms experienced improved performance relative to control firms. This raises an important question. Why do employers not

voluntarily refrain from using NDAs? In other words, why is government intervention needed to restrict their use? Theory on signal jamming provides an explanation [e.g., Stein, 1989]. The key friction is that, when employers can use NDAs, job seekers rationally anticipate that negative opinions are suppressed by NDAs and discount observable employee disclosure. Reducing the use of NDAs voluntarily will not alter job seekers' perception of employers' NDA use, because job seekers do not observe the actual use. While credibly committing to not using NDAs can resolve job seekers' concern, such commitment rarely happens at the job search stage, is difficult to contract on, and would not have been credible to job seekers since employers would have incentives to use NDAs, should workplace issues arise afterward. As such, the equilibrium features underinvestment in workplace conditions, reducing profitability. Narrowing the scope of NDAs by law, by imposing external constraint on employers' NDA use, can systematically alter job seekers' perception of employers' NDA use, thereby alleviating the underinvestment problem, improving firm profits.

This paper contributes to two strands of literature. First, we add to the literature on factors influencing firms' ability to attract human capital. Recent research shows that firm financial conditions (e.g., financial distress and earnings news) and non-wage factors (e.g., Environmental, Social, and Governance (ESG) commitments and climate concerns) affect firms' ability to attract or retain human capital [e.g., Brown and Matsa, 2016; Choi et al., 2023; deHaan et al., 2023; Teoh et al., 2023; Leung et al., 2024; Huang et al., 2025]. Building on this literature, we identify workplace transparency as a new factor influencing firms' ability to attract human capital. Our findings suggest that greater transparency enhances a firm's ability to attract human capital through a real effect mechanism, namely, improving workplace conditions. In this regard, our paper relates to Sran et al. [2020] and Sran [2025], who examine how labor demand disclosure and pay history bans affect job seekers' behavior and firms' hiring outcomes.

Second, we contribute to the emerging literature on the real effects of employee voice. Recent

studies document that reducing restrictions on employee voice improves the amount of employee disclosure [Böke et al., 2025; Sockin et al., 2024].⁵ Several studies also examine the impacts on employers’ labor market practices, primarily focusing on employer ratings or workplace conditions. The evidence is mixed [e.g., Dube and Zhu, 2021; Böke et al., 2025; Koenraadt et al., 2025].⁶ One possible explanation is that, in these settings, some employers can still use NDAs to suppress negative employee opinions. As observed employee disclosures are selected by employers, information asymmetry about workplace issues persists, as shown by Sockin et al. [2024].

Our paper examines the broader labor market implications of employers’ NDA use for their labor market outcomes. We show that narrowing the scope of NDAs motivates employers to improve workplace conditions, which is also supported by Cheng et al. [2025], suggesting the usefulness of regulatory inventions that directly target employment contracts.⁷ We also show an improvement in employers’ ability to attract workers, which leads to higher firm profits. These results suggest that NDA laws alleviate the information asymmetry problem in the labor market, thereby improving the welfare of workers (through workplace conditions) and employers (through profits).

2 Institutional Background

A Non-Disclosure Agreement (NDA), also known as a confidentiality agreement, is a legally binding contract that establishes a confidential relationship between parties. It is originally designed

⁵Böke et al. [2025] find that anti-SLAPP laws, which improves freedom-of-speech protection, lead to more credible negative employee disclosures about workplace issues. Sockin et al. [2024] document increased employee social media activities following the same NDA law changes.

⁶While some studies find that employee disclosure improves employer ratings or workplace conditions, others document limited or nuanced effects. Specifically, Dube and Zhu [2021] document that negative reviews on platforms like Glassdoor pressure firms to improve their corporate social responsibility scores, particularly regarding employee relations and diversity. By contrast, Böke et al. [2025] find that anti-SLAPP laws, which improves freedom-of-speech protection, reduces job vacancy duration only when employees discuss non-sensitive topics. They interpret the evidence as improvement in the efficiency of labor market sorting. Koenraadt et al. [2025] find that negative reviews on Glassdoor *reduce* OSHA inspections and that employers do not, in fact, improve their safety measures following these reviews.

⁷Consistent with the importance of regulatory inventions, Heese and Leonelli [2025] show that regulator press releases significantly increase whistleblower tips in peer facilities, highlighting the importance of credible information flows in motivating employee action.

to prevent the unauthorized disclosure of sensitive information to a third party [Starr et al., 2021]. NDAs are widely used across various settings—such as business negotiations, employment relationships, and collaborative projects—to protect trade secrets, proprietary information, and other confidential data. They may be unilateral, where only one party discloses information, or mutual, where both parties exchange and agree to safeguard confidential material.

The typical elements of an NDA include definitions of what constitutes confidential information, the obligations of the receiving party, exclusions, the duration of confidentiality, and penalties for breach. These agreements can be signed at different stages, including the beginning of employment, during the course of employment, or as part of severance or settlement arrangements. A basic NDA template is provided in Appendix A.⁸ Among restrictive covenants—such as non-solicitation, non-recruitment, and noncompete agreements—NDAs are the most prevalent, covering 57% of the workforce and used by 88% of firms for at least some employees (e.g., Starr et al. [2021]; Balasubramanian et al. [2024]).

In recent years, public awareness of workplace misconduct, such as harassment and discrimination, has increased significantly, particularly in the wake of high-profile cases like the Harvey Weinstein scandal and the emergence of the #MeToo movement (e.g., Billings et al. [2022]; Lins et al. [2024]). These events revealed how some companies have used NDAs not only to protect proprietary information but also to silence employees who have experienced or witnessed harmful workplace behavior. As Lobel [2018] notes, NDAs are increasingly employed to prevent workers from speaking out about toxic corporate cultures or disclosing negative information about workplace conditions and leadership. This use of NDAs can cover up serious internal issues from public scrutiny, reducing accountability and impeding efforts to improve organizational practices. Although courts may refuse to enforce NDAs that use overly broad language, including barring an

⁸The NDA template was obtained from <https://nondisclosureagreement.com/>

employee from disclosing lawful complaints (e.g., discrimination, harassment, retaliation), employees often cite significant personal, emotional, and financial burdens as the reasons against taking legal action against their employer [Chan et al., 2024]. This not only enables harmful behavior to persist but may also undermine employee well-being and long-term firm performance.

In response to these challenges, several U.S. states have introduced “narrowing NDA” policies aimed at limiting the scope of NDAs. These state laws focus on settlement and severance agreements in the employment context, aiming to allow workers to speak more freely about workplace issues while still allowing employers to use NDAs to protect legitimate trade secrets⁹. Between 2018 and 2022, a total of 13 states passed such legislation. Table A1 and Figure A1 list the states that implemented changes to NDA policies, along with their effective dates. These states have implemented various restrictions on the use of NDAs in sexual harassment cases, with the common goal of increasing transparency and protecting employees’ rights. The laws generally prohibit employers from requiring employees to sign NDAs that would prevent them from disclosing information about sexual harassment or other unlawful workplace conduct (discrimination, retaliation).¹⁰ Some states, like California and New Jersey, have gone further by voiding certain confidentiality provisions in settlement agreements, while others, like New York, allow such provisions only if requested by the complainant. On December 7, 2022, President Joe Biden signed the Speak Out Act, a federal law

⁹All states that have enacted restrictions on NDAs still allow NDAs concerning trade secrets, proprietary information, or confidential information not involving allegations of illegal acts (<http://www.shpclaw.com/new-state-laws-restrict-employers-use-of-nondisclosure-agreements?p=11399>).

¹⁰NDA laws differ from anti-SLAPP laws. Both laws relate to limiting “silencing” or suppression of speech or disclosure, though in different ways. The anti-SLAPP statute does not address employee contract (e.g., the use of NDAs). Rather, it protects persons from *lawsuits* related to public speech and petition rights, especially on matters of public interest. If a lawsuit arises from protected activity, the defendant can file a “special motion to strike” to get the case dismissed early. For instance, a Baltimore developer sued residents and homeowners’ associations for \$25 million after they opposed changes to a development project. The court ruled that the lawsuit was a SLAPP—filed in bad faith to suppress community opposition—and dismissed it under Maryland’s Anti-SLAPP statute (<https://www.gfrlaw.com/what-we-do/insights/developers-action-against-protesting-residents-dismissed-slapp-suit>). By contrast, NDA restrictions directly reshape employment contracts and systematically enhance workplace transparency by limiting employers’ ability to silence employees about workplace conditions. This institutional setting therefore provides a direct and powerful lens for examining how transparency influences firms’ capacity to attract and retain human capital.

aimed at addressing the misuse of NDAs across the United States¹¹. This legislation represents a significant step in nationwide efforts to reform how NDAs are used, particularly in cases involving workplace misconduct.

3 Hypothesis Development

It is ex-ante unclear how limiting the usage of NDAs affects employers' ability to attract human capital. On one hand, it is possible that limiting the usage of NDAs hinders employers' ability to attract human capital. As employees are less restricted by what they say, more employees share negative information about their employers [Sockin et al., 2024]. Such negative information could hurt the employers' labor market reputation, resulting in loss of talent.

On the other hand, limiting the scope of NDAs may improve work conditions and, hence, increase employers' ability to attract human capital. First, limiting the scope of NDAs incentivizes employees to share their opinions on social media or to whistle-blow workplace issues [Sockin et al., 2024; Cheng et al., 2025]. More information available about workplace conditions can reduce job seekers' uncertainty about these conditions, which will increase their willingness to accept job offers because job seekers are generally risk averse.

Second, the NDA restrictions amplify the benefits of improving working conditions, thereby strengthening firms' incentives to do so and enhancing their ability to attract human capital. Before the NDA restriction policy, the use of NDAs was typically private information among employers. Aware that negative information might be concealed by NDAs, job seekers would discount positive signals about workplace quality. This discounting reduces the effectiveness of more favorable employee disclosure in attracting job seekers, discouraging employers from making investments in

¹¹ Although the Speak Out Act is only limited to sexual harassment and not all unlawful conduct, President Biden's decision to sign the legislation bolstered the NDA policy debate, further raising the importance of understanding how broad NDAs impact labor market dynamics.

improving workplace conditions. After the NDA restrictions, however, job seekers perceive positive information about working conditions as more credible and are thus less likely to discount it. Consequently, the returns to improving workplace conditions increase, motivating firms to invest more in better working conditions and ultimately improving their ability to attract job seekers. We summarize these predictions in the following hypothesis, expressed in its null form:

H1: Workplace conditions and employers' ability to attract workers do not change after regulations limiting firms' NDA use.

We next examine how restricting firms' use of NDAs affects profitability. The impact on profitability can inform us of why firms do not voluntarily restrict their use of NDAs. On the one hand, firms have strong incentives to maintain or enhance employees' perceptions of the firm to better attract talent. To do so, they can take real actions, such as improving workplace safety, decreasing labor-related violations, but these efforts involve additional costs. When NDA restrictions are voluntary, if the costs of real improvements outweigh the benefits, many firms will instead rely on NDAs to manage perceptions. When NDA usage is restricted, however, firms lose this option. Facing increased employee monitoring, they must either accept diminished employee perceptions, which reduce their ability to attract talent, or commit additional resources to genuinely improving workplace conditions. In either case, we expect these restrictions to reduce firms' profitability.

On the other hand, information frictions in the labor market can result in an equilibrium where firms underinvest in work conditions, hurting firm profitability. Specifically, when employers can use NDAs to suppress employee disclosure, job seekers discount positive signals about workplace quality, knowing that employers have incentives to suppress negative information. As a result, improvements in employee disclosure are less effective in attracting job seekers, implying a smaller marginal benefit in investments in work conditions. This hurts firms' labor acquisition and hence profits. By reducing

employers’ ability to conceal workplace issues, positive signals about work conditions become more credible to job seekers, which strengthen the benefits of investing in workplace improvements. These improvements not only enhance firms’ ability to attract talent but also help retain existing employees and boost productivity, further contributing to higher profits.

The key friction leading to underinvestment in workplace conditions is that the actual use of NDAs in a specific job is rarely observable by job seekers (e.g., employers rarely disclose the extent to which NDAs are used across their firm). While employers’ commitment not to using NDAs can allay job seekers’ concerns, such commitment is unlikely to be viewed as credible to job seekers since employers have incentives to use NDAs when workplace issues arise. As such, reducing the use of NDAs voluntarily will not alter job seekers’ perception. The equilibrium features underinvestment in workplace conditions, leading to low profitability. Laws that narrow the scope of NDAs can systematically shift job seekers’ beliefs, prompting firms to improve working conditions, enhance their ability to attract human capital and raise productivity, and ultimately increase profits. We summarize the prediction in the following hypothesis, stated in its null form:

H2: Employers’ profit does not change after regulations limiting firms’ usage of NDAs.

4 Research Design

Our primary empirical analysis employs a difference-in-differences design of the following form:

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}, \quad (1)$$

where y_{ijsot} denotes the job vacancy duration for job posting i for occupation o in firm j , located in state s in year t . We use job vacancy duration as a proxy for a firm’s ability to attract job

seekers. Holding labor demand constant, an increase in labor supply improves the efficiency of the matching process between firms and potential employees, as it becomes easier for firms to find qualified candidates (e.g., Moen [1997], Davis et al. [2013] and Kuhn et al. [2021]). Therefore, shorter vacancy durations are indicative of greater success in attracting job applicants, making vacancy duration a reasonable and widely accepted proxy for firms’ attractiveness to job seekers.¹²

The key independent variable, $1[t \geq \text{NarrowedNDA}]_{st}$, is an indicator equal to one in years following the implementation of legislation narrowing NDAs in state s . Between 2018 and 2022, thirteen states enacted such legislation. If the policy was implemented in the first half of the year, we classify that year as the first treated year; if implemented in the second half, we classify the following year as the first treated year. As a robustness check, we assign the year of narrowing NDA implementation as the treatment year, regardless of the specific month of implementation. The results remain consistent when using this alternative treatment timing definition. Our coefficient of interest is β . A negative and significant β would be consistent with the interpretation that narrowing NDAs enhances workplace transparency and improves firms’ ability to attract human capital, thereby reducing job vacancy durations.

To control for unobserved heterogeneity, we include firm-state-occupation fixed effects (ϕ_{jso}), which account for establishment- and occupation-specific factors that could influence job vacancy duration. For example, a firm may operate a research hub in a particular location that attracts a disproportionate number of qualified candidates relative to its establishments in other states or to peer firms in the same state. Including ϕ_{jso} helps absorb such localized firm-occupation effects. We also include firm-year-occupation fixed effects (λ_{jto}) to account for variation in firms’ development plans or strategic priorities over time that may systematically affect hiring needs and

¹²Job vacancy duration is also a function of labor demand. In Section 7.3, we directly test and confirm that there are no significant changes in labor demand. Moreover, in Section 7.1, we also employ alternative proxies for labor supply, including job search activities and labor market participation rates, that more directly capture job seekers’ employment interests.

vacancy durations for specific occupations. The error term is denoted by ϵ_{ijsot} . We cluster two-way standard errors—by firm and by state—to account for potential correlation of error terms within both dimensions (Abadie et al. [2023]). Our statistical inferences (untabulated) are robust to clustering by state only.

We also use a difference-in-differences design when the dependent variable is workplace conditions and firm performance. The assignment of treatment and control groups is the same, but the unit of observation and the fixed effect structure differ. The unit of observation is firm j , state s , and year t when the dependent variable is work conditions. We include firm-state and firm-year fixed effects. The unit of observation is firm j and year t when the dependent variable is firm performance. We include firm and year fixed effects. The fixed effect structure for these designs is less granular than that when the dependent variable is job vacancy duration because we do not have within firm-state-year variation.

5 Data and Sample Selection

5.1 Data

We measure job vacancy duration using job posting data from LinkUp, a leading provider of labor market intelligence. Since 2007, LinkUp has collected hundreds of millions of job postings directly from employers’ career websites across the globe. The dataset offers comprehensive coverage, encompassing job postings from over 67,000 companies in 195 countries. Each posting includes detailed information such as job title, location, occupation, a firm identifier, and so on. In addition, the dataset contains the full text of each job posting, enabling the extraction of valuable information such as salary, educational requirements, and detailed job descriptions. Importantly, LinkUp records both the creation and removal dates of each job posting, allowing us to measure job vacancy

durations. The key advantage of LinkUp job posting data is that it is collected directly from company websites, ensuring accurate recording of posting creation and removal dates while minimizing duplicate entries—a common problem in databases that rely on third-party job boards. Campello et al. [2020] compare LinkUp job posting data with administrative employment data, including the BLS Job Openings and Labor Turnover Survey (JOLTS) and the U.S. Census Bureau’s Quarterly Workforce Indicators, and find that LinkUp provides a reliable proxy for corporate hiring activity.

We focus on job postings from 2015 through December 7, 2022, a period that spans from three years before the enactment of the first narrowing NDA laws in Arizona, Tennessee and Washington in 2018 to the signing of the federal Speak Out Act. Job vacancy duration reflects the time a firm spends in searching, selecting, and hiring for a job opening. Studies on job vacancy duration have primarily relied on establishment-level data from the Job Openings and Labor Turnover Survey (JOLTS) (e.g., Davis et al. [2013]). However, the sector- or industry-level nature of JOLTS data, its voluntary reporting, and its relatively low frequency (monthly) limit its usefulness for analyzing vacancy durations with precision. Following Chen and Li [2023], we measure vacancy duration using the number of days between a job posting’s initial listing and its removal (or closing) date. Chen and Li [2023] validate this measure by showing that vacancy duration varies with job skill requirements, employee turnover, and local unemployment rates in patterns closely aligned with official labor market statistics. Consistent with their approach, we exclude postings with durations shorter than one day or longer than 180 days¹³. We then take the natural logarithm of the remaining vacancy durations to construct our primary outcome variable, denoted as *lntimediff*.

We examine changes in workplace conditions using data from OSHA’s Injury Tracking Application and Violation Tracker database. The OSHA data reports establishment-level data on total hours worked and the number of recordable injuries.¹⁴ We merge the OSHA data with Compus-

¹³LinkUp classifies postings exceeding 180 days as “evergreen” jobs—positions that are rarely removed and may not reflect active hiring needs.

¹⁴Establishments with 250 or more employees that are not on OSHA’s Exempt Industries list, as well as those

tat to construct firm-state-year level measures of workplace conditions. Specifically, we define two variables: *lntotal_injuries*, the natural logarithm of one plus the number of total injuries, and *lntotal_hours_worked*, the natural logarithm of one plus the total hours worked.

Moreover, we use data from Good Jobs First’s Violation Tracker database to measure safety and employee-related violations. The Violation Tracker database includes cases related to banking, consumer protection, false claims, environmental issues, wage and hour violations, workplace safety, discrimination, price-fixing, and other regulatory infractions. It compiles enforcement actions resolved by federal regulatory agencies, the U.S. Department of Justice, state attorneys general, and selected state and local agencies since 2000. We compute the number of safety or health- and employee-related violations at the firm-state-year level. From these, we construct two variables: *lnviolation_number_emp*, the natural logarithm of employee-related violations; *lnviolation_number_sf*, the natural logarithm of safety-related violations ¹⁵.

We also use data from Compustat and CRSP to capture firms’ financial characteristics, which allow us to examine the heterogeneous effects of NDA narrowing and its implications for firm performance. In addition, we incorporate job zone classifications from O*NET to measure variation in occupational skill requirements, where higher job zones correspond to more complex, skill-intensive roles.

5.2 Sample Selection and Summary Statistics

We restrict our sample to job postings from U.S. public firms and positions located in the United States. The initial dataset contains 64,107,261 job postings. We first remove entries with missing

with 20 to 249 employees in industries listed in the OSHA 300A Table, are required to electronically submit their workplace injury and working hour data to OSHA each year.

¹⁵In the Violation Tracker data, employment-related violations include labor relations violations, Family and Medical Leave Act violations, benefit plan administrator violations, wage and hour violations, employment discrimination, employment screening violations, workplace whistleblower retaliation, work visa violations, and Fair Credit Reporting Act violations. While workplace safety or health violations are part of safety-related offenses.

key variables, including posting date, deletion date, occupation code, state code, or company identifier (CUSIP). Next, we exclude postings with non-positive durations and further drop postings with durations shorter than one day or longer than 180 days. After dropping singleton observations from the regression, our final sample consists of 50,309,597 job postings from 2015 through December 7, 2022.

[Insert Table 1]

Table 1 presents summary statistics for the variables used in the analysis. The average job posting duration (*timediff*) is approximately 36.923 days (consistent with Chen and Li [2023]). Regarding workplace compliance violations, workplace safety or health violations (*lnviolation_number_sf*) have a higher mean value of 0.018, indicating that safety violations are more common than employment-related violations (*lnviolation_number_emp*) with a mean of 0.008. For workplace injuries, the natural logarithm of one plus the total injuries (*lntotal_injuries*) has a mean of 2.013, with values ranging from 0 to 8.189. Total work hours (*lntotal_hours_worked*) have a mean of 13.177, reflecting substantial reported working hours across firms. We also summarize firm-level financial characteristics, including a few different measures of ROA, firm size, leverage, cash holdings, sales growth, SG&A, TobinQ and R&D. Detailed definitions of all variables are provided in Table A2, Appendix C.¹⁶

¹⁶The summary statistics of job posting duration, turnover rates, are broadly consistent with those reported in prior studies on U.S. firms (e.g., Chen and Li [2023]; Leung et al. [2024]), suggesting that the sample is comparable in scale and composition to those commonly used in the literature

6 Empirical Results

6.1 Effects on Work Conditions

As hypothesized in Section 3, employers have incentives to improve work conditions following regulations that restrict the use of NDAs. Improvements in working conditions are therefore a key mechanism through which firms attract human capital. Before turning to the main analyses, we first provide direct evidence on this mechanism. Specifically, we examine whether, after the narrowing of NDAs, firms (1) improving workplace safety and (2) enhancing other aspects of working conditions.

We use data on workplace injuries from OSHA and records of safety and health violations from Violation Tracker to measure workplace safety. Prior research suggests that managers sometimes compromise workplace safety to meet performance targets (e.g., Caskey and Ozel [2017]). Table 2 Panel A reports the estimated effects of narrowing NDAs on workplace injuries and safety or health violations. The results show that the policy change leads to a significant decline in both outcomes, indicating improvements in workplace safety. Overall, these findings suggest that narrowing NDAs fosters a safer working environment for employees.

[Insert Table 2]

Our second and third measures of workplace condition are employee-related violations and total hours worked. Beyond workplace safety, narrowing NDAs may also promote broader improvements in working conditions, including fewer employee-related violations and reduced total hours worked. Labor infractions—such as wage theft, discrimination, and violations of leave policies—undermine employee well-being and damage a firm’s reputation [Chircop et al., 2025]. For instance, wage theft deprives workers of legally entitled pay and benefits, disproportionately affecting vulnerable populations while temporarily boosting corporate profits [Raghunandan, 2021]. Excessive or improperly compensated work hours may also indicate non-compliance with labor standards.

We measure employee-related violations using Violation Tracker data and assess changes in total hours worked using OSHA data.¹⁷ We measure the total number of hours worked at the firm-state-year level and take the natural logarithm of this number to reduce skewness. Table 2 Panel B reports the estimated effects of narrowing NDAs on other aspects of working conditions. Column (1) shows that the policy reduces the number of employee-related violations, indicating improved compliance with labor regulations. Column (2) shows a decline in total hours worked, which may reflect changes in work practices or greater operational efficiency following the policy. All models include firm-state and firm-year fixed effects to account for cross-sectional differences and time-varying firm-level factors. Overall, the results suggest that narrowing NDAs fosters a better and potentially more efficient work environment.

The improvements in working conditions we document in this section align with Cheng et al. [2025], who find that NDA restrictions lead to more whistleblower-initiated OSHA inspections, which are followed by fewer workplace injuries. In summary, these findings indicate that workplace conditions improve after NDA restrictions, consistent with the law change having a material impact on firms' labor practices.¹⁸

6.2 Effects on Firms' Ability to Attract Human Capital

6.2.1 Main Results

Table 3 reports the regression results assessing the effect of narrowing NDAs on job vacancy duration. In Column (1), we include firm-state and firm-year fixed effects. The coefficient on the post-

¹⁷Violation Tracker defines employee-related violations to include labor relations violations, Family and Medical Leave Act violations, benefit plan administrator violations, wage and hour violations, employment discrimination, employment screening violations, workplace whistleblower retaliation, work visa violations, and Fair Credit Reporting Act violations.

¹⁸Whether employee sentiment improves depends on the extent to which NDAs suppress negative opinions. If negative opinions suppressed by NDAs are now disclosed, employee sentiment will decline on average. However, if workplace conditions improve significantly, employee sentiment will improve. Sockin et al. [2024] show that the former effect dominates in the data.

policy indicator is -0.0231 , statistically significant at the 5% level, indicating that job vacancy durations decline by approximately 2.28% on average following the implementation of narrowed NDA policies.¹⁹ In Column (2), we incorporate more granular controls by adding firm-state-occupation and firm-year-occupation fixed effects. The effect remains negative and statistically significant at the 1% level, indicating robustness to finer fixed effects. NDA narrowing is estimated to reduce vacancy duration by 2.14%. Aggregated to the firm–state–year level using the treated group’s pre-policy average of 206.355 postings, this implies roughly 31.5 weeks of reduced aggregate vacancy time per year for an average treated firm–state unit (≈ 157.5 workdays, ≈ 7.36 months). These findings suggest that restricting NDAs leads to a statistically significant reduction in the time required to fill job openings, potentially reflecting an improvement in firms’ ability to attract human capital.

[Insert Table 3]

The key identifying assumption underlying our analysis is that, in the absence of NDA policy changes, job postings in treated and untreated states would have followed similar trends in their ability to attract talent. In other words, unobserved factors influencing job vacancy duration in certain states—such as changes in job quality, industry composition, or organizational reputation—are not systematically correlated with the timing of NDA reforms across states. To assess the plausibility of this assumption, we test whether treated and control states exhibit parallel pre-treatment trends in job vacancy duration. This specification also allows us to examine the dynamic effects of narrowing NDA on vacancy durations over time. We estimate the following model:

$$y_{ijsot} = \sum_{n=-5}^{n=4} \beta_n \mathbf{1}[t = n] + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot} \quad (2)$$

¹⁹The estimated coefficient is $\beta = -0.0231$, which implies $e^{-0.0231} - 1 \approx -0.0228$, or an average reduction in vacancy duration of about 2.28%.

Here, n denotes the number of years relative to the implementation year of the narrowing NDA policy. For instance, if a job posting occurs one year after the policy change in a treated state, the indicator variable $\mathbf{1}[t = 1]$ equals one, while all other time indicators equal zero. We use the year prior to the policy change as the benchmark period. Observations occurring more than five years before or four years after the policy change are grouped into the endpoints, with $\mathbf{1}[t = -5]$ and $\mathbf{1}[t = 4]$ indicating the pre- and post-policy tails, respectively. Standard errors are two-way clustered at the firm and state levels. All other variable definitions are consistent with those used in Equation 1.

[Insert Figure 1]

Figure 1 plots the estimated coefficients β_n , capturing the dynamic effects of narrowing NDAs on job vacancy duration. The absence of significant pre-treatment differences in job vacancy duration between treated and control states supports the parallel trends assumption and reinforces the validity of our identification strategy. After the implementation of NDA restrictions, we observe a significant decline in job vacancy duration, an effect that persists for several years following the policy change.

6.2.2 Heterogeneous Effects

After establishing the main effects, we turn to analyzing the heterogeneous impacts of narrowing NDAs across different firms and labor market characteristics. We begin by examining heterogeneity by firms' reliance on human capital, focusing on labor-intensive firms. As labor matters more for these firms, they are likely to have stronger incentive to use NDAs. Hence, after regulations that narrow the scope of NDAs, they have stronger incentives to improve work conditions. Following Jung et al. [2014], we define labor intensity as the ratio of the number of employees to the previous year's total assets. Based on the median value of this measure, we classify firms into high labor

intensity (*High Labor Intensity*) and low labor intensity (*Low Labor Intensity*) groups.

[Insert Table 4]

Panel A of Table 4 presents the results. We find that firms with high labor intensity experience a statistically significant reduction in job vacancy duration, while those with low labor intensity do not. The difference in coefficients between the two groups is statistically significant, suggesting that firms more dependent on human capital are more responsive to the policy change.

Next, we examine whether the effects of narrowing NDAs are more pronounced for positions requiring lower skill levels. Employers often compete for workers in the labor market. When competition for labor intensifies, rival employers will improve work conditions or offer other benefits, thereby diluting the incremental effects of the focal employer's own improvements. We expect such competition to be stronger for high-skilled workers than for low-skilled workers. Accordingly, the impact of the NDA law should be more pronounced for low-skilled workers, because high-skilled workers are more likely to have enjoyed relatively favorable working conditions even before the law changed. We classify occupations by skill level using the job zone classifications from the O*NET database.²⁰ Job zones range from 1 to 5, based on the education, experience, and training required. Higher zones indicate more skill-intensive occupations. Specifically, we define occupations with a job zone above 3 as high-skill jobs.

As shown in Panel B of Table 4, we find that job vacancy durations significantly decline for low-skilled positions, while the effect is not significant for high-skilled positions, with the difference between the two being statistically significant. This pattern is consistent with our expectation that lower-skilled workers benefit more from increased workplace transparency.

²⁰<https://www.onetonline.org/find/zone?z=0>

6.3 Effects on Firm Performance

If negative employee opinions can motivate employers to improve working conditions and thereby enhance their ability to attract talent, a natural question arises: do these policies benefit workers at the expense of employer profit? As explained in Section 3, for many employers, the costs of improving working conditions outweigh the benefits (e.g., higher worker productivity). Limiting NDA use forces these firms to choose between costly improvements and the risk of reputational or legal harm, implying a decline in profitability. However, mandatory NDA restrictions could also raise average profitability by mitigating labor-market information frictions and reducing job seekers' skepticism over employee disclosure.

[Insert Table 5]

Table 5 shows the estimated effects on firm performance, using two alternative measures: ROA_{ib} (income before interest scaled by total assets in the prior year), and ROA_{ni} (net income scaled by total assets in the prior year). Across all two metrics, we find a positive and statistically significant relationship between the narrowing of NDAs and firm performance. This suggests that greater transparency and improved workplace conditions—enhancing employee attraction and retention—contribute to better financial outcomes. Overall, the evidence suggests that firms do not refrain from voluntarily restricting NDAs because the costs of improving work conditions exceed the benefits, but rather because they lack a credible way to signal such voluntary restraint, which diminishes the marginal returns to workplace improvements.

7 Additional Analyses

7.1 Job Search Activities

In our baseline analysis, we use job vacancy duration as a proxy for a firm’s ability to attract human capital. A potential concern, however, is that vacancy duration may not directly capture firms’ attractiveness to job seekers. To address this limitation, we construct an alternative measure at the firm–state–year level using the normalized Google search index for “firm name + job” (e.g., “Apple job”). This measure reflects the volume of searches for a particular firm’s jobs in a given area. If a firm becomes more attractive to job seekers, we would expect higher search activity for its jobs on Google. To mitigate occasional missing values and downward-biased measurements in Google Trends data, we conduct three independent queries at the firm–state–year level. Based on these queries, we construct two alternative measures: *max_search_index*, defined as the maximum value across the three independent queries, and *mean_search_index*, defined as the average of the non-missing results.

[Insert Table 6]

Table 6 reports the regression results on the effect of narrowing NDAs on job search activities. We find that job search intensity increases significantly in treated areas following the implication of NDA restrictions. The results are robust across both measures of search activity, indicating that job seekers in treated states more frequently seek information about firms’ job opportunities. Overall, this evidence reinforces our baseline findings and suggests that NDA restrictions meaningfully influence firms’ ability to attract human capital.

7.2 Alternative Research Designs

7.2.1 Border County Tests

A remaining concern in identifying the causal effect of narrowing NDAs on firms' ability to attract and retain human capital is the possibility that states may adopt such policies in response to unobserved changes in local labor market conditions—such as anticipated shifts in local economic prospects or patterns of worker migration. Since the treatment status varies at the state-year level, we cannot directly control for state-year fixed effects to fully account for such confounding factors.

To address this concern, we adopt a border-county comparison approach commonly used in the literature (e.g., Dube et al. [2016], Agarwal et al. [2024]), which leverages geographic proximity to control for local labor market conditions while allowing state-level policy variation. The central idea is that counties located on either side of a state border are likely to share similar economic environments but may be subject to different NDA policies. We therefore use untreated counties adjacent to treated counties as counterfactuals to estimate what job vacancy durations would have been in the absence of narrowing NDA policies. Specifically, we re-estimate Equation 1 using a matched subsample of 14,314,397 job posting observations in which, during year t , one county is affected by a narrowing NDA law while its neighboring border county is not. To further account for time-varying unobserved heterogeneity shared by county pairs, we include County Pair-Year fixed effects in the specification.

[Insert Table 7]

Table 7 presents the regression results examining the effect of narrowing NDAs on job vacancy duration using the border-county sample. Mirroring the structure of Table 3, Column (1) includes firm-state and firm-year fixed effects, while Column (2) incorporates more granular fixed effects. In Column (1), the coefficient on the post-policy indicator $1[t \geq \text{NarrowedNDA}]st$ is -0.0285,

statistically significant at the 1% level, indicating that job vacancy durations declined by approximately 2.81% following the policy change. In Column (2), the estimated coefficient is -0.0320, also significant at the 1% level, suggesting an even larger reduction in vacancy duration after controlling for more detailed heterogeneity. These findings reinforce the conclusion that narrowing NDAs significantly reduces job vacancy durations, and the effect remains robust even when accounting for time-varying local economic conditions.²¹

7.2.2 Stacked DID Tests

Recent research has emphasized potential biases arising from time-varying treatment effects in staggered DID designs (e.g., Goodman-Bacon [2021], Baker et al. [2022]). To address these concerns, we implement a stacked DID approach, which mitigates such biases by ensuring that earlier-treated units are not used as controls for later-treated ones [Wing et al., 2024]. For each treated state, we define its control group as its neighboring states²². We define a treatment cohort as a set of states that adopted NDAs in the same year, along with their neighboring states. For each cohort, we include observations from five years before to four years after the treatment year and use this window to construct the final sample.

[Insert Figure 2]

Figure 2 presents the estimated coefficients β_n , which capture the dynamic effects of narrowing NDAs on job vacancy duration using the stacked DID approach. The results show no significant pre-treatment differences in vacancy durations, supporting the parallel trends assumption. After NDA implementation, we observe a significant decline in job vacancy durations, consistent with

²¹One caveat of this test is that across-state movement, which is common across state borders, may contaminate the treatment effect. For example, workers in the control group may relocate to the neighboring county in the treatment group.

²²We exclude California from the analysis because all of its neighboring states also implemented NDAs, making it impossible to identify untreated neighboring controls.

the patterns displayed in Figure 1.

7.3 Labor Demand

In this paper, we use job vacancy duration as a proxy for firms' ability to attract human capital, assuming labor demand remains constant. To test this assumption, we use the number of job postings as a proxy for labor demand. If the NDA policy significantly changed firms' job posting behavior due to reduced hiring needs, then observed changes in vacancy duration or employee retention could reflect shifts in labor demand rather than increased labor supply or improvements in matching efficiency.

[Insert Table 8]

Table 8 reports the results of this analysis. In Column (1), we regress the log number of job postings at the firm-state-year level ($\ln jobposting_n$) on the treatment indicator, controlling for firm-state and firm-year fixed effects. The coefficient on $1[t \geq NarrowedNDA]_{st}$ is statistically insignificant, indicating no meaningful change in the overall number of postings. In Column (2), we refine the analysis by examining the effects on the number of job postings at the firm-state-occupation-year level ($\ln jobposting_{n-o}$) and including more granular firm-state-occupation fixed effects and firm-year-occupation fixed effects. The estimated effect remains statistically insignificant. Overall, these results suggest that narrowing NDAs does not significantly influence firms' labor demand, reinforcing our interpretation that the observed reduction in vacancy durations is driven by increases in labor supply, rather than a decline in job creation.

7.4 Private Firm Tests

We further conduct a robustness test using private firm job postings to assess the generalizability of our findings. Information about work conditions in private firms is typically more limited, making

this setting a useful test of whether the effects of NDA restrictions extend to environments with greater information asymmetry. If narrowing NDAs indeed enhances workplace transparency and improves firms’ ability to attract human capital, we expect similar or stronger effects among private firms.

[Insert Table 9]

Table 9 reports the results of this analysis. We re-estimate the baseline specification by replacing the sample of public firms with private employers, following the same model specification as in Table 3. In Column (1), we include firm-state and firm-year fixed effects. In Column (2), we incorporate more granular controls by adding firm-state-occupation and firm-year-occupation fixed effects. Across both specifications, we find consistently negative and statistically significant coefficients on $1[t \geq \text{NarrowedNDA}]_{st}$, indicating that job vacancy durations shorten following NDA restrictions. These consistent results demonstrate that the observed improvement in firms’ ability to attract human capital is not limited to public firms but also holds among private employers, reinforcing the broad relevance of workplace transparency policies.

7.5 Additional Robustness Tests

Finally, we conduct several robustness tests to verify the stability of our results. To ensure that our results are not sensitive to the choice of time interval for defining job vacancy duration, we re-estimate our main specification using two alternative time windows: vacancies lasting at least one day and 1–120 days. The results are presented in Columns (1) and (2) of Table 10. In both cases, we find consistently negative and statistically significant coefficients on $1[t \geq \text{NarrowedNDA}]_{st}$. Specifically, the estimated policy effect remains significant at the 1% level, with magnitudes ranging from -0.0255 in Column (1) to -0.0201 in Column (2). These findings suggest that the observed reduction in vacancy duration is robust to alternative definitions of the job vacancy duration measure

and not driven by a specific time threshold.

[Insert Table 10]

Next, to address the concern that our results might be confounded by labor market disruptions caused by the COVID-19 pandemic [Coibion et al., 2020], we re-estimate our baseline specification excluding data from the year 2020. Column (3) of Table 10 presents the results. The estimated coefficient on the treatment indicator $1[t \geq \text{NarrowedNDA}]_{st}$ is -0.0198 and remains statistically significant at the 1% level. These findings suggest that the observed effect is robust and not driven by pandemic-related labor market shocks.

Column (4) of Table 10 tests the robustness of our main findings by redefining the treatment year. Specifically, we define the year of narrowing NDA implementation as the treatment year, regardless of the specific month of implementation. This adjustment helps mitigate potential measurement error from partial-year policy exposure. The estimated coefficient on the post-policy indicator $1[t \geq \text{NarrowedNDA}]_{st}$ is -0.0211 and statistically significant at the 1% level. These results confirm that our findings are robust to alternative definitions of the treatment period and are not driven by specific assumptions about policy timing.

8 Conclusion

This paper examines the effects of narrowing NDAs on firms' ability to attract human capital, as well as the implications for work conditions and firm performance. Exploiting a series of state-level policy changes between 2018 and 2020 that limited the enforceability of NDAs related to workplace misconduct, we provide causal evidence that greater workplace transparency enhances labor market outcomes for firms.

We first provide validation tests that narrowing the scope of NDAs leads to meaningful improve-

ments in workplace conditions, including reductions in workplace injuries, safety-related violations, and employee-related violations. Next, using granular job posting data from LinkUp, we find that firms in treated states experience a significant reduction in job vacancy durations following the implementation of NDA restrictions, indicating improved attractiveness to job seekers. These effects are stronger among labor-intensive firms and for lower-skilled positions. Moreover, we find that narrowing NDAs correlates with higher firm performance, measured by return on assets (ROA), suggesting that increased transparency better aligns managerial incentives with long-term firm value.

Our findings contribute to the literature on labor market frictions, employee voice, and workplace governance by identifying workplace transparency as a key factor in firms' ability to attract and retain talent. From a policy perspective, the results underscore the broader benefits of restricting NDAs: such reforms not only empower workers but also incentivize firms to foster safer and more equitable workplaces—ultimately generating gains for both employees and employers.

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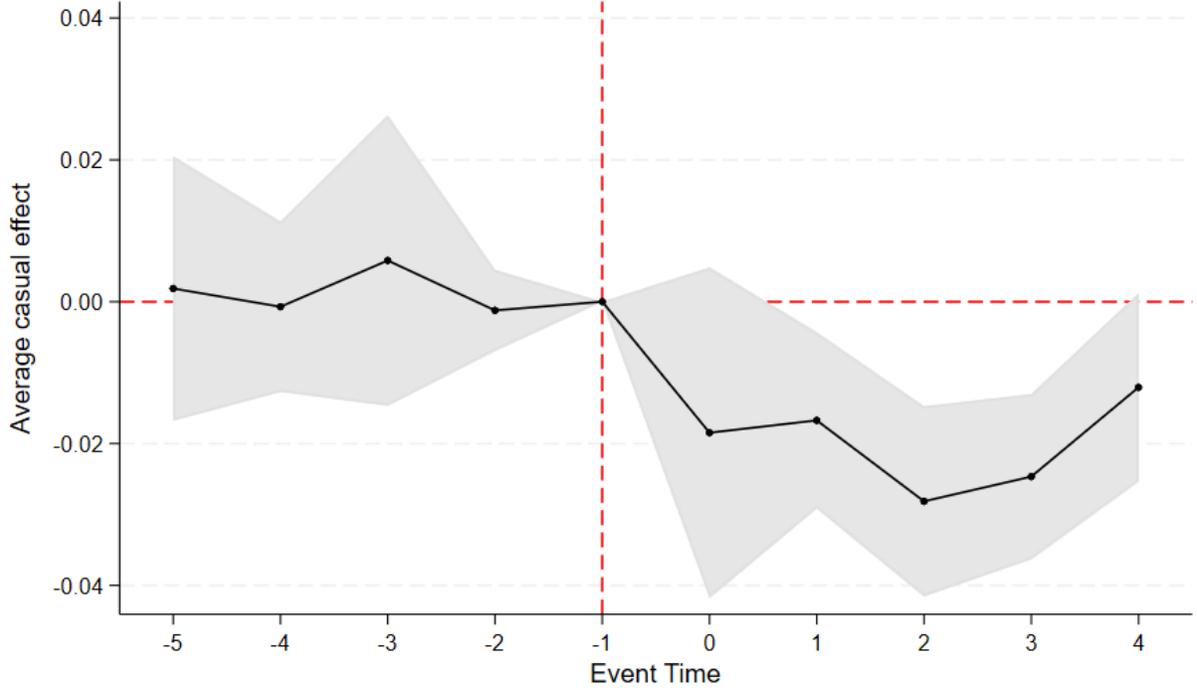
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Figure 1: Narrowing NDAs' Dynamic Effect on Job Vacancy Duration

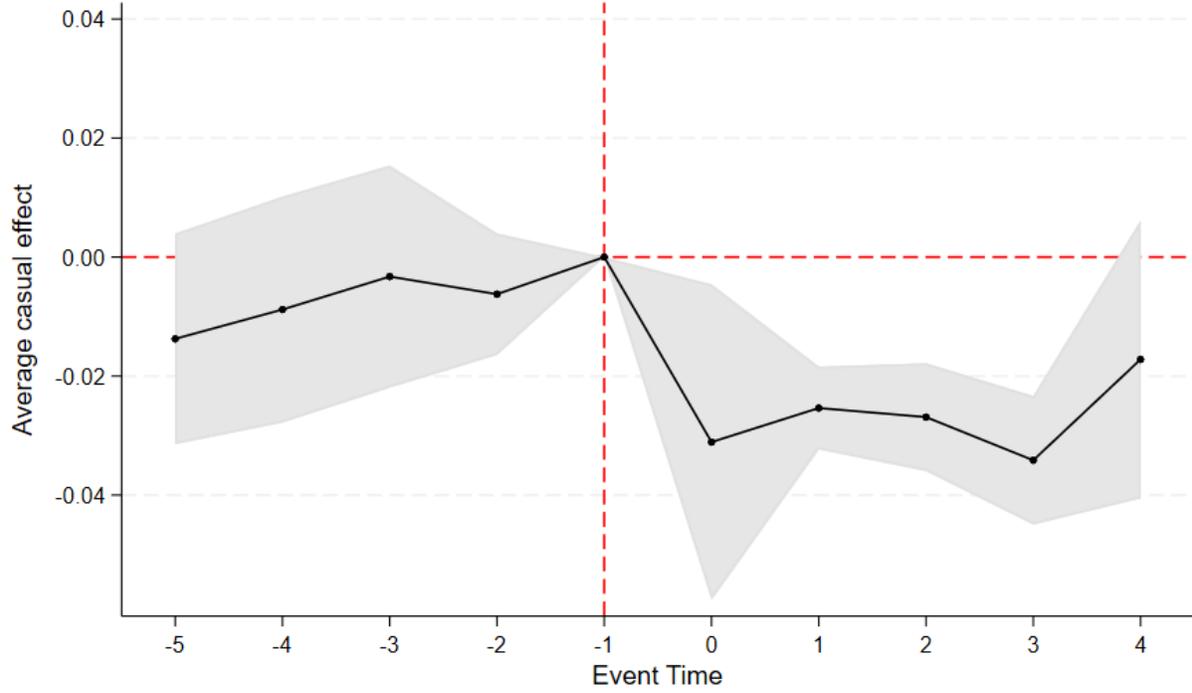


This figure shows the dynamic treatment effect of narrowing NDAs, using the specification .Where n denotes the number of years relative to the implementation year of the narrowing NDA policy.

$$y_{ijst} = \sum_{n=-5}^{n=4} \beta_n \mathbf{1}[t = n] + \phi_{jso} + \lambda_{jto} + \epsilon_{ijst}$$

For example, if a job posting was created one year after the policy change in a treated state, the indicator variable $\mathbf{1}[t = 1]$ equals one, and all other event-time indicators equal zero. We use the year prior to the policy implementation as the reference period. Job postings that occurred more than five years before or four years after the NDA policy change are grouped together, such that the indicator variable $\mathbf{1}[t = -5]$ ($\mathbf{1}[t = 4]$) equals one for these observations, with all other indicators equal to zero. Standard errors are clustered at the firm and state level.

Figure 2: Narrowing NDAs' Dynamic Effect on Job Vacancy Duration: Stacked DID Method



This figure shows the dynamic treatment effect of narrowing NDAs, using the stacked DID specification. Where n denotes the number of years relative to the implementation year of the narrowing NDA policy. k denotes stack and p denotes state pair.

$$y_{ijsot} = \sum_{n=-5}^{n=4} \beta_n \mathbf{1}[t = n] + \phi_{jsok} + \lambda_{jtok} + \theta_{kpt} + \epsilon_{ijsot}$$

For example, if a job posting was created one year after the policy change in a treated state, the indicator variable $\mathbf{1}[t = 1]$ equals one, and all other event-time indicators equal zero. We use the year prior to the policy implementation as the reference period. Job postings that occurred more than four years before (after) the NDA policy change are grouped together, such that the indicator variable $\mathbf{1}[t = -5]$ ($\mathbf{1}[t = 4]$) equals one for these observations, with all other indicators equal to zero. Standard errors are clustered at the firm and state level.

Table 1: Summary Statistics

The table presents the summary statistics of the primary variables used in this study. Additional information on all variables can be found in Appendix A. All variables are winsorized at the 1st and 99th percentiles (*lnviolation_number_sf* and *lnviolation_number_emp* have not been winsorized because the original data contains a large number of zero values).

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Job Postings					
<i>timediff</i>	50,309,597	36.923	37.719	1.000	180.000
<i>lntimediff</i>	50,309,597	3.033	1.185	0.000	5.193
<i>lnjobpostingn</i>	250,208	3.123	2.008	0.000	8.033
<i>lnjobpostingn_o</i>	2,404,288	1.419	1.330	0.000	5.298
Workplace Safety					
<i>lnag_total_injuries</i>	25,664	2.013	1.488	0.000	8.189
<i>lnviolation_number_sf</i>	267,300	0.018	0.133	0.000	4.263
Other Working Conditions					
<i>lnviolation_number_emp</i>	130,300	0.008	0.088	0.000	4.454
<i>lnag_total_hours_worked</i>	25,664	13.177	1.573	5.124	19.000
Firm Characteristics					
<i>ROA_{ib}</i>	13,409	0.009	0.124	-0.560	0.246
<i>ROA_{ni}</i>	13,409	0.010	0.126	-0.559	0.266
<i>Size</i>	13,409	7.834	1.787	3.369	12.298
<i>Leverage</i>	13,409	0.318	0.266	0.000	1.302
<i>TobinQ</i>	13,409	2.573	2.646	0.557	17.401
<i>Salegrowth</i>	13,409	0.116	0.267	-0.511	1.558
<i>Sg&A</i>	13,409	0.241	0.256	0.006	1.302
<i>RD</i>	13,409	0.038	0.074	0.000	0.389
<i>Cashholding</i>	13,409	0.181	0.24	0.001	1.38
Job Search					
<i>max_search_index</i>	233,436	0.823	1.109	0.000	4.830
<i>mean_search_index</i>	233,436	0.391	0.661	0.000	4.830

Table 2: Narrowing NDAs' Effect on Work Conditions

This table presents regression outputs using the following specification:

$$y_{jst} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{js} + \lambda_{jt} + \epsilon_{jst}$$

where y_{jst} denotes the natural logarithm of one plus the total injuries (*ln**total_injuries*), workplace safety or health violations (*ln**violation_number_sf*), the natural logarithm of one plus the number of employee-related violations (*ln**violation_number_emp*) and total work hours (*ln**total_hours_worked*) in firm j in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{js} and λ_{jt} are Firm-State fixed effects and Firm-Year fixed effects, respectively. Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Workplace Safety		
VARIABLES	(1) <i>ln</i> <i>total_injuries</i>	(2) <i>ln</i> <i>violation_number_sf</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0637*** (0.0227)	-0.00644** (0.00263)
Observations	25,664	267,300
R-squared	0.914	0.344
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State
Panel B: Other Working Conditions		
VARIABLES	(1) <i>ln</i> <i>violation_number_emp</i>	(2) <i>ln</i> <i>total_hours_worked</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.00703*** (0.00244)	-0.0399** (0.0188)
Observations	130,300	25,664
R-squared	0.190	0.943
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Table 3: Effects of Narrowing NDAs on Job Vacancy Duration

This table presents regression outputs using the following specification:

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}$$

where y_{ijsot} denotes the job vacancy duration for job posting i for occupation o in firm j , located in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. We also control Firm-State fixed effects and Firm-Year fixed effects in Column (1). Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>lntimediff</i>	(2) <i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0231** (0.0109)	-0.0216*** (0.00730)
Observations	50,904,045	50,309,597
R-squared	0.284	0.361
Firm-State FE	YES	
Firm-Year FE	YES	
Firm-State-Occupation FE		YES
Firm-Year-Occupation FE		YES
Cluster	Firm&State	Firm&State

Table 4: Heterogeneous Effects of Narrowing NDAs on Job Vacancy Duration

This table presents regression outputs using the following specification:

$$y_{ijst} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{ijst}$$

where y_{ijst} denotes the job vacancy duration for job posting i for occupation o in firm j , located in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. The sample is split by labor intensity and job zone. Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Difference in Labor Intensity	<i>High Labor Intensity</i>	<i>Low Labor Intensity</i>
VARIABLES	(1) <i>lntimediff</i>	(2) <i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0289*** (0.0101)	-0.00157 (0.00704)
Difference		-0.027***
P-value		0.000
Observations	22,446,028	21,956,541
R-squared	0.403	0.322
Firm-State-Occupation FE	YES	YES
Firm-Year-Occupation FE	YES	YES
Cluster	Firm&State	Firm&State
Panel B: Difference in Job Zone	<i>High Skills Job</i>	<i>Low Skills Job</i>
VARIABLES	(1) <i>lntimediff</i>	(2) <i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0144 (0.00924)	-0.0238*** (0.00737)
Difference		0.009***
P-value		0.000
Observations	16,194,150	32,147,543
R-squared	0.346	0.364
Firm-State-Occupation FE	YES	YES
Firm-Year-Occupation FE	YES	YES
Cluster	Firm&State	Firm&State

Table 5: Narrowing NDAs' Effect on Firm Performance

This table presents regression outputs using the following specification:

$$y_{jt} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_j + \lambda_t + \epsilon_{jt}$$

where y_{jt} denotes three different performance measures: ROA_{ib} (income before interest scaled by total assets in the prior year), and ROA_{ni} (net income scaled by total assets in the prior year) in firm j in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_j and λ_t are Firm fixed effects and Year fixed effects, respectively. Standard errors, clustered at the firm level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>ROA_ib.l</i>	(2) <i>ROA_ni.l</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	0.00813*** (0.00290)	0.00906*** (0.00298)
<i>Size</i>	0.0143*** (0.00481)	0.0156*** (0.00501)
<i>Leverage</i>	-0.0474*** (0.00741)	-0.0526*** (0.00761)
<i>TobinQ</i>	0.00957*** (0.000912)	0.00938*** (0.000928)
<i>Salegrowth</i>	0.0581*** (0.00533)	0.0547*** (0.00549)
<i>SG&A</i>	-0.113*** (0.0227)	-0.113*** (0.0235)
<i>R&D</i>	-0.602*** (0.0763)	-0.626*** (0.0779)
<i>Cashholding</i>	0.0102 (0.0114)	0.0282** (0.0123)
Observations	13,409	13,409
R-squared	0.782	0.772
Firm FE	YES	YES
Year FE	YES	YES
Cluster	Firm	Firm

Table 6: Effects of Narrowing NDAs on Google Search Index

This table presents regression outputs using the following specification:

$$y_{jst} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{js} + \lambda_{jt} + \epsilon_{jst}$$

where y_{jst} denotes Google search index for firm j in state s in year t . To address occasional missing values and downward-biased measurements in Google Trends, we query at the firm–state–year level using the keyword “firm name + job” (e.g., “Apple job”) three times. In Column (1), max_search_index is defined as the maximum value across the three queries (if two are missing and one is available, we take the available value as the maximum). In Column (2), $mean_search_index$ is the average computed over the non-missing query results. $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{js} and λ_{jt} are Firm-State fixed effects and Firm-Year fixed effects, respectively. Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>max_search_index</i>	(2) <i>mean_search_index</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	0.0351*** (0.00910)	0.0115** (0.00501)
Observations	233,436	233,436
R-squared	0.360	0.553
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Table 7: Narrowing NDAs' Effect on Job Vacancy Duration for Border-County

This table presents regression outputs using the following specification:

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \theta_{bt} + \epsilon_{ijsot}$$

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{js} + \lambda_{jt} + \theta_{bt} + \epsilon_{ijsot}$$

where y_{ijsot} denotes the job vacancy duration for job posting i for occupation o in firm j , located in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. We also control county pair-year fixed effects (θ_{bt}) in regression. We also control Firm-State fixed effects (ϕ_{js}) and Firm-Year fixed effects (λ_{jt}) in Column (1). We use untreated counties adjacent to treated counties as a counterfactual to capture what vacancy durations would have looked like in the absence of NDA restrictions. Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>lntimediff</i>	(2) <i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0285*** (0.00798)	-0.0320*** (0.00833)
Observations	12,113,471	12,198,903
R-squared	0.297	0.396
Firm-State FE	YES	
Firm-Year FE	YES	
Firm-State-Occupation FE		YES
Firm-Year-Occupation FE		YES
County Pair-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Table 8: Effects of Narrowing NDAs on Job Posting Numbers

This table presents regression outputs using the following specification:

$$y_{jst} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{js} + \lambda_{jt} + \epsilon_{jst}$$

$$y_{jsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{jsot}$$

where y_{jst} denotes the number of job postings in firm j in state s in year t ($\ln\text{jobpostingn}$), y_{jsot} denotes the number of job postings for occupation o in firm j in state s in year t ($\ln\text{jobpostingn}_o$). $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. We also calculate the number of job postings in in firm j in state s in year t ($\ln\text{jobpostingn}$), and control Firm-State fixed effects (ϕ_{js}) and Firm-Year fixed effects (λ_{jt}) in Column (1). Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>lnjobpostingn</i>	(2) <i>lnjobpostingn_o</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0218 (0.0166)	-0.0111 (0.0140)
Observations	250,208	2,404,288
R-squared	0.920	0.858
Firm-State FE	YES	
Firm-Year FE	YES	
Firm-State-Occupation FE		YES
Firm-Year-Occupation FE		YES
Cluster	Firm&State	Firm&State

Table 9: Effects of Narrowing NDAs on Job Vacancy Duration: Private Firm Tests

This table presents regression outputs using the following specification:

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}$$

where y_{ijsot} denotes the job vacancy duration for job posting i for occupation o in private firm j , located in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. We also control Firm-State fixed effects and Firm-Year fixed effects in Column (1). Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) <i>lntimediff</i>	(2) <i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0158*** (0.00555)	-0.0116** (0.00556)
Observations	57,431,965	55,760,987
R-squared	0.422	0.490
Firm-State FE	YES	
Firm-Year FE	YES	
Firm-State-Occupation FE		YES
Firm-Year-Occupation FE		YES
Cluster	Firm&State	Firm&State

Table 10: Effects of Narrowing NDAs on Job Vacancy Duration: Robustness Tests

This table presents regression outputs using the following specification:

$$y_{ijsot} = \beta 1[t \geq \text{NarrowedNDA}]_{st} + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}$$

where y_{ijsot} denotes the job vacancy duration for job posting i for occupation o in firm j , located in state s in year t , $1[t \geq \text{NarrowedNDA}]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s . ϕ_{jso} and λ_{jto} are firm-state-occupation fixed effects and firm-year-occupation fixed effects, respectively. We re-estimate our main specification using two alternative time windows: vacancies lasting at least one day (*lntimediff_1 - all*) and 1–120 days (*lntimediff_1 - 120*) in Column (1) and Column (2); Next, We re-estimate our baseline specification after excluding the year 2020 from the sample in Column (3); In Column (4), we use the same extended sample but define the year following the treat date as the treatment year, regardless of the implementation month.. (*New_Timing*). Standard errors, clustered at the firm and state level, are shown in parentheses below the coefficient estimates. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) >=1 Days	(2) 1-120 Days	(3) Drop Covid-19 Year	(4) New_Timing
VARIABLES	<i>lntimediff_1-all</i>	<i>lntimediff_1-120</i>	<i>lntimediff</i>	<i>lntimediff</i>
$1[t \geq \text{NarrowedNDA}]_{st}$	-0.0255** (0.0114)	-0.0201*** (0.00623)	-0.0198*** (0.00539)	-0.0211*** (0.00497)
Observations	53,992,319	47,691,212	44,649,705	50,309,597
R-squared	0.417	0.350	0.365	0.361
Firm-State-Occupation FE	YES	YES	YES	YES
Firm-Year-Occupation FE	YES	YES	YES	YES
Cluster	Firm&State	Firm&State	Firm&State	Firm&State

Appendix A Non-Disclosure Agreement Examples

An Example of Non-Disclosure Agreement Template

NON-DISCLOSURE AGREEMENT (NDA)

This Nondisclosure Agreement or ("Agreement") has been entered into on the date of _____ and is by and between:

Party Disclosing Information: _____ with a mailing address of _____ ("Disclosing Party").

Party Receiving Information: _____ with a mailing address of _____ ("Receiving Party").

For the purpose of preventing the unauthorized disclosure of Confidential Information as defined below. The parties agree to enter into a confidential relationship concerning the disclosure of certain proprietary and confidential information ("Confidential Information").

1. Definition of Confidential Information. For purposes of this Agreement, "Confidential Information" shall include all information or material that has or could have commercial value or other utility in the business in which Disclosing Party is engaged. If Confidential Information is in written form, the Disclosing Party shall label or stamp the materials with the word "Confidential" or some similar warning. If Confidential Information is transmitted orally, the Disclosing Party shall promptly provide writing indicating that such oral communication constituted Confidential Information.

2. Exclusions from Confidential Information. Receiving Party's obligations under this Agreement do not extend to information that is: (a) publicly known at the time of disclosure or subsequently becomes publicly known through no fault of the Receiving Party; (b) discovered or created by the Receiving Party before disclosure by Disclosing Party; (c) learned by the Receiving Party through legitimate means other than from the Disclosing Party or Disclosing Party's representatives; or (d) is disclosed by Receiving Party with Disclosing Party's prior written approval.

3. Obligations of Receiving Party. Receiving Party shall hold and maintain the Confidential Information in strictest confidence for the sole and exclusive benefit of the Disclosing Party. Receiving Party shall carefully restrict access to Confidential Information to employees, contractors and third parties as is reasonably required and shall require those persons to sign nondisclosure restrictions at least as protective as those in this Agreement. Receiving Party shall not, without the prior written approval of Disclosing Party, use for Receiving Party's benefit, publish, copy, or otherwise disclose to others, or permit the use by others for their benefit or to the detriment of Disclosing Party, any Confidential Information. Receiving Party shall return to Disclosing Party any and all records, notes, and other written, printed, or tangible materials in its possession pertaining to Confidential Information immediately if Disclosing Party requests it in writing.

4. Time Periods. The nondisclosure provisions of this Agreement shall survive the termination of this Agreement and Receiving Party's duty to hold Confidential Information in confidence shall remain in effect until the Confidential Information no longer qualifies as a trade secret or until Disclosing Party sends Receiving Party written notice releasing Receiving Party from this Agreement, whichever occurs first.

NDA Template (Page 1)

5. **Relationships.** Nothing contained in this Agreement shall be deemed to constitute either party a partner, joint venture or employee of the other party for any purpose.

6. **Severability.** If a court finds any provision of this Agreement invalid or unenforceable, the remainder of this Agreement shall be interpreted so as best to affect the intent of the parties.

7. **Integration.** This Agreement expresses the complete understanding of the parties with respect to the subject matter and supersedes all prior proposals, agreements, representations, and understandings. This Agreement may not be amended except in writing signed by both parties.

8. **Waiver.** The failure to exercise any right provided in this Agreement shall not be a waiver of prior or subsequent rights.

9. **Notice of Immunity.** Employee is provided notice that an individual shall not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that is made (i) in confidence to a federal, state, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal. An individual who files a lawsuit for retaliation by an employer for reporting a suspected violation of law may disclose the trade secret to the attorney of the individual and use the trade secret information in the court proceeding, if the individual (i) files any document containing the trade secret under seal; and (ii) does not disclose the trade secret, except pursuant to court order.

This Agreement and each party's obligations shall be binding on the representatives, assigns and successors of such party. Each party has signed this Agreement through its authorized representative.

DISCLOSING PARTY

Signature:

Typed or Printed Name: Date:

RECEIVING PARTY

Signature:

Typed or Printed Name: Date:

An Example of Non-Disclosure Agreement Misuse

A Missouri law firm required all newly-hired support staff and attorneys to sign an employment agreement containing the following non-disparagement provision (Meyer [2019]):

*During and after Employee's employment or association with Law Firm ends, for any reason, employee will **not in any way criticize, ridicule, disparage, libel, or slander** Law Firm, its owners, its partners, or any Law Firm employees, either orally or in writing.*

Schwans Home Services, Inc. included language within their NDA which prohibited their workers from sharing confidential or proprietary information that would hurt the employer (Schwans Home Serv., Inc., 364 N.L.R.B. No. 20 2016 (p. 6)):

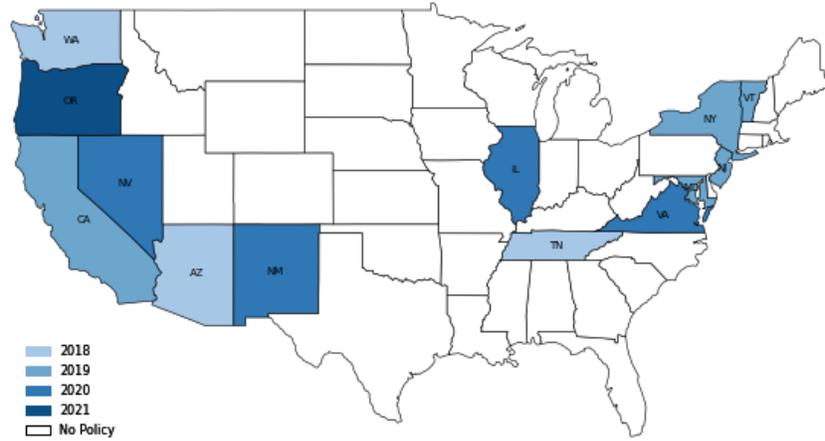
*Employee shall neither directly nor indirectly (i) disclose to any person not in the employ of Employer any Confidential or Proprietary Information, or (ii) use any such information to the Employee's benefit, the benefit of any third party or [e]mployer, or **to the detriment of Employer.***

Employees at Juvly Aesthetics, a beauty salon, were required to agree to the following as a condition of employment (Consolidated Complaint in Juvly Aesthetics, Case No. 09-CA-300239):

*... disparaging statements concerning individuals within management, other employees, or The Company will be considered insubordination, **both in writing, in person, on social media, on review sites and on all other venues** and are prohibited.*

Appendix B Treated State and Treated Year

Figure A1: Staggered Adoption of State Policies Narrowing NDAs



The figure shows when and where restrictions on the use of NDAs have been enacted in the United States. More details about these regulations are reported in the Table A1.

Table A1: State-Level Implementation Timeline of NDA Narrowing Policies

Treat State	Treated Year	Treated Date
Arizona	2018	201804
Tennessee	2018	201805
Washington	2018	201806
California	2019	201901
Maryland	2019	201810
New Jersey	2019	201903
New York	2019	201807
Vermont	2019	201807
Illinois	2020	202001
Nevada	2020	201907
New Mexico	2020	202005
Virginia	2020	201907
Oregon	2021	202010

Appendix C Variable Definitions

Table A2: Variable Definitions and Data Sources

Variable	Definition	Source
<i>timediff</i>	Job vacancy duration: The number of days between the posting and the closing date of a job opening between 1 and 180 days.	LinkUP
<i>lntimediff</i>	Natural logarithm of vacancy duration for job postings with durations between 1 and 180 days.	LinkUP
<i>lnjobpostingn</i>	Natural logarithm of numbers for job postings with durations between 1 and 180 days at the firm-state-year level.	LinkUP
<i>lnjobpostingn_o</i>	Natural logarithm of numbers for job postings with durations between 1 and 180 days at the firm-state-year-occupation level.	LinkUP
$1[t \geq \text{NarrowedNDA}]$	Indicator for treated states after NDA policy implementation.	–
<i>lnviolation_number_emp</i>	Natural logarithm of one plus the number of employee-related violations at the firm-state-year level.	Violation Tracker
<i>lnviolation_number_sf</i>	Natural logarithm of one plus the number of workplace safety or health violations at the firm-state-year level.	Violation Tracker
<i>lntotal_injuries</i>	Natural logarithm of one plus the number of total workplace injuries at the firm-state-year level.	OSHA
<i>lntotal_hours_worked</i>	Natural logarithm of one plus the number of total hours worked at the firm-state-year level.	OSHA
<i>ROA_{ib}</i>	Income before extraordinary items / lagged total assets.	Compustat
<i>ROA_{ni}</i>	Net income / lagged total assets.	Compustat
<i>Labor Intensity</i>	Number of employees / lagged total assets (Jung et al., 2014).	Compustat
<i>Size</i>	Log of total assets.	Compustat
<i>Leverage</i>	(Long-term debt + short-term debt) / lagged total assets.	Compustat
<i>TobinQ</i>	(Assets - common equity + market value) / lagged total assets.	Compustat
<i>Salegrowth</i>	Percentage change in sales from previous year.	Compustat

Continued on next page

Table A2 (Continued)

Variable	Definition	Source
<i>SG&A</i>	SG&A expenses / lagged total assets.	Compustat
<i>Cashholding</i>	(Cash + cash equivalents) / lagged total assets.	Compustat
<i>R&D</i>	Research and development expenses / lagged total assets.	Compustat
<i>max_search_index</i>	The maximum normalized Google search index value for “firm name + job” obtained from three independent Google Trends queries at the firm–state–year level.	
<i>mean_search_index</i>	The average of the non-missing normalized Google search index values for “firm name + job” obtained from three independent Google Trends queries at the firm–state–year level.	

Appendix D Model

In this section, we present a stylized model explaining (i) why mandatory NDA restrictions might help improve work conditions and firm profits and (ii) why employers do not voluntarily restrict their use of NDAs.

A firm lasts for two periods, $t \in \{0, 1\}$. The firm's manager maximizes firm value by choosing: (i) the amount of investment to improve work conditions, I , at $t = 0$, and (ii) the intensity at which to use NDA to improve job seekers' perception about work conditions, Δ , at $t = 1$. We explain these actions below.

Investment in Work Conditions: Investment in work conditions is costly with the total cost being convex in the amount of investment. For analytical tractability, we model the cost as a quadratic function, $\frac{1}{2}I^2$. Greater investment improves work conditions, which are realized at time $t = 1$. We denote work conditions by w , defined as $w = I + \eta$, where $\eta \sim \mathcal{N}(0, \sigma_\eta^2)$. The term η captures factors beyond the manager's control. For instance, the installation of new equipment intended to enhance workplace safety may fail to deliver the expected benefits due to installation errors or operational issues.

Information Structure and Manipulation Decisions: The manager's investment in work conditions, I , is not directly observable to job seekers, that is, the manager cannot credibly disclose such investments. However, existing employees observe work conditions and can share information about them. In the absence of managerial interference (e.g., through non-disclosure agreements, NDAs), we represent the summary statistic of employee-shared information as $w + \epsilon$, where ϵ is a normally distributed noise term with mean zero and variance σ_ϵ^2 . The noise term may capture a number of factors. Employees may work in different functions with heterogeneous workplace environments, making their reports only partially relevant. They may also differ in their preferences over aspects of work conditions (e.g., some value work-life balance more than others), thereby

reducing the informativeness of their disclosures to job seekers with different preferences. Finally, some employees may simply lack the time or motivation to share information. The noise in the signal increases as the number of employees sharing their opinions decreases.

The manager can influence the extent to which employees share their opinions by, for example, requiring NDAs. This generates two effects. First, we let Δ denote the extent of signal improvement from the manager's perspective. Δ is continuous. Its magnitude captures, in reduced form, factors such as the prevalence of NDA clauses in employment contracts at the employer level and their degree of enforceability. As such, the signal observed by job seekers is

$$s = w + \epsilon + \Delta.$$

Second, greater reliance on NDAs discourages employees from sharing information due to concerns over potential employer retaliation. To capture this effect, we assume

$$\epsilon \sim \mathcal{N}(0, g(\Delta)\sigma_\epsilon^2),$$

where $g(0) = 1$ and $g'(\Delta) > 0$. This reduced-form specification implies that stronger suppression of employee communication (i.e., larger Δ) deteriorates the informativeness of employee opinions. For instance, broader NDA coverage may reduce both the likelihood of negative disclosures and the number of employees who share their views, whether publicly or privately. Similarly, aggressive NDA enforcement may undermine the credibility of positive statements, as such opinions could be perceived as employer-influenced. For tractability, the manager incurs a convex manipulation cost of $\frac{1}{2}c\Delta^2$ with $c > 0$.

Objective Function: Let N denote the number of job vacancies at the firm. We assume that, for a given vacancy, the probability that a job seeker accepts the firm's job offer increases with

the job seeker's perceived quality of workplace conditions given s , which is denoted by $\mathbb{E}^J(w|s)$. For tractability, let $\Phi(\mathbb{E}^J(w|s)) = \gamma\mathbb{E}^J(w|s)$ be this probability, where $\gamma > 0$.²³ A filled vacancy produces one unit of revenue, and an unfilled one does not produce revenue. The manager's objective function can be specified as:

$$\max_{I, \Delta} \left\{ \mathbb{E}^M \left[N \underbrace{\gamma \mathbb{E}^J[w|s]}_{\text{Probability that a vacancy is filled}} - \frac{1}{2}I^2 - \frac{1}{2}c\Delta^2 \right] \right\},$$

where \mathbb{E}^M and \mathbb{E}^J denote expectations taken by the manager and by job seekers, respectively.

Rational Expectation Equilibrium: Job seekers are rational and recognize the manager's incentive to manipulate perceptions of work conditions. However, because they cannot observe I or Δ directly, they must form conjectures about these variables. Let \hat{I} denote job seekers' conjecture about I , and $\hat{\Delta}$ their conjecture about Δ . The manager's maximization problem can then be written as:

$$\max_{I, \Delta} \left\{ \mathbb{E}^M \left[N\gamma \left(\hat{I} + \frac{\sigma_\eta^2}{\underbrace{\sigma_\eta^2 + g(\hat{\Delta})\sigma_\epsilon^2}_{\equiv \beta}} \left(\underbrace{I + \Delta + \eta + \epsilon}_{\text{Signal about work conditions}} - \underbrace{\hat{\Delta}}_{\text{Bias adjustment}} - \hat{I} \right) \right) \right] - \frac{1}{2}I^2 - \frac{1}{2}c\Delta^2 \right\}.$$

In equilibrium, job seekers' conjectures are correct, that is, $\hat{I} = I^*$ and $\hat{\Delta} = \Delta^*$. Taking first order conditions with respect to I and Δ solves the model. We summarize the solution in the following proposition:

Proposition 1. *There exists a unique rational equilibrium in which the manager manipulates*

²³Consider the following simple model of a job applicant's decision to accept an offer. Her utility from accepting the offer equals $U_1(s) = \mathbb{E}^J(w|s)$, which depends on her perception of work conditions given s , namely $\mathbb{E}^J(w|s)$. Let the utility of rejecting it be U_0 , which represents the utility of the applicant's other options, for example, remaining with the current employer or staying out of the labor force. From the employer's perspective, U_0 is random, reflecting heterogeneity in applicants' circumstances and preferences. A job applicant accepts the offer if and only if $U_1(s) \geq U_0$. Accordingly, the probability that an applicant accepts the offer is given by $Pr(\text{accept}|s) = Pr\{U_0 \leq \mathbb{E}(w|s)\} = \Phi(\mathbb{E}^J(w|s))$, where $\Phi(\cdot)$ is the distributional function of U_0 .

employee opinions by $\Delta^* > 0$ and invest in work conditions by $N\gamma\beta$, where $\beta = \frac{\sigma_\eta^2}{\sigma_\eta^2 + g(\Delta^*)\sigma_\epsilon^2}$.

Proof. The first order conditions are:

$$\gamma\beta - I = 0 \implies I^* = N\gamma\beta = \frac{N\gamma\sigma_\eta^2}{\sigma_\eta^2 + g(\Delta^*)\sigma_\epsilon^2}, \quad (3)$$

$$c\Delta = \frac{\gamma\sigma_\eta^2}{\sigma_\eta^2 + g(\hat{\Delta})\sigma_\epsilon^2} \implies \Delta^* > 0 \text{ and is unique.} \quad (4)$$

□

It is clear from Proposition 1 that, since $\Delta^* > 0$, the manager does not have incentive to restrict the use of NDAs voluntarily. This is because the use of NDAs helps improve the signal observed by job seekers, which, all else equal, benefits the employer. In equilibrium, job seekers can de-bias the signal, removing this benefit. Nevertheless, restricting the usage of NDAs will not help improve job seekers' perception of work conditions, as they do not observe the actual NDA usage, similar to earnings management models [Stein, 1989].

D.1 Empirical predictions

We derive three empirical predictions regarding the effects of limiting the scope of NDAs. In our model, limiting the scope of NDAs is equivalent to setting $\Delta = 0$. The first two predictions pertain to the impact on the manager's investment in work conditions (I) and the ex-ante likelihood of filling a job vacancy ($\gamma E^M(\Phi)$.)

Corollary 1. *When restricting $\Delta = 0$, investment in work conditions and the likelihood of filling vacancies both increase.*

Proof. From the expression of the equilibrium investment level, $I^* = \frac{N\gamma\sigma_\eta^2}{\sigma_\eta^2 + \lambda\Delta\sigma_\epsilon^2}$, I^* increases as Δ decreases. It follows that $E^M(\Phi)$ increases as $E^M(\Phi) = N\gamma I^*$. □

Corollary 2. *Firm profit increases when restricting $\Delta = 0$.*

Proof. In equilibrium, the manager underinvest in work condition. The first best investment level, assuming work conditions are observable, equals $N\gamma$. The first best level is higher than the second best investment level, $I^* = N\gamma\beta$, because $\beta < 1$.

In expectation, firm profits without manipulation costs equal $N^2\gamma^2(\beta - \frac{1}{2}\beta^2)$. Taking the derivative with respect to Δ , we have $-N^2\gamma^2(1 - \beta)\frac{\lambda\sigma_\epsilon^2\sigma_\eta^2}{(\sigma_\eta^2 + \lambda\hat{\Delta}^*\sigma_\epsilon^2)^2} < 0$. Thus, manipulation reduces firm profit even when we do not account for the cost of manipulation, which is absent when $\Delta = 0$. It follows that setting $\Delta = 0$ should increase profits. \square

In equilibrium, the manager's underinvest in work conditions because workers do not observe work conditions and need to rely on employee opinions. Less manipulation improves the responsiveness of job seekers' perception of work conditions to actual investment in work conditions, reducing underinvestment. As such, firm profits increase.