

Workplace Harassment Risk, Non-disclosure Agreements, and Information Flow*

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Preliminary draft. Please do not distribute.

This version: March 2023

Abstract

We study the effects of the legal reform of non-disclosure agreements (NDAs) targeting workplace harassment. We argue that the new laws that limit the use of NDAs in harassment cases (i) reduce harassment-related frictions in social interactions between employees and (ii) improve information exchange in firms. Empirically, we find that legal insider trading becomes more profitable and less frequent, and firm value increases. The effects of the laws are stronger for individuals with high frictions in their social networks and for firms with high reliance on private communication.

Keywords: Information exchange, firm value, insider trading

*We thank José Albuquerque de Sousa (discussant), Alvin Chen, Zoe Cullen, Thomas Geelen, Nataliya Gerasimova, Ricard Gil (discussant), Laurence van Lent, Ruidi Shang (discussant), Jacco Wielhouwer, seminar participants at CY Cergy Paris University, Frankfurt School of Finance and Management, Goethe University Frankfurt, Johannes Kepler University Linz, NHH Norwegian School of Economics, Tilburg University, Vrije Universiteit Amsterdam, University of Groningen, 2022 EAA Annual Congress, 2022 MAS Midyear Meeting, 2023 SARAC, NFN Young Scholars Finance Webinar, Universitat de Barcelona Microeconomics Workshop for their feedback. Zheng gratefully acknowledges funding from NHH Centre for Ethics and Economics (CEE). Zhu gratefully acknowledges funding from the Deutsche Forschungsgemeinschaft (Project ID 403041268 – TRR 266).

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1. INTRODUCTION

The Harvey Weinstein case and the #MeToo movement that went viral in October 2017 has brought the pervasive, yet largely obscured, workplace harassment problem into the spotlight. Research has shown that workplace harassment imposes substantial costs to employees and firms, such as significant negative psychological and job-related consequences for individuals (Willness et al., 2007; Wasti et al., 2000; Schneider et al., 1997) and also negatively affects team relationships and workgroup productivity (Raver and Gelfand, 2005; Bergman and Drasgow, 2003; Fitzgerald et al., 1999). The effects of workplace harassment can reach beyond victims to include witnesses, workgroups, and others within the organization (Raver and Gelfand, 2005; Cortina and Areguin, 2021). The recent experiences suggested that existing governance systems were insufficient in combatting harassment. The #MeToo movement spurred a wave of new legislative reforms; prohibiting employers from requiring individuals to sign re-dispute non-disclosure agreements has been a centerpiece of these reforms¹ (“NDAs”) that prevent an employee from disclosing harassment, discrimination, and/or sexual assault.

NDAs have not only been used to silence and intimidate victims (Garrahan, 2017), but also to preclude other employees from reporting or testifying as a witness to workplace harassment (Huang, 2019). Responding to the call around the country to ban the use of NDAs in workplace harassment cases, state-level legislative reform have been introduced since 2017. As of December 2019, 13 states have adopted the anti-NDA laws along the two year timeline (see Section 2 for details).

We argue that anti-NDA laws improve information exchange in firms as social friction related to harassment risks is lower among employees. Our argument is brought forward in a simple model in which employees, in order to exchange information fruitfully, must make an effort to build up a relationship to a colleague or supervisor which differs in terms of intensity to the routine interaction. This setting is motivated by literature showing that

¹A non-disclosure agreement, also known as a confidentiality agreement, is a legally enforceable promise between parties to keep silent about a piece of confidential information.

social interactions are important activities at the workplace for relationship-building and are the key channels of information and knowledge exchange (Hayek, 1945; Bolton and Dewatripont, 1994; Deming, 2017; Sandvik et al., 2020; Cullen and Perez-Truglia, 2022). Building up such a relationship, though, exposes the employee to an increased risk of being harassed. When the risk of meeting a person who is a potential harasser is too large and the harasser need not fear a sufficiently stark punishment for their behavior, employees will not make the effort and useful information exchange does not take place. Laws that limit the use of NDAs affect the payoff structure of potential harassers who need to fear more negative consequences of their behavior and they may also reduce the loss of utility of the person who is harassed, which leads to the prediction that more useful information is exchanged in equilibrium.

Empirically we can neither observe the incidence of harassment in firms nor the intensity of interaction between employees.² We can hence not directly measure the effect of changes in the laws regulating the use of NDAs in firms, but we can use the simple predictions of the model that if information exchange in firms improves because of new laws, both profits of insider trading and firm value should increase. Importantly, this is the case if information exchange is such that by bringing together two pieces of information that reside with two people, the information value increases, i.e., that the pieces of information available are not substitutes.

We take advantage of the staggered implementation of the law to study the effects of the anti-NDAs. Consistent with our prediction, we find that the passage of anti-NDA laws results in higher insider trading profit derived from employees' legal trades disclosed to the public. Voluminous literature shows that corporate insider trades entail their private information and have predictability for future firm operations and returns (Seyhun, 1986; Lin and Howe, 1990; Damodaran and Liu, 1993; Bernhardt et al., 1995; Cohen et al., 2012; Chen et al.,

²Various survey studies show that up to 75 percent victims do not file a complaint (Schlick et al., 2021), so it is hard to accurately measure the actual harassment cases. Another confounding factor is that the #MeToo movement changed the norm and many victims are encouraged to speak out and accuse perpetrators (Keplinger et al., 2019), so the "reported" harassment cases may increase as the result.

2020).³ In terms of economic magnitude, we show that the effect amounts to, on average, an increase in the daily gain of corporate insider trades by 0.0137 to 0.0275 percentage points. We also find that the increases in insider trade profits that are observed when NDAs change is accompanied by an increase in firm value by 3.08% measured by Tobin’s Q.

We further explore the heterogeneous effects across different contexts to examine whether the impact of anti-NDA varies as anticipated.

First, at the individual level, we show that the anti-NDA laws enable employees to make better use of their intra-firm connections for internal information acquisition: employees with a high number of internal connections benefit more from the law. Furthermore, we find that the anti-NDA laws increases communication more for employees with potentially higher harassment-related frictions in their social network. Specifically, we show that employees with a large network of weak ties (e.g., acquaintances) exhibit a larger information gain following the passage of anti-NDA. In contrast, anti-NDA has little effect on the information acquisition of employees with a large network of strong ties (e.g., friends).

At the firm level, we find that firms’ information diffusion increases more with the passage of anti-NDA laws when their employees have a greater need to rely on private communication channels for information. Specifically, we find that employees in opaque firms gain more information via improved social interactions than employees in transparent firms. In a similar vein, we find that firms with high levels of proprietary information presents more information diffusion after the passage of the law. In contrast, we find that for firms with established trusted communication channels in place (i.e., a stable management team), the anti-NDA laws have little effect on their information diffusion.

While the anti-NDA laws increase the insider trading profitability, we find that the anti-NDA laws discourage insider trading behavior. We show that this is due to the sharp decrease of information value when anti-NDA laws increase the speed of information diffu-

³There can be various types of information communicated among individuals via increased social interaction. Prior literature shows that insider trading is informative about earnings quality (Beneish and Vargus, 2002), reflecting the foreknowledge of future earnings and firm’s long-term prospects (Ke et al., 2003; Piotroski and Roulstone, 2005; Noe, 1999), related to recognizing misvaluation (Piotroski and Roulstone, 2005).

sion. In cross-sectional tests, we document that the corporate insiders with thin information advantage are more likely to reduce their trading behavior because they are not able to profit from the information that is already incorporated by the market.

These results are important for three reasons. First, workplace harassment risks, unobservable but pervasive, can cause serious friction in information flow. Second, the use of anti-NDA to combat workplace harassment can be effective. Third, the anti-NDA has significant firm valuation implications.

Our research contributes to the existing literature in the following ways. First, we add to the extensive literature on knowledge spillovers and information diffusion in the workplace. Prior literature has shown that social interaction facilitates information diffusion in the workplace (e.g., Singh, 2005; Mas and Moretti, 2009; Cai and Szeidl, 2018; Sandvik et al., 2020) and identified various ways⁴ to overcome the interaction barriers. We complement prior contributions by studying an important source of friction in social interaction – harassment risk – that is unlikely to be reduced by the mechanisms suggested in prior research. Our work is closely related to that of Sandvik et al. (2020), which finds that structured meetings help reduce initiation costs, including social concerns, coordination costs, and search friction in social interactions. Instead of viewing initiation cost as a general concept, we pinpoint one of the most prevalent social concerns related to workplace harassment and provide evidence that reducing its risk improves communication.

Second, we add to the literature on the effectiveness of policy interventions in improving communication in teams. Information diffusion is more difficult in a diversified team (e.g., Oppen, 2019; Battiston et al., 2021) than in a homogeneous team, because communication barriers are multifaceted (e.g., social incentives, Bandiera et al., 2010; cultural and language disparities, Lazear, 1999). More importantly, the literature shows that certain policies intended to stimulate interactions (e.g., mandatory blend-in) may even backfire.⁵ We con-

⁴For example, the possible ways include reducing costs due to geographical distances (Giroud, 2013; Catalini, 2018; Rosenthal and Strange, 2020), improving information and communication technology (Bloom et al., 2014), and providing team incentives (Friebel et al., 2017).

⁵For example, Carrell et al. (2013) experiments teaming up students with ability heterogeneity to foster

tribute to the literature by showing that legal interventions addressing the source of friction are effective in facilitating workplace information diffusion. Furthermore, we uncover some detailed contextual impediments and facilitators that contribute to the policy’s effectiveness.

Third, our work adds to the literature on whether improved social interaction leads to better decision-making. Prior literature provides ample evidence on the contagion effects of social interactions. For example, individuals’ housing decisions or investment decisions are often influenced by their friends or co-workers (Bailey et al., 2018; Hvide and Östberg, 2015). However, it is inconclusive whether such decisions are optimal. We speak to this question by showing that improved social interaction in the workplace leads not only to a gain of information, but also to better corporate decision-making, as evidenced by the increase in firm value following the passage of anti-NDA laws. Within-firm information flow is crucial to modern firms as they need information communicated safely and swiftly between co-workers to facilitate coordination and cooperation. For example, researchers find that firm’s internal information environment impacts organizational performance (Hansen, 1999), the dissemination and diffusion of innovations (Valente, 2012), external communication quality (Ittner and Michels, 2017; Chen et al., 2018), internal capital allocation (Heitzman and Huang, 2019), and workers’ productivity (Sandvik et al., 2020; Battiston et al., 2021).

The underlying mechanism of the anti-NDAs increasing social interactions is that such laws reduce harassment-related frictions of social interactions among employees. However, an inevitable portion of social interactions involve harassment concerns under the NDA regime as individuals do not have perfect information about the pervasiveness of harassment behaviors or the identity of harassers within an organization. We argue that, in the presence of anti-NDA laws, such concerns will be reduced as firms can no longer use NDAs to prohibit employees from revealing the identity of the harassers and the incidents they experienced or witnessed.⁶ Apart from the revelation effect, which is from an ex-post angle, the anti-NDA

beneficial social interaction. However, instead of stimulating intended interactions, such policy induced a voluntary formation of smaller homogeneous subgroups within the designated team.

⁶A concurrent study by Sockin et al. (2021) finds that the NDA reforms increase worker’s negative reviews and ratings of their employers on the website Glassdoor because anti-NDAs alleviate their concerns

laws also have an ex-ante deterrence effect because both the potential harassers and employers face higher reputation losses and legal liabilities for harassment cases compared to the era without such laws (Rondeau, 2019). The harassers are less likely to continue harassment because they face a larger risk of being exposed if they do so. Thus, the potential harassees are less concerned about interacting with others because they know that the harassers are likely to have been exposed, and the potential harassment behavior is more likely to be deterred after the law. Besides, many versions of the laws outline model policies and training programs,⁷ which draw a line between normal social interaction and workplace harassment, and increase the general awareness.

2. BACKGROUND

2.1. *Workplace (Sexual) Harassment*

Depending on the state, the scope of the anti-NDA laws covers from sexual harassment to any workplace harassment, discrimination, and retaliation. As all states which passed the anti-NDA law address the sexual harassment problems, we focus on sexual harassment and are brief about other types of harassment to get some basic facts of the issue. According to the US Equal Employment Opportunity Commission, workplace sexual harassment is defined as “unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitutes sexual harassment when submission to or rejection of this conduct explicitly or implicitly affects an individual’s employment, unreasonably interferes with an individual’s work performance or creates an intimidating, hostile or offensive work environment” (EEOC, 2002).⁸

Sexual harassment at the workplace affects both men and women. In the US, estimates

of speaking out.

⁷For example, the Part G of SB7848 describe such model policies as policies that 1) define sexual harassment, 2) include information concerning federal and state statutory provisions about sexual harassment, and 3) inform employees about their rights of redress.

⁸We obtain this definition from the EEOC official website: <https://www.eeoc.gov/fact-sheet/facts-about-sexual-harassment>

indicate that 40-75% of women and 13-31% of men have experienced workplace sexual harassment (Aggarwal and Gupta, 2000; Berdahl and Raver, 2011; McDonald, 2012; McCann et al., 2018). Rospenda et al (2009) find in a nationally representative study that 47% of workers in the US experienced harassment at least once.

Among all the harassment cases, the Equal Employment Opportunity Commission (EEOC) estimates that 75% of the victims do not report experiencing workplace harassment because they are not aware that these behaviors can be labeled as harassments (Feldblum and Lipnic, 2016). Other studies find that 99.8% of victims never file formal charges (McCann et al., 2018) because they fear to be shamed and humiliated (Fitzgerald et al., 1995) or retaliatory firing (Dahl and Knepper, 2021).

Sexual harassment is carried out both by those in authoritative positions (i.e. supervisors, managers, employers) as well as by co-workers and subordinates; and same-sex harassment is not uncommon (McDonald et al., 2008; Cortina and Berdahl, 2008). Importantly, being in a position of power in a corporation, for instance, as a board member or C-suite managers, does not preclude harassment.⁹ The Institute of Directors (IoD) in New Zealand surveyed 250 directors about bullying; 32% reported having been bullied or witnessed bullying in the boardroom.

Harassment is an issue that includes but goes beyond sexual harassment and is subject to a substantial degree of ambiguity among the victims. Many victims are unclear whether what they experience is harassment and whether they can report it and receive protection. Fear of retaliation of supervisors and employers leads to under-reporting. Indeed, the most common type of complaint filed with the U.S. Equal Employment Opportunity Commission involves retaliation, where an employer harasses or bullies an employee for objecting to illegal discrimination.¹⁰

⁹For example, we identify the following board members or C-suite managers who sued the company for being harassed at workplace: Ayten Saridas - the CFO of Oil Search; Sonya Elling - the senior director of Eli Lilly; Carleen Pierce - the former CFO of Rochester School.

¹⁰<https://www.eeoc.gov/2021-annual-performance-report-apr>

2.2. NDAs and Harassment

Non-disclosure agreements (NDAs), also known as confidentiality agreements, are legally enforceable business contracts or agreements between parties to keep silent about a piece of “confidential information”. The origin of such agreement is unclear, but the first mention in the database is around 1940s in the context of maritime law (Dean, 2022). Historically non-disclosure agreements were mainly used by employers to prevent employees from disclosing any knowledge they had of company trade secret. For example, NDAs appear often in tech firms like IBM to protect their proprietary algorithms. At the end of 19th century, courts expanded the scope of NDAs to a “generally prohibition on using a wide range of firm-specific information” (Fisk, 2009).

Since the 1970s, the use of NDAs has expanded greatly. The NDAs are employed not only between firms but also between a firm and its employees, contractors and sub-contractors (MacMillan, 2022). NDAs may be customized for any situation and can be agreed to at the outset of employment, while employed, or in severance arrangements or settlement agreements. Data regarding the use of NDAs by employers is scarce due to the suppressing nature of NDAs (Sockin et al., 2021). However, a large-scale survey of 33,000 workers from 1,800 U.S. firms (Balasubramanian et al., 2021) found that 88% of US companies use NDAs covering 57% of employees in the US. In practice, NDAs are essential for corporate employers to protect trade secrets, proprietary business information, or other information such as public figures’ privacy (Huang, 2019). Violating an NDA can have serious consequences. The company can take legal actions if an employee has violated an NDA (Reuters, 2022). The penalties for violating NDAs can vary from situation to situation. Noticeably, there are important legal exceptions to the enforceability of NDAs. Federal laws generally limit an employer’s ability to enforce contracts that prevent workers from discussing employment conditions or situations.¹¹ An NDA can never prevent an employee from assisting in official

¹¹Federal laws, including the National Labor Relations Act (“NLRA”), 29 U.S.C. §§ 151-169) and Title VII of the Civil Rights Act of 1964 (“Title VII”), 42 U.S.C. § 2000e et seq.

agency investigations nor from employee from officially reporting illegal conduct of the firm (Lobel, 2018). Despite these exemptions, studies show that employees are largely uninformed about these protections (Lobel, 2016) and employers use NDAs that do not mention any such exceptions and so by their terms prevent employees from sharing their stories and reporting worker rights violations.¹² Some employers even threaten litigation under circumstances in which NDAs would be void (Lobel, 2016).

The #MeToo movement revealed how NDAs could be misused to enable and conceal harassment in contracts between parties with clearly unbalanced power, in particular, employment contracts (Tippett, 2018). In the presence of NDAs, harassment victims may not dare to speak up, not only because they may fear retaliation but also legal consequences when employers choose to back harassors rather than harassees.¹³ The consequences of NDAs are hence not only that victims may get less compensation and protection, but also that harassors may get away without punishment. Facing less punishment and less fear of being identified in the firm, the incentives to harass will be stronger than in a world without NDAs. When the dozens of allegations of Harvey Weinstein’s sexual assault and harassment incidents were first revealed to the public by the New York Times in 2017 (Knator and Twohey, 2017), many were shocked by the hostile work environment at Weinstein’s company. Weinstein used his “secret weapon” – non-disclosure agreements in employment contracts – to prevent victims from criticizing the company’s leaders in a way that could harm its business reputation or any employee’s personal reputation.¹⁴

¹²<https://nwlc.org/resource/limiting-nondisclosure-and-nondisparagement-agreements-that-silence-workers-policy-recommendations/>

¹³On the campaign website devoted for lobbying government to have a reform on NDAs and raising public awareness of the immoral use of NDAs, there are numerous testimonies shared by victims who told how their employers failed to address their complaints and force them to sign NDAs. Some examples: “I was asked to sign an NDA twice in my life. After a formal complaint to my HR department’s officials about sexual harassment by my boss...I could not afford the on-going fees to defend my case, so I finally pressured to give up my case...” “My nightmare scenario started with me putting in a complaint at work against ‘bullying management.’... A begrudgingly last minute settlement was agreed and then the NDA was levelled at me like an afterthought.” More quotes available at <https://www.cantbuymysilence.com/testimonies>.

¹⁴The former assistant of Weinstein, Mr Perkins, publicized the NDAs she had signed 20 years ago. The NDAs writes “...during your employment you learned...(ii) confidential, private and/or non-public information about the Released Parties, including, without limitation, Harvey Weinstein and Bob Weinstein and their immediate family members, close personal friends and/or close business associates, (6(i) and (ii) to-

2.3. Legal Reforms of NDAs

Following the New York Times article, the #MeToo movement started a social media campaign where victims, including some high-profile celebrities, publicized allegations of sex crimes. At the top of the #MeToo agenda were demands for a legal reform restricting the use of various forms of non-disclosure agreements related to harassment. The EEOC and advocate groups (e.g., the National Women’s Law Center) see the #MeToo movement as an opportunity to unite people suffering from all kinds of workplace harassment toward building a harassment-free workplace. Changing the culture of silence in addressing workplace misconduct such as harassment, discrimination and other worker rights through a change of NDA legislation is widely seen as one of the most important steps toward that goal.

Responding to calls around the country, state-level legislative efforts were devoted to combating the misuse of NDAs in workplace harassment cases. In December 2017, the State of Washington introduced an anti-NDA bill, which later became the first state legislation to limit the use of NDAs related to workplace sexual assault and harassment. Specifically, it prohibits employers from requiring “an employee, as a condition of employment to sign a non-disclosure agreement, waiver, or other document that prevents the employee from disclosing sexual harassment or sexual assault occurring in the workplace, at work-related events coordinated by or through the employer or between employees, or between an employer and an employee, off the employment premises.” More importantly, it makes any non-disclosure agreement “signed by an employee as a condition of employment” (i.e., *existing* non-disclosure agreement in employment contract) void and unenforceable *ex post*.¹⁵ This first anti-NDA bill passed in the State of Washington marked a significant move towards promoting a “harassment-free” workplace environment.

gether with the terms of this Agreement, the existence thereof and the related allegations made by you with respect to you or any other person at the date hereof referred to collectively as “Confidential Information”). You hereby agree: to keep in confidence and not to disclose to, or use for the benefit of, any third party (including yourself), any Confidential Information without the prior written consent of Harvey Weinstein or Bob Weinstein...” <https://assets.bwbx.io/documents/users/iqjWHBFdfxIU/rwaVb6l30x54/v0>.

¹⁵See SB5996 of Washington for details.

Besides limiting the usage of NDAs related to harassment in settlement agreements, several states also details harassment prevention measures directly aimed at promoting awareness of harassment and creating a better workplace culture. Specifically, the law requires the state’s labor department to produce a strong model management policy for employers that would “define sexual harassment and provide examples of conduct that would be defined as unlawful sexual harassment.” Moreover, the law required the department to produce a model training program to prevent sexual harassment in the workplace including definitions, examples, and legal information concerning sexual harassment.¹⁶ In California, for example, employers with five or more employees need to provide at least two hours of interactive sexual harassment prevention training to all supervisory employees and at least one hour of such training to all nonsupervisory employees. New York also requires all employers to provide annual interactive sexual harassment prevention training to employees.

Some states enlarge the scope of workplace harassment beyond sexual harassment. For example, The law in New Jersey includes any discrimination, retaliation, or harassment. The law in Oregon covers sexual assault and any discrimination (including harassment). Maryland includes sexual harassment and retaliation. The initial legislation in New York in 2018 covers workplace sexual harassment, but it was later extended to all discrimination claims. As a general tendency, NDA reforms are increasingly targeted to limit harassment risks in general, and not just for sexual harassment cases.¹⁷ As of December 2019, 13 states have adopted anti-NDA laws.¹⁸ In the Online Appendix Table 2, we provide a more in-depth summary of anti-NDAs in each adopting state.

¹⁶See SB7848 of New York for details.

¹⁷In a hearing held by EEOC in 2018, Professor Elizabeth Tippet from University of Oregon School of Law stated, “It would be a mistake for employers and state legislators to limit their response exclusively to sexual harassment. In doing so, they risk laying a foundation for the next crisis, whether it involves other forms of harassment, or discrimination and retaliation.”

¹⁸See Figure 1 for an overview.

2.4. Consequences of NDA Reforms

First, anti-NDA laws lower employees' risk of being harassed at the workplace by increasing the expected cost to potential harassers. Anti-NDA laws explicitly limit harassers' ability to silence victims, which increases the potential risk to the reputation of harassers. At the same time, the increased disclosure and regulatory transparency required by anti-NDAs can reveal the identity of harassers and promote public monitoring, which reduces the likelihood of repeated crimes. According to survey data, there is evidence of a shift in public opinion on sexual harassment issues that is consistent with the expected change. While the effect of anti-NDA laws on expected harassment risk cannot be directly quantified, two surveys conducted in the US in 2018 (Graf, 2018) and 2022 Brown (2022) on sexual harassment reveal a change in attitudes. The 2018 survey shows that many participants believed that harassers getting away with sexual harassment and victims not being believed were major problems. However, in the 2022 survey, participants reported a shift in perception, with more people believing that harassers or perpetrators are now more likely to be held responsible and victims are more likely to be believed. We will explain this logic and its implications for information exchange between members of the same organization in more detail in Section 3.

Second, anti-NDA laws reduce employees' risks of unknowingly committing harassment at workplace. As observed previously, many preventive measures of anti-NDA laws aim to promote awareness and reduce perception gaps of the definition of workplace harassment by producing model policies and mandatory training to define and give examples of harassment. With clearer guidance, employees are better equipped with knowledge of harassment risks and, therefore, are more likely to behave appropriately. Recent survey evidence shows that, due to heightened awareness, not only stronger consensus exists about what behaviors constitute sexual harassment but also that the consensus cut across gender lines (Brooks et al., 2019). This is important because the law indeed institutionalizes the changes in cultural thinking before and during the legislative process, thus ensuring the long-term success of the

social reforms.

3. AN ILLUSTRATIVE MODEL

The purpose of the model whose game tree is in Figure A is to illustrate how changes in NDA regulation would affect information exchange and firm value. We consider the interaction of two workers i, j as a game in which the first mover i can initiate a more intensive work relationship with the second mover j with the goal of exchanging information that, in principle, is useful for both workers, reflecting the idea that bringing together two pieces of information can produce gains for both sides. The setting is inspired by a substantial literature on communication as a social interaction that needs trust between sender and receiver.

In our game, worker i 's trust entails the risk that the second mover harasses i rather than to reciprocate in the exchange of information. Worker i , in the beginning of the game, decides whether or not to establish a more intensive work relationship with worker j to exchange information. We normalize the cost of standard workplace interaction between the two workers to zero while more intensive interaction ($e = 1$ rather than $e = 0$) has costs c for worker i . If worker j reciprocates in the exchange of information, both workers receive an extra benefit of Y . If worker j decides to harass worker i , though, j receives a non-monetary benefit B of harassing worker i , while the latter bears the damage of harassment D .

Importantly, at the time of having to choose whether or not to intensify the work relationship with j , the type of j , namely, whether or not they have low cost h or high cost H of harassing the other worker is unknown to i . Alternatively, and with similar implications, one could model the heterogeneity of worker j through different levels of the benefit associated with harassment. With probability p , j is a type that is prone to harassing other people (cost of harassing is h), with probability $1 - p$, j 's cost of harassing is H .

We will assume that $B - H < Y$ and $B - h > Y$, such that only the low-cost type will harass worker i , while the high cost-type does not. B is assumed to be a private benefit,

while Y reflects the value of information that i and j respectively receive as profit from insider trading. To make things simple, it is also the value of the increase of the firm value, but, this is without loss of generality. In reality, the increase of firm value will not be fully captured by i, j , but this does not matter for the main prediction.

Solving the model by backward induction, we see that worker j who has low cost of harassment will harass, while the other worker will not. Worker i , when deciding to initiate a more intensive relationship with j will abstain from doing so if, prior to the introduction of the new NDA laws, $(1 - p)Y - c > pD$. However, the introduction of new NDA laws, potentially does a number of things that all make the more intensive work relationship more valuable for work i : (i) first, h is likely to increase, because a harassor faces more negative consequences when the harassee can openly communicate about the harassment, (ii) a worker's damage D may decrease, for instance, because the firm will need to pay more compensations, (iii) the identity of harassors may be revealed or they may be removed from the organization, resulting in a decrease in p .

Taken together we have shown in a simple model that NDA reforms may lead to better information exchange (that we will measure by insider profits) and more firm value. We will also be able to link heterogeneity results to the model, but will first turn to the two main predictions.

4. RESEARCH DESIGN

4.1. *Measure of Information Flow*

The process of information flow between corporate insiders is unobservable. However, we argue that we can use corporate insiders' trading patterns and their trades' profitability as an outcome measure of this information exchange.¹⁹ Although insiders are not allowed to

¹⁹Unlike Ahern (2017), the measure we use is legal insider trading (Aktas et al., 2008), i.e., employees trading of their company's stocks as disclosed in SEC Form 4.

trade on material non-public information,²⁰ it is well documented in the literature that insiders’ trading still entails their private information (Damodaran and Liu, 1993; Cohen et al., 2012).²¹ More recently, Chen et al. (2020) show that institutional investors earn abnormal returns if they track and follow the trades of valuable or connected corporate insiders. There are two major advantages of using this proxy as our main dependent variable. First, because the proxy represents an individual’s proactive choice of using private information, it is arguably more accurate and timely in capturing an individual’s information advantages than proxies relying on corporate behavior or survey responses. It is also unlikely to suffer from reporting bias induced by corporate incentives or response bias in surveys. Second, given that all corporate insiders need to file Form 4 for their transactions within two business days after the transactions take place, using this proxy allows us to have a large and diversified set of firms for analysis, which helps increase the generalizability of our results.

4.2. *Empirical Strategy*

We use cross-state variation in the timing of anti-NDA laws to analyze their effect on information diffusion in the workplace. The recent econometric literature (e.g. Goodman-Bacon, 2021; Baker et al., 2022) is concerned about the aggregation of time-varying treatment effects in the DiD design when the treatment timing is staggered. Using a standard DiD design would result in a bias, because it would compare the states that recently passed the anti-NDA laws with the earlier adopters in the overlapping window. To address this concern, we follow Cengiz et al. (2019) and use a stacked regression research design and estimate the

²⁰In principle, insider tradings are subject to the SEC Section 10(b) and Rule 10b-5 which prohibit insiders trade on material non-public corporate information. Many U.S. public companies have insider trading policies such as imposing blackout periods (Guay et al., 2021) or requiring insiders to pre-specify their plans of when to trade (i.e. 10b5-1 plans).

²¹In the majority of our analyses, we focus on non-routine trades (Cohen et al., 2012). Under current rules, it is still possible for corporate insiders to time their transactions for larger gains (Dechow et al., 2016; Arif et al., 2022; Blackburne et al., 2021; Larcker et al., 2021).

following baseline regression:

$$(1) \quad \text{DependentVariables}_{ijt} = \beta_1 \text{PostXNDA}_{jtk} + \text{Controls} + \gamma_{ijk} + \delta_{tk} + \epsilon_{ijt}$$

We first create a wave-specific dataset, where the wave is defined as the individuals in states that passed anti-NDA regulations in the same month. Next, we keep qualified control firms²² and include observations for treated and control firms from six months before the treatment month to six months after the treatment month for each wave-specific sub-dataset. We include observations from control group for a certain wave if they are not treated during the six months window. We further exclude treatment waves that do not have more than 10 treated firms. Finally, we stack each of the wave-specific datasets in relative time and estimate the event-study DiD model.

We have two sets of dependent variables, namely $\text{InsiderTradingProfitability}_{ijt}$ and $\mathbb{1}\{\text{InsiderTrading}\}_{ijt}$. $\text{InsiderTradingProfitability}_{ijt}$ is measured as the insider trading profit for individual i of firm j in month t in wave k . $\mathbb{1}\{\text{InsiderTrading}\}_{ijt}$ is a dummy variable equal to one if an individual makes an insider trade in a month. PostXNDA_{jtk} is an indicator equal to 1 if the headquarter state of firm j has passed the anti-NDA law in month t in wave k . γ_{ijk} are individual-firm-wave fixed effects, and δ_{tk} are year-month-wave fixed effects. We include individual-firm-wave fixed effects to account for the time-invariant, unobservable characters of each individual and firm, as well as the individual-firm matches. Also, we include year-month-wave fixed effects to control for unobserved time trends or macroeconomic shocks. We cluster the standard error at the state-wave level, allowing for a correlation of errors over time within a state in a certain wave.

Our empirical strategy could be jeopardized by omitted-variable bias if the passage of anti-NDA laws is determined by some economic force that also impacts information diffusion in the workplace. If this were the case we might be capturing a spurious correlation instead

²²To be included as control firms in the sub-dataset, we require the firms to have consecutive observations from one month before to one month after the treatment month of the wave-specific sub-dataset.

of a causal effect of anti-NDA laws.

We reduce the omitted-variable bias by including related state-level and firm-level variables. We include state-level GDP per capita to account for the local economic development, which could affect the importance of building up a transparent and equal environment (Doepke et al., 2012). We include state-level female labor participation rates to control for the rising importance of women’s rights movements (Iversen and Rosenbluth, 2008). Firm-level controls such as board size, the proportion of independent and busy directors (i.e., those who serve on multiple boards) are included to account for the effect of different corporate governance levels across firms. Additional control variables such as stock volatility, turnover, prior return, and the size of an insider’s monthly total trades are included to account for possible factors that influence the profitability of insider trades.

Another concern of our research design is that firms may choose to relocate (move their headquarters) if they believe the anti-NDA laws induce higher risks for them. If a large number of firms relocated due to the anti-NDA laws, then relocation behavior would naturally become an outcome variable of interest. However, we document that the number of firms relocating is small. We find 79 firms relocate during our sample period. Only 6 out of the 79 firms move from states that passed anti-NDA law to states that have not passed anti-NDA law, which indicates that anti-NDA laws are unlikely the reason for relocation. In this case, we are more concerned that the treated firms are misclassified into the control group as we retrieve a firm’s headquarter data from its 10-K/Q filings, which are delayed in recognizing the relocation. Therefore, we exclude such firms that changed their headquarter state in our sample period from the final sample.

As explained in the background section, legal reforms abolishing NDAs were introduced as a direct consequence of harassment scandals. In the legal texts and the related debates, explicit reference was given to these cases. Hence, our study is not likely to be affected by reverse causality that could be a concern if changes in workplace information diffusion triggered the passage of anti-NDA laws. We see clear evidence that anti-NDA laws were

introduced following the #MeToo movement, which featured a series of name-and-shame activities that questioned the legitimacy of NDAs and drew attention to how powerful individuals or institutions used NDAs to “buy secrecy” (Weston, 2020) in harassment cases. The anti-NDA laws have arisen as a response to these controversies. By restricting the misuse of NDAs, the anti-NDA laws protect vulnerable individuals from being silenced and thus prevent potential harassment.

5. DATA

The SEC requires corporate insiders to file Form 3 within ten days after an insider becomes affiliated with a company. Corporate insiders need to file Form 4 within two business days following the transaction. For the transactions they have conducted during the year but failed to report or were exempt from reporting them via Form 4, insiders are required to file Form 5 no later than 45 days after the company’s fiscal year ends. We identify corporate insiders as all individuals that filed Forms 3, 4 or 5 during the period from January 2017 to December 2019. We end our sample period at December 2019 to eliminate the potential impact of COVID-19 on our analyses. We create a individual-firm-month panel for our insider trading pattern analyses. For each individual-firm-month, we label it as one if the individual conducted insider trade for the given firm in the given month. We obtain actual insider trading data from firms’ Form 4 filings and stock price information from CRSP to calculate insider trading profits. Following Jagolinzer et al. (2011), we include only open-market non-derivative transactions and calculate individual-firm-month level²³ insider trading profit. More specifically, we measure insider trading profit as the α ($-\alpha$) from the following regression estimated over the 180 days²⁴ following the first purchase (sale) of each

²³There are very few cases (0.16% of the total individual-firm-month observations) that an insider has both open-market purchases and sales of the same stock in the same month. In these cases, we define an insider buys (sells) in a month if the amount of purchase (sale) outweighs that of sale (purchase). Our main results are robust to excluding such cases.

²⁴We use a 180-day horizon because the “short-swing” rule requires corporate insiders to return profits earned on trades of fewer than 180 days.

insider in the corresponding month.

$$(2) \quad R_i - R_f = \alpha + \beta_1(R_{mkt} - R_f) + \beta_2SMB + \beta_3HML + \beta_4UMD + \epsilon$$

where R_i is the daily return to firm i 's equity, R_f is the daily risk-free interest rate, R_{mkt} is the CRSP value-weighted market return, SMB , HML , and UMD are the size, book-to-market, and momentum factors.

Region-level controls are obtained from various sources. We obtain female labor participation data from the U.S. Bureau of Labor Statistics, state-level GDP per capita from the U.S Bureau of Economic Analysis, and current governors' party affiliations from the State Election Commission/Board of Elections.

We use the following datasets to construct the firm-level proxies: Compustat for firm fundamentals, CRSP for firm stock price information, I/B/E/S for analyst forecast and earnings announcement information, and Execucomp for the top management team composition data. For individual-level and board-level proxies, we use BoardEx to obtain data on individuals' personal and social network information.

Table 1a, panels A and B present the sample selection for our analysis on internal information diffusion and firm value. Table 1b presents the sample distribution of insider trades by different states. Table 2 presents the descriptive statistics for the variables used in our main analysis. To better illustrate the composition of individuals in our sample, we separate individuals based on their role in the organization. In our sample, out of 25,558 individual-firm-year pairs that we can identify positions from BoardEx, 34.1% of individuals are independent board members, 14.0% are executive board members, and 51.9% are senior managers.

6. RESULTS

We here first present the average effects of anti-NDA adoption on our proxies of a firms' internal information diffusion, insider trading profits, and firm value. We then look at the frequency of insider trading, before turning to heterogeneity on the individual and the firm level.

6.1. Main Effects of Anti-NDA on Firms' Internal Information Diffusion: Insider Trading Profitability

Table 3 summarizes the findings from specification (1) with insider trading profitability as left-hand side variable. In column 1, we use all available open-market trades from individuals who meet our sample selection criteria, and we include individual $\times$ firm $\times$ wave and year-month $\times$ wave fixed effects. The estimated coefficient for *PostXNDA* is significantly positive ($\beta = 0.0137$, s.e. = 0.0077). In terms of economic magnitude, the passage of anti-NDAs, on average, leads to a 0.0137 percentage point higher trading profits per day, or 2.5 percentage points higher profits during a 180-day window.

In column 2, we exclude trades placed by routine traders because such trades are not predictive of the firm's future and thus are unlikely to be driven by private information (Cohen et al., 2012). We identify traders as routine traders if they have placed a trade in the same calendar month for at least three consecutive years. Consistent with the notion that the passage of anti-NDA laws facilitates private information diffusion, we find a slightly higher coefficient for our main variable *PostXNDA* in the sample excluding routine trades ($\beta = 0.0212$, s.e. = 0.0078). In column 3, we include several time-varying control variables and find similar effects. In column 4, we use an alternative fixed effects design that we replace individual $\times$ firm $\times$ wave fixed effects with firm $\times$ wave fixed effects. This change shifts our focus from within-individual variation to within-firm variation by allowing comparison across different individuals in the same firm when estimating the treatment effects. We continue to

find a significantly positive coefficient of $PostXNDA$, which confirms the robustness of our results for various fixed effects designs.

It is worth noting that the size of the effect is economically meaningful. We benchmark our results with Cao et al. (2014) and find that the effect of anti-NDA laws on trade profitability (2.5 - 5.0 percentage points in a 180-day window, depending on the specification) equals around 15.2% to 30.4% of the effect of an independent director having a connection with the incoming CEO or CFO (16.4 percentage points in a 180-day window).

To capture the dynamic effects of the anti-NDA laws on insider trading profitability, we use the month prior to the law passage as the benchmark and estimate the relative treatment effect compared to the benchmark. In Figure 2, the insignificant coefficients for periods prior to the passage of anti-NDAs are indicative of satisfying the parallel-trend assumption. We observe that the effect starts to become positive significant after the second month following the law passage.

6.2. *Heterogeneous Effects of Anti-NDAs on Firms' Internal Information Diffusion*

To further support our hypothesis that information diffusion is facilitated by increased social interaction, we test whether the effect of anti-NDA laws varies with ex-ante levels of harassment risks. Firstly, we explore the heterogeneous effect of the anti-NDAs on individuals with different social networks, as individuals may face different ex-ante levels of information diffusion frictions due to harassment risks embedded in social networks. Secondly, we explore whether firm information environmental characteristics moderate such effects, as individuals in different information environments may rely differently on social interactions for information.

6.2.1. *Individuals' Social Networks*

First, we study whether the anti-NDA laws have a greater impact on individuals with larger social network, as they have more access to information and the access are likely dampened by heightened harassment risks in the absence of anti-NDA laws. We expect

that, once the anti-NDA laws alleviate the harassment risk concerns, individuals with large networks are more able to acquire relevant information. One may argue that the anti-NDA laws likely to have an impact not only on how social network is used but also on how network is built. In other words, the anti-NDA laws can have information effect on both intensive margin and extensive margin of the social network. Our tests here focus on the intensive margin of the existing social network as we do not have predictions on the effects of anti-NDAs on network building. To measure an individual's network, we count the individual's total number of social connections in 2016 and define *High Connect* as an indicator variable that equals one if an individual's total number of connections is in the top quartile within the state in 2016. In Table 4, column 1, we find that the coefficient of *PostXNDA* is significantly positive and the interaction of *PostXNDA* and *High Connect* is positive but insignificant, indicating that while all individuals benefit from information acquisition from the anti-NDA laws, individuals with a large social network have an insignificant advantage of information acquisition. Another explanation is that our measure of social connections does not precisely capture the anti-NDA targeted harassment risks. The social connection measure includes both the internal connections at workplace and the external connections outside the firm, while the anti-NDA laws mainly address the workplace harassment issues. We expect the effects to be stronger for internal connections in the workplace than in other social settings.

To test this conjecture, we decompose total connections into two categories: internal connections and external connections. In Table 4, column 2, we find that both coefficients of *PostXNDA* and the interaction of *PostXNDA* and *High Internal Connect* are significantly positive. As expected, the interaction of *PostXNDA* and *High External Connect* is positive but statistically insignificant. In terms of economic magnitude, moving from the non-*High Internal Connect* group (with an average of 1.3 total internal connections) to the *High Internal Connect* group (with an average of 20.5 total internal connections) further increase of insider trading profits of 0.044 percentage points per day, our proxy for private information.

While the classification of the internal connect and external connect shows the differen-

tiated effects of the law on the main targeted groups versus non-targeted groups, we also expect different effects on social connections with ex ante low and high harassment risks. We then further classify internal connections as advice ties versus friendship ties. We expect the law to have a stronger effect for individuals with high advice ties and a weaker effect for individuals with high friendship ties, because friendship ties are supposed to have better bonding and more trust; therefore, they raise lower harassment risk concerns. Following prior literature (e.g., Gibbons, 2004; Bruynseels and Cardinaels, 2014), we classify internal connections as advisory if the connection is established through education and employment and as friendship if the connection is established through voluntary associations such as NGOs, charities, or social clubs. The results are shown in Table 4, column 3. Consistent with our prediction, the effect of the anti-NDA laws is more substantial for individuals with a higher number of advice ties and is significantly attenuated for individuals with a higher number of friendship ties.²⁵ In table 4, We replace the individual $\times$ firm $\times$ wave fixed effects with firm $\times$ wave fixed effects, and show that the results are similar to our main specification.

To sum up, we show that the effect is more substantial for interactions between colleagues in the workplace (more than in other social settings), and between individuals with non-friendship relationships. The aforementioned results support the idea that the improvement in private information is driven by reductions in harassment risks.

6.2.2. *Firm Characteristics*

In this subsection, we explore whether firms' information environment influences the effect of anti-NDA laws on internal information acquisition.

First, Table 5 shows how the effect of anti-NDA laws varies across transparent and opaque firms. We expect that the effect of anti-NDA laws will be less pronounced in more transparent firms, as individuals in such firms rely less on private communication channels for information acquisition. Our first proxy for transparency is based on a firm's information

²⁵Overall, we do not find a huge overlap between individuals in *High Friend Connection* group and *High Advice Connection* group. We find that out of 13,918 individuals that we are able to identify social connections in 2016 in our main sample, only 439 are in both groups.

system, specifically the earnings announcement (EA) speed, which measures the capability of a firm to quickly integrate information within an organization, such as a low degree of manual intervention and a clear order of information flow (Gallemore and Labro, 2015; Heitzman and Huang, 2019). Consistent with our expectation, Table 5, column 1 shows that the law’s effect is significantly attenuated for a group of firms with *High EA Speed*. For further exploration, we use two alternative proxies – earnings surprise and analyst forecast dispersion – to measure transparency. These two proxies capture the extent to which analysts know about the firm. As a sophisticated information intermediary in the financial market, analysts collect public and private information from different sources (e.g., professional networks) before issuing their forecasts (Fang and Huang, 2017; Bradley et al., 2017). One possible consequence of having reliable and consistent information is the existence of a consensus forecast among analysts covering the same firm, as proxied by *Low Forecast Dispersion*. In such cases, the disagreement among analysts is likely a reflection of information disparity, which indicates an opaque information environment inside a company. On the other hand, if analysts’ consensus deviate from the actual reported earnings by a wide margin (as proxied by *High Earnings Surprise*), it is likely that the public information available for analysis is not reliable, or the private information from different connected insiders is not consistent. We find that the effect of anti-NDA laws is significantly lower for individuals in transparent firms (i.e. *Low Forecast Dispersion*) and higher for individuals in opaque firms (i.e. *High Earnings Surprise*). To sum up, our evidence suggests that the anti-NDA laws reduce the communication frictions more in firms where individuals need to rely more on private communication when searching for information.

Second, we examine whether the effect of anti-NDA laws varies with the amount of proprietary information. Firms withhold information when proprietary costs are high (Verrecchia, 1983; Darrough, 1993). Thus, due to a lack of public information on many critical aspects of a firm, we expect individuals in such firms to rely more on social interactions to acquire information, thus benefiting more from the reduced communication friction following the

passage of anti-NDA laws. Empirically, we use R&D expenses scaled by total assets (Boone et al., 2016) and trade secrets (Glaeser, 2018) to measure proprietary costs. Consistent with our expectation, the result in Table 5, columns 4 and 5 show that individuals in firms with high proprietary information indeed benefit more from anti-NDA laws.

Lastly, we expect the effect of anti-NDA laws to be weaker for firms with reliable communications channels as measured by management team stability (Bushman et al., 2016; Guay et al., 2019). We argue that a stable management team is likely the result of an established trusting team. Trusting team members are less likely to have harassment risk concerns when interacting and exchanging information with other colleagues. As a result, we expect a weaker effect for individuals in such firms. In Table 5, column 6, we find results consistent with our expectations. In table 5, we replace our individual $\times$ firm $\times$ wave fixed effects with firm $\times$ wave fixed effects and show that the results are similar to our main specification.

6.3. Main Effects of Anti-NDA on Firms' Internal Information Diffusion: Insider Trading Likelihood

Our previous findings document that insider trading profitability increases following the passage of anti-NDA laws. We interpret that as evidence of insiders possessing more or better-quality information due to the removal of harassment concerns. However, this raises a question about the sustainability of insider trading profits. As Kyle (1985) predicts in his model, insiders are strategic and consider the price impact of their trades. If, due to the reduction of harassment risks, insiders are more willing to exchange private information and trade on such information, their trades are likely to increase price informativeness and in turn reduce the marginal benefit of conducting such trades. What's the equilibrium when, on average, insiders are exposed to larger amount of private information? We empirically answer this question by looking at the trading strategies of different corporate insiders.

In Table 6, we document that the likelihood of an individual making a trade decreases after the passage of anti-NDA laws. In terms of economic magnitude, we find that anti-NDA

laws significantly reduce the likelihood of an individual trade in a month by 0.39 percentage point, which equals to 6.9% of the sample mean of the trading likelihood. Figure 3 shows the dynamic effects of insider trading likelihood. Furthermore, we test whether the effects are mainly concentrated in non-routine trades. In Table OA6, we show that anti-NDA laws significantly reduces the non-routine insider trades while does not have a significant effect on the routine insider trades. This is consistent with Kyle’s prediction that insider trades are discouraged by the incorporation of their own private information in the market prices.

To corroborate this finding, we examine whether the insider trading profits are less sustainable after the anti-NDA laws. In Figure 5, we present the trading profitability of pseudo trading days by moving the actual trading days of insider trades to 1 day to 60 days after the actual days. We separate the sample by state-months with and without anti-NDA laws and plot the trading profit of a given trading window for the two subgroups respectively. Consistent with our earlier findings in Table 3, we show a stark distinction for the actual trading profits between the two subgroups. In the following pseudo trading windows that start one to five days after the actual trading days, we document a sharper decline in insider trading profits for firms in state-months with anti-NDA laws compared to the other subgroup without anti-NDA laws. We interpret this as suggestive evidence for a price discovery process that corporate insiders’ information advantage diminishes due to the more timely dissemination of information after the law.

Lastly, we provide evidence to reconcile the findings that anti-NDA laws increase insider trading profits while decrease insider trading behavior. We find that this is largely driven by the withdrawal of corporate insiders that have very thin information advantage. In the first column of Table 7, we show that corporate insiders with a low trading profit in the year prior to the start of our sample exhibit lower likelihood of trading in the subsequent years. In contrast, we document that among corporate insiders that are connected to at least one of their colleagues within the organization, the individuals who are more central in the corporate social network (as measured by the eigenvalue centrality (Bonacich, 1987) of

an individual’s internal social network in the year prior to the sample start) are less likely to reduce subsequent trading behaviors than the ones on the edge of their colleagues’ social network.

6.4. *Main Effects of Anti-NDA on Firms’ Internal Information Diffusion: Firm Value*

We propose that anti-NDA laws can impact firm value via two potential channels: increase in productivity and improvement in information diffusion. First, prior literature has shown that harassment risks lower job satisfaction, increase job turnover rates, and result in a wage premium (Antecol and Cobb-Clark, 2004; Hersch, 2011). Thus, reducing harassment risks increases productivity and, therefore, firm value. Second, our evidence shows that the passage of anti-NDA laws increases workplace information diffusion. Moreover, this is likely to have positive externalities. For example, investors are more able to assess managerial strategies and lower monitoring costs in a transparent environment. Combining the channels implied by our previous results and the literature, we predict that the anti-NDA laws, on average, will lead to an increase in firm value.

To estimate the effect of anti-NDA laws on firm value, we estimate equation (1) with an alternative dependent variable for firm value, $\ln(Q)$, as measured by the natural logarithm of the market-to-book ratio of the firm (Cremers and Ferrell, 2014). The result is shown in Table 8. As expected, the estimated coefficient for $PostXNDA$ is positive and statistically significant ($\beta = 0.0284$, s.e. = 0.0100). In terms of economic magnitude, the result indicates that firms subject to anti-NDA laws have an average of 2.88% ($=e^{0.0284} - 1$) increase in Tobin’s Q. When looking at the dynamic effects in Figure 4, we show a general increasing trend of firm value following the adoption of anti-NDAs.

7. CONCLUSION

Modern firms bear the responsibility to coordinate and integrate disparate knowledge within the organization due to the high demand for collaboration in their production activities

(Grant, 1996; Garicano, 2000). One way to achieve this role is to stimulate social interaction between individuals with different specializations. In this paper, we study the effects of harassment risks as one source of friction in social interaction in firms, exploiting the passage of state-level anti-NDA laws. Anti-NDA laws are supposed to improve awareness and prevent workplace harassment by limiting the use of NDAs in harassment litigation. We find significant improvement in within-firm information diffusion following the passage of anti-NDA laws, suggesting that these laws are effective in fostering communication among co-workers.

Our results highlight the importance of social interaction in information and knowledge sharing within a firm. More specifically, we identify scenarios in which social interactions play a large role in determining a firm’s information environment, and document stronger effects in these scenarios. For example, we find that insider information increases more sharply for less transparent firms, as they rely more on informal interactions to exchange information due to a less effective information system or proprietary concerns. We also document a positive effect for individuals who have a larger number of workplace acquaintances, suggesting that anti-NDA laws foster mutual trust in the workplace.

Our results have noteworthy implications. First, the findings in this paper emphasize the effect of policy intervention in shaping a firm’s internal information environment. We document a muted effect of policy intervention in the presence of trusted management teams, as well as in firms with reliable formal information channels. This finding speaks to the question of formal and informal controls within an organization. It is unclear whether formal and informal controls are substitutes or complements. Our finding tends to suggest a non-monotonic relation between the two types of controls. Formal controls can be spared when trust can be guaranteed by informal controls, while formal controls can have stronger effects when informal controls are not established but does not substitute the effects of informal controls.

Second, our results indicate a gradual change of workplace norms following the passage of

anti-NDA laws, which is consistent with the finding of Acemoglu and Jackson (2017) that law enactment and enforcement can influence social norms. Our findings support the growing literature on corporate culture (e.g., Kreps, 1990; Guiso et al., 2015; Graham et al., 2016) by showing that explicit requirements of regulations change interactions among employees and thus the information they own. Along this line, future research can investigate whether employees' gender beliefs evolve as the norm of workplace interaction changes. We believe this will be an important step towards understanding whether the effects of anti-NDA laws can sustain in the long run.

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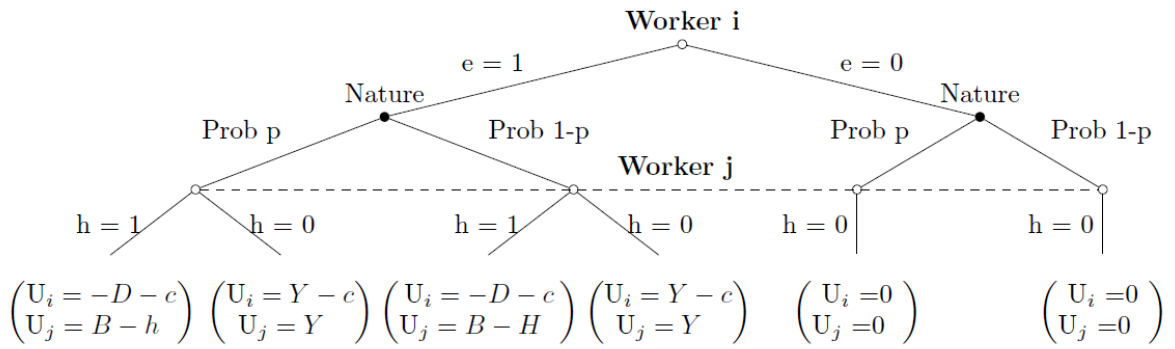
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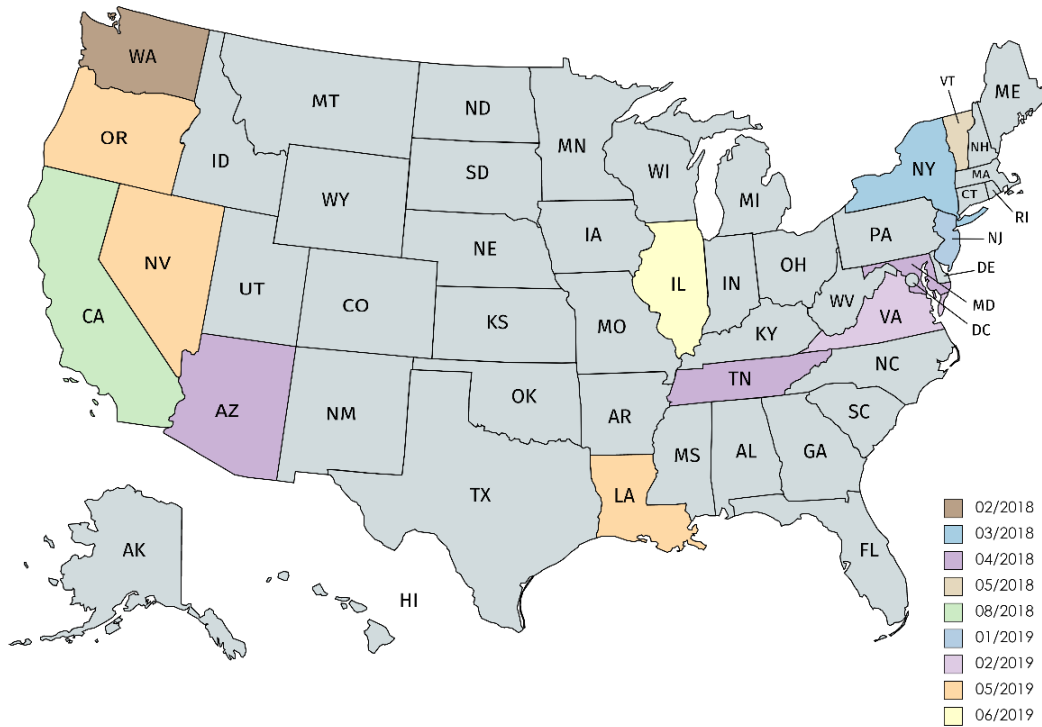
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Figure A: Game Tree



Notes: This figure illustrates the theoretical model described in Section 3.

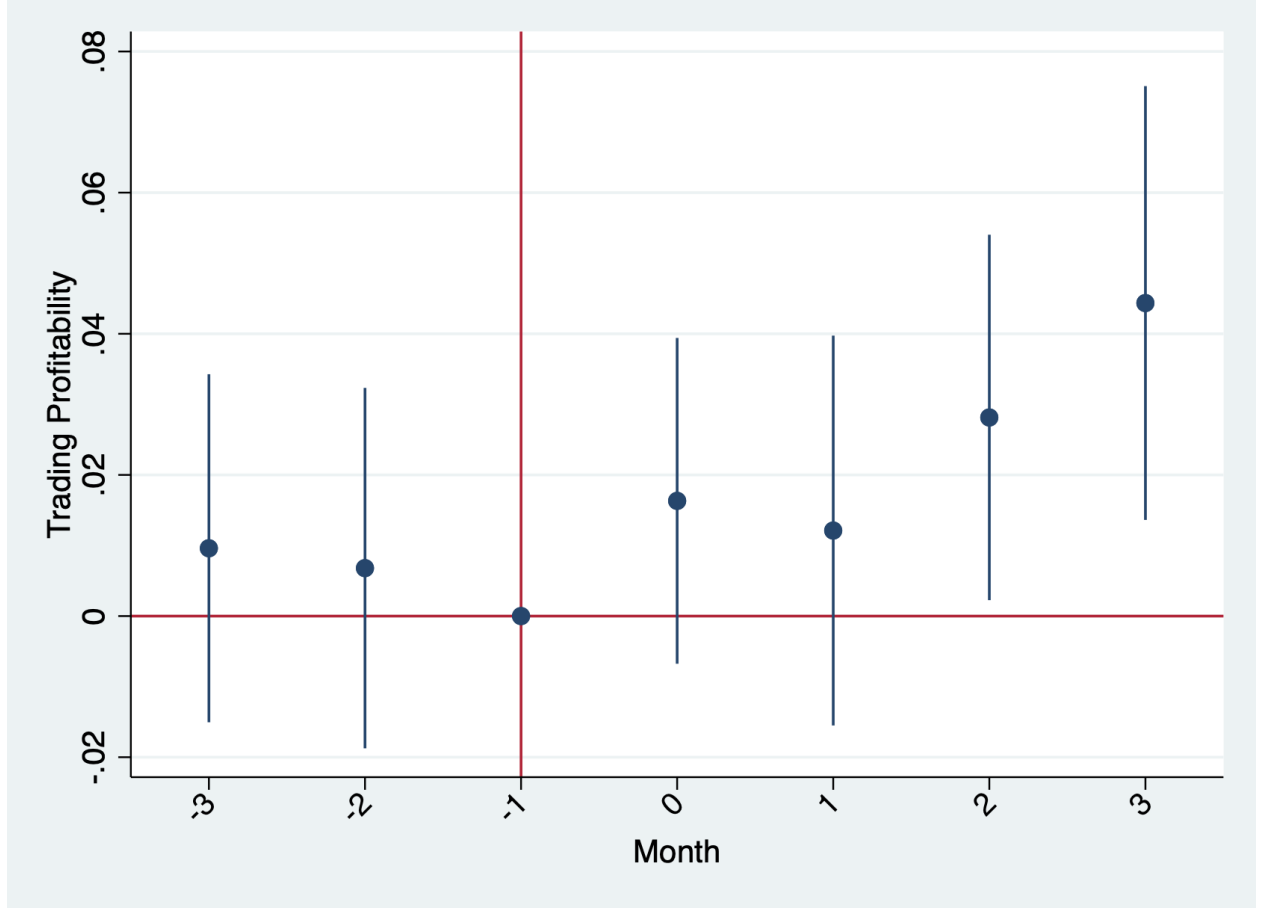
Figure 1: Passage of anti-NDA laws across states



Created with mapchart.net

Passage Time	State
02/2018	WA
03/2018	NY
04/2018	AZ, MD, TN
05/2018	VT
08/2018	CA
01/2019	NJ
02/2019	VA
05/2019	LA, NV, OR
06/2019	IL

Figure 2: Dynamic effects of insider trading profitability – Stacked regression approach

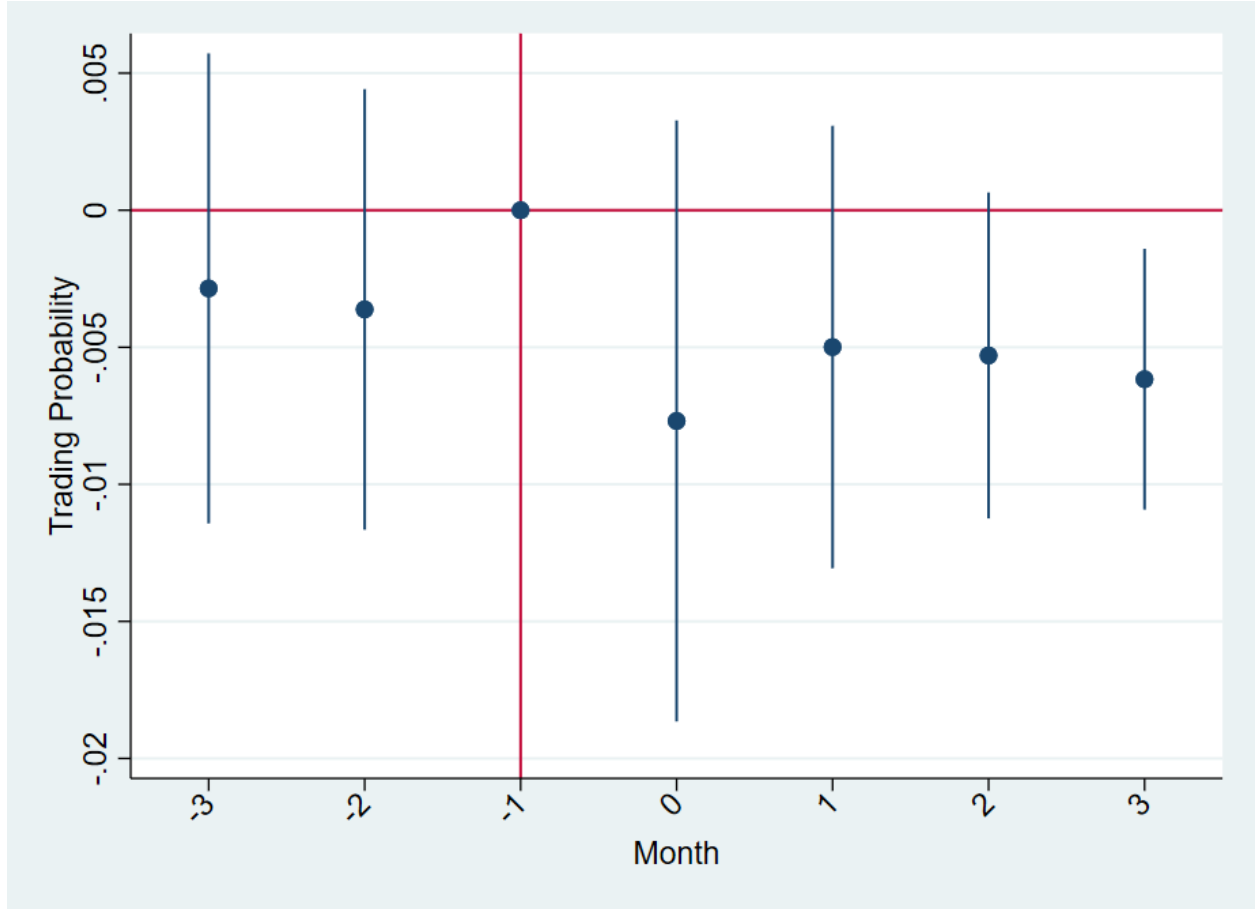


Notes: This figure plots the β coefficients and associated 95% confidence intervals from an estimation of the following model:

$$InsiderTradingProfitability_{ijtk} = (\beta_1 Minus3M_{ijt} + \beta_2 Minus2M_{ijt} + \beta_3 Minus0M_{ijt} + \beta_4 Plus1M_{ijt} + \beta_5 Plus2M_{ijt} + \beta_6 Plus3M_{ijt}) \times Treat_{jk} + \gamma_{ijk} + \delta_{tk} + \epsilon_{ijtk}$$

where i indexes individual, j indexes company, t indexes time (year-month), and k indexes specific sub-datasets created for each treatment month (i.e., treatment wave). Treatment-month-specific sub-datasets are created for each treatment month. We include observations for treated and control firms from six months before the treatment month to six months after the treatment month for each sub-dataset. We include observations as control group of a sub-dataset for a certain treatment month if the individual-month is not (yet) treated. We further exclude treatment waves that do not have more than 10 treated firms. γ_{ijk} is a fixed effect for each individual-company pair interacted with sub-dataset identifier k , and δ_{tk} is year-month fixed effects interacted with sub-dataset identifier k . $Minus3M_{ijt}$ ($Plus3M_{ijt}$) is an indicator equal to 1 if t is at least three months before (after) the headquarters state of firm j passed the anti-NDA law, and so on. $Minus2M_{ijt}$ ($Plus2M_{ijt}$) is an indicator equal to 1 if t is two months before (after) the headquarters state of firm j passed the anti-NDA law. $Minus0M_{ijt}$ is an indicator equal to 1 if t is the month when the headquarter state of firm j passed the anti-NDA law. $Plus1M_{ijt}$ is an indicator equal to 1 if t is one month after the headquarter state of firm j passed the anti-NDA law. The reference period is the month prior to when the headquarter state of firm j passed the anti-NDA law (i.e., $Minus1M_{ijt}$). $Treat_{jk}$ is an indicator equal to 1 if firm j is headquartered in a state that passed the anti-NDA law in the treatment month specific to the sub-dataset k . The sample period is from January 2017 to December 2019. Standard errors are clustered at the state-wave level.

Figure 3: Dynamic effects of insider trading likelihood – Stacked regression approach

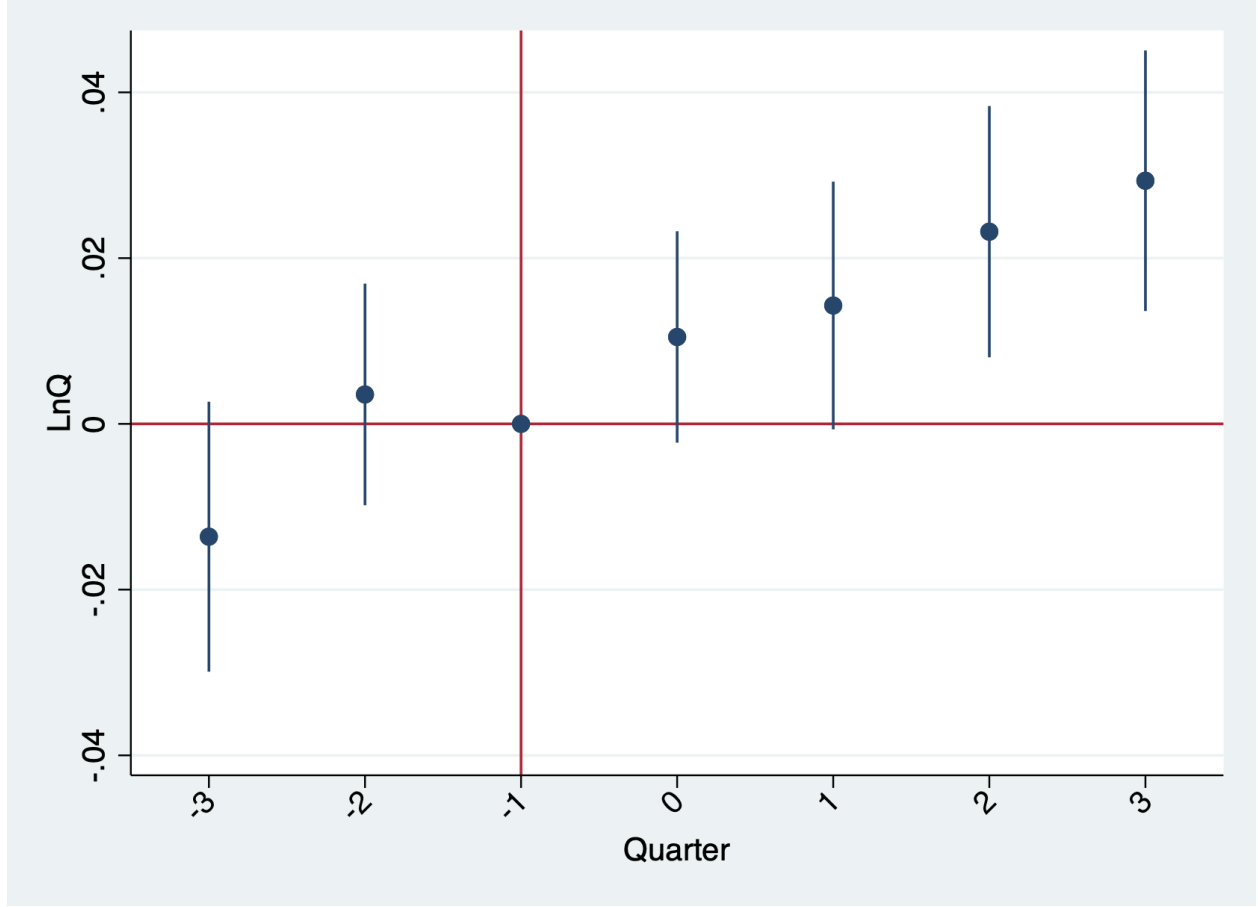


Notes: This figure plots the β coefficients and associated 95% confidence intervals from an estimation of the following model:

$$\mathbb{1}\{InsiderTrading\}_{ijtk} = (\beta_1 Minus3M_{ijt} + \beta_2 Minus2M_{ijt} + \beta_3 Minus0M_{ijt} + \beta_4 Plus1M_{ijt} + \beta_5 Plus2M_{ijt} + \beta_6 Plus3M_{ijt}) \times Treat_{jk} + \gamma_{ijk} + \delta_{tk} + \epsilon_{ijtk}$$

where i indexes individual, j indexes company, t indexes time (year-month), and k indexes specific sub-datasets created for each treatment month (i.e., treatment wave). Treatment-month-specific sub-datasets are created for each treatment month. We include observations for treated and control firms from six months before the treatment month to six months after the treatment month for each sub-dataset. We include observations as control group of a sub-dataset for a certain treatment month if the individual-month is not (yet) treated. We further exclude treatment waves that do not have more than 10 treated firms. γ_{ijk} is a fixed effect for each individual-company pair interacted with sub-dataset identifier k , and δ_{tk} is year-month fixed effects interacted with sub-dataset identifier k . $Minus3M_{ijt}$ ($Plus3M_{ijt}$) is an indicator equal to 1 if t is at least three months before (after) the headquarters state of firm j passed the anti-NDA law, and so on. $Minus2M_{ijt}$ ($Plus2M_{ijt}$) is an indicator equal to 1 if t is two months before (after) the headquarters state of firm j passed the anti-NDA law. $Minus0M_{ijt}$ is an indicator equal to 1 if t is the month when the headquarter state of firm j passed the anti-NDA law. $Plus1M_{ijt}$ is an indicator equal to 1 if t is one month after the headquarter state of firm j passed the anti-NDA law. The reference period is the month prior to when the headquarter state of firm j passed the anti-NDA law (i.e., $Minus1M_{ijt}$). $Treat_{jk}$ is an indicator equal to 1 if firm j is headquartered in a state that passed the anti-NDA law in the treatment month specific to the sub-dataset k . The sample period is from January 2017 to December 2019. Standard errors are clustered at the state-wave level.

Figure 4: Dynamic effects of firm value – Stacked regression approach

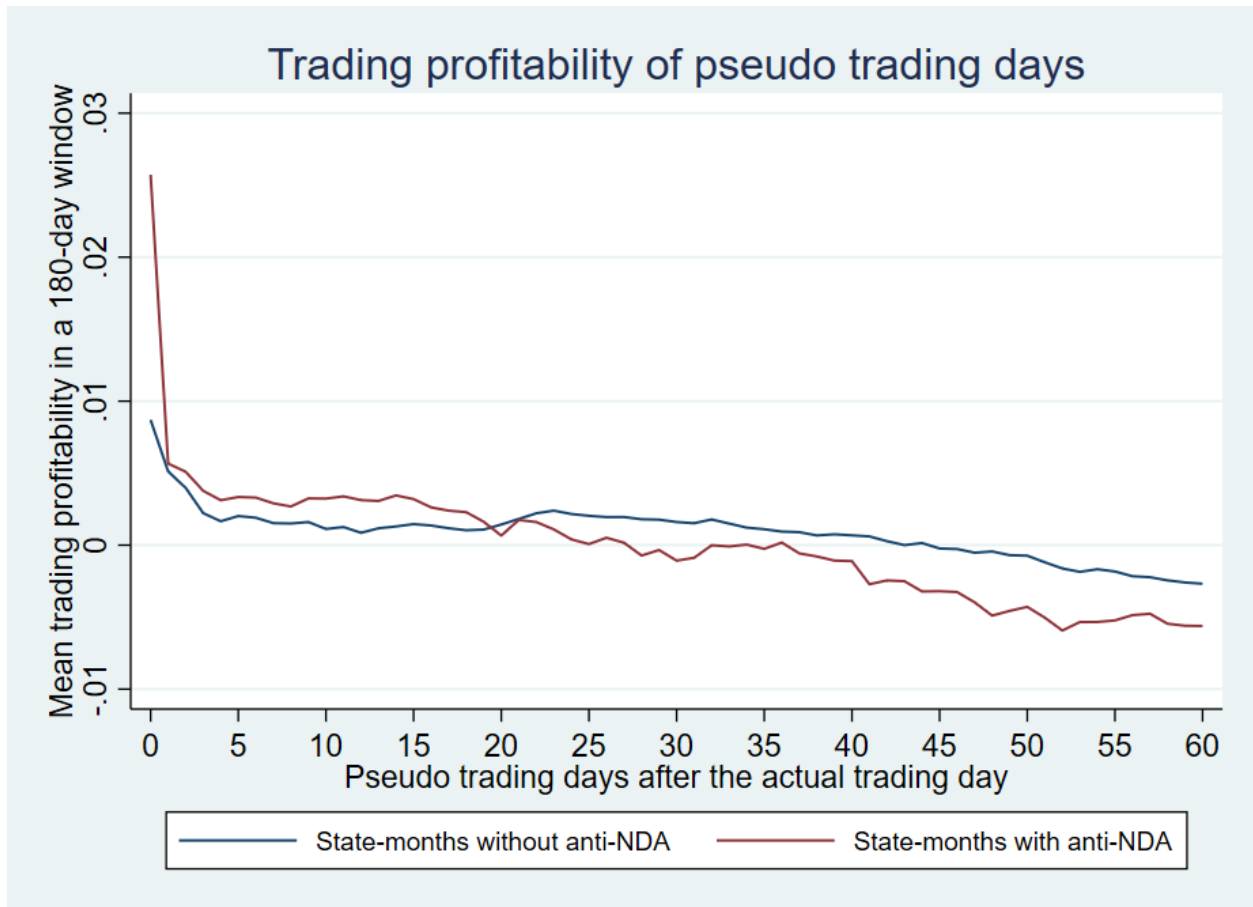


Notes: This figure plots the β coefficients and associated 95% confidence intervals from an estimation of the following model:

$$\ln(Q)_{jtk} = (\beta_1 \text{Minus}3M_{jt} + \beta_2 \text{Minus}2M_{jt} + \beta_3 \text{Minus}0M_{jt} + \beta_4 \text{Plus}1M_{jt} + \beta_5 \text{Plus}2M_{jt} + \beta_6 \text{Plus}3M_{jt}) \times \text{Treat}_{jk} + \gamma_{jk} + \delta_{tk} + \epsilon_{jtk}$$

where j indexes company, t indexes time (year-month), and k indexes indexes specific sub-datasets created for each treatment quarter (i.e., treatment wave). Treatment-quarter-specific sub-datasets are created for each treatment quarter. We include observations for treated and control firms from five quarters before the treatment quarter to five quarters after the treatment quarter for each sub-dataset. We include observations as control group of a sub-dataset for a certain treatment quarter if the individual-quarter is not (yet) treated. We further exclude treatment waves that do not have more than 10 treated firms. γ_{jk} is a fixed effect for each individual-company pair interacted with sub-dataset identifier k , and δ_{tk} is year-quarter fixed effects interacted with sub-dataset identifier k . $\text{Minus}3M_{jt}$ ($\text{Plus}3M_{jt}$) is an indicator equal to 1 if t is at least three quarters before (after) the headquarters state of firm j passed the anti-NDA law, and so on. $\text{Minus}2M_{jt}$ ($\text{Plus}2M_{jt}$) is an indicator equal to 1 if t is two quarters before (after) the headquarters state of firm j passed the anti-NDA law. $\text{Plus}1M_{jt}$ is an indicator equal to 1 if t is one quarter after the headquarter state of firm j passed the anti-NDA law. The reference period is the quarter prior to when the headquarter state of firm j passed the anti-NDA law (i.e., $\text{Minus}1M_{jt}$). Treat_{jk} is an indicator equal to 1 if firm j is headquartered in a state that passed the anti-NDA law in the treatment quarter specific to the sub-dataset k . The sample period is from January 2017 to December 2019. Standard errors are clustered at the state-wave level.

Figure 5: Trading profitability of pseudo trading day



Notes: This figure plots the average 180-day profitability of actual trading and "pseudo" tradings that start at 1 - 60 days after the actual trading day for individuals in states with anti-NDA laws (the red line) and in states without anti-NDA laws (the blue line) .

Table 1a: Sample selection

Panel A: Insider trading profitability			
Steps	Observations	Unique insiders	Unique firms
Number of monthly insider-firm transactions from January 2017 to December 2019 for individuals with BoardEx coverage	84,362	24,969	3,557
Removing individuals in firms not fully profiled in BoardEx	82,675	24,369	3,373
Removing firms in finance and utility industries (SIC: 6000-6999; 4900-4999)	59,408	17,222	2,446
Removing firms not headquartered in US	57,665	16,682	2,379
Removing relocating firms	56,440	16,302	2,300
Removing firms without necessary controls	54,857	15,876	2,230
Removing individuals that switch firms during sample period	53,100	15,146	2,219
Final sample	53,100	15,146	2,219
Panel B: Insider Trading Likelihood			
Steps	Observations	Unique Insiders	Unique firms
Monthly observations of all Forms 3, 4 and 5 filers in sample firms from January 2017 to December 2019 that has BoardEx coverage	1,104,660	28,050	2,219
Removing observations before the filer files the first Form-3	868,612	26,882	2,219
Final sample	868,612	26,882	2,219
Panel C: Firm value			
Steps	Observations	Unique firms	
Firm-quarters in the insider trading sample with quarterly data	25,965	2,219	
Removing firm-quarters without Q, or controls	23,974	2,155	
Final sample	23,974	2,155	

Table 1b: Sample distribution by state

State	# Firms	# Individuals	# Individual-trading months	# Individual-Firm combinations
AK	2	16	377	5
AL	7	91	2878	34
AR	11	178	5500	84
AZ	31	416	12310	213
CA	407	4849	148705	2874
CO	70	820	23983	389
CT	41	592	17492	293
DE	4	50	1425	32
FL	88	1151	33033	526
GA	50	712	20555	339
HI	4	35	1059	21
IA	12	159	4282	72
ID	5	66	2016	26
IL	100	1542	45101	707
IN	27	413	11748	163
KS	13	155	4744	69
KY	12	148	4014	61
LA	10	117	3192	59
MA	156	1968	58669	1076
MD	39	475	13937	219
ME	4	44	1302	25
MI	42	672	18541	346
MN	48	690	20587	369
MO	26	386	10734	185
MS	3	24	792	13
NC	48	606	17496	277
ND	2	9	283	4
NE	10	125	3864	54
NH	8	86	2540	35
NJ	90	1212	34117	556
NM	2	10	235	2
NV	21	240	7054	120
NY	168	2131	62369	973
OH	81	1255	36791	565
OK	27	310	8962	140
OR	17	190	5585	98
PA	90	1227	35912	577
RI	8	103	3010	58
SC	11	151	4775	76
SD	3	24	755	8
TN	37	603	16956	248
TX	249	3167	93343	1463
UT	22	242	6977	141
VA	59	832	24420	418
WA	46	644	18996	309
WI	39	574	16845	297
WV	2	15	351	7

Notes: This table reports distribution of the final sample of insider trading probability analysis before transforming to stacked dataset (N = 868,612).

Table 2: Descriptive statistics

Panel A: Insider trading profitability sample

Variables	N	Mean	S.D.	P25	P50	P75
Insider Trading Profitability	53,100	0.010	0.226	-0.103	0.002	0.116
PostXNDA	53,100	0.179	0.383	0.000	0.000	0.000
%Female Labor Participation	53,100	57.721	3.232	55.300	56.200	59.600
GDP	53,100	11.016	0.161	10.913	11.041	11.139
GOP Governor	53,100	0.440	0.496	0.000	0.000	1.000
Board Size	53,100	8.934	2.000	8.000	9.000	10.000
Busy Directors	53,100	0.500	0.230	0.333	0.500	0.667
Independent Directors	53,100	0.850	0.072	0.833	0.875	0.900
Volatility	53,100	0.024	0.011	0.016	0.021	0.029
Turnover	53,100	2.586	1.983	1.399	2.038	3.072
Prior Return	53,100	0.126	0.433	-0.126	0.060	0.286
Trade Size	53,100	33.227	95.524	2.538	7.776	21.500

Panel B: Insider trading probability sample

Variables	N	Mean	S.D.	P25	P50	P75
$\mathbb{1}\{InsiderTrading\}$	868,612	0.056	0.229	0.000	0.000	0.000
PostXNDA	868,612	0.173	0.378	0.000	0.000	0.000
%Female Labor Participation	868,612	57.771	3.205	55.400	56.600	59.400
GDP	868,612	10.985	0.165	10.855	10.997	11.139
GOP Governor	868,612	0.501	0.500	0.000	1.000	1.000
Board Size	868,612	8.943	2.142	7.000	9.000	10.000
Busy Directors	868,612	0.486	0.238	0.333	0.500	0.667
Independent Directors	868,612	0.854	0.072	0.833	0.875	0.900

Panel C: Firm value sample

Variables	N	Mean	S.D.	P25	P50	P75
LnQ	23,974	0.642	0.606	0.186	0.528	1.009
PostXNDA	23,974	0.169	0.375	0.000	0.000	0.000
Size	23,974	6.855	2.064	5.428	6.963	8.268
Leverage	23,974	0.289	0.242	0.093	0.264	0.419
ROA	23,974	-0.013	0.076	-0.014	0.007	0.020
CAPEX	23,974	0.011	0.013	0.003	0.006	0.013
R&D	23,974	0.883	4.876	0.000	0.000	0.106

Notes: This table presents descriptive statistics for the main variables employed in our analyses before transforming to stacked datasets for stacked regressions analysis. Panel A (Panel B) presents descriptive statistics for the insider trading (firm value) sample. All variables are defined in Online Appendix Table 1.

Table 3: The effect of anti-NDA laws on internal information diffusion

	(1)	(2)	(3)	(4)
	Insider Trading profitability			
PostXNDA	0.0137* (0.0077)	0.0212*** (0.0078)	0.0240*** (0.0070)	0.0275*** (0.0077)
N	73,361	57,297	57,297	85,571
$Adj.R^2$	0.382	0.397	0.431	0.473
Individual $\times$ firm $\times$ wave FE	yes	yes	yes	no
Year-month $\times$ wave FE	yes	yes	yes	yes
Firm $\times$ wave FE	no	no	no	yes
Controls	no	no	yes	yes
Routine trade excluded	no	yes	yes	yes

Notes: This table presents the results of equation 1 using the stacked regressions approach. The dependent variable is *Insider Trading Profitability*, which is α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the individual in the month. We include observations for treated and control firms from six months before the treatment month to six months after the treatment month for each sub-dataset. We exclude treatment month that do not have more than 10 treated firms. The sample period is from January 2017 to December 2019. The primary independent variable is the *PostXNDA*. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. In column 1, we run our main specification without controls. In column 2, we exclude routine trades following Cohen et al. (2012). In column 3, we present the results with controls. We include the following control variables: *%Female Labor Participation*, *GDP*, *GOP Governor*, *Board Size*, *Independent Directors*, *Busy Directors*, *Volatility*, *Turnover*, *Prior Return*, and *Trade Size*. Each specification from column 1 to 3 includes individual $\times$ firm $\times$ wave fixed effects and year-month $\times$ wave fixed effects. In column 4, we include firm $\times$ wave fixed effects instead of individual $\times$ firm $\times$ wave fixed effects. All variables are defined in Online Appendix Table 1. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state $\times$ wave in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10% levels, respectively.

Table 4: Insider trading profitability and individual social connections

	(1)	(2)	(3)
	Insider Trading profitability		
PostXNDA	0.0270*** (0.0080)	0.0132 (0.0085)	0.0129 (0.0087)
High Total Connection $\times$ PostXNDA	0.0142 (0.0184)		
High Internal Connection $\times$ PostXNDA		0.0395*** (0.0124)	
High Advice Connection $\times$ PostXNDA			0.0443*** (0.0128)
High Friend Connection $\times$ PostXNDA			-0.0207 (0.0192)
High External Connection $\times$ PostXNDA		0.0093 (0.0180)	0.0099 (0.0174)
N	51,473	51,473	51,473
$Adj.R^2$	0.425	0.425	0.425
Controls	yes	yes	yes
Individual $\times$ firm $\times$ wave FE	yes	yes	yes
Year-month $\times$ wave FE	yes	yes	yes
Routine trade excluded	yes	yes	yes

Notes: This table presents the results of estimating modified versions of equation 1 using the stacked regressions approach. The dependent variable is *Insider Trading Profitability*, which is α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. In column 1, we sort individuals into quartiles of their total connections. The variable *High Connect* is an indicator equal to 1 if the total number of the individual's connections in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. In column 2, we use a similar approach and sort individuals into quartiles of their internal and external connections, respectively. The variable *High Internal Connect* is an indicator equal to 1 if the number of the individual's connections to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. The variable *High External Connect* is an indicator equal to 1 if the number of the individual's connections to individuals in other companies or organizations in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. In column 3, we further sort individuals into quartiles of their types (i.e. advice v.s. friend) internal connections. The variable *High Internal Advice Connect* is an indicator equal to 1 if the number of the individual's advice connections (i.e. education, listed and unlisted organizations) to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. The variable *High Internal Friend Connect* is an indicator equal to 1 if the number of the individual's friend connections (i.e. not-for-profit organizations and others) to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. All variables are defined in Online Appendix Table 1. In each specification, we include the full set of control variables, individual $\times$ firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10% levels, respectively.

Table 5: Insider trading profitability and firm-level heterogeneities

	(1)	(2)	(3)	(4)	(5)	(6)
	Insider Trading Profitability					
PostXNDA	0.0479*** (0.0123)	0.0366*** (0.0090)	0.0234*** (0.0070)	-0.0005 (0.0098)	0.0356*** (0.0068)	0.0406*** (0.0115)
High EA Speed $\times$ PostXNDA	-0.0494** (0.0224)					
Low Forecast Dispersion $\times$ PostXNDA		-0.0222* (0.0122)				
High Earnings Surprise $\times$ PostXNDA			0.0352*** (0.0118)			
Trade Secret $\times$ PostXNDA				0.0297** (0.0121)		
Low R&D $\times$ PostXNDA					-0.0192** (0.0090)	
High Team Stability $\times$ PostXNDA						-0.0815*** (0.0166)
<i>N</i>	52,508	50,159	50,159	56,049	52,514	30,543
<i>Adj. R</i> ²	0.424	0.424	0.424	0.437	0.424	0.462
Controls	yes	yes	yes	yes	yes	yes
Individual $\times$ firm $\times$ wave FE	yes	yes	yes	yes	yes	yes
Year-month $\times$ wave FE	yes	yes	yes	yes	yes	yes
Routine trade excluded	yes	yes	yes	yes	yes	yes

Notes: This table presents the results of estimating modified versions of equation 1. The dependent variable is *Insider Trading Profit*, which is α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. We sort firms into different groups based on the firm-level characteristic. The variable *High (Low) Firm-level Characteristics* is an indicator equal to 1 if the firm's characteristics proxy is in the top (bottom) quartile of all firms in the same state in 2016, and zero otherwise. *EA Speed* is measured as minus one times the gap between the firm's earnings announcement date and fiscal year end date. *Earnings Surprise* is measured as the absolute value of the difference between actual earnings and analyst consensus (mean value of analyst earnings forecasts) scaled by actual earnings. *Forecast Dispersion* is measured as the standard deviation of analyst earnings forecasts in the fiscal year-end month scaled by the absolute value of actual earnings. *R&D* measures R&D expenses divided by total assets of the firm. *Team Stability* is measured by the number of consecutive years the firm's management team remains the same. *Trade Secret* is a dummy variable equal to one if the firm has a trade secret in 2016 as defined in Glaeser (2018), zero other wise. All variables are defined in Online Appendix Table 1. In each specification, we include the full set of control variables, individual $\times$ firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10 % levels, respectively.

Table 6: The impact of anti-NDA on trading likelihood

	(1)	(2)	(3)
	$\mathbb{1}\{InsiderTrading\}$		
PostXNDA	-0.0039*** (0.0015)	-0.0036** (0.0014)	-0.0038*** (0.0014)
N	1,717,216	1,717,216	1,726,446
$Adj.R^2$	0.214	0.214	0.075
Controls	no	yes	yes
Individual $\times$ firm $\times$ wave FE	yes	yes	no
Year-month $\times$ wave FE	yes	yes	yes
Firm $\times$ wave FE	no	no	yes

Notes: All variables are defined in Online Appendix Table 1. The dependent variable is $\mathbb{1}\{InsiderTrading\}$, which is an indicator of whether there is insider trade by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. In each specification, we include the full set of control variables, individual $\times$ firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10 % levels, respectively.

Table 7: The heterogeneous effect of anti-NDAs on trading likelihood

	(1)	(2)
	$\mathbb{1}\{InsiderTrading\}$	
PostXNDA	-0.0031 (0.0020)	-0.0065** (0.0025)
Low Prior Profit $\times$ PostXNDA	-0.0123** (0.0059)	
High Eigenvector Centrality $\times$ PostXNDA		0.0059** (0.0028)
N	487,061	934,197
$Adj.R^2$	0.201	0.245
Controls	yes	yes
Individual $\times$ firm $\times$ wave FE	yes	yes
Year-quarter $\times$ wave FE	yes	yes

Notes: All variables are defined in Online Appendix Table 1. The dependent variable is $\mathbb{1}\{InsiderTrading\}$, which is an indicator of whether there is insider trade by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. To calculate *Low Prior Profit*, we require at least one non-routine trade by the individual during the year 2016. In order to calculate the *Eigenvector Centrality* of an individual's social network within a firm, we require the individual to have at least one internal connection in the firm in 2016. In each specification, we include the full set of control variables, individual $\times$ firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10 % levels, respectively.

Table 8: Firm value analysis

	(1)
	$\ln(Q)$
PostXNDA	0.0284***
	(0.0100)
N	83,684
$Adj.R^2$	0.910
Controls	Yes
Firm $\times$ wave FE	Yes
Year-quarter $\times$ wave FE	Yes

Notes: This table presents the results of estimating modified versions of equation 1. The dependent variable is $\ln(Q)$, which is measured as a logarithm of (market value of equity + book value of total assets – book value of equity – deferred taxes) / total assets. *PostXNDA* is an indicator variable equal to 1 if the firm’s headquarter state has passed the anti-NDA law before the end of the current quarter, and zero otherwise. The control variables include *Size*, *Leverage*, *ROA*, *Capex*, *R&D*. The sample period is from January 2017 to December 2019. All variables are defined in Online Appendix Table 1. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10% levels, respectively.

Online Appendix
to
**“Workplace Harassment Risk, Non-disclosure
Agreements, and Information Flow”**

DATA APPENDIX

We start our main sample construction by downloading Form 4 insider trades collected by WRDS Insiders from 2017 to 2019. We select transactions from the WRDS Insiders non-derivatives database. Since we only focus on open market transactions, we only use transactions with transaction acquired/disposed code in “A” or “D” and transactions code in “P” or “S”. We then use the linking table from WRDS to link CIK of the firm to GVKEY to prepare for merging with other databases such as CRSP and Compustat. We use the variable rptownername to identify names of the insider and create a linking table²⁶ to link individuals in the Form-4 filings to individuals in the BoardEx database (ReportingownerCIK to Directorid). Due to the lack of data from WRDS Insiders from September to December in 2019, we collect the data from Form 4 filings and perform same linking exercises. We only choose the first trade of an individual in a month to reduce noises, because some Form 4 filings have multiple transactions and will be over-weighted if we include all of them in our dataset. In BoardEx database, there are two types of firm – firms that are fully profiled and firms are not fully profiled. BoardEx actively search for personal information for directors and senior managers of a firm only if the firm is a fully-profiled firm. To reduce noise of the sample, we thus exclude all individuals whom we can link to BoardEx but are not in a fully-profiled firm. Since we are interested in the financial information of US headquartered firms, we delete the finance and utility industry because their financial accounting practices are heavily regulated, and we delete the first without US headquarters because we are using state level legislations as shocks. We identify firm’s industry by SIC code from the Compustat database, and the firm’s headquarter state from WRDS SEC analytical suite. From the same data source, we are able to find companies that move headquarters across states. Finally, we remove firms without necessary control variables and individuals that we know that has switched firms during our sample period from the BoardEx database.

Our second sample for the likelihood of transactions start by identifying all the individuals that we can reasonably assume to hold stocks as insiders and trade in the open-market. We begin by the sample firms we have in the first sample, and download all the Form 3, Form 4, and Form 5 filers from the WRDS analytical suites. Insiders need to file a Form 3 with SEC when they becomes an insider of the firm, a form 4 with SEC when they trade stocks from their companies, and form 5 with SEC when they trade stocks but failed to file it within 2 business days by form 4. We then create a linking table to link individuals in the Form-3/4/5 filings to individuals in the BoardEx database (ReportingownerCIK to Directorid). We eliminate individuals who only become insiders of a firm after our sample period has started. We identify these individuals by the time of their filing of form 3 of a firm.

Our third sample continues with our sample firms in our first and second sample, and we collect firm-quarter financial data from Compustat quarterly datasets. We remove observations without all the necessary controls for our regression analysis.

²⁶We create the linking table using textual similarity between individual’s names and cleaned company names in two databases, and manually verify the validity of the linking table.

Online Appendix Table 1: Variable Definition

Variable	Definition
Trading Profit	α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the director in the month
PostXNDA	Indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise
GOP Governor	Indicator variable equal to 1 if the firm's headquarter state has a Republican Governor in a year, zero otherwise
%Female Labor Participation	The population of female labor forces divided by the total female population for a state in a year
GDP	The GDP per capita of a state in a year
Board Size	The number of directors of the firm's board
Independent Directors	The proportion of independent directors of a board
Busy Directors	The proportion of directors who hold three or more board directorships
Volatility	The standard deviation of a company's stock returns in the interval (-380, -20) days before the first trade of an individual in a given month
Turnover	The trading volume of a company's stock over the interval (-380, -20) days before the first trade of an individual in a given month scaled by average shares outstanding
Prior Return	The market adjusted return over the over the interval (-380, -20) days before the first trade of an individual in a given month
Trade Size	The number of shares (in thousands) of an individual transacts in a given month
$\ln(Q)$	The logarithm of (market value of equity + book value of total assets – book value of equity – deferred taxes) / total assets
Size	The logarithm of total assets at the beginning of the quarter
Leverage	The logarithm of (long term debt + short term debt) / total assets at the beginning of the quarter
ROA	The lagged value of net income divided by the total assets at the beginning of the quarter
Capex	The lagged value of capital expenditure divided by total assets at the beginning of the quarter
R&D	The lagged value of R&D expense divided by the lagged value of sales; missing R&D expense is replaced with zero
High Connect	Indicator equal to 1 if the total number of the director's connections in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise

Continuation of Online Appendix Table 1

Variable	Definition
High Internal Connect	Indicator equal to 1 if the total number of the director's connections to colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise
High External Connect	Indicator equal to 1 if the total number of the director's connections to individuals in other companies or organizations in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise
High Advice Connect	Indicator equal to 1 if the number of the director's advice connections (i.e., education, listed and unlisted organizations) to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise
High Friend Connect	Indicator equal to 1 if the number of the director's friend connections (i.e., not-for-profit organizations and others) to colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise
High EA Speed	Indicator equal to 1 if the Earnings Announcement (EA) Speed in 2016 is in the top quartile of all firms in the same state in 2016, and zero otherwise. EA Speed is measured as minus one times the gap between the firm's earnings announcement date and fiscal year-end date
High Earnings Surprise	Indicator equal to 1 if the Earnings Surprise in 2016 is in the top quartile of all firms in the same state in 2016, and zero otherwise; Earnings Surprise is measured as the absolute value of the difference between actual earnings and analyst consensus (mean value of analyst earnings forecasts) scaled by actual earnings
Low Forecast Dispersion	Indicator equal to 1 if the Forecast Dispersion in 2016 is in the bottom quartile of all firms in the same state in 2016, and zero otherwise; Forecast Dispersion is measured as the standard deviation of analyst earnings forecasts in the fiscal year-end month scaled by the absolute value of actual earnings
Low R&D	Indicator equal to 1 if the firm's R&D expense scaled by total assets in 2016 is in the bottom quartile of all firms in the same state in 2016, and zero otherwise
Trade Secret	Indicator equal to 1 if the firm has trade secrets in 2016 as defined in Glaeser (2018), and zero otherwise
High Team Stability	Indicator equal to 1 if the Team Stability in 2016 is in the top quartile of all firms in the same state in 2016, and zero otherwise; Team Stability is measured by the number of consecutive years the firm's management team remains the same (i.e., with no more than one original top executive leaving the team)
Low Prior Profit	Indicator equal to one if the non-routine trade profitability of an individual in the lowest quartile of all individuals in a state in 2016, zero otherwise. Individuals with at least one non-routine insider trade have non-missing value for this variable.

Continuation of Online Appendix Table 1

Variable	Definition
High Eigenvector Centrality	Indicator equal to one if the eigenvector centrality of an individual in the social network inside the firm is in the top quartile of all individual in a state in 2016. We require individuals to have at least one social connection inside the firm for the calculation of this variable. Eigenvector centrality measures the centrality for an individual based on the centrality of his/her neighbors.
End of Table	

Online Appendix Table 2: Summary of anti-NDA laws

State	Law passage time	References	Snippets
WA	02/2018	SB5996	(1) ... an employer may not require an employee, as a condition of employment , to sign a nondisclosure agreement, waiver, or other document that prevents the employee from disclosing sexual harassment or sexual assault occurring in the workplace , at work-related events coordinated by or through the employer, or between employees, or between an employer and an employee, off the employment premises. (2)... any nondisclosure agreement, waiver, or other document signed by an employee as a condition of employment that has the purpose or effect of preventing the employee from disclosing or discussing sexual harassment or sexual assault occurring in the workplace, at work-related events coordinated by or through the employer, or between employees, or between an employer and an employee, off the employment premises is against public policy and is void and unenforceable . (3) It is an unfair practice ... for an employer to discharge or otherwise retaliate against an employee for disclosing or discussing sexual harassment or sexual assault occurring in the workplace, at work-related events coordinated by or through the employer, or between employees, or between an employer and an employee, off the employment premises.

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
NY	03/2018	SB7848	(1) Actions for sexual harassment...no court shall accept any settlement, including any confidentiality agreement or provision that would prevent the disclosure of any or all factual information related to the action unless the condition of confidentiality is the complainant's preference and the court has considered the potential impact on the public and finds that the complainant's preference is not a result of intimidation, coercion, retaliation, or threats directed at the complainant. Any such condition must be provided in writing to the complainant and to the court for consideration. If the court determines that any or all of the factual information related to the action shall not be disclosed, the preference shall be memorialized in an agreement signed by the complainant. For the purposes of this section, sexual harassment includes unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature ...(2) The department shall produce a strong model management policy defining and prohibiting sexual harassment in the workplace. Such model policy shall (a) define sexual harassment and provide examples of conduct that would be defined as unlawful sexual harassment; (b) include but not be limited to information concerning the federal and state statutory provisions concerning sexual harassment and remedies available to victims of sexual harassment; and (c) inform employees of their rights of redress and the availability and forms of complaint resolution assistance available. Such model policy shall clearly state that sexual harassment is considered a form of employee misconduct and that sanctions will be enforced against individuals engaging in sexual harassment and against supervisory and managerial personnel who knowingly allow such behavior to continue. (3) The department shall produce a model training program to prevent sexual harassment in the workplace. (a) Such model training program shall be interactive and no less than two hours in length and include (i) a definition of sexual harassment; (ii) examples of conduct that would be defined as unlawful; and (iii) information concerning the federal and state statutory provisions concerning sexual harassment and remedies available to victims of sexual harassment.

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
AZ	04/2018	SB2020	(1) The terms of a nondisclosure agreement may not be used to prohibit a party to the agreement from doing any of the following in relation to a violation or an alleged violation of title 13, chapter 149 or 35: 1. responding to a peace officer's or a prosecutor's inquiry.2. making a statement not initiated by that party in a criminal proceeding. b. an act that is allowed by subsection a of this section may not be used to avoid or invalidate a party's right to consideration under the contract or to require the return of consideration that has already been provided to the party. c. this section may not be used as authority to enforce a nondisclosure agreement. d. public monies may not be used as consideration in exchange for a nondisclosure agreement that is related to an allegation of or attempted sexual assault or sexual harassment .
MD	04/2018	HB1596	(1) ... except as prohibited by federal law, a provision in an employment contract, policy, or agreement that waives any future substantive or procedural right or remedy to a claim that accrues in the future of sexual harassment, discrimination, or retaliation for reporting or asserting a right or remedy based on sexual harassment is null and void as being against the public policy of the state. (2) an employer may not take adverse action against an employee because the employee fails or refuses to enter into an agreement that contains a waiver that is void under ... this section.
TN	04/2018	HB2613	(1) ..., a public or private employer shall not require an employee or prospective employee to execute or renew a non-disclosure agreement with respect to sexual harassment in the workplace as a condition of employment.

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
VT	05/2018	H707	(1) An employer shall not require any employee or prospective employee, as a condition of employment, to sign an agreement or waiver that does either of the following: (A) prohibits, prevents, or otherwise restricts the employee or prospective employee from opposing, disclosing, reporting, or participating in an investigation of sexual harassment; or (B) except as otherwise permitted by State or federal law, purports to waive a substantive or procedural right or remedy available to the employee with respect to a claim of sexual harassment. (2) An agreement to settle a sexual harassment claim shall expressly state that: (A) it does not prohibit, prevent, or otherwise restrict the individual who made the claim from doing any of the following: lodging a complaint of sexual harassment committed by any person with the Attorney General, a State's Attorney, the Human Rights Commission, the Equal Employment Opportunity Commission, or any other State or federal agency ... (3)An agreement to settle a claim of sexual harassment shall not prohibit, prevent, or otherwise restrict the employee from working for the employer or any parent company, subsidiary, division, or affiliate of the employer (4)Employers and labor organizations are encouraged to conduct an education and training program for all current employees and members, and for all new employees and members, that includes at a minimum all the information outlined in this section within one year after commencement of employment.

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
CA	08/2018	SB820; SB1300	(1) ... a provision within a settlement agreement that prevents the disclosure of factual information related to a claim filed in a civil action or a complaint filed in an administrative action, regarding any of the following, is prohibited: (1) An act of sexual assault that is not governed by subdivision (a) of Section 1002. (2) An act of sexual harassment , as defined in Section 51.9 of the Civil Code. (3) An act of workplace harassment or discrimination based on sex , or failure to prevent an act of workplace harassment or discrimination based on sex or an act of retaliation against a person for reporting harassment or discrimination based on sex, as described in subdivisions. (2) It is an unlawful employment practice for an employer, in exchange for a raise or bonus, or as a condition of employment or continued employment, to do either of the following: ... to require an employee to sign a nondisparagement agreement or other document that purports to deny the employee the right to disclose information about unlawful acts in the workplace, including, but not limited to, sexual harassment .

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
NJ	01/2019	SB121	(1) A provision in any employment contract or settlement agreement which has the purpose or effect of concealing the details relating to a claim of discrimination, retaliation, or harassment (hereinafter referred to as a “non-disclosure provision”) shall be deemed against public policy and unenforceable against a current or former employee (hereinafter referred to as an “employee”) who is a party to the contract or settlement. If the employee publicly reveals sufficient details of the claim so that the employer is reasonably identifiable, then the non-disclosure provision shall also be unenforceable against the employer. Every settlement agreement resolving a discrimination, retaliation, or harassment claim by an employee against an employer shall include a bold, prominently placed notice that although the parties may have agreed to keep the settlement and underlying facts confidential, such a provision in an agreement is unenforceable against the employer if the employee publicly reveals sufficient details of the claim so that the employer is reasonably identifiable.
VA	02/2019	H1820	(1) No employer shall require an employee or a prospective employee to execute or renew any provision in a nondisclosure or confidentiality agreement that has the purpose or effect of concealing the details relating to a claim of sexual assault pursuant to § 18.2-61, 18.2-67.1, 18.2-67.3, or 18.2-67.4 as a condition of employment. Any such provision is against public policy and is void and unenforceable.
LA	05/2019	HB197	(1) Public monies may not be used as consideration in exchange for a nondisclosure agreement that is related to an allegation of or attempted sexual assault or sexual harassment .

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
NV	05/2019	AB 248	(1) A settlement agreement must not contain a provision that prohibits or otherwise restricts a party from disclosing factual information relating to a claim in a civil or administrative action if the claim relates to any of the following: (a) Conduct that if criminal liability were imposed would constitute a sexual offense pursuant to NRS 179D.097 and would be punishable as a felony, regardless of whether there was a criminal investigation, prosecution or conviction of such conduct; (b) Discrimination on the basis of sex by an employer or a landlord; or (c) Retaliation by an employer or a landlord against the claimant for his or her reporting of discrimination on the basis of sex . If a settlement agreement is entered into on or after July 1, 2019, any provision in such an agreement that prohibits or otherwise restricts a party from disclosing factual information pursuant to subsection 1 is void and unenforceable. A court shall not enter an order that prohibits or otherwise restricts the disclosure of factual information in a manner that conflicts with subsection 1.
OR	05/2019	SB726	(1) It is an unlawful employment practice for an employer to enter into an agreement with an employee or prospective employee, as a condition of employment, continued employment, promotion, compensation or the receipt of benefits , that contains a nondisclosure provision, a nondisparagement provision or any other provision that has the purpose or effect of preventing the employee from disclosing or discussing conduct : (a)(A) That constitutes discrimination prohibited by ORS 659A.030, including conduct that constitutes sexual assault ; or (B) That constitutes discrimination prohibited by ORS 659A.082 or 659A.112.

Continuation of Online Appendix Table 2

State	Law passage time	Reference	Snippets
IL	06/2019	SB75	(1) Any agreement, clause, covenant, or waiver that is a unilateral condition of employment or continued employment and has the purpose or effect of preventing an employee or prospective employee from making truthful statements or disclosures about alleged unlawful employment practices is against public policy, void to the extent it prevents such statements or disclosures, and severable from an otherwise valid and enforceable contract under this Act. ... "Unlawful employment practice" means any form of unlawful discrimination, harassment, or retaliation that is actionable under Article 2 of the Illinois Human Rights Act, Title VII of the Civil Rights Act of 1964, or any other related State or federal rule or law that is enforced by the Illinois Department of Human Rights or the Equal Employment Opportunity Commission.
End of Table			

Online Appendix Table 4: Insider trading profitability and individual social connections – alternative fixed effects structure

	(1)	(2)	(3)
	Insider Trading profitability		
PostXNDA	0.0326*** (0.0073)	0.0241*** (0.0069)	0.0240*** (0.0070)
High Total Connection	0.0007 (0.0014)		
High Internal Connection		-0.0036* (0.0020)	
High External Connection		0.0007 (0.0013)	0.0012 (0.0014)
High Advice Connection			-0.0022 (0.0021)
High Friend Connection			-0.0054*** (0.0018)
High Total Connection $\times$ PostXNDA	0.0026 (0.0059)		
High Internal Connection $\times$ PostXNDA		0.0260*** (0.0069)	
High External Connection $\times$ PostXNDA		0.0003 (0.0060)	0.0012 (0.0060)
High Advice Connection $\times$ PostXNDA			0.0295*** (0.0066)
High Friend Connection $\times$ PostXNDA			-0.0128 (0.0087)
N	77,189	77,189	77,189
$Adj.R^2$	0.473	0.473	0.473
Controls	yes	yes	yes
Firm $\times$ wave FE	yes	yes	yes
Year-month $\times$ wave FE	yes	yes	yes
Routine trade excluded	yes	yes	yes

Notes: This table presents the results of estimating modified versions of equation 1 using the stacked regressions approach. The dependent variable is *Insider Trading Profitability*, which is α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. In column 1, we sort individuals into quartiles of their total connections. The variable *High Connect* is an indicator equal to 1 if the total number of the individual's connections in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. In column 2, we use a similar approach and sort individuals into quartiles of their internal and external connections, respectively. The variable *High Internal Connect* is an indicator equal to 1 if the number of the individual's connections to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. The variable *High External Connect* is an indicator equal to 1 if the number of the individual's connections to individuals in other companies or organizations in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. In column 3, we further sort individuals into quartiles of their types (i.e. advice v.s. friend) internal connections. The variable *High Internal Advice Connect* is an indicator equal to 1 if the number of the individual's advice connections (i.e. education, listed and unlisted organizations) to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. The variable *High Internal Friend Connect* is an indicator equal to 1 if the number of the individual's friend connections (i.e. not-for-profit organizations and others) to the colleagues in the same company in 2016 is in the top quartile of all individuals in our sample in the same state, and zero otherwise. All variables are defined in Online Appendix Table 1. In each specification, we include the full set of control variables, firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10% levels, respectively.

Online Appendix Table 5: Insider trading profitability and firm-level heterogeneities – alternative fixed effects structure

	(1)	(2)	(3)	(4)	(5)	(6)
	Insider Trading profitability					
PostXNDA	0.0450*** (0.0114)	0.0365*** (0.0096)	0.0236*** (0.0066)	0.0006 (0.0064)	0.0374*** (0.0089)	0.0352*** (0.0097)
High EA Speed $\times$ PostXNDA	-0.0439*** (0.0091)					
Low Forecast Dispersion $\times$ PostXNDA		-0.0269** (0.0136)				
High Earnings Surprise $\times$ PostXNDA			0.0276* (0.0145)			
Trade Secret $\times$ PostXNDA				0.0334*** (0.0085)		
Low R&D $\times$ PostXNDA					-0.0299** (0.0143)	
High Team Stability $\times$ PostXNDA						-0.0615*** (0.0135)
N	79,904	76,078	76,078	84,261	79,949	48,087
$Adj. R^2$	0.468	0.471	0.471	0.477	0.469	0.479
Controls	yes	yes	yes	yes	yes	yes
Firm $\times$ wave FE	yes	yes	yes	yes	yes	yes
Year-month $\times$ wave FE	yes	yes	yes	yes	yes	yes
Routine trade excluded	yes	yes	yes	yes	yes	yes

Notes: This table presents the results of estimating modified versions of equation 1. The dependent variable is *Insider Trading Profit*, which is α ($-\alpha$) from the four-factor model estimated over the 180 days following the first purchase (sale) by the individual in the month. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. We sort firms into different groups based on the firm-level characteristic. The variable *High (Low) Firm-level Characteristics* is an indicator equal to 1 if the firm's characteristics proxy is in the top (bottom) quartile of all firms in the same state in 2016, and zero otherwise. *EA Speed* is measured as minus one times the gap between the firm's earnings announcement date and fiscal year end date. *Earnings Surprise* is measured as the absolute value of the difference between actual earnings and analyst consensus (mean value of analyst earnings forecasts) scaled by actual earnings. *Forecast Dispersion* is measured as the standard deviation of analyst earnings forecasts in the fiscal year-end month scaled by the absolute value of actual earnings. *R&D* measures R&D expenses divided by total assets of the firm. *Team Stability* is measured by the number of consecutive years the firm's management team remains the same. *Trade Secret* is a dummy variable equal to one if the firm has a trade secret in 2016 as defined in Glaeser (2018), zero otherwise. All variables are defined in Online Appendix Table 1. In each specification, we include the full set of control variables, firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10 % levels, respectively.

Online Appendix Table 6: The impact of anti-NDAs on likelihood of non-routine and routine trades

	(1)	(2)	(3)	(4)	(5)	(6)
	$\mathbb{1}\{InsiderTrading_{non-routine}\}$			$\mathbb{1}\{InsiderTrading_{routine}\}$		
PostXNDA	-0.0034** (0.0013)	-0.0031** (0.0013)	-0.0031** (0.0012)	-0.0005 (0.0003)	-0.0005 (0.0003)	-0.0006 (0.0004)
<i>N</i>	1,717,216	1,717,216	1,726,446	1,717,216	1,717,216	1,726,446
<i>Adj.R</i> ²	0.187	0.187	0.063	0.283	0.283	0.065
Controls	no	yes	yes	no	yes	yes
Individual $\times$ firm $\times$ wave FE	yes	yes	no	yes	yes	no
Year-month $\times$ wave FE	yes	yes	yes	yes	yes	yes
Firm $\times$ wave FE	no	no	yes	no	no	yes

Notes: All variables are defined in Online Appendix Table 1. The dependent variable is $\mathbb{1}\{InsiderTrading_{non-routine}\}$ for columns (1) to (3), which is an indicator of equal to one if there is a non-routine insider trade, as defined in Cohen et al. (2012), by the individual in the month, zero otherwise. The dependent variable is $\mathbb{1}\{InsiderTrading_{routine}\}$ for columns (4) to (6), which is an indicator of equal to one if there is a routine insider trade, as defined in Cohen et al. (2012), by the individual in the month, zero otherwise. *PostXNDA* is an indicator variable equal to 1 if the firm's headquarter state has passed the anti-NDA law in the month, and zero otherwise. The sample period is from January 2017 to December 2019. In each specification, we include the full set of control variables, individual $\times$ firm $\times$ wave fixed effects, and year-month $\times$ wave fixed effects. Coefficients on the control variables are omitted for brevity. All continuous variables are winsorized at 1% and 99% level. We present standard errors clustered by the state in parentheses below coefficient estimates. ***, **, * denotes statistical significance at the 1, 5, and 10 % levels, respectively.