Non-Disclosure Agreement and the Market for Talent*

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Abstract

This paper examines how information frictions in workplace issues affect employers' incentives to improve workplace conditions and firm outcomes. 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 information frictions in the labor market leading to underinvestment in workplace conditions, which hurts firms' ability to attract human capital and their financial performance.

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1 Introduction

Attracting workers is among the most consequential challenges that firms face, and job seekers' perceptions of workplace conditions are a central determinant of where they choose to work (Maestas et al. [2023]). This creates strong incentives for employers to manage those perceptions. Recent evidence indicates that many firms do so by using aggressive Non-Disclosure Agreements (NDAs hereafter) to restrict employees from disclosing workplace problems such as harassment, safety hazards, and stressful working conditions.[1] By shaping the information available to prospective employees, these practices likely influence firms' recruiting outcomes. This paper examines how NDAs affect firms' ability to attract and match with workers.

We posit that, as NDA use becomes more widespread, the lack of negative information becomes increasingly uninformative about workplace quality. The resulting increase in information asymmetry causes two labor-market distortions that plausibly undermine recruiting, even for NDA adopters. First, greater information asymmetry reduces efficient matching between employers and job seekers. Job seekers who value workplace quality must search more intensively before accepting positions, which can require remaining unemployed longer or staying longer in unsatisfying jobs. Employers, in turn, face a larger pool of poorly informed applicants and devote more resources to screening for suitable matches.

Second, greater information asymmetry disincentivizes workplace improvements, driving down average workplace quality, which further complicates job searches and reduces job seekers' willingness to work. One reason is that NDAs mask poor conditions and allow low-quality firms to avoid costly improvements. Another reason is that NDAs make it harder for firms to credibly com-

[1] NDAs 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, and 88% of firms use NDAs for at least some employees (Balasubramanian et al. [2024]; Starr et al. [2021]). While a main purpose of NDAs is to protect trade secrets, they are used to restrict employee disclosures of workplace issues. See Appendix A for examples of using NDAs to prevent workers from speaking out about workplace issues.

municate workplace quality to job seekers, since job seekers heavily discount the lack of negative information when NDAs are common. A consequence of this discount is that workplace improvements are less effective in attracting productive workers, reducing the profitability of improving workplace quality and leading firms across the quality spectrum to invest less in workplace conditions. Lower workplace quality, in turn, reduces workers' willingness to accept a position or enter the labor market.[2]

We investigate the effect of NDAs on worker recruiting by examining state-level regulations that restrict employers' use of NDAs to suppress negative employee disclosures. Due to concerns that NDAs impose costs on employees, between 2018 and 2020, 13 states enacted legislation prohibiting employers from using NDAs to prevent employees from disclosing information about workplace issues such as harassment, discrimination, retaliation, unsafe conditions, or other unlawful practices. Our logic developed above implies that to the extent that these laws increase employee disclosures and reduce information asymmetries in the labor market, the average firm's ability to attract and match with workers should improve.

Our hypothesis rests on two key premises: (1) NDAs suppress the flow of negative employee disclosures, and (2) job seekers rely on such disclosures to assess workplace quality. Situations in which these premises do not hold are sources of tension. For example, although contemporaneous research finds that NDA laws increase the flow of employees' negative public disclosures (Sockin et al. [2024]; Cheng et al. [2025]; Holstead et al. [2025]), employees likely still communicate through word-of-mouth or other private channels. In addition, job seekers are plausibly able to learn about, or infer, workplace conditions through alternative mechanisms, or high-quality firms may find ways to credibly signal their quality. In such settings, NDA laws are unlikely to have material effects on information asymmetry and job searches. Section 3 further discusses sources of tension.

[2]Although NDAs undermine recruiting, it is difficult for an individual firm to escape the equilibrium: forgoing an NDA means bearing the full cost of negative employee disclosures, without gaining a credible signal of workplace quality.

We test our hypothesis using a difference-in-differences design that compares "treated" locations in states that restrict NDAs to "control" locations of the same firm in states that do not introduce NDA laws, thereby exploiting within-firm-year, cross-state variation in exposure to NDA laws. Following Chen and Li [2023], we proxy for a firm's ability to attract and match with job seekers using job vacancy duration, constructed from job posting data. If job seekers are more willing to apply for and accept job offers, the time required to match with qualified candidates should decrease (e.g., Moen [1997], Davis et al. [2013] and Kuhn et al. [2021]). We find that treated locations indeed fill vacancies more quickly following the implementation of NDA regulations, which is consistent with the hypothesis that NDAs impair recruiting. The result is robust to a border-county design that compares locations of the same firm on either side of a state border, which further controls for local social and economic conditions, and to alternative variable definitions.

We also examine two cross-sectional settings in which the effects of NDA laws should be strongest. First, we expect larger effects in settings where workplace conditions are especially important to job seekers, such as among labor-intensive firms and for non-remote positions. Second, the effects should be more pronounced for jobs with greater information asymmetry about workplace conditions. Our empirical findings indicate that the effect of NDA laws on job vacancy duration is stronger in these cases.

We next investigate one of the mechanisms through which we expect NDA laws to improve employers' abilities to attract workers: by increasing their incentives to improve workplace conditions.[3] Workplace conditions are multi-dimensional and difficult to measure, so we draw on several empirical proxies from the literature, including workplace injuries and safety- or health-related violations, employee-related violations, and total hours worked (Caskey and Ozel [2017]; Raghunandan [2021]). Consistent with NDAs disincentivizing workplace improvements, we find that employers

[3]NDA laws, by improving the flow of workplace information to job seekers, can directly improve employers' ability to match with job seekers. As explained above, prior research already establishes an increased information flow, so we do not re-investigate those tests.

in treated states improve workplace conditions following the enactment of NDA laws.

Having shown an improvement in firms' ability to attract workers and better workplace conditions, our final set of analyses examines the consequences of these changes for firms' ability to retain existing employees and firm performance. The effect on firms' ability to retain workers is theoretically ambiguous. Improvements in workplace conditions and matching efficiency should incentivize employees to remain with their current employer. However, these effects could be offset because employees are better able to identify external opportunities or because peer firms are better able to lure workers away. The net effect can still be positive as more workers join the labor force. We follow prior literature in measuring employee retention using turnover (e.g., Li et al. [2022]; Leung et al. [2024]; Kong et al. [2024]), and our analyses indicate that NDA restrictions improve employee retention.

How firm performance is affected is also not obvious. On the one hand, improving workplace conditions is costly, which is presumably one of the reasons firms adopt NDAs in the first place. On the other hand, NDA laws could increase firms' profits by improving matching efficiency and worker productivity, especially if NDA adoptions are driven by competitive pressures. Another consideration is wages, which could decrease as workplace conditions improve and uncertainty decreases, or increase as firms must compete more openly for workers. Using return on assets to measure firm performance, we find that treated firms experience improvements in performance relative to control firms after the enactment of NDA laws.[4]

In sum, although firms might initially adopt NDAs to suppress negative disclosures and improve recruiting, our findings indicate that widespread NDA use degrades the labor market information environment in ways that ultimately hinder firms' ability to attract and retain workers and are associated with lower average firm performance. These results are consistent with the notion that,

[4]We do not have firm-state level performance data, so these tests are not amenable to the powerful within-firm designs used in our previous tests.

while firms collectively benefit from lower information asymmetry, using NDAs is an individually rational response to their recruitment incentive, particularly when facing competitive pressure. NDA laws serve as a commitment device not to use NDAs, reducing information asymmetry in the labor market and moving it toward a more efficient equilibrium for firms.

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 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.[5] 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

[5]The NDA template was obtained from https://www.ilrg.com/forms/employmt.html

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 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 secrets[6]. Between 2018 and 2020, a total of 13 states passed such legislation. Table B1 and Figure B1 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).[7] Some states,

[6]All 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).

[7]NDA 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

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 aimed at addressing the misuse of NDAs across the United States[8]. This legislation represents a significant step in nationwide efforts to reform how NDAs are used, particularly in cases involving workplace misconduct.

3 Hypothesis Development

This section develops our central hypothesis: that aggressive NDAs exacerbate information frictions in the labor market, ultimately harming firms' ability to attract workers. It follows that laws restricting aggressive NDAs can improve firms' recruiting outcomes.

A key premise underlying our hypothesis is that aggressive NDAs successfully suppress negative information about workplace quality, making it harder for job seekers to distinguish among prospective employers. Several factors could limit this suppression, and are therefore sources of tension in our study. First, employees may be unconcerned about publicly violating their NDAs if they expect aggressive agreements are difficult to enforce in court (Rose and Russ [2019]), or if they believe their online posts will remain anonymous. [9] Second, even when NDAs are binding,

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, which was 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.

[8] 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.

[9] For example, Glassdoor has won several court cases seeking to uncover the identities of employees posting negative reviews. See Glassdoor, "Tell me about some of Glassdoor's successful legal efforts to defend user anonymity." Accessed 4/27/2026.

job seekers may learn about workplace conditions through alternative channels; for example, private conversations, observations by non-employees who transact with the firm, or externally visible accidents and incidents. Third, because NDAs are unlikely to suppress positive disclosures, a sophisticated job seeker might infer that a firm with few positive disclosures and no negative ones is using an NDA to obscure poor conditions, leading to partial unraveling (Dye [1985]; Zhou and Zhou [2020]).[10] Finally, job seekers may somehow directly observe which firms use NDAs, or firms may be able to credibly commit to not having one. [11]

Despite these tensions, survey and empirical evidence indicates that aggressive NDAs frequently and effectively suppress negative information. A survey by Chan et al. [2024] finds that employees often comply with aggressive NDAs due to significant expected costs of violations, including litigation, forfeiture of severance, reputational harm, and difficulty in obtaining future work. According to Weston [2021], the silence of affected employees allows workplace misconduct to persist and exists "across industries and at all levels of society." Consistent with these anecdotes, contemporaneous empirical work finds that NDA restrictions drive increases in negative online employee postings, media coverage, and whistleblower-initiated OSHA inspections (Sockin et al. [2024]; Cheng et al. [2025]; Holstead et al. [2025]). Additionally, the fact that thirteen states enacted NDA restrictions is at least suggestive that aggressive NDAs are perceived as a meaningful labor market concern.

When NDAs are at least partially effective in suppressing negative information, firms face strong incentives to adopt them. A firm with poor workplace conditions can pool with higher-quality employers, since job seekers cannot easily distinguish quality. A new hire may eventually observe

[10] Full unraveling is unlikely because a lack of negative disclosures may also be driven by other frictions, such as employees' lack of interest in information sharing, rather than NDAs. In addition, understanding the implications of a lack of negative disclosures requires sophisticated strategic thinking, and research shows that economic agents often do not fully understand the implications of nondisclosure (Brown et al. [2012]; Zhou and Zhou [2020]; Liu et al. [2026]).

[11] When job seekers can observe which firms use NDAs or firms can credibly commit to not using NDAs, a lack of negative employee disclosures is less likely to be driven by suppression of negative information and more likely by genuinely better workplace conditions. This said, it seems unlikely that firms commit at the job search stage to not using NDAs, and job seekers plausibly view any commitment as incredible given employers' incentives to introduce NDAs should workplace issues arise.

poor conditions, but is unlikely to leave immediately because of switching costs and uncertainty about outside options, so the NDA-using employer retains its recruiting benefit. The resulting competitive dynamic creates pressure toward widespread adoption: because NDAs compress the observable quality distribution, firms with better conditions cannot easily signal their type, leaving them disadvantaged relative to lower-quality NDA users. Even firms that might otherwise prefer transparency are thus pressured to adopt.

As NDA usage grows and negative disclosures are widely suppressed, their absence tells job seekers increasingly little about workplace quality. We expect this erosion of informativeness to generate two distortions that impair employers' ability to attract workers: a matching channel and an incentive channel.

The first distortion operates through the matching channel (Jovanovic [1979]; Schaal [2017]; Den Haan et al. [2021]). Poorly informed job seekers must search longer and more cautiously before accepting positions, either remaining unemployed longer or staying in unsatisfying jobs longer than they otherwise would. This imposes productivity losses on employers and wage losses on workers. Employers, in turn, face a larger pool of poorly informed applicants and must either invest more in screening for suitable matches or bear the cost of hiring ill-fitting workers. The efficiency and quality of matching both decline.

The second distortion operates through an incentive channel: firms' incentives to invest in workplace quality weaken, lowering average workplace quality and therefore job seekers' willingness to work. When firms can suppress negative information, low-quality employers face less competitive pressure to improve their workplace conditions. The incentive problem extends beyond low-quality firms, however, because even employers who would otherwise prefer to invest in workplace improvements find that those improvements are harder to communicate credibly. Specifically, job seekers who know that NDAs are prevalent will discount the absence of bad news, because silence could

reflect either good conditions or effective suppression. This undermines the returns to workplace investment, such that average workplace quality is lower than it would be in the absence of NDAs. Research indicates that the resulting lower average quality should cause some workers to stay out of the labor market altogether (Roback [1982]; Hwang et al. [1998]; Sullivan and To [2014]; Hall and Mueller [2018]).

Our central prediction is that NDA restrictions unwind both distortions. By increasing the flow of negative employee disclosures, these restrictions improve the efficiency of job matches and strengthen firms' incentives to improve workplace quality. As workplace quality improves, workers become more willing to enter or remain in the labor market. We therefore expect that NDA restrictions improve the average employer's ability to attract workers, and state our hypothesis in the alternative form:

H1: On average, restrictions on aggressive NDAs improve employers' ability to attract workers.

4 Research Design

Our empirical analyses employ a difference-in-differences design around the adoption of NDA laws. We use the following specification to test the effects on job vacancy duration:

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

where y_{ijsot} denotes the vacancy duration of job i that is posted by firm j in state s and year t and belongs to occupation o. The idea is that, if NDA laws enhance matching between firms and job seekers as well as workplace conditions, thereby improving firms' ability to attract and match with job seekers, job vacancy duration should decrease (e.g., Moen [1997], Davis et al. [2013], and Kuhn

et al. [2021]).[12] The key independent variable, $\mathbb{1}[t \geq NarrowedNDA]_{st}$, is an indicator equal to one in years following the enactment of the NDA law in state s. Between 2018 and 2020, thirteen states enacted these laws. 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.

To control for unobserved heterogeneity, we include firm-state-occupation fixed effects (ϕ_{jso}), which account for time-invariant, unobserved firm-specific factors within an occupation and state. For example, a firm may operate a research hub in a particular state that attracts a disproportionate number of technological specialists relative to its establishments in other states or to peer firms in the same state. We also include firm-year-occupation fixed effects (λ_{jto}) to account for time-varying, unobserved factors specific to an occupation and firm. For example, a firm may decide to change its growth strategy in a year and thus demand more labor in a specific occupation than its existing labor demand in that occupation. The error term is denoted by ϵ_{ijsot}. We cluster standard errors by firm and state to account for the potential correlation of error terms along both dimensions (Abadie et al. [2023]). Our statistical inferences (untabulated) are robust to computing clustered standard errors at the state level only.

Our coefficient of interest is β. If, as we have hypothesized, NDA laws improve firms' ability to attract and match with job seekers, decreasing job vacancy duration, the coefficient on $\mathbb{1}[t \geq NarrowedNDA]_{st}$ should be negative, that is, $\beta < 0$.

[12] Job vacancy duration could also be affected by changes in labor demand. In Section 8.3, we find no statistically significant changes in labor demand, using the number of job postings as the proxy.

5 Data and Variable Measurement

5.1 Linkup 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, firm identifier, and so on. Importantly, LinkUp records the creation and removal dates of each job posting, allowing us to measure job vacancy durations.[13] A 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, such as Burning Glass. [Hershbein and Kahn, 2018]. Campello et al. [2024] 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 job posting data accurately capture corporate hiring activities.

We focus on job postings from January 1, 2015 to December 7, 2022, a period that spans from three years before the enactment of the first 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. 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 it varies

[13] 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.

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 days. LinkUp classifies postings exceeding 180 days as "evergreen" jobs. These positions are rarely removed by employers and likely do not reflect active hiring needs. We then take the natural logarithm of job vacancy durations to construct our primary outcome variable, denoted as $lntimediff$.

5.2 Other Data

We use individual employment histories from Revelio Labs to construct measures of employee turnover. Revelio Labs is a workforce intelligence firm that aggregates publicly available online profiles from professional networking platforms such as LinkedIn. These profiles provide information on individuals' demographics, education, employers, job titles, positions, and skills. Using this dataset, we track the number of employees who joined or left a given firm in each year. Following prior literature (e.g., Aldatmaz et al. [2018]; Li et al. [2022]; Kong et al. [2024]), we define firm-state level employee turnover as the number of employees leaving a firm-state in a given year, normalized by the total number of employees in that firm-state in the current and previous year.

To examine changes in workplace conditions, we use data from OSHA's Injury Tracking Application and Violation Tracker database. The OSHA data report total hours worked and the number of recordable injuries at the establishment level.[14] We merge the OSHA data with Compustat and aggregate the data to measure workplace conditions at the firm-state-year level. Specifically, we construct 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

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

and employee-related violations. The Violation Tracker database compiles enforcement actions by federal regulatory agencies, the U.S. Department of Justice, state attorneys general, and selected state and local agencies since 2000.[15] We aggregate the data to compute the number of safety- or health-related violations and employee-related violations at the firm-state-year level: $lnviolation\_number\_emp$, the natural logarithm of one plus the number of employee-related violations; $lnviolation\_number\_sf$, the natural logarithm of one plus the number of safety-related violations.[16]

Finally, we obtain data on firms' financial characteristics from Compustat. We also rely on job zone classifications from O*NET to measure occupational skill requirements. Higher job zones correspond to more complex, skill-intensive roles.

5.3 Sample Selection and Summary Statistics

We collect job postings for domestic positions of U.S. public firms. The initial dataset contains 64,107,261 job postings. We then remove entries with missing key variables, including posting date, deletion date, occupation code, state code, or company identifier (CUSIP), exclude postings with non-positive job vacancy duration, and drop postings with vacancy duration shorter than one day or longer than 180 days. After dropping fixed effects singleton observations from the regression, our final sample consists of 50,309,597 job postings from January 1, 2015 to December 7, 2022.

[Insert Table 1]

Table 1 presents summary statistics for the variables used in the analysis. The average job vacancy duration ($timediff$) is approximately 36.923 days, consistent with Chen and Li [2023] and

[15] In 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. Workplace safety or health violations are both classified as safety-related offenses.

[16] Because the Violation Tracker database only records firms with violations, we first identify a firm as operating in a given state-year if it has job postings in that state during that year. We then set violations equal to zero for firm-state-year observations with valid job postings but no matched Violation Tracker records.

Leung et al. [2024]. The average turnover rate, $Turnover\_l$, computed as the number of employees leaving a firm-state-year divided by the average number of employees in the prior year, is 22.5%. Regarding the workplace quality measures, the average of total injuries is 28.9, with an interquartile range of 2 to 18. The average workplace safety or health violations equals 0.059, whereas the average employment-related violations equals 0.024, implying that many firms do not have violations. The total work hours have a mean of 1,865,202. The detailed definitions of all variables are provided in Table C1, Appendix C.

6 Effects on Firms' Ability to Attract Human Capital

6.1 Main Results

Table 2 reports our results from estimating equation (1). Column (1) includes firm-state and firm-year fixed effects. The coefficient on $\mathbb{1}[t \geq NarrowedNDA]$ is -0.0231 and statistically significant at the 5% level. A decrease in job vacancy duration supports our hypothesis that NDA laws improve firms' ability to attract and match with job seekers. Column (2) includes firm-state-occupation and firm-year-occupation fixed effects. The estimated coefficient, -0.0216, remains similar in magnitude and becomes statistically significant at the 1% level, indicating that our results are not driven by changes in occupational composition or occupation-specific trends. The estimate in column (2) implies that NDA laws reduce job vacancy duration by 2.14% ($=e^{-0.0216} - 1$). To gauge the economic magnitude of this effect, consider that, prior to the policy change, the average treated firm-state-year has 206.4 job postings with a vacancy duration of 38.53 days. A 2.14% reduction corresponds to approximately 170 fewer vacancy days in total ($=206.4 \times 38.53 \times 2.14\%$), equivalent to about 34 working weeks.

[Insert Table 2]

The key identifying assumption of our analysis is that, in the absence of NDA laws, job vacancy duration in treated and control states would have followed similar trends. To assess the plausibility of this assumption, we test for differential pre-treatment trends by estimating the following dynamic specification:

$$y_{ijsot} = \sum_{k=-5, k\neq -1}^{4} \beta_k \mathbb{1}[\tau_{st} = k] + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}, \tag{2}$$

where τ_{st} denotes event time, defined as the number of years relative to the implementation year of the NDA law in state s. For example, $\tau_{st} = 1$ indicates that calendar year t is one year after the policy change in state s. We omit the year immediately preceding the policy change, $\tau_{st} = -1$, which is used as the benchmark period. Observations occurring more than five years before the policy change are grouped into the endpoints, so that $\mathbb{1}[\tau_{st} = -5]$ and $\mathbb{1}[\tau_{st} = 4]$ capture the pre- and post-policy tails, respectively. Standard errors are two-way clustered at the firm and state levels. All other variable definitions follow equation (1).

[Insert Figure 1]

Figure 1 plots the estimated coefficients β_k, capturing the dynamic effects of NDA laws on job vacancy duration. There are no statistically significant pre-treatment trends in job vacancy duration between treated and control states, leading up to treatment. After the enactment of NDA laws, we observe a significant decline in job vacancy duration. The effect persists for several years following the policy change.

6.2 Heterogeneous Effects

After establishing the main effects, we turn to the heterogeneous impacts of NDA laws. Panels A and B of Table 3 report our first set of cross-sectional tests, which focus on the importance of workplace information for worker attraction. The effect of NDA laws should be stronger when

information about workplace quality matters more for worker attraction.

Our first measure of the importance of workplace information is the intensity of labor use. For firms with more intensive labor use, information about workplace quality plausibly has a larger impact on employers' ability to attract workers, implying a stronger effect of NDA laws. Following Jung et al. [2014], we measure labor intensity as the ratio of the number of employees to lagged total assets. Firms are then classified into high and low labor intensity groups based on the sample median. Panel A demonstrates that job vacancy duration declines significantly for firms with high labor intensity, while no statistically significant effect is observed for low labor intensity firms. The difference between the two effects is significant at the 1% level, indicating a stronger effect of the policy change among firms with high labor intensity.

[Insert Table 3]

The importance of workplace information also plausibly varies between remote and on-site positions. Workplace conditions are likely less relevant for remote positions, where workers are not exposed to the firm's physical working environment, than for on-site roles. Thus, the effect of NDA laws should be more pronounced for non-remote jobs. Panel B confirms this prediction: job vacancy duration decreases significantly for non-remote positions, whereas the effect for remote jobs is smaller and statistically insignificant. The difference between these two effects is statistically significant at the 1% level.

Panels C and D of Table 3 turn to the role of information frictions about workplace quality. We expect that, when job seekers face greater information frictions, they are more likely to benefit from employee disclosures, implying a larger effect of NDA laws.

Our first proxy for job seekers' information friction is the required skill level. Lower-skilled workers are less likely to access alternative sources of information about workplace quality and therefore stand to benefit more from increased transparency than higher-skilled ones. Using O*NET

job zone classifications, which range from 1 (low skill) to 5 (high skill), we define occupations with job zones above 3 as high skill. Panel C shows that vacancy duration declines significantly for low-skill positions, with no significant effect for high-skill positions; the difference between the two effects is statistically significant at the 1% level.

Information frictions vary with job applicants' experience. Applicants for positions with higher experience requirements are typically more familiar with the industry and workplace quality and are thus likely to rely less on employee disclosures. By contrast, candidates for entry-level or low-experience positions tend to be less familiar with their industry and therefore likely place greater weight on employee disclosures. Panel D of Table 3 presents the results. We restrict the sample to job postings that explicitly disclose a minimum experience requirement. Within this sample, we classify positions based on the sample median and find that job vacancy duration declines significantly more for low-experience positions than for high-experience positions.

Overall, the cross-sectional evidence indicates that the effects of NDA laws are strongest in settings where workplace information is most valuable and information frictions are most severe. Taken together, these patterns support the interpretation that NDA laws improve firms' ability to attract workers by enhancing the availability of workplace information.

6.3 Robustness Tests

In this section, we conduct several additional analyses to ensure the robustness of our main findings.

6.3.1 Border County Tests

A remaining identification concern is that the adoption of NDA laws may be endogenous to unobserved changes in local labor market conditions. For example, states may implement NDA policies in anticipation of shifts in economic prospects that also affect firms' ability to attract human cap-

ital. A related concern is that broader cultural changes, such as the MeToo movement, could differentially influence treated and control states. Because treatment varies at the state-year level, we cannot include state-year fixed effects to fully absorb these potential confounding factors.

To alleviate these concerns, 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 social and 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 duration would have been in the absence of the enactment of NDA laws. Specifically, we re-estimate equation (1) using a matched subsample of 12,113,471 job posting observations in which, during year t, one county experiences an NDA law change while its neighboring county does 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 4]

Table 4 presents the regression results examining the effect of NDA laws on job vacancy duration using the border-county sample. Mirroring the structure of Table 2, column (1) includes firm-state and firm-year fixed effects, while column (2) includes firm-state-occupation and firm-year-occupation fixed effects. The coefficients on $\mathbb{1}[t \geq NarrowedNDA]$ are negative and statistically significant at the 1% level in both columns. The economic magnitudes are similar to those in Table 2. Using the coefficient estimate from column (2), NDA laws reduce job vacancy duration by about 3.3%. These findings reinforce our main result in Table 2 that NDA laws reduce job vacancy duration, improving firms' ability to attract and match with job seekers.

6.3.2 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]. We also note that our border-county design adopts a stacked DID approach. Specifically, for each treated state, we define its control group as its neighboring states. We exclude California from the analysis because all of its neighboring states implemented NDAs. We define a treatment cohort as the 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_k using the specification in equation (2), which capture the dynamic effects of NDA laws on job vacancy duration, using the stacked DID sample. The results show no significant pre-treatment differences in job vacancy duration and a significant decline in job vacancy duration, consistent with the patterns displayed in Figure 1. The economic magnitudes are also similar to those observed in Figure 1 and Table 2.

6.3.3 Other Robustness Tests

This section discusses several additional robustness tests for the empirical analyses reported in Table 5. 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 windows to measure job vacancy duration: (1) exceeding one day and (2) between one day and 120 days. The results

are presented in columns (1) and (2). In both cases, the estimated policy effect remains statistically significant at the 1% level, with magnitudes ranging from -0.0255 in column (1) to -0.0201 in column (2), similar to those in Table 2.

[Insert Table 5]

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) presents the result of this analysis. The estimated coefficient on $\mathbb{1}[t \geq NarrowedNDA]_{st}$ is -0.0198 and remains statistically significant at the 1% level.

Finally, column (4) tests the robustness of our main findings by redefining the treatment year as the year after the law's enactment, regardless of the month in which the NDA law was enacted. This adjustment helps mitigate potential measurement errors from partial-year policy exposures. The estimated coefficient on $\mathbb{1}[t \geq NarrowedNDA]_{st}$ is -0.0211 and statistically significant at the 1% level.

7 Effects on Workplace Conditions and Employee Retention

In our hypothesis, NDA laws improve firms' ability to attract and match with workers because (1) employee disclosures about workplace quality increase, and that (2) more information improves matching with employers and incentivizes workplace improvements. As existing research already provides robust evidence of increased employee disclosures, we focus on whether workplace quality and other labor market outcomes change following the enactment of NDA laws.

First, we examine changes in workplace conditions. Our regression analysis takes the following

form:

$$y_{jst} = \beta \mathbb{1}[t \geq NarrowedNDA]_{st} + \phi_{js} + \lambda_{jt} + \epsilon_{jst}, \tag{3}$$

where y_{jst} denotes our proxies for the workplace issues of firm j's establishments in state s in year t, which inversely relate to workplace quality. The key independent variable, $\mathbb{1}[t \geq NarrowedNDA]_{st}$, follows the same definition as in equation (1). Our coefficient of interest is β. A negative and significant β would be consistent with the interpretation that NDA laws reduce workplace issues, leading to a better workplace.

As workplace condition measures vary at the firm-state-year level, we include firm-state fixed effects (ϕ_{js}), which account for time-invariant factors that could influence workplace issues at the firm-state level. We also include firm-year fixed effects (λ_{jt}) to account for time-varying firm-specific heterogeneity, such as firms' development plans or strategic priorities, that may systematically affect workplace issues. The error term is denoted by ϵ_{jst}. We cluster standard errors at the state and firm levels as in equation (1).

We use data on workplace injuries from OSHA and the 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 6 Panel A reports the estimated effects of NDA laws on workplace injuries and safety and health violations. The results show that the policy change leads to a significant decline in both outcomes, indicating improvements in workplace conditions.

[Insert Table 6]

Our next two measures of workplace conditions are employee-related violations and total hours worked. Beyond workplace safety, NDA laws 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 the OSHA data.

Table 6 Panel B reports the estimated effects of NDA laws on employee-related violations and total hours worked. Column (1) shows that the policy change 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 and/or greater operational efficiency.

In addition to improvement in workplace conditions, we also investigate the effects of NDA laws on firms' ability to retain employees. On one hand, better workplace conditions and increases in matching efficiency can improve employee retention. On the other hand, improvements in workplace conditions elsewhere may encourage job searches, thereby reducing employee retention. The net effect can be positive if broader improvements in workplace conditions encourage workers to enter the labor market or move to the affected states. To capture firms' retention capabilities, we use employee turnover as our primary outcome measure. Following prior literature (e.g., Li et al. [2022], Leung et al. [2024], Kong et al. [2024]), we define employee turnover as the number of employees leaving a firm's establishments in a given state, divided by the current and lagged average number of employees in that firm state.

[Insert Table 7]

Table 7 presents the results examining the effect of NDA laws on employee turnover. We find

that NDA laws lead to a statistically significant decline in employee turnover, indicating that the enactment of NDA laws improves employee retention.

8 Additional Analyses

8.1 Effects on Firm Performance

If NDA laws can enhance matching and motivate employers to improve working conditions, which increases their ability to attract workers, a natural question is whether NDA laws ultimately benefit employers, given the potential costs of these improvements. This section addresses that question.

On the one hand, if NDA restrictions compel firms to incur higher costs to improve workplace conditions or risk losing workers, profitability may decline. On the other hand, these policies may increase profitability by alleviating information frictions in the labor market. In the absence of such regulations, firms have incentives to use NDAs to conceal workplace issues. When NDA use becomes widespread, information frictions can impair matching efficiency and weaken firms' incentives to improve workplace conditions, as explained when developing our hypothesis. Importantly, individual firms may be unable to resolve this friction on their own. Forgoing NDAs can be costly due to the risk of losing workers to competitors that continue to suppress information. At the same time, the benefits are limited: job seekers typically do not observe a firm's NDA practices, reducing any credibility gains from voluntarily increasing transparency. Thus, after NDA laws are enacted, profits increase due to reduced information frictions.

We use the following specification to test the effects on firm performance:

$$y_{jt} = \beta \mathbb{1}[t \geq NarrowedNDA]_{st} + \phi_j + \lambda_t + \epsilon_{jt}, \tag{4}$$

where y_{jt} represents one of our firm performance measures. The key independent variable, $\mathbb{1}[t \geq$

$NarrowedNDA]_{st}$, is an indicator equal to one if a firm's headquarters s is located in a treated state. We cannot use the more accurate treatment definition based on establishments because we do not have firm-state level performance data. For the same reason, we include firm and year fixed effects and cluster standard errors at the firm level.

[Insert Table 8]

Table 8 shows the estimated effects on firm performance, using two measures: ROA_{ib} (income before extraordinary items scaled by lagged total assets) in column (1), and ROA_{ni} (net income scaled by lagged total assets) in column (2). Across both columns, we find a positive and statistically significant effect on firm performance, consistent with NDA laws improving firm performance.

Finally, if improved transparency enhances firms' ability to attract and retain human capital, labor productivity will increase, which lead to more capital investments based on classic investment models (e.g., in a Cobb-Douglas production function). In column (3), we examine firms' investment responses *Capex* (capital expenditures scaled by lagged total assets). We find that NDA laws lead to investment activities. More investments could indicate either capital projects that aim to improve the workplace or improved labor productivity that incentivize more investments in capital.

8.2 Job Search Activities

In our baseline analysis, we use job vacancy duration as a proxy for a firm's ability to attract and match with labor. A potential limitation, however, is that job vacancy duration does not directly capture job seekers' interests in the firm. 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 activities 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 9]

Table 9 reports the regression results on the effect of NDA laws on job search activities. We find that job search intensity significantly increases following the enactment of NDA laws. The results are robust across both measures of job search activities, consistent with job seekers more frequently seeking information about employment opportunities in treated states. Overall, this evidence reinforces our finding that NDA laws improve firms' ability to attract and match with job seekers.

8.3 Labor Demand

In this paper, we use job vacancy duration as a proxy for firms' ability to attract human capital. One concern is that job vacancy duration may decrease because increases in labor demand lead to a large number of positions needing to be filled. Although it is unclear why NDA laws increase labor demand, particularly given the earlier evidence of lower employee turnovers, we investigate whether the number of job postings changes around the enactment of NDA laws.

[Insert Table 10]

Table 10 reports the results of this analysis. In column (1), the dependent variable is the log number of job postings at the firm-state-year level ($lnjobpostingn$), and we control for firm-state and firm-year fixed effects. The coefficient on $\mathbb{1}[t \geq NarrowedNDA]_{st}$ 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 (*lnjobpostingn_o*) and including firm-state-occupation fixed effects and firm-year-occupation fixed effects. The estimated effect remains statistically insignificant. Overall, these results suggest that NDA laws do not significantly influence firms' labor demand.

8.4 Private Firm Tests

We further conduct a robustness test using private firm job postings to assess the generalizability of our findings. If NDA laws indeed enhance workplace transparency and improve firms' ability to attract human capital, job vacancy duration should also decline among private firms.

[Insert Table 11]

Table 11 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 2. In column (1), we include firm-state and firm-year fixed effects. In column (2), we include firm-state-occupation and firm-year-occupation fixed effects. Across both specifications, we find consistently negative and statistically significant coefficients on $\mathbb{1}[t \geq NarrowedNDA]_{st}$, indicating that job vacancy duration shortens following NDA laws. 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.

9 Conclusion

This paper examines the effects of NDA laws on firms' ability to attract and match with job seekers. We examine a series of state-level policy changes between 2018 and 2020 that limited

the enforceability of NDAs related to workplace misconduct. Using granular job posting data from LinkUp, we find that firms in treated states experience a significant decline in job vacancy durations following the enactment of NDA laws, suggesting an increase in firms' ability to attract and match with job seekers. The effects are more pronounced among labor-intensive firms, for non-remote positions, and for jobs with greater information asymmetry about workplace quality.

To shed light on the mechanisms, we show that NDA laws improve workplace conditions, including reductions in workplace injuries, safety-related violations, and employee-related violations. In addition, we document improved employee retention, indicating that firms not only attract new applicants but also strengthen their ability to retain existing employees after the policy change. Finally, we find that the enactment of NDA laws is associated with higher firm performance.

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 NDA laws: such reforms not only empower workers but also incentivize firms to foster safer and more equitable workplaces, ultimately generating gains for employers.

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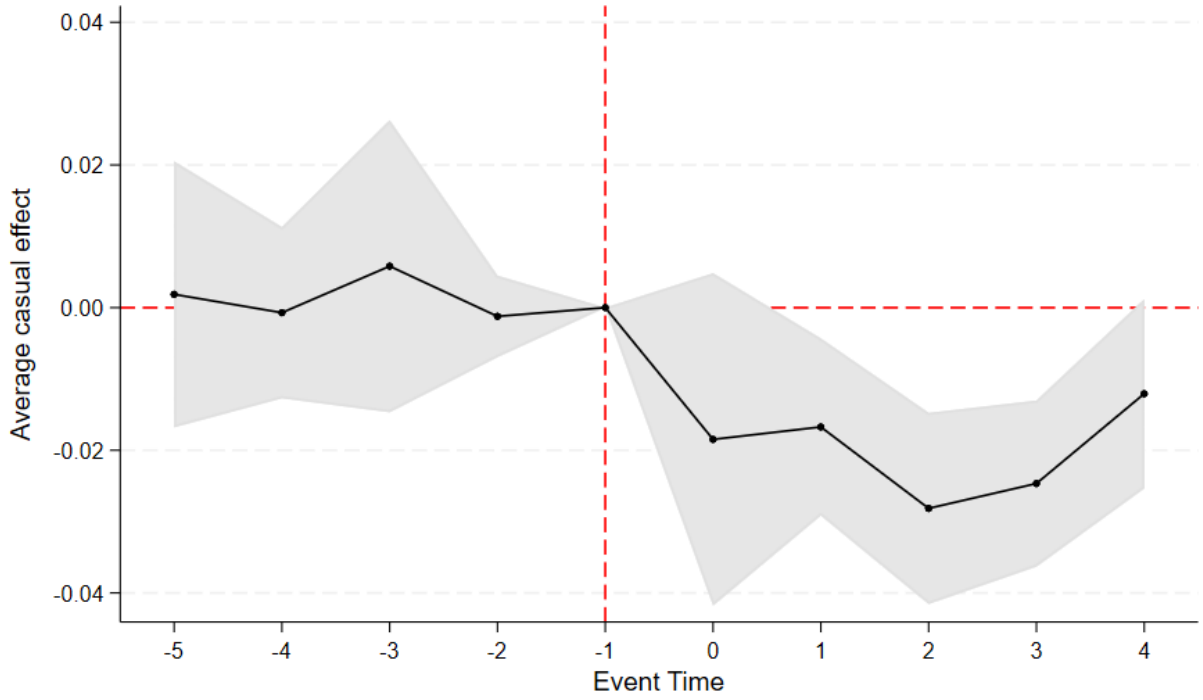
Figure 1: Narrowing NDAs' Dynamic Effect on Job Vacancy Duration

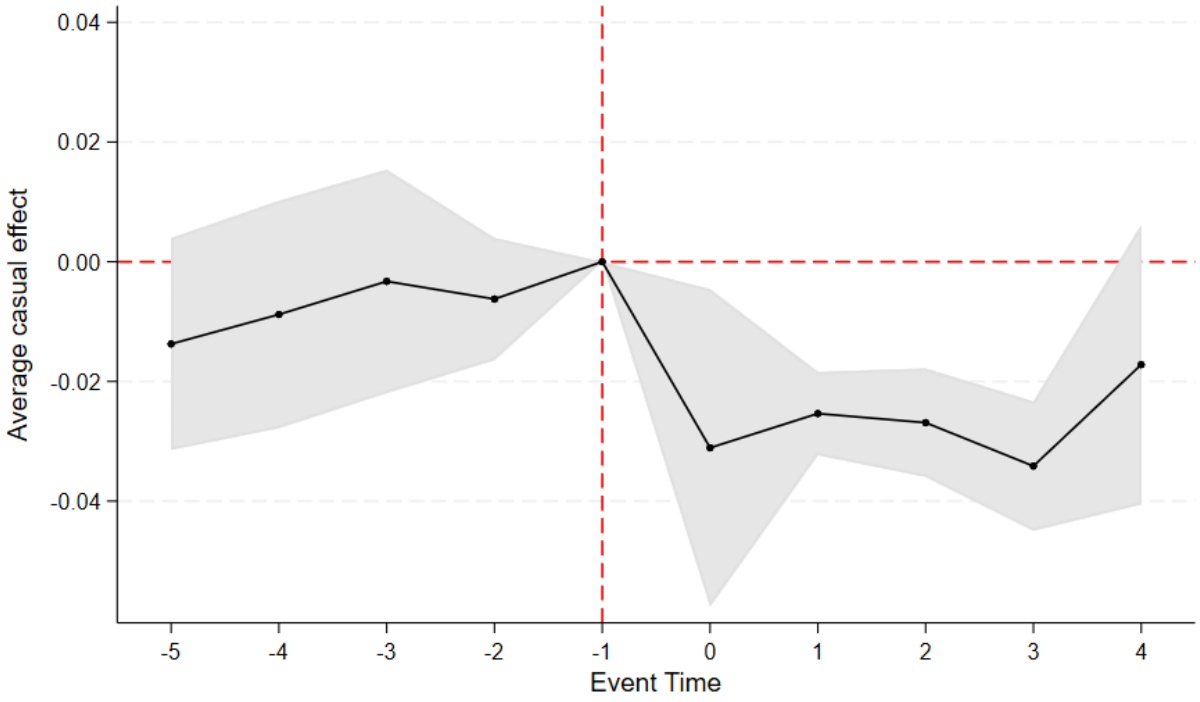


This figure shows the dynamic treatment effect of narrowing NDAs, using the specification, where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t. τ_{st} denotes the number of years relative to the implementation year of the narrowing NDA policy.

$$y_{ijsot} = \sum_{k=-5, k\neq -1}^{4} \beta_k \mathbb{1}[\tau_{st} = k] + \phi_{jso} + \lambda_{jto} + \epsilon_{ijsot}$$

For example, if a job posting in state s occurs one year after the policy change, $\mathbb{1}[\tau_{st} = 1]$ equals one, and all other event-time indicators equal zero. We use $\tau_{st} = -1$ as the benchmark period. Job postings that occur more than five years before the policy change are grouped into $\tau_{st} = -5$, respectively. Standard errors are clustered at the firm and state levels.

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 y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t. τ_{st} denotes the number of years relative to the implementation year of the narrowing NDA policy. k denotes event time, r denotes stack, and p denotes state pair.

$$y_{ijsot} = \sum_{k=-5, k\neq -1}^{4} \beta_k \mathbb{1}[\tau_{st} = k] + \phi_{jsor} + \lambda_{jtor} + \theta_{rpt} + \epsilon_{ijsot}$$

For example, if a job posting in state s occurs one year after the policy change, $\mathbb{1}[\tau_{st} = 1]$ equals one, and all other event-time indicators equal zero. We use $\tau_{st} = -1$ as the benchmark period. Job postings that occur more than five years before the policy change are grouped into $\tau_{st} = -5$. Standard errors are clustered at the firm and state levels.

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 C. 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) p25	(5) p75
Job Postings					
timediff	50,309,597	36.923	37.719	8.522	51.880
lntimediff	50,309,597	3.033	1.185	2.143	3.949
lnjobpostingn	250,208	3.123	2.008	1.609	4.543
lnjobpostingn_o	2,404,288	1.419	1.330	0.000	2.197
Turnover					
Turnover_c	518,309	0.216	0.255	0.000	0.319
Turnover_l	491,219	0.225	0.251	0.000	0.333
Workplace Safety					
lntotal_injuries	25,627	2.013	1.487	1.099	2.944
total_injuries	25,627	28.927	109.820	2.000	18.000
lnviolation_number_sf	99,829	0.033	0.176	0.000	0.000
violation_number_sf	99,829	0.059	0.470	0.000	0.000
Other Working Conditions					
lnviolation_number_emp	62,562	0.014	0.116	0.000	0.000
violation_number_emp	62,562	0.024	0.210	0.000	0.000
lntotal_hours_worked	25,627	13.177	1.573	12.060	14.218
total_hours_worked	25,627	1,865,202	5,203,055	172,890	1,495,288
Firm Characteristics					
ROA_{ib}	24,740	-0.009	0.168	-0.021	0.063
ROA_{ni}	24,740	-0.007	0.170	-0.020	0.065
Capex	24,740	0.034	0.049	0.003	0.042
Size	24,740	6.936	2.139	5.659	8.363
Leverage	24,740	0.270	0.249	0.061	0.417
MTB	24,740	4.051	8.971	1.144	4.150
Salegrowth	24,740	0.144	0.426	-0.016	0.199
SG&A	24,740	0.248	0.299	0.030	0.349
COGS	24,740	0.519	0.611	0.075	0.733
Cashholding	24,740	0.200	0.305	0.033	0.237
Job Search					
max_search_index	233,436	0.823	1.109	0.000	1.887
mean_search_index	233,436	0.391	0.661	0.000	0.629

Table 2: Effects of Narrowing NDAs on Job Vacancy Duration

This table presents regression outputs using the following specification:

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

where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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) *lntimediff*	(2) *lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-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 3: Heterogeneous Effects of Narrowing NDAs on Job Vacancy Duration

This table presents regression outputs using the following specification:

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

where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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, remote work, job zone and experience requirements . 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	*High Labor Intensity*	*Low Labor Intensity*
	(1)	(2)
VARIABLES	*lntimediff*	*lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.0289***	-0.00157
	(0.0101)	(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 Remote Work	*Remote Work*	*No Remote Work*
	(1)	(2)
VARIABLES	*lntimediff*	*lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.000631	-0.0240***
	(0.0137)	(0.00745)
Difference	0.023***	
P-value	0.000	
Observations	2,208,525	45,121,941
R-squared	0.381	0.370
Firm-State-Occupation FE	YES	YES
Firm-Year-Occupation FE	YES	YES
Cluster	Firm&State	Firm&State

Table 3 (continued)

Panel C: Difference in Job Zone	*High Skills Job*	*Low Skills Job*
VARIABLES	(1) *lntimediff*	(2) *lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-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
Panel D: Difference in Experience Requirements	*High Experience*	*Low Experience*
VARIABLES	(1) *lntimediff*	(2) *lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.00318 (0.0126)	-0.0299** (0.0140)
Difference	0.0267***	
P-value	0.000	
Observations	7,945,084	11,477,731
R-squared	0.408	0.355
Firm-State-Occupation FE	YES	YES
Firm-Year-Occupation FE	YES	YES
Cluster	Firm&State	Firm&State

Table 4: Narrowing NDAs' Effect on Job Vacancy Duration for Border-County

This table presents regression outputs using the following specification:

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

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

where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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) *lntimediff*	(2) *lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.0285*** (0.00798)	-0.0320*** (0.00833)
Observations	12,198,903	12,113,471
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 5: Effects of Narrowing NDAs on Job Vacancy Duration: Robustness Tests

This table presents regression outputs using the following specification:

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

where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in firm j, located in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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	*lntimediff_1-all*	*lntimediff_1-120*	*lntimediff*	*lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.0255**	-0.0201***	-0.0198***	-0.0211***
	(0.0114)	(0.00623)	(0.00539)	(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

Table 6: Narrowing NDAs' Effect on Workplace Conditions

This table presents regression outputs using the following specification:

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

where y_{jst} denotes the natural logarithm of one plus the total injuries (*lntotal_injuries*), the natural logarithm of one plus the workplace safety or health violations (*lnviolation_number_sf*), the natural logarithm of one plus the number of employee-related violations (*lnviolation_number_emp*) and the natural logarithm of one plus the total work hours (*lntotal_hours_worked*) in firm j in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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) *lntotal_injuries*	(2) *lnviolation_number_sf*
$1[t \geq NarrowedNDA]_{st}$	-0.0637***	-0.0115**
	(0.0227)	(0.00451)
Observations	25,627	99,829
R-squared	0.914	0.374
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Panel B: Other Working Conditions

VARIABLES	(1) *lnviolation_number_emp*	(2) *lntotal_hours_worked*
$1[t \geq NarrowedNDA]_{st}$	-0.00920***	-0.0386**
	(0.00294)	(0.0190)
Observations	62,562	25,627
R-squared	0.215	0.943
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Table 7: Effects of Narrowing NDAs on Turnover

This table presents regression outputs using the following specification:

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

where y_{jst} denotes the turnover in firm j in state s in year t. In Column (1), $Turnover\_c$ is defined as the number of employees leaving a firm-state-year divided by the current year's average employees. In Column (2), $Turnover\_l$ is defined as the number of employees leaving a firm-state-year divided by last year's average employees. $1[t \geq NarrowedNDA]_{st}$ is an indicator that equals one for year t following the implementation of narrowing NDA changes in state s. ϕ_{js} and λ_{js} 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) *Turnover_c*	(2) *Turnover_l*
$1[t \geq NarrowedNDA]_{st}$	-0.00963**	-0.0108***
	(0.00378)	(0.00392)
Observations	518,309	491,219
R-squared	0.372	0.398
Firm-State FE	YES	YES
Firm-Year FE	YES	YES
Cluster	Firm&State	Firm&State

Table 8: Narrowing NDAs' Effect on Firm Performance

This table presents regression outputs using the following specification:

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

where y_{jt} denotes *ROA_ib* (income before extraordinary items scaled by total assets in the prior year), and *ROA_ni* (net income scaled by total assets in the prior year) and *Capex* (capital Expenditures scaled by total assets in the prior year)in firm j in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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) *ROA_ib*	(2) *ROA_ni*	(3) *Capex*
$1[t \geq NarrowedNDA]_{st}$	0.00727**	0.00840***	0.00208**
	(0.00317)	(0.00323)	(0.000970)
Size	0.0308***	0.0324***	0.00587***
	(0.00498)	(0.00499)	(0.00120)
Leverage	-0.0802***	-0.0859***	0.00560**
	(0.00904)	(0.00928)	(0.00259)
MTB	0.00165***	0.00164***	0.00005
	(0.000193)	(0.000199)	(0.00004)
Salegrowth	0.0307***	0.0274***	0.00775***
	(0.00410)	(0.00429)	(0.00119)
SG&A	-0.214***	-0.218***	0.0302***
	(0.0203)	(0.0209)	(0.00401)
COGS	0.108***	0.105***	0.0190***
	(0.0102)	(0.0104)	(0.00257)
Cashholding	0.0318***	0.0534***	0.00713***
	(0.00964)	(0.0105)	(0.00218)
Observations	24,740	24,740	24,740
R-squared	0.738	0.723	0.737
Firm FE	YES	YES	YES
Year FE	YES	YES	YES
Cluster	Firm	Firm	Firm

Table 9: Effects of Narrowing NDAs on Google Search Index

This table presents regression outputs using the following specification:

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

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. $1[t \geq NarrowedNDA]_{st}$ 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) max_search_index	(2) $mean\_search\_index$
$1[t \geq NarrowedNDA]_{st}$	0.0351***	0.0115**
	(0.00910)	(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 10: Effects of Narrowing NDAs on Job Posting Numbers

This table presents regression outputs using the following specification:

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

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

where y_{jst} denotes the natural logarithm of the number of job postings in firm j in state s in year t ($lnjobpostingn$),y_{jsot} denotes the natural logarithm of the number of job postings for occupation o in firm j in state s in year t ($lnjobpostingn\_o$). $1[t \geq NarrowedNDA]_{st}$ 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 natural logarithm of the number of job postings in firm j in state s in year t (($lnjobpostingn$)), 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) *lnjobpostingn*	(2) *lnjobpostingn_o*
$1[t \geq NarrowedNDA]_{st}$	-0.0218	-0.0111
	(0.0166)	(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 11: Effects of Narrowing NDAs on Job Vacancy Duration: Private Firm Tests

This table presents regression outputs using the following specification:

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

where y_{ijsot} denotes the natural logarithm of job vacancy duration for job posting i for occupation o in private firm j, located in state s in year t, $1[t \geq NarrowedNDA]_{st}$ 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) *lntimediff*	(2) *lntimediff*
$1[t \geq NarrowedNDA]_{st}$	-0.0209***	-0.0158***
	(0.00532)	(0.00568)
Observations	36,684,018	35,627,169
R-squared	0.405	0.472
Firm-State FE	YES	
Firm-Year FE	YES	
Firm-State-Occupation FE		YES
Firm-Year-Occupation FE		YES
Cluster	Firm&State	Firm&State

Appendix A Non-Disclosure Agreement Examples

An Example of Non-Disclosure Agreement Template

EMPLOYMENT AGREEMENT

Employment Agreement, between _____ (the "Company") and _____ (the "Employee").

1. For good consideration, the Company employs the Employee on the following terms and conditions.

2. **Term of Employment**. Subject to the provisions for termination set forth below this agreement will begin on _____, 20____, unless sooner terminated.

3. **Salary**. The Company shall pay Employee a salary of $_____ per year, for the services of the Employee, payable at regular payroll periods.

4. **Duties and Position**. The Company hires the Employee in the capacity of _____ [***insert job title***]. The Employee's duties may be reasonably modified at the Company's discretion from time to time.

5. **Employee to Devote Full Time to Company**. The Employee will devote full time, attention, and energies to the business of the Company, and, during this employment, will not engage in any other business activity, regardless of whether such activity is pursued for profit, gain, or other pecuniary advantage. Employee is not prohibited from making personal investments in any other businesses provided those investments do not require active involvement in the operation of said companies.

6. **Confidential and Proprietary Information**. Employee agrees, while employed by the Company and at all times thereafter (regardless of the reason for termination), as follows:

(a) *Confidential Information and Inventions Agreement*. Not in limitation of the provisions of any other Confidentiality Agreement that the Employee may have previously executed with Company, in furtherance, the Employee shall take all steps reasonably necessary to hold the Company's proprietary information in trust and confidence, will not use proprietary information in any manner or for any purpose except in connection with the performance of the Employee's services to the Company, and will not (other than in the performance of the services to the Company as herein contemplated) disclose any such proprietary information to any third party without first obtaining the Company's express written consent on a case-by-case basis.

(b) *Third Party Information*. Third parties have provided the Company with confidential or proprietary information and may do so in the future. The Company has a duty to safeguard the confidentiality of such information and use it only for authorized purposes. Employee agrees to use such information only in a manner consistent with the Company's duties and the Employee's authorized scope of responsibility, to hold such information in strict confidence, and not to disclose the information to anyone (other than authorized personnel within the Company), unless authorized in writing by an officer of the Company.

NDA Template (Page 1)

(d) *Exceptions*. Employee will hold the terms of this Agreement in strict confidence, subject to the following exceptions: (i) Employee may disclose this Agreement to his or her immediate family, attorney, accountant, auditor, tax preparer, and financial advisor, provided that such disclosure is made in confidence; and (ii) Employee may disclose this Agreement to the extent that a disclosure may be required by law. Nothing in this Agreement shall deny or limit the Employee's right to discuss the terms and conditions of his or her employment with the Equal Employment Opportunity Commission, the United States Department of Labor, the National Labor Relations Board, or any federal, state, or local government agency or entity to the extent expressly permitted by Section 7 of the National Labor Relations Act.

7. **Non-Disparagement**. Employee agrees, while employed by the Company and at all times thereafter (regardless of the reason for termination), as follows:

(a) *Agreement Not to Disparage*. Except as it may be required by law or legal process, Employee agrees not to disparage the Company or any of its officers, directors, shareholders, investors, potential investors, partners, predecessors, subsidiaries, employees, consultants, attorneys, or any others associated with the Company, by any means including but not limited to (i) postings to blogs, social media, industry websites, employer review websites (for example, Glassdoor or Indeed), consumer review websites (for example, Google Reviews or Yelp); or (ii) communications with accountants, investment bankers, commercial bankers, insurance brokers or carriers, media, journalists, reporters, equity analysts, investors, potential investors, customers, suppliers, competitors, joint venture partners and regulators (including but not limited to the Securities and Exchange Commission or the United States Department of Commerce).

(b) *Definition of "Disparage."* For purposes of this Agreement, "disparage" shall mean any negative statement, whether written or oral, about _____ [***insert the full list of people, companies, products, etc. that are reasonably associated with the Employee's scope of work***].

(c) *Exclusions, Rights, and Legal Obligations*. Nothing contained in this Agreement is intended to or shall limit Employee's ability or right: (i) to respond to a lawful subpoena; (ii) to disclose information about unlawful acts in the workplace, including, but not limited to, sexual harassment or any other unlawful or potentially unlawful conduct; (iii) to discuss with others the terms and conditions of the Employee's employment to the extent expressly permitted by Section 7 of the National Labor Relations Act; (iv) to file a charge or complaint with the Equal Employment Opportunity Commission, the National Labor Relations Board, the Occupational Safety and Health Administration, the Securities and Exchange Commission or any other federal, state or local governmental agency or commission ("Government Agencies"); (v) to communicate voluntarily with any Government Agencies or otherwise participate in any investigation or proceeding that may be conducted by any Government Agency, including providing documents or other information, without notice to the Company; (vi) to receive an award for information provided to any Government Agencies; or (vii) to comply with any other legal obligation.

NDA Template (Page 2)

An Example of Non-Disclosure Agreement Misuse

(1) In April of 2015, the U.S. Securities and Exchange Commission (SEC) sanctioned defense contractor, KBR, ***for requiring its employees to sign restrictive non-disclosure agreements that barred employees from reporting fraud and misconduct to the proper regulatory authorities***[17].

(2) Board Rules that Employers May Not Offer Severance Agreements Requiring Employees to Broadly Waive Labor Law Rights (McLaren Macomb)[18]:

> *7. Non-Disclosure. At all times hereafter, the Employee promises and agrees not to disclose information, knowledge or materials of a confidential, privileged, or proprietary nature of which the Employee has or had knowledge of, or involvement with, by reason of the Employee's employment.* ***At all times hereafter, the Employee agrees not to make statements to Employer's employees or to the general public which could disparage or harm the image of Employer, its parent and affiliated entities and their officers, directors, employees, agents and representatives****.*

(3) Apple was accused of misusing NDAs by using overly broad confidentiality clauses that discouraged employees from speaking about workplace issues or reporting concerns to regulators[19]:

> *The complaint stems from charges filed against Apple in 2021 by Ashley Gjovik, a former senior engineering manager at the company. Gjovik said various Apple rules,* ***including those relating to confidentiality and social media use, deter employees from discussing issues such as pay equity and sex discrimination with each other and the media****.*

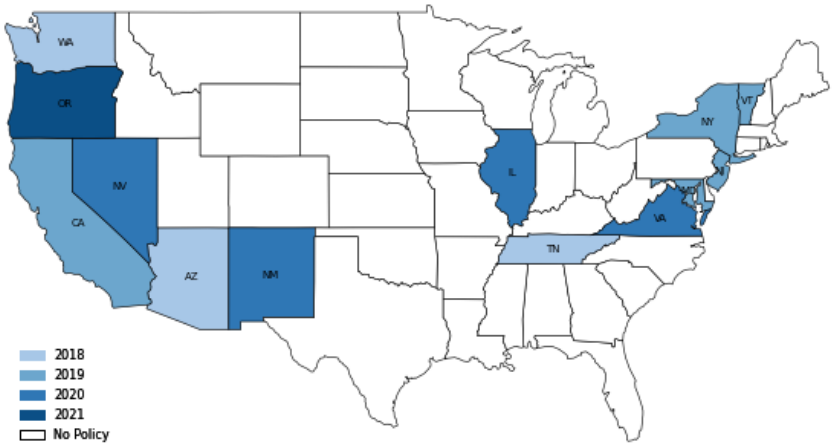
[17] https://www.whistleblowers.org/non-disclosure-agreements-and-whistleblowers/

[18] https://www.nlrb.gov/news-outreach/news-story/board-rules-that-employers-may-not-offer-severance-agreements-requiring

[19] https://www.reuters.com/technology/apple-accused-by-us-labor-board-imposing-illegal-workplace-rules-2024-10-01/

Appendix B Treated State and Treated Year

Figure B1: 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 B1.

Table B1: State-Level Implementation Timeline of NDA Narrowing Policies

Treat State	Treated Year	Treated Date	Filings
Arizona	2018	201804	A.R.S.§12-720
Tennessee	2018	201805	Tenn.Code Ann.§50-1-108
Washington	2018	201806	RCW 49.44.210
New York	2019	201807	CPLR §5003-b & GOL 5-336
Vermont	2019	201807	Bill H.707
Maryland	2019	201810	Disclosing Sexual Harassment in the Workplace Act
California	2019	201901	SB 820
New Jersey	2019	201903	Senate Bill 121
Nevada	2020	201907	Assembly Bill 248
Virginia	2020	201907	Va.Code §40.1-28.01
Illinois	2020	202001	IWTA, 820 ILCS 96
New Mexico	2020	202005	HB 21 (N.M.Stat.§50-4-36)
Oregon	2021	202010	Oregon's Workplace Fairness Act

Appendix C Variable Definitions

Table C1: Variable Definitions and Data Sources

Variable	Definition	Source
timediff	Job vacancy duration: The number of days between the posting and the closing date of a job opening between 1 and 180 days.	LinkUP
lntimediff	Natural logarithm of vacancy duration for job postings with durations between 1 and 180 days.	LinkUP
lnjobpostingn	Natural logarithm of numbers for job postings with durations between 1 and 180 days at the firm-state-year level.	LinkUP
lnjobpostingn_o	Natural logarithm of numbers for job postings with durations between 1 and 180 days at the firm-state-year-Occupation level.	LinkUP
$1[t \geq NarrowedNDA]$	Indicator for treated states after NDA policy implementation.	–
Turnover_c	Number of employees leaving a firm-state-year divided by current years' average employees (Li et al.,2022).	Revelio Labs
Turnover_l	Number of employees leaving a firm-state-year divided by last years' average employees (Li et al.,2022).	Revelio Labs
lnviolation_number_emp	Natural logarithm of one plus the number of employee-related violations at the firm-state-year level.	Violation Tracker
violation_number_emp	The number of employee-related violations at the firm-state-year level.	Violation Tracker
lnviolation_number_sf	Natural logarithm of one plus the number of workplace safety or health violations at the firm-state-year level.	Violation Tracker
violation_number_sf	The number of workplace safety or health violations at the firm-state-year level.	Violation Tracker
lntotal_injuries	Natural logarithm of one plus the number of total workplace injuries at the firm-state-year level.	OSHA
total_injuries	The number of total workplace injuries at the firm-state-year level.	OSHA

Continued on next page

Table C1 (Continued)

Variable	Definition	Source
lntotal_hours_worked	Natural logarithm of one plus the number of total hours worked at the firm-state-year level.	OSHA
total_hours_worked	The number of total hours worked at the firm-state-year level.	OSHA
ROA_{ib}	Income before extraordinary items / lagged total assets.	Compustat
ROA_{ni}	Net income / lagged total assets.	Compustat
Capex	Capital Expenditures / lagged total assets.	Compustat
Labor Intensity	Number of employees / lagged total assets (Jung et al., 2014).	Compustat
Size	Log of total assets.	Compustat
Leverage	(Long-term debt + short-term debt) / lagged total assets.	Compustat
MTB	Market value of equity / lagged common equity.	Compustat
Salegrowth	Percentage change in sales from previous year.	Compustat
SG&A	SG&A expenses / lagged total assets.	Compustat
COGS	Cost of goods sold / lagged total assets.	Compustat
Cashholding	(Cash + short-term investments) / lagged total assets.	Compustat
max_search_index	The maximum normalized Google search index value for "firm name + job" obtained from three independent Google Trends queries at the firm–state–year level.	
mean_search_index	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 $\gamma > 0$.[20] 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:

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

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*

[20] Consider 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 $Pr(accept|s) = Pr\{U_0 \leq \mathbb{E}(w|s)\} = \Phi(\mathbb{E}^J(w|s))$, where $\Phi()$ 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:

$$\gamma\beta - I = 0 \Longrightarrow I^* = N\gamma\beta = \frac{N\gamma\sigma_\eta^2}{\sigma_\eta^2 + g(\Delta^*)\sigma_\epsilon^2}, \tag{5}$$

$$c\Delta = \frac{\gamma\sigma_\eta^2}{\sigma_\eta^2 + g(\hat{\Delta})\sigma_\epsilon^2} \Longrightarrow \Delta^* > 0 \text{ and is unique.} \tag{6}$$

□

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 ($\gamma \mathrm{E}^M(\Phi)$.)

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. □

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.