Protection of proprietary information and forced CEO turnover: Evidence from a quasi-natural experiment

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Abstract

We examine whether the protection of proprietary information affects forced CEO turnover decisions. Using changes in the state-level enforceability of the covenant not to compete (CNC) as exogenous shocks to the protection level of a firm's proprietary information, we find that strengthening CNC enforceability increases both the likelihood of forced CEO turnover and the sensitivity of forced CEO turnover to firm performance. Such effects are more pronounced when firms ex-ante face more severe product market threats and operate in industries with greater potential threats of predatory hiring. Further analyses suggest that the increase in CNC enforceability reduces the likelihood of non-forced CEO turnover, implying a reduction in external CEO supply due to the shocks. As a result, a firm's forced CEO turnover decision more likely responds to changes in CNC enforceability when an internal successor is available. We also find positive market reactions to forced CEO turnovers when CNC enforceability increases.

Keywords: Proprietary information; Legal enforceability of covenants not to compete; Forced CEO turnover

JEL Classification: D23, G30, J63, K12, L20, O32

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1. Introduction

We examine whether and to what extent the protection of proprietary information affects the likelihood of forced CEO turnover and the sensitivity of forced CEO turnover to firm performance. Keeping a poorly performing CEO is harmful to a company; therefore, the CEO's timely turnover is considered an essential governance mechanism to turn around firm performance.[1] Despite the positive effects of forced CEO turnover, only about 2% of CEOs at large U.S. corporations are fired every year, and the association between forced CEO turnover and firm performance appears to be economically weak (Huson, Parrino, and Starks 2001; Brickley 2003; Kaplan and Minton 2006; Jenter and Lewellen 2014). Most prior studies attribute these seemingly suboptimal forced CEO turnover practices to pre-existing agency problems.[2] Apart from prior studies, we argue that the motive to protect proprietary information is one significant factor in forced CEO turnover decisions.

A firm's survival and success increasingly depend on its proprietary information, such as trade secrets and employees' know-how. Unintended leaks or misappropriations of such sensitive information would impose severe competitive harm on the firm, leading to decreased firm value. As highlighted by Pamela Passman, the President, and CEO of the Center for Responsible Enterprise and Trade (CRET), the estimated costs associated with proprietary information leakage and misappropriation range from 1% to 3% of the GDP of the United States and other advanced industrial economies (CRET, 2014).[3]

The turnover of employees, especially top executives, can be one significant conduit of proprietary information leakages and misappropriations. First, when assuming a new role, a departing CEO can directly leak sensitive information from former employers to the new

[1] See Weisbach (1988), Denis and Denis (1995), Weisbach (1995), Kang and Shivdasani (1995), Denis, Denis, and Sarin (1997), Guo and Masulis (2015), and Dasgupta, Xi and Wang (2017).
[2] For example, prior studies find that ineffective CEO turnover decisions are associated with non-performing boards of directors (Weisbach 1988), a lack of block-holder monitoring (Denis et al. 1997; Guo and Masulis 2015), or inefficient product market discipline (Dasgupta et al. 2017). See Section 2 for more details.
[3] https://create.org/wp-content/uploads/2014/07/CREATe.org-PwC-Trade-Secret-Theft-FINAL-Feb-2014_01.pdf

employer.[4] Second, a departing CEO may misappropriate proprietary information to start a new business, increasing competitive threats to the former employer. Third, departing CEOs can misappropriate information about the former employer's human capital and hire away key employees, resulting in an unintended employee turnover wave (e.g., Vanko 2002). This potential "predatory hiring" would significantly damage the former employer's competitive advantages.[5] When making forced CEO turnover decisions, corporate boards would consider these potential negative consequences as a significant cost.

The covenant not to compete (CNC) is one of the widely used contractual mechanisms to discourage employees, particularly high-level executives, from undertaking jobs at rival firms or running a competing business following the termination of their current employment. However, in many cases, the existence of a CNC is unobservable in empirical data. Some companies may disclose their contracts with CEOs, allowing researchers to obtain such information about CNC clauses in CEO contracts. However, both the decisions to include CNCs in executive contracts and to disclose relevant information can be related to unmodeled firm-specific characteristics (Gillian, Hartzell, and Parrino 2009), resulting in a selection bias.[6] Furthermore, companies rarely disclose their employment contracts with non-executive

[4] E.g., See *Lutheran Health Network. v.. Brian Bauer* 2017.

[5] See "SAP Sues Siebel Systems, Alleging 'Predatory Hiring'" - Wall Street Journal, on Nov. 10, 1999, reporting that "German software giant SAP AG has sued Siebel Systems Inc., alleging its fast-growing rival is using 'predatory hiring' practices to damage SAP's ability to compete, a move that provoked criticism from analysts. Siebel, a provider of complex business software that links companies to their customers, has hired 27 SAP executives, managers and other staffers in the past year. They include Paul Wahl, former SAP America Inc. Chief Executive, and Jeremy Coote, previously president of SAP America, and executives who were in charge of SAP's Latin American sales, consumer products, electronic commerce development, corporate communications and legal department." See also a lawsuit that Wal-Mart filed against Amazon in 2002 stating that "The purpose of the lawsuit is to bring an immediate stop to what appears to be a wholesale raiding of its proprietary and highly confidential information systems by Amazon.com and others through the use of former Wal-Mart associates."

[6] Gillian et al. (2009) find evidence that the extent to which the relationship between a firm and its CEO is governed by an explicit or an implicit agreement depends on the uncertainty of the firm and the expected future profits between the two parties. They suggest that many public companies choose not to put explicit contract terms in a written employment agreement but rather rely on implicit contracts.

employees. Note that the negative effect of CEO turnover on a non-executive employee turnover wave largely depends on unobservable contracts with non-executive employees.[7]

To mitigate these problems, we rely on the exogenous variation of the *legal enforceability* of CNCs across states to identify changes in the strength of business secret protection. As noted in Garmaise (2011), the legal enforceability of the CNC has been substantially and unexpectedly altered in three U.S. states (Texas, Florida, and Louisiana) between 1992 and 2004. These changes are unlikely to be related to a company's ex-ante characteristics that are correlated with forced CEO turnover decisions (Garmaise 2011; Chen, Zhang, and Zhou 2018).[8] We take advantage of these changes in the legal environment and conduct a difference-in-difference estimation, controlling for unobservable year- and firm-specific factors that are jointly determined with other corporate governance mechanisms (Hermalin and Weisbach 1998; Bertrand and Mullainathan 2003; Guo and Masulis 2015).

We examine whether the CNC enforceability is associated with forced CEO turnover decisions. Consistent with our expectation, we find that the likelihood of forced CEO turnover significantly increases in response to an increase in CNC enforceability. The coefficient estimate suggests that an increase in CNC enforceability leads to a 1.0% increase in the unconditional likelihood of forced CEO turnover, which represents a 40% increase relative to the average forced CEO turnover rate in our sample (2.5%). We also examine the sensitivity of forced CEO turnover to firm performance and how the increase in CNC enforceability affects the sensitivity (e.g., Guo and Masulis 2015). We find that the sensitivity of forced CEO turnover to firm performance also significantly increases after the shocks that strengthen the legal enforceability of CNCs. The coefficient estimates suggest that a one standard deviation

[7] It also depends on non-solicitation agreements between departing executives and the firm. Similarly, these agreements are unobservable in many cases.

[8] We note that changes in CNC enforceability may affect hiring costs, which in turn affect forced CEO turnover decisions. However, this would discourage us from finding a positive relationship between CNC enforceability and the likelihood of forced CEO turnover. We discuss this issue in detail in Section 5.5.

decrease in firm performance increases the likelihood of forced CEO turnover by 2.53% on average. However, if the CNC enforceability increases (or decreases), then a one standard deviation decrease in firm performance would further increase (or decrease, respectively) the likelihood of forced CEO turnover by 1.076%, which represents a 43.04% incremental increase relative to the unconditional mean. This result suggests that the increased CNC enforceability allows corporate boards to incorporate the signal regarding the fit and ability of the CEO more effectively into their forced CEO turnover decisions, increasing the efficiency in the disciplining mechanism. Overall, these findings indicate that the ex-post risks of proprietary information leakage and misappropriation are an important ex-ante consideration in forced CEO turnover decisions.

As a falsification test, we examine the effects of changes in CNC enforceability on voluntary (i.e., non-forced) CEO turnover. Note that the decision-maker of forced CEO turnover is the corporate board, which compares the company's costs (e.g., the risk of proprietary information leakage and misappropriation) and benefits (e.g., the improvement in firm performance) of dismissing a CEO.[9] In contrast, the decision-maker of voluntary turnover is the CEO herself, who compares the personal costs (e.g., transition costs) and benefits (e.g., increase in salary or promotion) of job switching.[10] As for the latter case, therefore, the protection of information leakage and misappropriation should not be a parameter in CEOs' voluntary turnover decisions, and thus the shock that increases the CNC enforceability should not affect voluntary CEO turnover decisions. Rather, an increase in CNC enforceability reduces CEOs' net benefits from job switching, discouraging voluntary CEO turnover (Garmaise 2011). Our results confirm this conjecture.[11] This falsification test strengthens our inference and

[9] The underlying assumption is that firms behave as if their goal is to maximize shareholder wealth (e.g., Friedman 1970; Jensen 2001; Kothari, Frankel, and Zuo 2018).

[10] CEO job switching is not uncommon in practice. Voluntary turnovers also impose negative effects on stock prices. (http://archive.fortune.com/magazines/fortune/fortune_archive/2001/02/19/296882/index.htm).

[11] We also explore the sensitivity of voluntary CEO turnover to firm performance, but make no directional predictions. We find that when firm performance is greater, the adverse effect of increased CNC enforceability

highlights the importance of distinguishing forced CEO turnover from non-forced CEO turnover in the research design due to the different cost-benefit structure (e.g., Parrino 1997; Guo and Masulis 2015; Jenter and Kanaan 2015).[12]

To substantiate our inference, we search for evidence on the underlying channels through which changes in CNC enforceability affect forced CEO turnover. We first examine whether the effects are more pronounced for firms facing significant product market threats. We argue that if those firms operate in states where CNC enforceability is low, then they are more likely to be concerned about potential information leaks and misappropriation due to CEO turnover, imposing greater constraints on boards' turnover decisions. Hence, an increase in CNC enforceability will enhance the protection of proprietary information and thus substantially lift the constraints for those firms. Consistent with this idea, we find that the effects of changes in CNC enforceability are stronger for firms facing greater product market threats (Garmaise 2011; Chen et al. 2018; Hoberg and Phillips 2016).

Second, we test whether effects are stronger for firms facing a greater potential threat of the predatory hiring of their key employees by rival firms (i.e., labor market threats). The strengthened CNC enforceability discourages predatory hiring practices resulting from forced CEO turnover via two channels. First, strengthened CNC enforceability makes the non-solicitation agreements between departing CEOs and firms more binding. Second, even if such a non-solicitation agreement is absent, strengthened CNC enforceability still discourages key employees from switching jobs via CNCs in their employment contracts. Using the industry-

on voluntary turnover is reduced. This finding can be attributed to CEOs with higher performance being able to voluntarily switch jobs for which the benefits (i.e., increased salary or job promotion) outweigh the additional switching costs due to increased CNC enforceability.

[12] Garmaise (2011) analyzes all executives' turnovers and does not distinguish between forced and voluntary turnovers. Given that the voluntary turnover rate is on average higher than the forced turnover rate, findings in Garmaise are likely driven by voluntary turnovers of top executives. Garmaise identifies 1,883 transfers of top executives over the sample period between 1992 and 2004, which account for 8.98% of firm-year observations (= 1,883 / 20,965). In our sample, the voluntary CEO turnover rate is 7.4%, which is approximately three times higher than the forced CEO turnover rate of 2.5%.

average level of employee turnover rate as a proxy for threats of predatory hiring, we find a consistent result.

To further strengthen our inferences, we examine the succession problem after forced CEO turnover. On the one hand, high CNC enforceability mitigates against the concerns over proprietary information leakage due to forced CEO turnover. On the other hand, it may also increase the costs of finding an external successor since high CNC enforceability discourages job switching between firms (Garmaise 2011). A natural solution to this issue is to make a forced CEO turnover decision in response to the increased protection of proprietary information when there is an internal CEO candidate. Consistent with our expectations, we find that the effect of changes in CNC enforceability on forced CEO turnover is concentrated on cases where an internal candidate is appointed as a CEO after such a decision.

Lastly, we examine market reactions to the announcement of forced CEO turnover and how it varies with changes in CNC enforceability. If the CNC enforceability increases the efficiency of forced CEO turnover, one should expect a more positive announcement effect on forced CEO turnover after CNC enforceability increases, and this is exactly what we find. This finding provides another piece of evidence to support the notion that better protection of the firm's proprietary information and know-how enhances efficiency in the CEO retention decisions, thereby increasing firm value.

Our paper contributes to the literature in the three ways. First, our study provides evidence that the potential risk of proprietary information leakage and misappropriation affects forced CEO turnover decisions. The implicit assumption embedded in the prior literature is that keeping poorly performing CEOs is primarily due to agency problems, and thus various governance mechanisms such as independent directors, institutional investors, and product market competition reduce the deadweight costs (e.g., Weisbach 1988; Denis et al. 1997; Guo and Masulis 2015; Dasgupta et al. 2017). One key challenge in this literature is that the optimal

forced CEO turnover decisions are not assessable partially due to the lack of knowledge about potential direct costs that corporate boards consider. Taylor (2010) uses a dynamic model and incorporates the effect of direct costs of dismissals. However, Taylor (2010) is silent on the question of what constitutes these direct costs. We provide supportive empirical evidence that the risk of proprietary information leakage can be such a direct cost that corporate boards consider in their CEO replacement decisions.

Second, this paper contributes to studies on the economic consequences of changes in CNC enforceability. One stream of this literature examines whether changes in CNC enforceability affect the external job opportunities of employees (Marx, Strumsky and Fleming 2009; Garmaise 2011).[13] Another stream examines the effect of changes in CNC enforceability on corporate disclosure and financial reporting behavior via the channel of managerial career concerns (Aobdia 2018; Chen et al. 2018; Tang et al. 2018). Both rely on the argument that an increase in CNC enforceability discourages employees from seeking outside job opportunities. Chen et al. (2018) argue that, due to career concerns, managers are more likely to engage in earnings management and underinvest in discretionary expenditures. However, what has been largely overlooked is the possibility that an increase in CNC enforceability can enhance the efficiency of corporate boards' CEO retention decisions. Our paper provides evidence that such an improvement is feasible since CNC and its strong enforcement can reduce the risk of proprietary information leakage and misappropriation.

Third, our work expands the work of studies on proprietary costs.[14] The literature has long discussed the proprietary costs of disclosure (e.g., Harris 1998; Botosan and Stanford 2005; Berger and Hann 2007; Dedman and Lennox 2009; Berger 2011; Bens, Berger, and Monahan 2011; Ali, Klasa, and Yeung 2014; Glaeser, 2018; Li, Lin, and Zhang 2018). Recent studies

[13] A concurrent working paper by Kini et al. (2018) examines the determinants of including a CNC in CEO employment contracts.

[14] Prior literature terms the costs associated with proprietary information leakage and misappropriation as proprietary costs.

shift the focus of proprietary costs from corporate disclosure decisions to other economic decisions, such as banking decisions (Asker and Ljungqvist 2010; Karolyi 2018; Lin et al. 2017). We add to the literature by providing evidence that the concerns over potential leaks of proprietary information are also an important determinant of forced CEO turnover.

2. Literature Review and Hypothesis Development

2.1. CEO Turnover

Studies on CEO turnover date back to the 1980s when scholars tried to evaluate firm performance changes around CEO turnover (e.g., Couglan and Schimidt 1985; Warner, Watts, and Wruck 1988; Weisbach 1988). While the inverse relationship between CEO turnover and performance is statistically significant in some studies, its economic significance is found to be very small. For example, according to a survey provided by Brickley (2003), moving from the top to the bottom decile of performance increases the likelihood of CEO turnover in publicly traded firms by only about 4%.

Prior studies seek to explain this weak CEO turnover sensitivity to firm performance from the perspective of agency problems. Put differently, prior literature focuses on internal corporate governance mechanisms, such as the board of directors and block shareholders, and examines whether effective governance mechanisms play a crucial role in removing poorly performing CEOs. For example, Weisbach (1988) examines the role of the composition of corporate boards, finding that among firms with outsider-dominated boards, the likelihood of CEO turnover ranges from 7% for a firm whose performance lies in the bottom decile to 1.3% for one with performance in the top decile. In contrast, among firms with insider-dominated boards, the likelihood ranges from 5.7% for a firm whose performance lies in the bottom decile to 3.6% for one in the top decile, which is neither economically nor statistically significant. Goyal and Park (2002) examine the effect of the board chairman on CEO turnover sensitivity

to firm performance, discovering a much weaker CEO turnover sensitivity to performance for firms whose board chair and CEO duties are vested in the same individual. Denis et al. (1997) and Kaplan and Minton (2012) focus on the effects of block shareholders and find block shareholders exercise a mild disciplinary effect in removing nonperforming CEOs.

A critical limitation of the studies above lies in the endogenous nature of corporate governance mechanisms (Hermalin and Weisbach 1998). That is, corporate governance mechanisms, including forced CEO turnover, are jointly determined by firm characteristics that could be unobservable or cannot be modeled. Therefore, recent studies apply more rigorous empirical designs to address the endogeneity issue. Guo and Masulis (2015) rely on the exogenous change in board and committee independence due to the passage of the Sarbanes-Oxley Act in 2002, and they examine the causal relation between board structure and CEO turnover. They find that both nominating committee independence and board independence have distinct effects on removing non-performing CEOs. Dasgupta et al. (2017) focus on the disciplinary effects of external governance mechanisms (i.e., product market competition) on forced CEO turnover decisions. Specifically, they exploit the exogenous change in industry-level tariff cuts as a shock to product market competition, finding that product market competition increases both the likelihood of CEO turnover and its sensitivity to performance. In sum, in endeavoring to establish the causal effects of internal or external corporate governance mechanisms on forced CEO turnover decisions, the extant studies indicate that the low sensitivity of CEO turnover to performance can be attributed to the lack of monitoring mechanisms.

2.2. Covenants not to Compete

A covenant not to compete (CNC) prohibits a departing employee, regardless of the reasons for departure, from competing with his or her former employer, either as a new employer of a rival firm or by starting a new firm. The economic rationale for a CNC is to

safeguard against the leakage of trade secrets and proprietary information, and to discourage the transfer of employee know-how to competitors. Garmaise (2011) finds that 70.2% of firms use CNCs for their top executives. Survey evidence conducted by the Society of Human Resource Management in 2007 also indicates that CNCs are widely used by companies to maintain confidentiality, suggesting that unintended leaks of proprietary information are a significant concern for a majority of public companies.[15]

However, unlike usual contract terms, CNCs need not be enforceable. The enforceability of a CNC is the subject of heated debate among both legislatures and scholars. One of the main reasons for the debate is the fact that it does not fit perfectly into a single area of law. Instead, the CNC involves concepts from both contract laws and trade secret laws.

According to the contract law theory, courts should not scrutinize the adequacy of consideration or vitiate an otherwise valid contract to protect a party who carried out an unfair transaction (Collins 2003). That is, the court does not scrutinize the reasonableness of contract terms but leaves it to the parties to determine what they value and the price that they are willing to pay for any item. From this perspective, the employer and the employee have the legal rights to include a CNC in an employment contract freely.

However, from the perspective of trade secret laws, the doctrine above does not need to be applied. In particular, a CNC can be viewed as a mechanism protecting employer information or know-how. Although a CNC can protect the interests of employers, the courts need not view this protection as entirely in line with public interests. Many legislatures and scholars believe that employee mobility is essential for "information transfer" and plays a critical role in spurring innovation. For example, an influential paper by Gilson (1999) asserts that California's law *against* enforcing a CNC provided a superior legal infrastructure for

[15] https://www.shrm.org/Pages/default.aspx

innovation, which explained the rise of Silicon Valley. Also, some scholars argue that the CNC violates an individual's fundamental right to earn a living (Graves 2011).

For these reasons, there is no federal law governing the administration of the CNC. Instead, firms are free to include any CNC in an employment contract, but the enforceability of the CNC is another debatable question and varies across states. In some U.S. states, the enforcement of CNCs needs to be based on a "reasonableness" test. For example, Colorado is more permissive of CNCs in employment agreements for top executives. Some states, such as California, prohibit the enforcement of a CNC. Several other states, like Texas, however, have increased the enforceability of the CNC (Garmaise 2011; Chen et al. 2018).

In essence, the CNC is an ex-ante strategic tool used by an employer to protect its trade secrets and proprietary information. Note that some other ex-post legal rules also can be used to protect the employer's trade secrets. For example, the adoption of the Inevitable Disclosure Doctrine (IDD) and the Uniform Trade Secret Act (UTSA) can also protect employers' trade secrets from falling into the hands of their competitors. We argue that the CNC provides *additional protection* for employers' proprietary information. The IDD and UTSA are useful for protecting soft and hard proprietary information, but the know-how acquired by an employee through prior employment can go beyond the scope of the IDD and UTSA. This know-how is an equally valuable form of knowledge that potentially aids competitors (Nicandri 2010). A CNC, once strongly enforced, can effectively preempt competitive harm resulting from the leakage of proprietary information and the transfer of knowledge. Therefore, we rely on changes in CNC enforceability as an instrumental variable to test our research question. [16]

[16] We note that changes in CNC enforceability, IDD adoptions, and UTSA adoptions can potentially act as instrumental variables for the protection of trade secrets. However, the question of which legal change can have a stronger effect on trade secrect protection goes beyond the scope of our research question about the effect of trade secret protection on forced CEO turnover. The changes in CNC enforceability are merely used as instrumental variables to test our research question. Therefore, the prerequisite of our identification strategy is that changes in CNC enforeceability affect the protection of trade secrects.

2.3. Hypothesis Development

Forced CEO turnover is an essential corporate governance mechanism to turn around firm performance when an incumbent CEO is poorly performing. However, such a decision also imposes costs on both shareholders and boards of directors. These ex-post costs may discourage a board of directors from dismissing a CEO, leading to a turnover rate lower than that of "the first best."[17] However, the direct costs to shareholders resulting from forced CEO turnover have not been precisely defined and are largely overlooked by prior studies. We posit that one possible and significant direct cost to shareholders is the potential risk of proprietary information leakage and misappropriation.

First, CEO turnover inevitably results in information and technology spillovers among companies. Although the social welfare implications of the spillover effect are still debatable, it will impose severe competitive harm on the prior employers (i.e., shareholders) and thus will frequently lead to legal disputes. For example, in November 2017, Lutheran Health Network, the largest healthcare provider in the northeast region of Indiana, sued its former CEO, Brian Bauer, for breach of contract for using confidential information to lure competitor Indiana University Health to the Fort Wayne area. The Lutheran Health Network had fired Bauer due to his poor performance in a previous M&A deal. However, subsequently, Bauer was hired by Indiana University Health to help build a new primary-care practice in Fort Wayne.[18] Lutheran Health Network was concerned about proprietary information leakage and the resultant competitive harms, and therefore filed a lawsuit against Bauer in Indiana.[19]

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[17] Note that the economic channel affecting the forced CEO turnover decisions due to the concerns about confidential information leakage and misappropriation is different from agency problems in prior studies. Prior studies argue that the observed CEO turnover practices (i.e., the low likelihood of forced CEO turnover and its sensitivity to performance) are suboptimal due to agency problems (e.g., entrenched managers or insufficient monitoring), while we argue that the observed CEO turnover practices could be optimally constrained due to the corporate boards' cost-benefit analysis due to concerns over proprietary information leakage and misappropriation.

[18] http://www.modernhealthcare.com/article/20171103/NEWS/171109948

[19] Also, in September 2010, Hewlett-Packard (HP) accused its former CEO Mark Hurd, who had been fired by HP and subsequently joined Oracle, of breach of contract and threatened misappropriation of trade secrets. https://www.cnet.com/news/hp-suing-former-ceo-mark-hurd

Second, a departing executive may misappropriate the former employer's proprietary information to start a competing business. For example, on July 14, 2011, John Kanas and John Bohlsen, two former senior executives of North Fork Bank, were alleged to breach a non-competing agreement they signed with the company. The non-competing agreement was specially set to prevent these two senior executives from misappropriating the company's proprietary information and running a competing banking business in the same state.[20] The probability of a departing executive establishing a competing business can be higher in a forced turnover context, as he or she may face more difficulties in finding a similar position in other companies due to a damaged reputation.

Third, departures of executives can impose a negative spillover effect on other non-executive employees' job switching decisions, leading to an unintended employee turnover wave. In particular, top executives have a better understanding of who in the organization is talented, and who understands the details of the trade secret, which a departing executive can use to attract them (Vanko 2002). For example, in the case of *Loral Corp. v. Moyes,* Robert Moyes, former president of TerraCom Division of Conic, was alleged to solicit key TerraCom employees on behalf of his new employer, Aydin Corporation. Conic claimed that a large number of their key employees had interviewed with Moyes and had been offered jobs at Aydin, resulting in a turnover wave. TerraCom had to spend over $400,000 for recruiting new employees.[21]

To address these potential negative effects resulting from executive turnovers, many firms rely on CNCs to safeguard against the leakage and misappropriation of proprietary

[20] *RJ Capital One Financial Corporation v. Kanas et* al, No. 1:*2011cv0075 (Cal. 2012)*
https://law.justia.com/cases/federal/district-courts/virginia/vaedce/1:2011cv00750/269230/140/
[21] *Loral Corp. v. Moyes, 219 Cal. Rptr. 836, 841-43 (Cal. 1985)*
https://law.justia.com/cases/california/court-of-appeal/3d/174/268.html

information. However, as we discussed in Section 2.2, due to controversies surrounding CNC, different states hold different opinions regarding the enforcement of CNC.[22]

Several states, including Texas, Florida, and Louisiana, have experienced significant changes in CNC enforceability between 1992 and 2004 (Garmaise 2011), which we describe in detail in the next section. These changes create a natural laboratory allowing us to investigate whether corporate boards consider the potential risks of proprietary information leakage and misappropriation before they make CEO replacement decisions. The idea is that an increase (decrease) in CNC enforceability would more (less) effectively curtail the potential leakage and misappropriation of trade secrets or transfers of employee know-how because it is less (more) difficult for courts to enforce the non-competition covenants. Hence, if corporate boards consider the risk of proprietary information leakage and misappropriation, an enhancement in CNC enforceability would reduce concerns about information leaks and misappropriations due to CEO turnover, thereby increasing the likelihood of forced CEO turnover. In contrast, a reduction in CNC enforceability decreases the protection of the firm's proprietary information and thereby increases the risk of information leaks, leading to an increased constraint on corporate boards' CEO turnover decisions. This discussion leads to our first hypothesis stated in an alternative form:

H1: Ceteris paribus, the likelihood of forced CEO turnover increases (or decreases) for affected firms following an increase (or a decrease) in CNC enforceability.

Prior literature often relates discussions about forced CEO turnover decisions to firm performance (e.g., stock return) because they serve as a signal of the CEO ability or performance. The inverse relationship between the likelihood of forced CEO turnover and firm performance is intended to capture forced CEO turnovers driven by poor performance. As such,

[22] For example, California is hostile toward claims of non-competition. In the aforementioned legal dispute between HP and Hurd, HP decided to give up its lawsuit after less than two weeks because such a lawsuit would face tough going in the courts of California. We check our results by excluding firms located in California and find our inferences are qualitatively similar. See Section 5 for details.

prior studies extensively examine this inverse relationship and find that effective corporate governance strengthens the inverse relationship between forced CEO turnover and performance (Hermalin and Weisbach 1998; Guo and Masulis 2015; Dasgupta et al. 2017). Along the same line, we also examine whether the changes in CNC enforceability influence the turnover sensitivity to performance(i.e., the slope) that corporate boards would apply to their forced CEO turnover decisions. More specifically, we expect that the increased CNC enforceability allows boards to incorporate the signal about CEO ability more objectively into their forced CEO turnover decisions, and thereby such better protection of trade secrets and know-how can strengthen the inverse relationship between the likelihood of forced CEO turnover and firm performance. This leads to our second hypothesis:

H2: Ceteris paribus, the inverse relationship between forced CEO turnover and firm performance increases (or decreases) for affected firms following an increase (or a decrease) in CNC enforceability.

Unlike forced CEO turnover, voluntary (non-forced) CEO turnover is determined by CEOs considering a different set of factors. In particular, a CEO's objective function in a voluntary turnover decision is to maximize his or her utility rather than shareholder wealth. The CEO would compare the costs of job-switching due to the legal liability of the CNC to the benefits of job-switching, which could be greater pay or better job prospects (Gao, Luo, and Tang 2015). An enhancement in CNC enforceability increases the costs of voluntary job-switching, thus reducing the mobility of CEOs (Garmaise 2011). Following this discussion, we state our third hypothesis in an alternative form:

H3: Ceteris paribus, the likelihood of non-forced CEO turnover decreases (or increases) for affected firms following an increase (or a decrease) in CNC enforceability.

An indirect implication of H2 could be that the increase in CNC enforceability could also reduce the supply of external candidates. On one hand, if this effect is strong enough, it may limit us in finding supportive evidence for H1. On the other hand, the concern over searching

costs in the external CEO labor market can be resolved by promoting an internal candidate to CEO after removing the incumbent CEO. In this regard, the positive effect of the increased CNC enforceability on removing poorly performing CEOs, as stated in H1 and H2, likely outweighs the increase in external labor market searching cost implied by H3.

3. Research Design

3.1. Empirical Specification

To mitigate the potential endogeneity issue and establish causality, we use a staggered difference-in-difference research design with firm and year fixed effects (Bertrand and Mullainathan 2003). Following prior studies, we consider the time-series changes in CNC enforceability at the state level to be exogenous for an individual firm's ex-ante characteristics (Garmaise 2011; Aobdia 2018; Chen et al. 2018). We examine multiple shocks at the state level, which exogenously affect different firms at different points in time from different directions. Thus, our identification can avoid a common identification challenge that there can be omitted variables coinciding with a single shock. More specifically, following Garmaise (2011), we estimate the following regression model to examine how changes in CNC enforceability affect the unconditional likelihood of forced CEO turnover:

$$\begin{aligned} Forced = \; & \boldsymbol{\beta_1\, IncreaseEnforce} + \beta_2\, Ret + \beta_3\, Size + \beta_4\, MTB + \beta_5\, Leverage \\ & + \beta_6\, RetVol + \beta_7\, Duality + \beta_8\, Tenure + \beta_9\, Age{>}60 + \beta_{10}\, Own \\ & + \beta_{11}\, EquityPay{>}0 + \beta_{12}\, Delta + \beta_{13}\, StateUnemp + \beta_{14}\, StateGDP \\ & + \Sigma Firm\ FE + \Sigma Year\ FE + \varepsilon_t \end{aligned} \tag{1}$$

where *Forced* is an indicator variable equal to 1 if a forced CEO turnover occurs in period *t*, and 0 otherwise. Forced CEO turnover is identified following the procedure in Parrino (1997) and Peters and Wagner (2014).[23] It is noteworthy that this dependent variable essentially

[23] It is noteworthy that the potential misclassification of forced CEO turnovers works against finding evidence consistent with our hypothesis. Garmaise (2011) shows that changes in CNC enforceability *positively* affect voluntary CEO turnovers.

captures a change in the employment status of CEO. Therefore, the primary explanatory variable of interest, *IncreaseEnforce*, should be defined as an order variable. *IncreaseEnforce* is equal to 1 for states increasing CNC enforceability, −1 for states decreasing CNC enforceability, and 0 otherwise (Garmaise 2011; Chen et al. 2018). Garmaise (2011) identifies three states that significantly amended the enforceability of a CNC over the period 1992-2004. Florida increased CNC enforceability effective from 1997. Louisiana reduced CNC enforceability during the period 2002-2003 but increased CNC enforceability again from 2004. The enforceability of a CNC in Texas was decreased effective from 1995. Therefore, *IncreaseEnforce* takes the value of 1 for firms located in Florida between 1997 and 2004, -1 for firms located in Louisiana between 2002 and 2003 and for firms located in Texas between 1995 and 2004, and 0 otherwise.

We note that Ertimur, Rawson, Rogers, and Zechman (2018) identify additional time-series changes in CNC enforceability after 2004 in five other U.S. states (Georgia, Hawaii, Kansas, Mississippi, and Virginia). However, these are relatively insignificant because they did not modify the enforceability index by more than one. Therefore, prior studies such as Aobdia (2018), Cici et al. (2018), and Chen et al. (2018) only focus on the changes discussed by Garmaise (2011).[24] Following prior studies, therefore, we also focus on the significant time-series changes in CNC enforceability identified by Garmaise (2011). We discuss this issue in Section 5.8 in more detail.

To capture the changes in the sensitivity of forced CEO turnover likelihood to firm performance as a consequence of changes in CNC enforceability, we estimate the following regression model:

$$Forced = \beta_1 IncreaseEnforce + \boldsymbol{\beta_2 IncreaseEnforce \times Ret} + \beta_3 Ret + \beta_4 Size \qquad (2)$$

[24] Including these extended but marginal changes in our sample would decrease the empirical power to detect the effects. Note that the empirical power is a particularly important issue in the current research setting in which the forced CEO turnovers are rare events in the observed data (i.e., less than 3%).

$$+ \beta_5 MTB + \beta_6 Leverage + \beta_7 RetVol + \beta_8 Duality + \beta_9 Tenure$$
$$+ \beta_{10} Age{>}60 + \beta_{11} Own + \beta_{12} EquityPay{>}0 + \beta_{13} Delta$$
$$+ \beta_{14} StateUnemp + \beta_{15} StateGDP + \Sigma Firm\ FE + \Sigma Year\ FE + \varepsilon_t$$

where we interact *IncreaseEnforce* with stock return, *Ret*, in the regression. Following prior studies, we use stock return as a primary performance measure of the firm (Peters and Wagner 2014; Guo and Masulis 2015) for four reasons. First, the stock return can better capture the value of growth due to proprietary information such as trade secrets. Second, the stock return is a direct measure of shareholder wealth maximization that corporate boards would consider when they make CEO replacement decisions. Third, the stock return is less subject to direct manipulation by top managers. Chen et al. (2018) document that the increase in CNC enforceability leads to earnings management due to high managerial career concerns, which distorts the earnings' informativeness regarding the efforts and ability of the CEO. Therefore, true firm performance is better captured by stock returns than by earnings in the current setting. Fourth, using operating performance measures does not allow us to address the timing problem in the forced turnover setting. For instance, when using the lagged operating performance, there might be a significant gap between the departure date of a CEO and the period in which firm performance is measured. Contemporaneous operating performance could also be problematic if a CEO left the firm early in the fiscal period. Since we know the announcement dates of CEO departures, measuring performance based on the stock return does not suffer from this timing problem. Specifically, if the forced CEO turnover occurs in period *t*, *Ret* is measured as the annual market-adjusted abnormal buy-and-hold stock returns over a period that covers the 12 months before the announcement date of a fired CEO (Peters and Wagner 2014). If there is no forced CEO turnover in period *t*, *Ret* is measured as the annual market-adjusted abnormal buy-and-hold returns in period *t*-1.

We also include a comprehensive set of control variables in the regression model to control for firm-level, CEO-level, and state-level characteristics that would affect CEO

turnover (Goyal and Park 2002; Garmaise 2011; Florian and Peters 2014; Guo and Masulis 2015). *Size* is measured as the natural logarithm of 1 plus total revenue for firm *i* at the beginning of period *t*. *MTB* is the market-to-book ratio for firm *i* at the beginning of period *t*. *Leverage* is measured as the sum of long-term and short-term debts divided by total assets for firm *i* at the beginning of period *t*. *RetVol* is measured as the standard deviation of monthly market-adjusted abnormal returns measured over the same period that *Ret* is measured. *Duality* is an indicator variable equal to 1 if the CEO is the chairman of the corporate board, and 0 otherwise. *Tenure* is the natural logarithm of 1 plus the length of CEO tenure in years. *Age>60* is an indicator variable equal to 1 if the CEO is older than 60, and 0 otherwise. *Own* is the percentage of shares owned by the CEO. *EquityPay>0* is an indicator equal to 1 if the CEO receives a positive amount of equity-based pay in period *t*, and 0 otherwise. *Delta* is the natural logarithm of 1 plus portfolio delta of the CEO, which measures the change in the value of the CEO's portfolio of current and outstanding prior grants of shares for a 1% change in the stock price. *StateUnemp* is the state's unemployment rate in period *t*. *StateGDP* is the state's GDP growth rate in period *t*. Appendix A provides further details on these variables.

Following prior studies, we employ a linear probability model with firm and year fixed effects for the empirical analyses (Cornelli, Kominek, and Ljungqvist 2013; Guo and Masulis 2015). First, controlling for unobservable firm-specific characteristics is essential in the current setting in which corporate governance mechanisms are jointly and endogenously determined, with unobservable firm characteristics (Hermalin and Weisbach 1998). Including firm fixed effects helps control for the unobservable firm-specific factors. However, a large set of fixed effects such as firm fixed effects in the non-linear specification makes it hard to conduct local maximum likelihood estimation due to the incidental parameter problem (Neyman and Scott 1948). Second, it is easier to interpret the marginal effect in a linear model where the marginal effects of two interacting variables (in our sensitivity tests) and three interacting variables (in

our cross-sectional tests) are not equal to the marginal effects of changing only the interaction terms when the model is nonlinear (Ai and Norton 2003). In a robustness test, we employ a logit model and find that our main inferences remain the same. We cluster standard errors by state (Garmaise 2011; Chen et al. 2018).

3.2. Data and Descriptive Statistics

We use hand-collected forced CEO turnover data for all ExecuComp CEOs over the sample period between 1992 and 2004, which coincides with the sample period analyzed in Garmaise (2011) and Chen et al. (2018). The procedure to classify turnover decisions as forced follows Parrino (1997) and uses press reports along with an age criterion and further refinements (Peters and Wagner 2014). We use the location of the firm's headquarters to measure the effect of CNC regulations because CNCs are enforced based on the employee's principal place of employment. That is, we assume that the CEO and key employees are principally employed at the firm's headquarters (Armstrong et al. 2018). The empirical issue in the location data provided by COMPUSTAT is that it only provides the firm's most recent address, not a historical one. Thus, we use the firm's historical location data, manually collected from the firm's 10-K filing each year. If it is missing, then we use the address provided by COMPUSTAT (e.g., Jennings et al. 2017). We obtain CEO titles (i.e., whether the CEO is the chairman of the board), tenure, age, and ownership from the ExecuComp database. Following Garvey and Milbourn (2006), we use a sample of ExecuComp firms with non-negative CEO tenure. We retrieve stock return data from CRSP and financial statement data from COMPUSTAT, and we require the stock return and financial data to be not missing. The above data requirements yield a sample of 18,390 firm-year observations that correspond to 2,356 unique firms. We identify 451 forced and 1,369 non-forced CEO turnover decisions over our sample period (a total of 1,820 CEO turnovers). To avoid the undue influence of outliers, all continuous variables are winsorized at .5 and 99.5 percentiles.

Panel A of Table 1 reports the mean, median, and standard deviations of the likelihood of forced CEO turnover, performance measures, and other control variables for the whole sample. The mean value of the likelihood of forced CEO turnover is 2.5%. That is, one in every 40 CEOs are fired in an average year. This number is consistent with prior studies showing that about 2% of CEOs at large U.S. corporations are fired every year (e.g., Kaplan and Minton 2006; Huson et al. 2001; Guo and Masulis 2015). The mean value of the likelihood of non-forced CEO turnover is 7.4%, about three times that of the likelihood of forced turnover, also consistent with prior studies (e.g., Guo and Masulis 2015; Jenter and Kanaan 2015). [25]

Panel B of Table 1 provides the enforceability index from Garmaise (2011) and the sample distribution across 50 U.S. states, including Washington, DC. Of 18,390 firm-year observations, 2,173 firm-year observations (11.82%) are observations from one of the three states that experienced changes in the enforceability of a CNC. Of 2,356 unique firms, 290 are headquartered in one of these three states (12.30%) and form our treatment group, which is consistent with the statistics in Garmaise (2011) and Chen et al. (2018). Firms located in other states serve as our control sample. We note that the forced and non-forced CEO turnover events are distributed fairly evenly across states.[26]

Table 2 provides unconditional correlations among the main variables. We note that changes in CNC enforceability are positively correlated with the likelihood of forced CEO turnover, but negatively correlated with the likelihood of non-forced CEO turnover, albeit they are statistically insignificant. The directions of these correlations are consistent with our first and second hypotheses. We also note that market-adjusted abnormal stock returns are negatively related to the likelihood of forced CEO turnover, which is consistent with a vast

[25] For example, the rate of forced CEO turnover in Jenter and Kanaan (2015) is 2.77% and that of non-forced CEO turnover is 7.85% during the sample period between 1993 and 2009.

[26] Some states included in the control group (Alaska, Arkansas, Hawaii, North Dakota, New Hampshire, Vermont, and West Virginia) experienced no forced CEO turnover during our sample period. We check the sensitivity of our results by excluding these states from control group and find similar results.

amount of prior research. The likelihood of non-forced CEO turnover is also significantly negatively correlated with market-adjusted abnormal stock returns, but the magnitude is relatively lower. We find that the likelihood of forced CEO turnover is significantly negatively correlated with CEO duality, tenure, and CEO ownership. These correlations suggest that entrenched CEOs are less likely to experience forced turnover (e.g., Weisbach 1988; Denis et al. 1997; Goyal and Park 2002; Guo and Masulis 2015; Dasgupta et al. 2017). However, the likelihood of non-forced CEO turnover is significantly positively correlated with CEO duality and tenure, suggesting that CEOs drive voluntary turnovers. Overall, these correlations suggest that the economic channels, costs, and benefits driving forced and non-forced CEO turnover decisions are significantly different from each other.

4. Empirical Results

4.1. The Effects of the Protection of Proprietary Information on Forced CEO Turnover

Table 3 presents the regression results of Equation (1). Consistent with our first hypothesis, in Column 1 of Panel A we find that the coefficient on *IncreaseEnforce* is positive and statistically significant at the conventional 5% level (0.010, *t*-stat = 2.441), suggesting that enhanced CNC enforceability significantly increases the likelihood of forced CEO turnover. The coefficient estimate suggests that an increase in CNC enforceability leads to a 1.0% increase in the likelihood of forced CEO turnover. This is economically significant given that the average forced CEO turnover rate is 2.50% in our sample, and thus it represents a 40% increase in the forced CEO turnover rate.

In Column 2 of Panel A, we estimate the effect of changes in CNC enforceability on forced CEO turnover sensitivity to firm performance. That is, we compare the turnover likelihood changes conditional on the same firm performance in the pre- and the post period. Consistent with our prediction, we find negative and statistically significant coefficients on

both *Ret* (-0.054, *t*-stat = -10.361) and the interaction term *IncreaseEnforce* × *Ret* (-0.023, *t*-stat = -8.436). That means, on average, a one standard deviation decrease in firm performance increases the likelihood of forced CEO turnover by 2.53% (= 0.054 × 0.468). If the CNC enforceability increases or decreases, then a one standard deviation decrease in firm performance would further increase (or decrease) the likelihood of forced CEO turnover by 1.076% (= 0.023× 0.468), which represents a 43.04% increase relative to the unconditional mean of the forced CEO turnover rate.

Regarding control variables, we find that the likelihood of forced CEO turnover is significantly negatively associated with *Duality* (-0.011, *t*-stat = -1.919), suggesting that entrenched CEOs are less likely to get fired. The likelihood of forced CEO turnover is also negatively associated with *EquityPay>0* and *Delta* at the 1% level, consistent with prior research and indicating that these equity incentives better align the CEO interests with shareholder interests (Peters and Wagner 2014). The likelihood of forced CEO turnover is significantly positively associated with *RetVol* (0.274, *t*-stat = 7.864). This coefficient suggests that volatile stock returns are more likely to lead to extremely poor firm performance, resulting in forced CEO turnover (Goyal and Park 2002). The *Age>60* variable is significantly negatively associated with the likelihood of forced CEO turnover (Weisbach 1988; Parrino 1997; Goyal and Park 2002).

In sum, the results in Table 3 support our argument that changes in CNC enforceability affect the risk of proprietary information leakage due to forced CEO turnover, and therefore forced CEO turnover decisions.

4.2. The Effects of Changes in CNC Enforceability on Non-forced CEO Turnover

We further examine the effect of changes in CNC enforceability on non-forced CEO turnover decisions. To test this hypothesis, we replace the dependent variable in Equation (1),

i.e., *Forced*, with an indicator variable, *Non-Forced*, that takes a value of 1 if a non-forced CEO turnover occurs in period *t* and 0 otherwise.

Table 4 presents the regression results using *Non-Forced* as a dependent variable. In Column 1, we find a negative and significant coefficient on *IncreaseEnforce* (-0.017, *t*-stat = -3.907). This finding is consistent with our second hypothesis and suggests that the enhanced enforceability of a CNC discourages CEOs' voluntary job switching. The magnitude of the coefficient can be translated into a 1.7% decrease in non-forced CEO turnover. Given that the unconditional mean of non-forced CEO turnover in our sample is 7.4%, the coefficient estimate suggests that the voluntary turnover rate is decreased by approximately 22.97% due to the increase in CNC enforceability. This finding is consistent with our hypothesis and prior research, suggesting that the increased enforceability of CNC adversely affects the CEO's outside job opportunities. Therefore, it would reduce the pool of job candidates in the external CEO labor market. In Section 5.5, we further investigate the implication of this adverse effect of CNC enforceability on the pool of external job candidates in the CEO labor market within the context of the focal firm's forced CEO turnover decisions.

Next, similarly to our forced CEO turnover analysis, we additionally explore the effects of firm performance on voluntary CEO turnover. It is noteworthy that we do not have a specific hypothesis regarding the effects of changes in CNC enforceability on the sensitivity of non-forced CEO turnover to firm performance. Nevertheless, we report the results in Column 2 of Table 4. We find that the coefficient on the interaction term *IncreaseEnforce* × *Ret* is significantly positive (0.032, *t*-stat = 5.9336), suggesting that the negative effects of increased CNC enforceability are reduced when firm performance increases. One potential interpretation is that good firm performance would help signal a CEO's ability/quality and thus increase his/her external job opportunities (e.g., Gao et al. 2015), partially offsetting the adverse effects of CNC enforcement on the CEO's outside job opportunities.

4.3. Competitive Threats and the Effects of CNC Enforceability

Our identification strategy implicitly assumes that changes in CNC enforceability can serve as an instrument for the unobservable risk of proprietary information leakage. Although this assumption is supported by prior studies such as Aobdia (2018) and Chen et al. (2018), we further validate this assumption using cross-sectional tests. If our instrument indeed captures changes in the protection level of proprietary information, then its impact on forced CEO turnover would be greater for firms facing more severe product market threats. Specifically, if the protection level of proprietary information leakage is low, those firms should have greater concerns over information leaks due to forced CEO turnover, leading to constrained decision-making. Hence, when the protection level is enhanced due to increased CNC enforceability, and thus the constraint is reduced, then they can improve their forced CEO turnover decisions.

4.3.1. Product market threats

Following the prior literature, we employ various measures as proxies for the degree of product market threats from existing competitors and potential entrants. First, Garmaise (2011) provides evidence that non-competition law is particularly important for firms facing significant in-state product market competition, because typically CNCs are easier to enforce within a single legal jurisdiction and they have a restricted geographical scope. Hence, following Garmaise (2011) and Chen et al. (2018), *InStateCompete* is measured as the sum of sales generated by competitors operating in the same state and industry as firm *i* (excluding sales of firm *i*) divided by total industry sales in period *t*-1. The industry is defined using the two-digit SIC industry classification. Intuitively, this variable measures the fraction of sales generated by competitors in the same industry and thus captures product market threats from existing rivals. Similarly, we use another measure, *InStatePeers*, which is the number of industry peers operating in the same state divided by the total number of industry peers.

Second, we employ the industry's average level of price-cost margin (PCM) to capture the industry's attractiveness and motives to enter the market for the potential entrants. *IndPCM* is the sales-weighted industry average of price-cost margin in period *t*-1. The price-cost margin is computed as sales less the sum of the cost of goods sold and SG&A expenses, divided by the sales in period *t*-1. In addition to the average price-cost margin of the industry, we employ the industry's average level of property, plant, and equipment (PP&E) to capture the level of industry entry barriers. Firms operating in an industry with lower entry barriers are more likely to face greater product market threats from potential entrants (e.g., Sutton 1991; Li 2010). *IndPPNE* is the sales-weighted industry average of PP&E in period *t*-1.

The results are reported in Panel A of Table 5. In Columns 1 and 2, we define the indicator variable *High PMT* based on *InStatePeers,* and this is equal to 1 if *InStatePeers* is above the sample median, and 0 otherwise. Then, we construct the variables of interest as an interacted term between *IncreaseEnforce* and *High PMT* for our forced CEO turnover likelihood test. Consistent with our expectation, we find that the coefficient on the interaction term, *IncreaseEnforce* × *High PMT*, is significantly positive at the 1% level in Column 1 (0.024, *t*-stat = 6.254), indicating that the likelihood of forced CEO turnover for firms with greater product market threats increases when the CNC enforceability increases. The coefficient estimate suggests that for firms with greater product market threats, an increase in CNC enforceability results in a 1.5% incremental increase in the likelihood of forced CEO turnover (0.15 = -0.007-0.002+0.024).

In Column 2, we examine the sensitivity of forced CEO turnover to firm performance using a triple interacted term among *IncreaseEnforce*, *Ret,* and *High PMT*. We find a significantly negative coefficient on the triple interaction term at the 5% level, suggesting that the effects of the increased CNC enforceability on the forced CEO turnover-performance sensitivity are more pronounced in an industry with greater product market threats from a

number of in-state peers. The coefficient estimates suggest that for firms with lower product market threats, an increase in CNC enforceability leads to a 2.53% (= [-0.056+0.002] × 0.468) increase in the likelihood of forced CEO turnover when firm performance decreases by one standard deviation. In contrast, for firms with greater product market threats, an increase in CNC enforceability leads to a 3.79% (= [-0.056+0.002+0.004-0.031] × 0.468) increase in the likelihood of forced CEO turnover when firm performance decreases by one standard deviation. In Column 3 and 4, we use *InStateCompete* to create the conditioning variable *High PMT* and find consistent evidence. In sum, our findings suggest that the effects of increased CNC enforceability on forced CEO turnover decisions are more pronounced for firms with greater product market threats from existing peers.

In Columns 5 and 6 (Columns 7 and 8), *High PMT* is based on *IndPCM* (*IndPPNE*) and equal to 1 if *IndPCM* (*IndPPNE*) is above (below) the sample median, and 0 otherwise. In Colum 5, we find a significantly positive coefficient on the interaction term between *IncreaseEnforce* and *High PMT* at the 1% level, consistent with our expectation. However, the coefficient estimate on the triple interaction term *Ret* × *IncreaseEnforce* × *High PMT* in Column 6 is negative but statistically insignificant. In Column 7, we examine whether the lower industry entry barriers are associated with an increase in the likelihood of forced CEO turnover in response to increased CNC enforceability. The coefficient on the interaction term *IncreaseEnforce* × *High PMT* is positive but statistically insignificant. In Column 8, however, we find that the coefficient on the triple interaction term is significantly negative at the 1% level (-0.034, *t*-stat = -4.697). Overall, these findings suggest that the effects of increased CNC enforceability on forced CEO turnover decisions are generally more pronounced if firms face greater product market threats from potential entrants.

4.3.2. Labor market threats

In Panel B, we examine the employees' tendency to leave the firm to work for rival companies as another potential labor market threat and how it affects the impact of CNC enforceability on forced CEO turnover decisions. As discussed in the hypothesis development section, departures of executives can impose a negative spillover effect on other non-executive employees' job switching decisions, leading to an unintended employee turnover wave (Vanko 2002). Such threats of predatory hiring are difficult to measure due to their unobservability. Hence, we rely on the average level of the industry's employee turnover rate as a proxy for these predatory hiring threats.[27] We use the Census Bureau's Survey of Income and Program Participation (SIPP) to create *Employment Turnover*. The SIPP is a nationally representative sample of individuals interviewed over 8-16 consecutive periods that are in most cases four months apart. We identify individuals who left their firms to work for rival firms and estimate the average turnover rate in each industry-year level. *High Employee Turnover* is an indicator equal to 1 if the employee turnover rate in period *t*-1 exceeds the sample median, and 0 otherwise.

In Column 1 of Panel B, we continue to find a significantly positive coefficient on *IncreaseEnforce* × *High Employee Turnover* at the 10% level (0.009, *t*-stat = 1.806). We also find a significantly negative coefficient on *Ret* × *IncreaseEnforce* × *High Employee Turnover* at the 5% level (-0.051, *t*-stat = -2.675) in Column 2, supporting our hypothesis.[28] Overall, the findings in Panel B are also consistent with our argument that the potential risks of proprietary information leakages due to an employee turnover wave also constrain the corporate boards' forced CEO turnover decisions.

[27] One caveat here is that a higher employee turnover rate can be driven by both predatory hiring and industry performance, and therefore it is a noisy proxy.

[28] As an additional cross-sectional test, we use the variation in CEO age and examine whether the effects of CNC enforceability is mitigated for older CEOs. We expect that older, potentially near-retirement CEOs are unlikely to start a competing firm or work for another employer. Therefore, proprietary cost is less likely to be a concern for these CEOs, decreasing the effects of CNC enforceability. In untabulated test, we find evidence consistent with our prediction that the effects of CNC enforceability on both the unconditional likelihood of forced CEO turnover and the performance sensitivity are lower for older CEOs.

5. Additional Analyses

5.1. Sensitivity Check Using the Alternative Sample

We note that several states are very hostile to CNCs, and therefore firms located in those states are not subject to them. For example, courts in California and North Dakota seldom enforce a CNC during our sample period, though firms located in these two states may still include a CNC in an employment contract. New York does not enforce a CNC for involuntary turnovers. To ensure that our results are robust, in untabulated tables we remove firms located in these three states from the control sample and then re-estimate our main models. We find that our results are qualitatively similar, indicating that our results are not driven by those states.

5.2. Dynamic Effects of Changes in CNC Enforceability

A causal interpretation of the effects of changes in CNC enforceability in our DiD regressions requires that the affected firms and the control firms follow parallel trends in the absence of changes in CNC enforceability. To examine the validity of our empirical strategy and the parallel trends assumption, we next introduce lead-lag terms in our difference-in-difference regression. The firm fixed effect specifications can further ensure that we are comparing within-firm trends in the decision of forced CEO turnover between the affected and the control firms, and that firm fixed effects hold the sample composition constant (Bertrand and Mullainathan 2003).

We introduce lead-lag variables in our DiD regression. Specifically, $IncreaseEnforce^{pre}$, $IncreaseEnforce^{0}$, and $IncreaseEnforce^{post}$, are equal to 1 (or -1) if a firm's headquarter is located in a state where the CNC enforceability increases (or decreases) in two years, increases (or decreases) in the current year, and increased (or decreased) one year or more ago, respectively, and 0 otherwise. Similar to our primary analysis, we interact these variables with *Ret*.

Table 6 reports the estimation results. We find that for both the likelihood of forced CEO turnover and turnover sensitivity to performance, the effect of CNC enforceability is insignificant for pre-change periods. This finding suggests that both the affected and the control firms follow parallel trends in the absence of changes in the status of CNC enforceability.

5. 3. Placebo Tests

To further ensure that our results are not confounded by unmodeled factors, we conduct a placebo test by randomly assigning a CNC enforceability increase (or decrease) year to states. Specifically, we generate pseudo-CNC enforceability change dates for all states using the following method. For each state, we randomly draw a CNC enforceability increasing (or decreasing) year from 1992 to 2004. Then, using these pseudo-CNC enforceability change dates, we re-estimate our baseline regression (i.e., the same specification as in Table 3). We repeat this exercise 1,000 times and obtain the distribution of the pseudo coefficients from the regressions.

Figure 1 plots the probability density function of the placebo coefficients based on pseudo-treatment and control samples. The red lines in the figure represent the regression coefficients obtained using the actual CNC enforceability change dates. The results reveal that such random assignments are associated with an insignificant effect on forced CEO turnover or turnover sensitivity to performance (i.e., $p > 0.1$). These analyses reinforce our identification strategy and suggest that our main finding is unlikely to be driven by unmodeled factors.

5.4. CNCs, UTSA, and IDD

Besides CNCs, ex post facto legal rules such as the Uniform Trade Secret Act (UTSA) and the Inevitable Disclosure Doctrine (IDD) also help protect the employer's trade secrets. However, the ranges and the effectiveness of protection due to these two legal mechanisms are different. The UTSA protects information that qualifies as trade secrets, and the IDD protects both information that qualifies as trade secrets and other valuable forms of proprietary

information such as marketing plans or completion analysis (Nicandri 2010). However, the know-how that an employee acquires through prior employment goes beyond the scope of the UTSA and IDD, and thereby a CNC and its effective enforcement may lead to a more pronounced impact on corporate boards' decisions about removing CEOs. From this perspective, we expect to observe that the effects of changes in CNC enforceability on forced CEO turnover decisions are stronger than those of the IDD or UTSA. We obtain the adoption data of UTSA from Png (2017a, 2017b).[29] The IDD adoption data across states is obtained from Klasa, Ortiz-Molina, Serfling, and Srinivasan (2018).

We test this conjecture and report the results in Table 7. In Panel A, Columns 1 and 2, we use the UTSA as an alternative protection mechanism. We find that the coefficient on *UTSA* in Column 1 is positive but statistically insignificant. However, we note that the coefficient on the interacted term between *UTSA* and *Ret* in Column 2 is negative and statistically significant at the 5% level (-0.016, *t*=-2.240). This finding is reassuring because it is consistent with our hypothesis that the protection of trade secrets increases the sensitivity of forced CEO turnover to firm performance. In Columns 3 and 4, we also include *IncreaseEnforce* and its interaction with *Ret.* We find that the coefficient on the interaction term *UTSA* × *Ret* becomes statistically insignificant while the coefficient on *IncreaseEnforce* and the interaction term *IncreaseEnforce* × *Ret* remains statistically significant at the 5% level. This finding corroborates our argument that the increased enforceability of a CNC provides stronger protection than that of the UTSA in the current research setting.

In Panel B, we use IDD to define alternative protection. We generally do not find significant results using *IDD* in Panel B, suggesting that the IDD may not play an important

[29] Following Png (2017a, 2017b), we include 44 states that enacted the UTSA between 1979 and 2010 in this analysis.

role in forced CEO turnover. This result holds when we include *IncreaseEnforce* and its interaction with *Ret,* as indicated in Columns 3 and 4.

5.5. Internally Promoted Versus Externally Hired CEOs

Prior research suggests that CNC enforceability negatively affects CEO mobility (Garmaise 2011). In this section, we examine whether the effects of changes in CNC enforceability on forced CEO turnover are more pronounced when the firm has internal candidates for the incoming CEO. The idea is that the increased enforceability of CNC raises the costs of hiring external CEOs due to increased job-switching costs, leading to a decreased supply of external candidates. In this case, firms would rationally respond to the enforceability shocks when they can promote one of their internal candidates rather than hire an outside CEO.

A challenge in this test is that the availability of an internal candidate is not ex-ante observable. Hence, we take an ex-post approach and classify the observed forced CEO turnovers into two categories based on ex-post outcomes: 1) choosing an internal successor, and 2) choosing an external successor. One would expect a stronger effect of the enforceability of a CNC for the first scenario if choosing an internal successor after a forced CEO turnover is a valid ex-post proxy for the availability of internal candidates. Specifically, we divide *Forced* into two variables, *Forced & Internal CEO* and *Forced & External CEO,* and estimate Equations (1) and (2) separately. *Forced & Internal CEO* is equal to 1 if the forced CEO turnover occurs in period t and the new CEO in period t+1 is one of the executives working for the current firm identified by ExecuComp in period t, and 0 otherwise. Similarly, *Forced & External CEO* is equal to 1 if the forced CEO turnover occurs in period t and the new CEO in period t+1 is not working for the current firm identified by ExecuComp in period t (e.g., Gillan et al. 2009), and 0 otherwise. In our sample, 59.65 percent (40.35 percent) of forced CEO turnovers are classified as forced CEO turnovers followed by an internal (external) candidate assuming the office.

Table 8 reports the estimation results. In Columns 1 and 2, the dependent variable is *Forced & Internal CEO*. Consistent with our expectations, in Column 2, we find a significantly negative coefficient on the interaction term between *IncreaseEnforce* and *Ret* at the 5% level (-0.018, *t*=-2.053). In contrast, in Columns 3 and 4, we use *Forced & External CEO* as a dependent variable and do not find a significant forced turnover-performance sensitivity, and the magnitude of the coefficient is also small (-0.005, *t*-stat= -0.689). This finding implies that increased enforceability of a CNC, in this case, does not have a significant impact on forced CEO turnover decisions because the benefits do not exceed the costs, including the search costs for external candidates. Overall, these findings are consistent with the notion that increased enforceability of a CNC is associated with increased search costs for external CEOs, and thus the effects are more pronounced for firms with available internal candidates.

5.6. CNC Enforceability and Market Reaction to Forced CEO Turnover

In this section, we examine the market reaction to the forced CEO turnover announcement and whether the increased CNC enforceability affects the short-term stock returns surrounding the announcement of forced CEO turnover. If an increase in forced CEO turnover and the forced CEO turnover sensitivity are attributed to an alleviation of the concern about proprietary information leakage associated with forced CEO turnover, we should find a more positive market reaction to the announcement of forced CEO turnover when the CNC enforceability increases. This test would shed light on shareholders' view on how the increased enforceability of CNC contributes to firm value by improving the efficiency of forced CEO turnover.

To examine market reaction, we use *BHAR* as a dependent variable, which is measured as the 5-day abnormal returns surrounding the announcement of forced CEO turnover. It is noteworthy that this test is conditional on firm-year observations of forced CEO turnover, and thus we replace firm fixed effects with state fixed effects.

Table 9 demonstrates the estimation results. We find a significantly positive coefficient on *IncreaseEnforce* at the 5% level (0.041, *t*-stat = 2.294). The coefficient estimate suggests that the buy-and-hold abnormal returns of forced CEO turnover announcements are 4.1% higher when CNC enforceability increases. This coefficient estimate is economically significant, given that the median abnormal announcement return is equal to -1.05% in the forced CEO turnover sample. The negative announcement effect could be driven by the negative signaling effect of forced CEO turnover (e.g., Warner et al., 1988). Overall, we find that shareholders respond to the announcement of forced CEO turnover more positively when CNC enforceability increases.

5.7. Increase or Decrease in CNC Enforceability

Following Chen et al. (2018), we use the order variable *IncreaseEnforce* in our main specification. In this section, we decompose the *IncreaseEnforce* variable into two indicators to capture the separate effects of an increase or a decrease in CNC enforceability. Specifically, *PosEnforce* is equal to 1 if the state increases the enforceability of CNC in period *t*, and 0 otherwise. That is, for firms located in Florida between 1997 and 2004, this variable is set to 1. Similarly, *NegEnforce* is equal to 1 for firms located in Texas between 1995 and 2004 and for firms located in Louisiana between 2002 and 2003, and 0 otherwise.

Table 10 presents the estimation results. In Column 1, we find a significantly positive coefficient on *PosEnforce* at the 10% level (0.016, *t*-stat= 1.788), suggesting that an increase in CNC enforceability is associated with the increased likelihood of forced CEO turnover. We also find that a decrease in CNC enforceability is significantly associated with a decreased likelihood of forced CEO turnover at the 1% level (-0.008, *t*-stat= -2.808). These findings suggest that the finding in Column 1 of Table 3 (i.e., the unconditional likelihood changes in response to changes in CNC enforceability) is driven by both increases and decreases in CNC enforceability.

In Column 2, we check the sensitivity of forced CEO turnover to firm performance. Consistent with the results in Table 3, we find a significantly negative coefficient on *Ret* at the 1% level, a significantly negative coefficient on *PosEnforce* × *Ret* at the 1% level (-0.029, *t*-stat = -5.821), and a significantly positive coefficient on *NegEnforce* × *Ret* at the 1% level (0.021, *t*-stat= 3.856). The coefficient estimates suggest that a one standard deviation decrease in firm performance would lead to a 3.838% (= [-0.053-0.029] × 0.468) increase in the likelihood of forced CEO turnover for firms located in states with an increase in CNC enforceability. However, for firms located in states with a decrease in CNC enforceability, a one standard deviation decrease in firm performance would only lead to a 1.498% increase in the likelihood of forced CEO turnover (= [-0.053+0.021] × 0.468). Overall, these findings suggest that both the increase and decrease in CNC enforceability affect the forced CEO turnover decisions.

5.8. Alternative Operating Performance Measure

Several prior studies use stock returns and/or accounting rates of return as measures of firm performance in determining the likelihood of executive turnover (see Rosen 1990; Weisbach 1988; Jensen and Murphy 1990; Murphy and Zimmerman 1993). Most prior studies find a significant relationship between the likelihood of CEO turnover and stock returns. However, the relationship between the likelihood of CEO turnover and accounting rates of return is found to be weaker. For example, while Murphy and Zimmerman (1993) find a strong relationship between turnover and accounting rates of return, Weisbach (1988) finds only a moderate relationship. In our context, as we discussed in Section 3, the accounting performance measure may be subject to considerable criticism. In particular, Chen et al. (2018) directly show that an increase in CNC enforceability affects managers' incentives to manipulate accounting earnings. Nevertheless, to ensure the robustness of our results, we use the accounting rates of return as an alternative measure of firm performance in this section. *ROA*

is return on assets in period *t*-1, which is defined as earnings before the extraordinary item in period *t*-1 divided by average total assets. All other variables are previously defined.

Table 11 presents the estimation results. We find that the coefficient on *IncreaseEnforce* in Column 1 is positive and significant at the 5% level (0.010, *t*-stat = 2.421), and the coefficient on the interacted term between *IncreaseEnforce* and *ROA* in Column 2 is negative and significant at the 1% level (-0.110, *t*-stat = -3.973). For an average firm, a one standard deviation decrease in *ROA* increases the likelihood of forced CEO turnover by 0.15% (= -0.013 × 0.113). If CNC enforceability increases, then a one standard deviation decrease in accounting performance would incrementally increase the likelihood of forced CEO turnover by an additional 1.24% (= -0.110 × 0.113).

5.9. CNC Enforceability Index and Forced CEO Turnover

In our main empirical tests, we use the time-series changes in CNC enforceability as a shock to the protection of proprietary information and we conduct difference-in-difference analyses. An alternative approach would be to simply rely on the cross-sectional variation in the legal environment across states. However, as noted in Garmaise (2011), the level of noncompetition enforceability may not be exogenous because "*perhaps firms that plan to have a corporate policy requiring noncompetition contracts locate in jurisdictions that will enforce these contracts*." Therefore, "*any results we may find linking noncompetition enforceability to, for example, executive mobility may thus be driven simply by sorting in the types of firms that choose to locate in different areas* (p. 394, Garmaise [2011])." Note that this potential sorting would be more pronounced for the more extended sample period if firms endogenously choose their location, increasing potential selection biases in the data.

Nevertheless, we supplement the time-series evidence by considering the cross-sectional variation of the enforcement index across states using the longer sample period between 1992 and 2015. Specifically, following Garmaise (2011), we use the following

regression model that allows the level of the non-enforcement index to have a different impact on firms that have a different level of competitive threats.

$$\begin{aligned} Forced = \; & \beta_1 EnforceIndex + \beta_2 InStateCompete + \beta_5 EnforceIndex \times InStateCompete \\ & + \beta_4 Ret + \beta_5 Ret \times EnforceIndex + \beta_6 Ret \times InStateCompete \\ & + \beta_7 Ret \times InStateCompete \times EnforceIndex + \beta_8 Size + \beta_9 MTB \\ & + \beta_{10} Leverage + \beta_{11} RetVol + \beta_{12} Duality + \beta_{13} Tenure + \beta_{14} Age{>}60 \\ & + \beta_{15} Own + \beta_{16} EquityPay{>}0 + \beta_{17} Delta + \beta_{18} StateUnemp \\ & + \beta_{19} StateGDP + \Sigma Firm\ FE + \Sigma Year\ FE + \varepsilon_t \end{aligned} \quad (3)$$

where *EnforceIndex* is the CNC enforceability index from Garmaise (2011). *InStateCompete* is measured as the fraction of the sales generated by industry competitors located in the same state (excluding the firm's own firm sales) divided by total industry sales in period *t*-1.

Table 12 demonstrates the estimation results. In Columns 1 and 2, we use the enforcement index obtained from Garmaise (2011), and find a negative and significant coefficient on *Ret* × *EnforceIndex* × *InStateCompete* (-0.019, *t*-stat = -2.196), consistent with our argument that the forced CEO turnover sensitivity to firm performance increases with the state-level CNC enforceability index, especially when firms face severe competitive threats.

Ertimur et al. (2018) identify additional changes in the enforcement index in Georgia, Hawaii, Kansas, Mississippi, and Virginia after 2004. As noted before, however, these changes are relatively insignificant because they did not modify the enforceability index by more than one. Nevertheless, in Columns 3 and 4, we use the enforcement index obtained from Ertimur et al. (2018) and find results almost identical to those in Columns 1 and 2. This finding is consistent with the argument that the additional changes identified by Ertimur et al. (2018) do not substantially alter the enforcement level of a CNC and thus this helps to justify our main empirical approach (e.g., Aobdia 2018; Chen et al. 2018).

6. Conclusion

This study examines whether the risk of proprietary information leakage and misappropriation affects CEO turnover decisions. Relying on reasonable exogenous time-series changes in state-level CNC enforceability, we find that an increase (or decrease) in CNC enforceability encourages (or discourages) firms to dismiss poorly performing CEOs. Such an effect is more pronounced when the firms are concerned more about competitive threats in both product and labor markets. These findings are consistent with our prediction that the risk of proprietary information leakage and misappropriation, which constitutes the direct costs of CEO turnover to shareholders, is an important factor that corporate boards consider in forced CEO turnover decisions. Also, we find that an increase (or decrease) in CNC enforceability discourages (or encourages) CEO job switching, which is consistent with the prior literature that a CNC helps retain employees due to increased job-switching costs. We find that as a response to the increase in job-switching costs due to strengthening CNC enforceability, firms are more likely to choose internal successors after removing incumbent CEOs.

Appendix A: Variable Definitions

Variables	Description
Forced	*Forced* is an indicator variable equal to one if a forced CEO turnover occurs in period *t*, and zero otherwise. Forced CEO turnover is identified following the procedure in Parrino (1997) and Peters and Wagner (2014).
Forced & Internal CEO	*Forced & Internal CEO* is equal to one if the forced CEO turnover occurs in period *t* and the new CEO in period *t+1* is one of the executives working for the current firm identified by ExecuComp in period *t*, and zero otherwise.
Forced & External CEO	*Forced & External CEO* is equal to one if the forced CEO turnover occurs in period *t* and the new CEO in period *t+1* is one of the executives who is not working for the current firm identified by ExecuComp in period *t*.
Non-Forced	*Non-Forced* an indicator variable that equals one if the CEO turnover is non-forced in period *t*, and zero otherwise.
IncreaseEnforce	*IncreaseEnforce* is an order variable that equals to one for states increasing CNC enforceability, negative one for states decreasing CNC enforceability, and zero otherwise. Specifically, this variable takes the value of one for firms located in Florida between 1997 and 2004, and takes the value of negative one for firms located in Louisiana between 2002 and 2003 and for firms located in Texas between 1995 and 2004, and zero otherwise.
PosEnforce	*PosEnforce* is an indicator variable equal to one if the state increases the enforceability of CNC in period *t*, and zero otherwise.
NegEnforce	*NegEnforce* is an indicator variable equal to one if the state decreases the enforceability of CNC in period *t*, and zero otherwise.
Ret	*Ret* is measured as the annual market-adjusted abnormal buy-and-hold stock returns in period *t*-1. If the forced CEO turnover occurs in period *t*, annual returns are measured over a period that covers the 12 months prior to the announcement date of a fired CEO.
ROA	*ROA* is the return on assets in period *t*-1 as measured by EBIT divided by the average total assets for firm *i* in period *t*-1.
Size	*Size* is the natural logarithm of one plus total assets for firm *i* in period *t*-1.
MTB	*MTB* is the market-to-book ratio for firm *i* in period *t*-1.
Leverage	*Leverage* is measured as the sum of long-term and short-term debts divided by total assets in period *t*-1.

RetVol	*RetVol* is measured as the standard deviation of monthly market-adjusted abnormal returns measured over the same period that *Ret* is measured.
Duality	*Duality* is an indicator variable equal to one if the CEO is the chairman of the corporate board and zero otherwise.
Tenure	*Tenure* is CEO tenure in period *t*. CEO tenure is measured as the difference between the *BECAMECEO* variable in ExecuComp and the date of fiscal year-end for firm *i* as of the beginning of period *t* divided by 365.
Age>60	*Age>60* is an indicator variable equal to one if the CEO age is greater than 60 and zero otherwise.
Own	*Own* is measured as the number of shares owned by the CEO excluding options divided by the number of shares outstanding for firm *i* in period *t.*
EquityPay>0	*EquityPay>0* is an indicator variable equal to one if the equity compensation for the CEO in period *t* is positive and zero otherwise.
Delta	*Delta* is computed as the natural log of one plus portfolio delta for the CEO in period *t*. Portfolio delta measures the change in the value of the CEO's portfolio of current and outstanding prior grants of shares for a 1% change in the stock price, calculated following the method in Core and Guay (2002) and Coles et al. (2006)
StateUnemp	*StateUnemp* is the state's unemployment rate in period *t.*
StateGDP	*StateGDP* is the state's GDP growth rate in period *t*.
InStatePeers	*InStatePeers* is the number of industry competitors located in the same state divided by the total number of industry competitors at the beginning of the period *t*.
InStateCompete	*InStateCompete* is the sum of sales generated by industry competitors located in the same state (excluding own firm sales) divided by total industry sales in period *t*-1.
IndPCM	*IndPCM* is measured as the sales-weighted industry-average of price-cost margin in period *t*-1. The price-cost margin is computed as sales less the sum of cost of good solds and SG&A expenses divided by sales.
IndPPNE	*IndPPNE* is measured as the sales-weighted industry-average of PP&E at the beginning of period *t*. The industry is defined using the two-digit SIC.
Employee Turnover	*Employee Turnover* is the average turnover rate in each industry-year level in period *t*-1. To compute the turnover rate, we use the Census Bureau's Survey of Income and Program Participation (SIPP), which is a nationally representative

	sample of individuals interviewed over 8-16 consecutive periods that are in most cases four months apart.
UTSA	*UTSA* is an indicator equal to one if the state enacted the protection of trade secrets laws according to the UTSA and zero otherwise. The data on the state enactment is from Png (2017a, 2017b).
IDD	*IDD* is an indicator equal to one if the state adopts the IDD in period *t* and zero otherwise. The adoption data is from Klasa et al. (2018).

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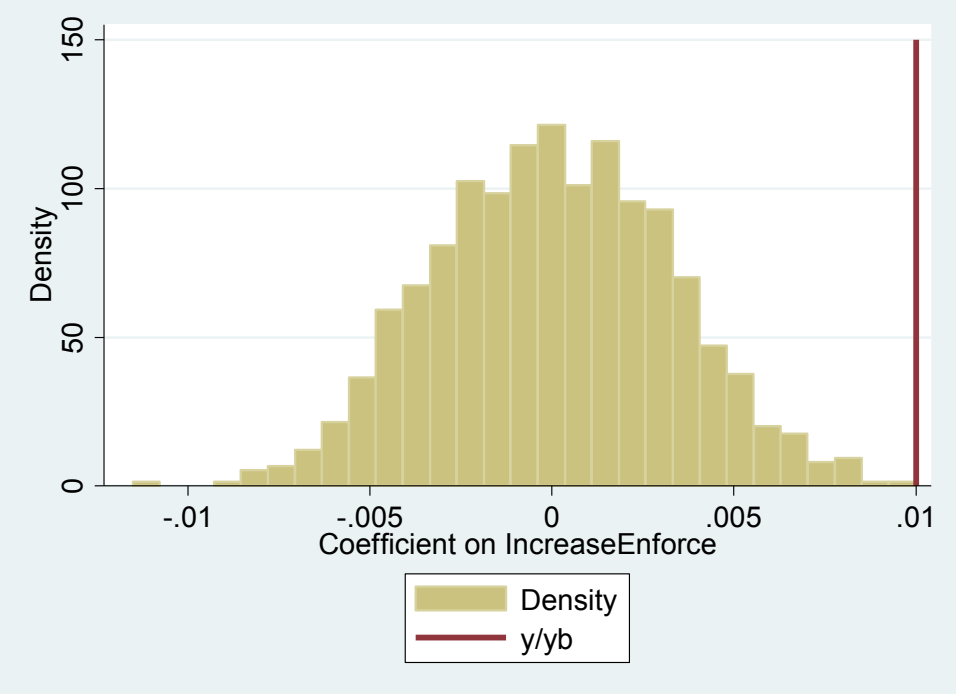
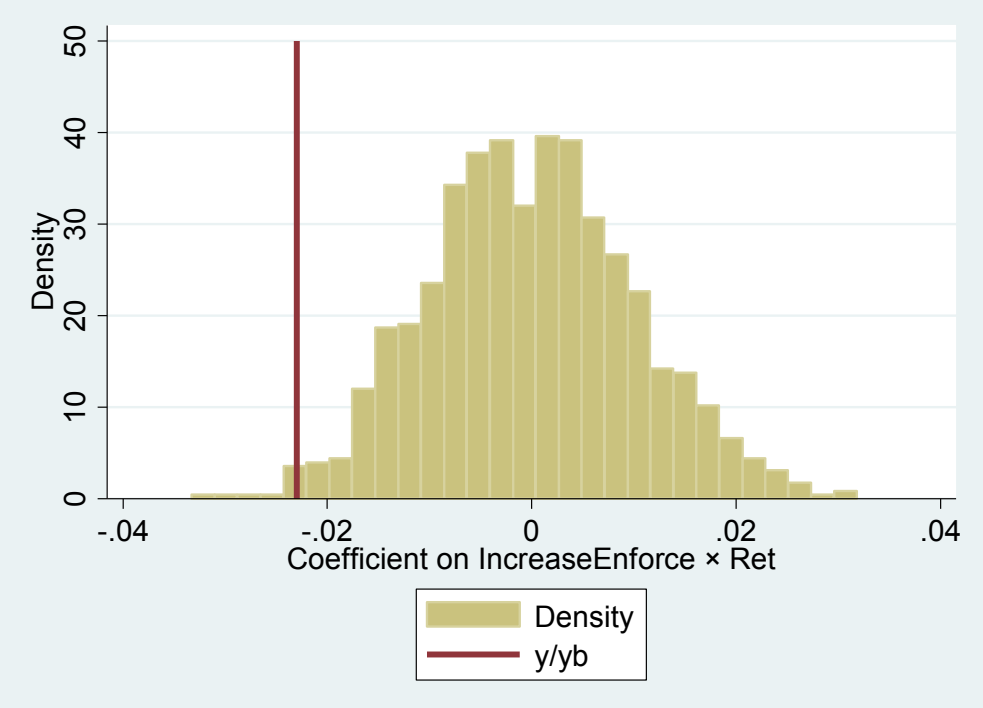
Figure 1 Placebo test: Random assignments of CNC increase/decrease dates





This figure reports the results of the effects of CNC enforceability on the likelihood of forced CEO turnovers and the sensitivity of forced CEO turnover to firm performance based on pseudo-treatment and control samples. We generate pseudo-CNC change dates for all states by randomly drawing a CNC increasing/decreasing year from 1992 to 2004. We then use these pseudo-CNC change dates and re-estimate our baseline regression. We repeat this exercise 1,000 times, obtain the distribution of the pseudo-coefficients from the regressions, and plot the distribution of pseudo-coefficients. The red lines in the graphs represent the regression coefficients obtained using the actual CNC change dates.

Table 1 Descriptive Statistics

Panel A presents descriptive statistics for our sample firms between 1992 and 2004. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Panel B presents the CNC enforceability index taken from Garmaise (2011) and the distribution of the sample and the mean values of the *Forced* and *Non-Forced* variables across states in our sample period. The affected states are three states (Florida, Louisiana, and Texas) in which the enforceability of a CNC was amended during the sample period. The control group consists of firms located in other states.

Panel A Descriptive Statistics

Variables	N	Mean	Std	Q1	Median	Q3
Forced	18,390	0.025	0.155	0.000	0.000	0.000
Forced & Internal CEO	18,390	0.015	0.120	0.000	0.000	0.000
Forced & External CEO	18,390	0.010	0.099	0.000	0.000	0.000
Non-Forced	18,390	0.074	0.262	0.000	0.000	0.000
IncreaseEnforce	18,390	-0.045	0.296	0.000	0.000	0.000
PosEnforce	18,390	0.022	0.147	0.000	0.000	0.000
NegEnforce	18,390	0.068	0.251	0.000	0.000	0.000
Ret	18,390	-0.004	0.468	-0.235	0.005	0.243
ROA	18,390	0.097	0.113	0.047	0.094	0.150
Size	18,390	7.100	1.762	5.817	6.912	8.237
MTB	18,390	2.053	1.659	1.117	1.478	2.261
Leverage	18,390	0.230	0.185	0.067	0.217	0.349
RetVol	18,390	0.114	0.067	0.067	0.097	0.141
Duality	18,390	0.579	0.494	0.000	1.000	1.000
Tenure	18,390	8.114	7.750	2.753	5.725	10.844
Age>60	18,390	0.290	0.454	0.000	0.000	1.000
Own	18,390	0.026	0.066	0.001	0.003	0.016
EquityPay>0	18,390	0.754	0.431	1.000	1.000	1.000
Delta	18,390	0.320	0.474	0.045	0.146	0.387
StateUnemp	18,390	0.055	0.014	0.045	0.053	0.063
StateGDP	18,390	0.035	0.023	0.020	0.034	0.048
InStatePeers	18,390	0.085	0.099	0.020	0.050	0.103
InStateCompete	18,390	0.093	0.134	0.008	0.036	0.127
IndPCM	18,390	0.113	0.074	0.061	0.110	0.142
IndPPNE	18,390	5,918.160	7,039.630	1,507.700	4,178.460	7,085.520
Employee Turnover	15,912	0.029	0.016	0.018	0.026	0.037
UTSA	15,878	0.731	0.444	0.000	1.000	1.000
IDD	18,390	0.512	0.500	0.000	1.000	1.000

Panel B Distribution by States

State	CNC Index	# of Obs.	$Forced_t$	$Non\text{-}Forced_t$	State	CNC Index	# of Obs.	$Forced_t$	$Non\text{-}Forced_t$
Alaska	3	11	0.000	0.000	Mississippi	4	63	0.016	0.063
Alabama	5	219	0.014	0.059	Montana	2	10	0.200	0.000
Arkansas	5	141	0.000	0.050	North Carolina	4	332	0.024	0.087
Arizona	3	207	0.019	0.039	North Dakota	0	9	0.000	0.000
California	0	3,041	0.032	0.068	Nebraska	4	72	0.014	0.069
Colorado	2	255	0.031	0.063	New Hampshire	2	69	0.000	0.101
Connecticut	3	567	0.019	0.086	New Jersey	4	616	0.023	0.081
DC	7	75	0.013	0.093	New Mexico	2	25	0.040	0.120
Delaware	6	71	0.014	0.113	Nevada	5	128	0.039	0.070
Florida 1992-1996	**7**	**154**	**0.026**	**0.084**	New York	3	1,404	0.019	0.073
Florida 1997-2004	**9**	**408**	**0.037**	**0.078**	Ohio	5	948	0.023	0.070
Georgia	5	539	0.015	0.080	Oklahoma	1	166	0.012	0.078
Hawaii	3	42	0.000	0.095	Oregon	6	202	0.015	0.069
Iowa	6	112	0.009	0.054	Pennsylvania	6	933	0.026	0.079
Idaho	6	89	0.056	0.045	Rhode Island	3	73	0.041	0.068
Illinois	5	1,131	0.031	0.096	South Carolina	5	111	0.009	0.099
Indiana	5	241	0.021	0.058	South Dakota	5	31	0.032	0.032
Kansas	6	100	0.060	0.030	Tennessee	7	327	0.031	0.076
Kentucky	6	95	0.021	0.074	**Texas 1992-1994**	**5**	**265**	**0.004**	**0.045**
Louisiana 1992-2001, 2004	**4**	**103**	**0.029**	**0.097**	**Texas 1995-2004**	**3**	**1,217**	**0.027**	**0.078**
Louisiana 2002-2003	**0**	**26**	**0.038**	**0.077**	Utah	6	115	0.043	0.078
Massachusetts	6	858	0.028	0.072	Virginia	3	412	0.015	0.070
Maryland	5	253	0.008	0.079	Vermont	5	30	0.000	0.067
Maine	4	30	0.033	0.067	Washington	5	323	0.028	0.077
Michigan	5	382	0.029	0.079	Wisconsin	3	368	0.019	0.060
Minnesota	5	598	0.013	0.087	West Virginia	2	10	0.000	0.000
Missouri	7	383	0.023	0.076					

Table 2 Correlation Coefficients

This table presents the Pearson correlation coefficients for the main variables used in our regressions based on our sample firms between 1992 and 2004. A significance level of 5% is in bold. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. All variables are defined in Appendix A.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	*Forced*	-															
(2)	*Non-Forced*	**-0.04**	-														
(3)	*IncreaseEnforce*	0.00	0.00	-													
(4)	*Ret*	**-0.16**	**-0.03**	0.01	-												
(5)	*ROA*	**-0.05**	-0.01	**0.02**	**0.21**	-											
(6)	*Size*	0.00	**0.04**	**-0.03**	**-0.02**	**-0.04**	-										
(7)	*MTB*	-0.01	0.00	**0.04**	**0.31**	**0.31**	**-0.27**	-									
(8)	*Leverage*	0.00	0.01	**-0.03**	**-0.08**	**-0.12**	**0.30**	**-0.29**	-								
(9)	*RetVol*	**0.09**	0.00	0.00	0.01	**-0.23**	**-0.37**	**0.23**	**-0.11**	-							
(10)	*Duality*	**-0.04**	**0.09**	-0.01	**-0.02**	**0.04**	**0.28**	**-0.05**	**0.09**	**-0.13**	-						
(11)	*Tenure*	**-0.05**	**0.04**	0.01	**0.04**	**0.07**	**-0.08**	**0.04**	**-0.07**	**-0.02**	**0.18**	-					
(12)	*Age>60*	**-0.07**	**0.20**	0.01	0.00	0.02	**0.10**	**-0.07**	**0.04**	**-0.12**	**0.21**	**0.36**	-				
(13)	*Own*	**-0.04**	**-0.02**	0.01	**0.02**	**0.08**	**-0.19**	**0.08**	**-0.07**	**0.07**	**0.05**	**0.38**	**0.11**	-			
(14)	*EquityPay>0*	**-0.05**	**-0.06**	**-0.02**	**-0.02**	**-0.03**	**0.17**	**-0.02**	**0.03**	**-0.05**	**0.07**	**-0.17**	**-0.08**	**-0.22**	-		
(15)	*Delta*	**-0.05**	-0.01	0.01	**0.12**	**0.18**	**0.27**	**0.27**	**-0.06**	**-0.04**	**0.18**	**0.29**	**0.10**	**0.46**	**-0.04**	-	
(16)	*StateUnemp*	**-0.02**	-0.03	**-0.06**	**0.09**	**-0.06**	**-0.06**	**-0.02**	**-0.05**	**-0.03**	**-0.10**	**0.02**	**0.02**	0.00	**-0.05**	**-0.04**	-
(17)	*StateGDP*	0.01	0.01	**-0.05**	**-0.05**	**0.03**	**-0.10**	**0.07**	**-0.03**	**-0.06**	0.00	0.01	**-0.02**	**0.02**	**-0.02**	0.01	**-0.27**

Table 3 Changes in CNC enforceability and forced CEO turnover

This table presents the estimation results of the regression of *Forced* based on our sample of firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. The explanatory variable of interest in Column 1 is *IncreaseEnforce* and, in Column 2, we interact *IncreaseEnforce* with *Ret*, which is market-adjusted stock returns for firm *i* in period *t*-1. All other variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced	
Variables	(1)	(2)
IncreaseEnforce	**0.010****	**0.010****
	(2.441)	**(2.235)**
IncreaseEnforce* × *Ret	**-**	**-0.023*****
	-	**(-8.436)**
Ret	-0.052***	-0.054***
	(-9.730)	(-10.361)
Size	0.021***	0.021***
	(6.461)	(6.428)
MTB	0.012***	0.012***
	(7.334)	(7.232)
Leverage	-0.013	-0.013
	(-1.285)	(-1.259)
RetVol	0.270***	0.274***
	(8.222)	(7.864)
Duality	-0.011*	-0.011*
	(-1.907)	(-1.919)
Tenure	0.003***	0.003***
	(8.516)	(8.554)
Age>60	-0.032***	-0.032***
	(-6.589)	(-6.607)
Own	-0.034	-0.034
	(-0.700)	(-0.699)
EquityPay>0	-0.030***	-0.030***
	(-8.141)	(-8.167)
Delta	-0.038***	-0.038***
	(-7.866)	(-7.855)
StateUnemp	0.216	0.211
	(1.033)	(1.011)
StateGDP	0.094*	0.091
	(1.680)	(1.659)
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	18,390	18,390
Adjusted R squared	0.063	0.063

Table 4 Changes in CNC enforceability and non-forced CEO turnover

This table presents the estimation results of the regression of *Non-Forced* based on our sample firms between 1992 and 2004. *Non-Forced* is an indicator equal to one if firm *i* experiences a non-forced CEO turnover in period *t* and zero otherwise. The explanatory variable of interest in Column 1 is *IncreaseEnforce* and, in Column 2, we interact *IncreaseEnforce* with *Ret*, which is market-adjusted stock returns for firm *i* in period *t*-1. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Non-Forced	
Variables	(1)	(2)
IncreaseEnforce	**-0.017*** **	**-0.016*** **
	(-3.907)	**(-3.925)**
IncreaseEnforce* × *Ret	**-**	**0.032*** **
	-	**(5.933)**
Ret	-0.002	-0.000
	(-0.451)	(-0.103)
Size	0.004	0.004
	(0.736)	(0.718)
MTB	-0.000	-0.001
	(-0.164)	(-0.260)
Leverage	-0.015	-0.015
	(-0.686)	(-0.714)
RetVol	0.098**	0.094**
	(2.313)	(2.235)
Duality	0.036***	0.037***
	(4.594)	(4.622)
Tenure	0.006***	0.006***
	(8.770)	(8.756)
Age>60	0.144***	0.144***
	(14.900)	(14.853)
Own	-0.064	-0.064
	(-0.905)	(-0.906)
EquityPay>0	-0.051***	-0.051***
	(-8.883)	(-8.810)
Delta	-0.026**	-0.026**
	(-2.257)	(-2.244)
StateUnemp	0.436	0.443
	(1.052)	(1.069)
StateGDP	0.153	0.157
	(1.472)	(1.509)
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	18,390	18,390
Adjusted R squared	0.070	0.071

Table 5 Competitive threats and forced CEO turnover

This table presents the estimation results of the regression of *Forced* based on our sample firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. In Panel A, we interact *IncreaseEnforce* with *High PMT* and interact *IncreaseEnforce* with *High PMT* and *Ret*. In Column 1 and 2 (Column 3 and 4), *High PMT* is based on *InStatePeers* (*InStateCompete*) and equal to one if *InStatePeers* (*InStateCompete*) is above the sample median and zero otherwise. *InStatePeers* is the number of industry peers operating in the state divided by the total number of industry peers at the beginning of period *t*. *InStateCompete* is the fraction of total industry sales generated by in-state competitors in period *t-1* (excluding sales of the firm itself). In Column 5 and 6, *High PMT* is based on *IndPCM* and equal to one if *IndPCM* is above the sample median and zero otherwise. *IndPCM* is measured as the sales-weighted industry-average of price-cost margin in period *t*-1. In Column 7 and 8, *IndPPNE* is used to create *High PMT*, which is equal to one if *IndPPNE* is below the sample median and zero otherwise. *IndPPNE* is the sales-weighted industry-average PP&E at the beginning of period *t*. In Panel B, we use *High Employee Turnover* as a conditioning variable, which is equal to one if the average employee turnover rate in period *t*-1 is above the sample median and zero otherwise. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

Panel A Product market threats and CNC enforceability

	Forced							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	InStatePeers		*InStateComp*		*IndPCM*		*IndPPNE*	
IncreaseEnforce	-0.007	-0.007	0.002	0.003	0.003	0.005	0.008	0.008
	(-1.017)	(-0.991)	(0.519)	(0.685)	(0.717)	(0.868)	(1.186)	(1.148)
High PMT	-0.002	-0.002	0.004	0.004	0.003	0.003	-0.013**	-0.013**
	(-0.316)	(-0.356)	(0.801)	(0.745)	(0.648)	(0.720)	(-2.533)	(-2.532)
IncreaseEnforce × High PMT	**0.024*** **	**0.023*** **	**0.014***	**0.011***	**0.015*** **	**0.014*** **	**0.006**	**0.005**
	(6.254)	**(5.908)**	**(1.716)**	**(1.804)**	**(3.148)**	**(2.726)**	**(0.814)**	**(0.645)**
Ret	-0.052***	-0.056***	-0.052***	-0.049***	-0.053***	-0.054***	-0.052***	-0.053***
	(-9.595)	(-9.858)	(-9.685)	(-8.210)	(-9.712)	(-6.019)	(-9.701)	(-9.418)
Ret × IncreaseEnforce	-	0.002	-	-0.011***	-	-0.025***	-	-0.007
	-	(0.318)	-	(-4.265)	-	(-4.203)	-	(-1.229)
Ret × High PMT	-	0.004	-	-0.009	-	0.008	-	-0.000
	-	(0.450)	-	(-1.500)	-	(0.711)	-	(-0.074)
Ret × IncreaseEnforce × High PMT	**-**	**-0.031****	**-**	**-0.021*** **	**-**	**-0.005**	**-**	**-0.034*** **
	-	**(-2.377)**	**-**	**(-2.865)**	**-**	**(-0.905)**	**-**	**(-4.967)**
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,390	18,390	18,390	18,390	18,390	14,915	18,390	18,390
Adjusted R squared	0.063	0.063	0.063	0.063	0.063	0.060	0.063	0.063

Panel B Labor market threats and CNC enforceability

	Forced	
Variables	(1)	(2)
IncreaseEnforce	0.006**	0.005**
	(2.391)	(2.044)
High Employee Turnover	0.005	0.005
	(1.524)	(1.569)
IncreaseEnforce* × *High Employee Turnover	**0.009***	**0.009***
	(1.806)	**(1.788)**
Ret	-0.054***	-0.050***
	(-8.913)	(-6.905)
Ret × *IncreaseEnforce*	-	0.008
	-	(0.611)
Ret × *High Employee Turnover*	-	-0.009
	-	(-1.232)
Ret* × *IncreaseEnforce* × *High Employee Turnover	-	**-0.051****
	-	**(-2.675)**
Control variables	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	15,749	15,749
Adjusted R squared	0.067	0.068

Table 6 Dynamic effects of changes in CNC enforceability on forced CEO turnover

This table presents the dynamic effect of changes in CNC enforceability based on our sample firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. $IncreaseEnforce^{pre}$, $IncreaseEnforce^{0}$, and $IncreaseEnforce^{post}$ are equal to one (negative one) if a firm's headquarter is located in a state where CNC enforceability increases (or decreases) in two years, increased (or decreases) in the current year, and increased (or decreased) one year or more ago, respectively, and zero otherwise. All other variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced	
Variables	(1)	(2)
$IncreaseEnforce^{pre}$	0.001	-0.005
	(0.124)	(-0.547)
$IncreaseEnforce^{0}$	-0.012	-0.009
	(-1.363)	(-0.908)
$IncreaseEnforce^{post}$	**0.016*** **	**0.011** **
	(3.852)	**(2.103)**
$IncreaseEnforce^{pre} \times Ret$	-	0.023
	-	(0.542)
$IncreaseEnforce^{0} \times Ret$	-	-0.001
	-	(-0.186)
$IncreaseEnforce^{post} \times Ret$	**-**	**-0.023*** **
	-	**(-8.554)**
Control variables	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	18,390	18,390
Adjusted R squared	0.044	0.063

Table 7 Alternative protection of proprietary information and forced CEO turnover

This table presents the results of the regression of *Forced* based on our sample firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. In Panel A, the alternative protection is based on *UTSA*, which is an indicator equal to one if the state enacted the protection of trade secret laws according to the UTSA and zero otherwise. The state enactment of the UTSA is obtained from Png (2017a, 2017b). In Panel B, the alternative protection is based on *IDD*, which is an indicator equal to one if the state adopts the IDD in period *t* and zero otherwise. The IDD adoption data is obtained from Klasa et al. (2018). All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

Panel A UTSA

	Forced			
Variables	(1)	(2)	(3)	(4)
UTSA	**0.001**	**0.001**	**-0.000**	**-0.000**
	(0.185)	**(0.179)**	**(-0.042)**	**(-0.040)**
Ret	-0.053***	-0.041***	-0.041***	-0.046***
	(-8.891)	(-7.113)	(-7.141)	(-6.075)
UTSA* × *Ret	**-**	**-0.016****	**-0.016****	**-0.010**
	-	**(-2.240)**	**(-2.217)**	**(-1.140)**
IncreaseEnforce	-	-	0.010**	0.010**
	-	-	(2.083)	(2.038)
IncreaseEnforce × *Ret*	-	-	-	-0.017**
	-	-	-	(-2.425)
			-	
Control variables	Yes	Yes	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes	Yes	Yes
Number of observations	15,668	15,668	15,668	15,668
Adjusted R squared	0.069	0.069	0.069	0.069

Panel B IDD

	Forced			
Variables	(1)	(2)	(3)	(4)
IDD	**0.000**	**0.000**	**0.001**	**0.001**
	(0.079)	**(0.092)**	**(0.194)**	**(0.159)**
Ret	-0.053***	-0.056***	-0.056***	-0.056***
	(-9.757)	(-7.954)	(-7.877)	(-8.113)
IDD* × *Ret	-	**0.008**	**0.007**	**0.005**
	-	**(0.926)**	**(0.905)**	**(0.597)**
IncreaseEnforce	**-**	**-**	0.010**	0.010**
	-	**-**	(2.373)	(2.294)
IncreaseEnforce × *Ret*	**-**	**-**	**-**	-0.022***
	-	**-**	**-**	(-8.172)
Control variables	Yes	Yes	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes	Yes	Yes
Number of observations	18,390	18,390	18,390	18,390
Adjusted R squared	0.062	0.063	0.063	0.063

Table 8 Internal versus external CEOs after forced CEO turnover

This table presents the results of the regression of *Forced & Internal CEO* in Column 1 and 2 and *Forced & External CEO* in Column 3 and 4 based on our sample firms between 1992 and 2004. *Forced & Internal CEO* is equal to one if the forced CEO turnover occurs in period *t* and the new CEO in period *t*+1 is one of the executives working for the current firm identified by ExecuComp in period *t*, and zero otherwise. *Forced & External CEO* is equal to one if the forced CEO turnover occurs in period *t* and the new CEO in period *t*+1 is one of the executives who is not working for the current firm identified by ExecuComp in period *t*. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced & Internal CEO		*Forced & External CEO*	
Variables	(1)	(2)	(3)	(4)
IncreaseEnforce	**0.009**	**0.009**	**0.001**	**0.001**
	(1.487)	**(1.399)**	**(0.260)**	**(0.234)**
IncreaseEnforce* × *Ret	**-**	**-0.018****	**-**	**-0.005**
	-	**(-2.053)**	**-**	**(-0.689)**
Ret	-0.029***	-0.030***	-0.024***	-0.024***
	(-7.505)	(-8.026)	(-5.890)	(-5.750)
Size	0.013***	0.013***	0.007***	0.007***
	(4.381)	(4.393)	(4.486)	(4.485)
MTB	0.006***	0.006***	0.006***	0.006***
	(4.420)	(4.515)	(6.210)	(5.875)
Leverage	-0.003	-0.003	-0.010	-0.010
	(-0.339)	(-0.310)	(-1.166)	(-1.148)
RetVol	0.194***	0.197***	0.076***	0.077***
	(6.114)	(6.088)	(3.100)	(3.112)
Duality	-0.009**	-0.009**	-0.002	-0.002
	(-2.027)	(-2.041)	(-0.819)	(-0.828)
Tenure	0.002***	0.002***	0.001***	0.001***
	(6.760)	(6.766)	(5.587)	(5.607)
Age>60	-0.020***	-0.020***	-0.012***	-0.012***
	(-5.565)	(-5.569)	(-4.760)	(-4.772)
Own	-0.036	-0.036	0.001	0.001
	(-1.170)	(-1.168)	(0.034)	(0.034)
EquityPay>0	-0.018***	-0.018***	-0.012***	-0.012***
	(-6.429)	(-6.430)	(-4.948)	(-4.917)
Delta	-0.023***	-0.023***	-0.015***	-0.015***
	(-7.960)	(-7.909)	(-3.700)	(-3.705)
StateUnemp	-0.015	-0.019	0.231	0.230
	(-0.088)	(-0.112)	(1.497)	(1.492)
StateGDP	0.084	0.082	0.010	0.010
	(1.567)	(1.548)	(0.250)	(0.237)
Fixed effects (Firm, Year)	Yes	Yes	Yes	Yes
Number of observations	18,390	18,390	18,390	18,390
Adjusted R squared	0.043	0.043	0.019	0.019

Table 9 CNC enforceability and market reactions to forced CEO turnover

This table presents the results of the regression of *BHAR* based on the firm-year observations of forced CEO turnover between 1992 and 2004. *BHAR* is the buy-and-hold abnormal returns of the five-day window surrounding the forced CEO turnover announcement dates. All other variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	BHAR
Variables	(1)
IncreaseEnforce	**0.041****
	(2.294)
Ret	0.047***
	(4.764)
Size	0.014***
	(2.742)
MTB	0.002
	(0.313)
Leverage	0.032
	(0.679)
RetVol	0.261**
	(2.058)
Duality	0.005
	(0.269)
Tenure	0.000
	(0.132)
Age>60	0.001
	(0.053)
Own	0.171
	(0.896)
EquityPay>0	0.014
	(1.422)
Delta	-0.024
	(-1.102)
StateUnemp	0.205
	(0.198)
StateGDP	0.458
	(1.069)
Fixed effects (State, Year)	Yes
Number of observations	433
Adjusted R squared	0.004

Table 10 Increased/decreased CNC Enforceability and forced CEO turnover

This table presents the results of the regression of *Forced* based on our sample firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. *PosEnforce* (*NegEnforce*) is an indicator variable equal to one if the state increases (or decreases) the enforceability of a CNC in period *t*, and zero otherwise. Florida increased the enforceability of a CNC between 1997 and 2004. Texas and Louisiana decreased the enforceability of a CNC between 1995 and 2004 and between 2002 and 2003, respectively. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced	
Variables	(1)	(2)
PosEnforece **(Florida 1997-2004)**	**0.016***	**0.015***
	(1.788)	**(1.732)**
NegEnforece **(Texas 1995-2004 / Louisiana 2002-2003)**	**-0.008*****	**-0.007****
	(-2.808)	**(-2.479)**
Ret	-0.053***	-0.053***
	(-9.736)	(-9.394)
PosEnforce **×** ***Ret***	**-**	**-0.029*****
	-	**(-5.821)**
NegEnforce **×** ***Ret***	**-**	**0.021*****
	-	**(3.856)**
Control variables	Yes	Yes
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	18,390	18,390
Adjusted R squared	0.063	0.063

Table 11 Accounting Performance measure and forced CEO turnover

This table presents the results of the regression of *Forced* based on our sample firms between 1992 and 2004. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. The firm performance measure in this table is the return on assets in period *t*-1, *ROA*, which is interacted with *IncreaseEnforce* in Column 2. All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced	
Variables	(1)	(2)
IncreaseEnforce	**0.010****	**0.021*****
	(2.421)	**(5.491)**
IncreaseEnforce* × *ROA	**-**	**-0.110*****
	-	**(-3.972)**
ROA	-0.006	-0.013
	(-0.257)	(-0.538)
Ret	-0.052***	-0.052***
	(-10.086)	(-10.155)
Size	0.021***	0.021***
	(6.718)	(6.710)
MTB	0.012***	0.012***
	(6.691)	(6.759)
Leverage	-0.014	-0.013
	(-1.410)	(-1.335)
RetVol	0.269***	0.270***
	(7.974)	(7.901)
Duality	-0.011*	-0.011*
	(-1.908)	(-1.911)
Tenure	0.003***	0.003***
	(8.498)	(8.525)
Age>60	-0.032***	-0.032***
	(-6.603)	(-6.666)
Own	-0.035	-0.034
	(-0.703)	(-0.700)
EquityPay>0	-0.030***	-0.030***
	(-8.087)	(-8.086)
Delta	-0.038***	-0.038***
	(-7.980)	(-8.002)
StateUnemp	0.216	0.214
	(1.037)	(1.026)
StateGDP	0.094*	0.087
	(1.681)	(1.588)
Fixed effects (Firm, Year)	Yes	Yes
Number of observations	18,390	18,390
Adjusted R squared	0.063	0.063

Table 12 CNC enforceability index and forced CEO turnover

This table presents the results of the regression of *Forced* based on the extended sample period between 1992 and 2015. *Forced* is an indicator equal to one if firm *i* experiences a forced CEO turnover in period *t* and zero otherwise. In Columns 1 and 2, *EnforceIndex* is the CNC enforceability index obtained from Garmaise (2011), and in Columns 3 and 4, *EnforceIndex* is obtained from Ertimur et al. (2018). All variables are defined in Appendix A. To avoid the undue influence of outliers, all continuous variables are winsorized at the .5 and 99.5 percentiles. Standard errors are clustered by state. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels (two-sided), respectively.

	Forced			
Variables	(1)	(2)	(3)	(4)
	Garmaise Index		Ertimur et al. Index	
EnforceIndex	0.000	0.000	-0.000	-0.000
	(0.204)	(0.190)	(-0.089)	(-0.102)
InStateCompete	-0.021	-0.018	-0.023	-0.020
	(-0.916)	(-0.827)	(-0.993)	(-0.908)
EnforceIndex* × *InStateCompete	**0.006**	**0.006**	**0.007**	**0.007**
	(0.956)	**(0.890)**	**(1.042)**	**(0.976)**
Ret	-0.056***	-0.076***	-0.056***	-0.076***
	(-12.596)	(-7.418)	(-12.601)	(-7.398)
Ret × EnforceIndex	-	0.004**	-	0.004**
	-	(2.190)	-	(2.205)
Ret × InStateCompete	-	0.087**	-	0.087**
	-	(2.658)	-	(2.638)
Ret* × *EnforceIndex* × *InStateCompete	**-**	**-0.019****	**-**	**-0.019****
	-	**(-2.196)**	**-**	**(-2.185)**
Size	0.013***	0.013***	0.013***	0.013***
	(7.074)	(7.082)	(7.065)	(7.075)
MTB	0.008***	0.008***	0.008***	0.008***
	(6.486)	(6.335)	(6.481)	(6.330)
Leverage	-0.003	-0.003	-0.003	-0.003
	(-0.365)	(-0.359)	(-0.351)	(-0.342)
RetVol	0.266***	0.266***	0.266***	0.266***
	(7.418)	(7.524)	(7.404)	(7.522)
Duality	-0.015***	-0.015***	-0.015***	-0.015***
	(-4.605)	(-4.611)	(-4.598)	(-4.603)
Tenure	0.002***	0.002***	0.002***	0.002***
	(9.411)	(9.468)	(9.416)	(9.471)
Age>60	-0.021***	-0.021***	-0.021***	-0.021***
	(-6.588)	(-6.604)	(-6.594)	(-6.608)
Own	-0.067**	-0.066**	-0.067**	-0.066**
	(-2.598)	(-2.541)	(-2.598)	(-2.538)
EquityPay>0	-0.021***	-0.021***	-0.021***	-0.021***
	(-9.435)	(-9.397)	(-9.426)	(-9.393)
Delta	-0.026***	-0.026***	-0.026***	-0.026***
	(-8.279)	(-8.327)	(-8.282)	(-8.332)
StateUnemp	0.199	0.192	0.196	0.189
	(1.151)	(1.158)	(1.138)	(1.144)
StateGDP	0.052	0.047	0.051	0.046
	(0.813)	(0.811)	(0.803)	(0.796)
Fixed effects (Firm, Year)	Yes	Yes	Yes	Yes
Number of observations	37,283	37,283	37,283	37,283
Adjusted R squared	0.055	0.055	0.055	0.055