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Director Liability Protection and the Quality of Outside Directors

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Abstract

We investigate how state Universal Demand statutes (UD) that lower director liability in derivative lawsuits affect recruitment and retention of outside directors. Using a difference-in-differences analysis, we document improvements in outside director experience following UD adoptions, especially for firms facing greater litigation risk or smaller local supplies of director candidates. UD adoptions also make high-quality director candidates from non-UD states firms more willing to join boards at firms incorporated in UD states. We find some limited evidence that UD adoptions help attract outside director candidates with better educational and professional backgrounds, and reduce voluntary departures of high-quality directors.

Keywords: Legal liability, board of directors, board quality, litigation, derivative suits

JEL Classifications: G30, G34

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"Corporate directorship had become a 'job nobody wants.'"

Baum, L., Byrne, J.A., *Business Week*, September 8, 1986, 56-61.

"Limiting the potential liability of directors will enhance the company's ability to attract and retain qualified individuals."

- The 1989 proxy statement of American Business Products Inc.

"Board seats are going begging [again]."

- Anne Fisher, *Fortune*, May 16, 2005.

"24.5% of bank respondents advised [the American Association of Bank Directors] AABD that at least one of the following had occurred during the past five years: director candidate refused offer to become director …, director resigned …, director refused to serve on Board Loan Committee or resigned from that committee because of fear of personal liability."

- AABD survey results on measuring bank director fear of personal liability are not good news, April 9, 2014[1]

1. Introduction

In this study, we examine whether director liability protections affect the recruitment and retention of outside directors – a topic that has hitherto received limited research attention. Under modern corporation law, directors owe fiduciary duties (duty of loyalty and duty of care) to shareholders and can be sued by shareholders for a perceived breach of such duties. However, after decades of debate, the question of whether directors should be subject to legal liability from shareholders or be protected from bearing this legal liability remains unsettled. An important reason is that theoretically there are different views on the costs and benefits of providing legal liability protections to directors.[2]

On one hand, director exposure to legal liability risk has an important deterrence value and creates stronger director incentives to work faithfully and with due diligence, thereby lowering director-shareholder agency costs. On the other hand, a high (low) level of legal liability exposure could cause directors to become overly conservative (aggressive) in terms of corporate risk-taking at the expense of shareholder value. In addition to these (ex-post) incentive effects of legal liability

[1] See http://aabd.org/aabd-survey-results-measuring-bank-director-fear-personal-liability-good-news/

[2] For brevity, we will use director protections to denote director liability protections in the remainder of the paper.

risk on director decision making, legal liability risk may crucially affect the ex-ante recruitment and retention of outside directors.[3] This is because outside director candidates are risk averse (Amihud and Lev, 1981; May, 1995) and director compensation is often small relative to their potential liability risk of being a fiduciary (Romano, 1989). This leads firms to frequently lament that insufficient director protections make it difficult to attract and retain good outside director candidates (Davis, 2008). This is vividly illustrated in the 1989 proxy statement of American Business Products Inc. cited at the opening of this paper.

During the U.S. director liability insurance crisis in the mid-1980s, a wave of outside director resignations prompted *Business Week* to proclaim on its cover that corporate directorship had become a "job nobody wants" (Baum and Byrne, 1986). Following 1985 Delaware's ruling in Smith vs. Van Gorkom case, director and officer liability insurance (D&O insurance) premiums skyrocketed, deductibles increased, and coverage shrank. As a result, many existing outside directors resigned and many candidates declined to serve on corporate boards (Romano, 1989). The Delaware legislature quickly responded to the D&O liability insurance crisis by revising its corporation law in July 1986. The revised section 102(b) (7) of the Delaware General Corporation Law allows companies to opt out of director liability for breaches of duty of care through company charters or bylaws, subject to shareholder approval. Many Delaware-incorporated companies subsequently amended their charters by adding director liability limitation provisions. By 2002, all states have revised their corporation law to adopt some forms of director liability limitation (Romano, 2006). As a result, it is not uncommon for companies to include a director indemnification provision or a director liability limitation provision in corporate charters/bylaws, or for companies to directly sign indemnification contracts with directors as allowed by state laws.

The crisis directly led to director-friendly amendments to the corporation law of Delaware and other states (Moodie, 2004; Davis, 2008).[4] It suffices to say that director liabilities or protections can affect a firm at two stages – ex-ante director recruiting and retention (that determines director

[3] In the paper, "ex-ante" refers to the stage before an outside candidate joins the board, and 'ex-post" refers to the stage after an outside candidate is appointed or re-appointed to the board.

[4] The Delaware legislature quickly responded to the D&O liability insurance crisis by revising its corporation law in July 1986. The revised section 102(b) (7) of the Delaware General Corporation Law allows companies to opt out of

and board quality) and ex-post director incentives (that affect director effort and decision making). While there are many studies on the incentive effects of director liability protections (e.g., on firm policies and performance), evidence of whether director protections help recruit and retain high caliber director candidates is surprisingly sparse.

A company's success depends crucially on the quality of its directors. This is because even if directors work diligently, if they are inexperienced, incompetent, have poor judgement, or are prone to adopting poor strategies, then shareholders will suffer (Hermalin and Weisbach, 2017).[5] The limited attention paid to how director protections affect board quality is, therefore, puzzling because abundant anecdotes exist and many surveys including some recent ones suggest that liability risk is an important consideration for outside director candidates when deciding whether to join a corporate board (see the opening quote of the AABD survey result). Reasons for this lack of evidence include difficulties in measuring director protections and director quality (which is a multifaceted concept), and in identifying a suitable experimental setting to help identify a causal relation. Existing director protection measures like liability-limiting provisions (LLPs) stipulated in firm charters/bylaws and D&O insurance are invariably endogenous as they are initiated by boards, rendering any interpretation unlikely to be causal.

Our study departs from the extant large literature on the effects of liability risk on the ex-post incentives and performance of directors and corporate financial decisions by focusing on the effect of director liability protections on ex-ante director recruiting and retention (that determines director and board quality). Specifically, we test whether plausibly exogenous shocks to director protections affect U.S. firms' ability to recruit and retain high-quality outside (non-executive) directors (hereafter labeled the talent attraction and retention hypotheses). We exploit the staggered passage of state Universal Demand laws as a quasi-natural experiment and conduct a difference-in-differences (DiD) analysis of the talent attraction and retention hypotheses.

[5] There are numerous anecdotes to support the need to recruit high-quality directors. Tom Neff, Chairman of Spencer Stuart, said in 2005 that "some of the most *experienced* board members are unavailable [after SOX]." (Emphasis is added by the authors.) A Wall Street Journal article carried a title "More CEOs Say 'No Thanks' To Board Seats" (by Anita Raghavan, *The Wall Street Journal*, January 28, 2005, https://www.wsj.com/articles/SB110686483968738543).

Throughout this study, a high-quality director is defined as a director who has higher capability (measured by experience, education and professional background).[6] But, it is important to note that a high-quality director may or may not have stronger ex-post incentives to perform after she/he joins a board. This is because such incentives are also shaped by the level of legal liability exposure and factors such as the level and structure of director remuneration, various governance mechanisms, etc.

In the U.S., shareholder litigation includes 1) class action lawsuits brought by shareholders who feel they have been directly harmed by certain company behavior (e.g., financial misreporting that inflates stock price) and 2) derivative (law)suits brought by shareholders on behalf of the company when the board causes harm to the company and thereby indirectly damages shareholder interests. Unlike class action suits, any recovery from a derivative suit accrues to the company, rather than to plaintiff shareholders. Derivative suits can cover a wide range of causes of actions including misreporting, disclosure irregularities, insider trading, board failure to prevent company misconduct, inappropriate executive compensation, and questionable mergers and acquisition (M&A) deals (Davis, 2008; Erickson, 2010).

There is also a debate about both the financial compensation and governance effects of derivative suits. For example, opponents of derivative suits (e.g., Romano, 1991) argue that they are often frivolous and represent a dead weight cost on the corporation. However, Ferris et al. (2007) find that derivative suits tend to target firms with more managerial agency problems and that these targeted firms show a subsequent improvement in board independence and other dimensions of governance. They conclude that derivative suits can serve as an effective governance mechanism.

Whether frivolous or meritorious, derivative suits constitute a litigation threat for risk-averse outside directors because such suits impose potential monetary costs in the form of personal liability, reputational costs, and involve significant director time and effort in preparing to defend against such lawsuits. In fact, shareholders tend to file more derivative suits than class action suits (Erickson, 2010). It is important to note that in derivative suits the plaintiff typically strategically targets *all*,

[6] We detail our measurements of quality later in this section.

rather than specific individual directors on the board to circumvent the onerous demand requirement explained below and in Section 2.[7]

To reduce incidences of frivolous derivative suits and better protect directors, a total of 23 U.S. states passed a universal demand statute (hereafter as "UD") between 1989 and 2005 that requires shareholders to obtain board support before a derivative suit can commence. The court will not second-guess a board's refusal to act on shareholder demands provided it is a business judgement made by disinterested and independent directors (Moodie, 2004). Given the formidable procedural barrier created by UDs, director litigation risk declined significantly in the adopting states.[8] Accordingly, we expect high caliber outside candidates to become more willing to serve on boards of firms incorporated in UD-states if the talent attraction and retention hypotheses are valid. On the other hand, UDs only govern derivative suits, and have no impact on shareholder class action suits. Also, directors enjoy various other legal protections from LLPs stipulated in a firm's charter/bylaw (to the extent permitted by state law) and D&O insurance coverage. Thus, it is possible that UD adoption may not add incremental legal protection and so it may not significantly affect recruiting and retention of high caliber directors. These possibilities add tension to our hypotheses and make it harder for us to find support for these two hypotheses.

We select ten director quality characteristics, which are hand-collected from corporate proxy filings, and divide them into two broad categories: an experience metric and an educational and professional background metric. Characteristics reflecting a director's experience include a director's general managerial experience as a key executive at other firms, experience at firms having superior performance, experience at firms active in successful innovation, director experience in an S&P 1500 firm, and the number of outside directorships held. Characteristics regarding educational and professional background capture a director's educational, financial, legal, and (same) industry expertise. Following Callahan et al. (2003), Dey (2008) and Qin et al. (2018), we calculate the first principal component of the five characteristics in each of these two categories to summarize the quality of outside directors. We validate our director quality measures by showing

[7] In addition, the roles of individual directors in many business decisions may not be transparent to outside investors, and as a result, it may be infeasible for outside investors to evaluate which directors have good versus poor performance.
[8] Appel (2019) finds that the probability of derivative suits drops by about 40% after UD adoptions.

that they are positively related to more profitable large M&A investments and more valuable patent innovations, which are two major actions that can strongly affect a firm's long-term success.

We find that the quality of nominated outside directors significantly improves following UD adoption in terms of their experience relative to industry-size-year matched control firms incorporated in states without UDs. Importantly, these results are robust if we require industry-size-year matched control firms to be headquartered in the same state (but incorporated elsewhere) or in an adjacent state. This latter approach provides sharper identification since treatment firms and control firms are exposed to the same economic environment based on their headquarters states, and the only major difference is that the treatment and control firms and their directors are governed by different sets of corporation laws that shape the different levels of litigation risk faced by outside directors. We also find significant improvements in firms operating in industries targeted by more frequent shareholder derivative suits and for firms incorporated in Pennsylvania. Interestingly, around UD adoptions, we find only weak evidence that the educational and professional background of outside directors improves, coming primarily from evidence for firms incorporated in Pennsylvania and those firms facing higher litigation risk.

It is possible that firms value directors more when they have more experience, and firms generally pay more attention to directors' demonstrated experience than to directors' educational backgrounds and qualifications (Tenenbaum, 2017). It is possible that experienced director candidates, tend to be more time constrained and more concerned about potentially large reputational losses arising from litigation, and consequently are more difficult to recruit, while candidates with other credentials (degrees, financial, legal and industry background) are more readily available and easier to hire.

Our results are consistent with a causal interpretation since they do not exist before UD adoption, and they hold after UD adoption in Pennsylvania through a state Supreme Court ruling in *Cuker v. Mikalauskas* (1997) that is free of any corporate lobbying concerns. In robustness checks, we find no evidence that these results are due to: the passage of the Sarbanes-Oxley Act (SOX) and the ensuing NYSE and NASDAQ listing rule changes that required independent boards, changes in various state antitakeover laws, or changes in the way a firm compensates its outside directors.

There is also evidence that after UD adoptions high-quality director candidates in non-UD states are more willing to join the boards of firms in UD-adopting states.

We find some limited support for the talent retention hypothesis. Specifically, UD adoptions lower the voluntary departure rate of high-quality directors. However, the effect of UD adoptions on lowering director turnover rate does not differ between high-quality and other outside directors. It is possible that in addition to legal liability risk, other factors (e.g., relationship with the CEO, availability of outside options, as well as possible board changes following a CEO turnover) affect whether existing directors choose to retain their board seats (Faleye, 2007).

We also examine the heterogeneous effects of UD protection on outside director recruiting across firms. We find that the talent attraction effect is more pronounced in firms facing higher litigation risk and in high-technology companies that face many large risky investment decisions, when director quality is measured by the experience metric. This is confirmation that UD adoptions improve director quality through the litigation channel. In our tests, we classify firms as having high litigation risk when firms operate in an industry that experiences more frequent derivative suits or are involved in frequent M&A transactions (Thompson and Thomas, 2004; Lin et al., 2011).

We also find that the effect of UD adoptions on outside director recruiting does not significantly vary with the extent of liability-limiting provisions (LLPs) stipulated in a firm's charters/bylaws before UD adoption, suggesting that the director protection afforded by UDs is valuable because it helps reduce the likelihood of shareholder derivative suits. In contrast, LLP protections only limit the amount of director liability in the event of a derivative suit. This helps explain why given the existence of LLPs, UDs are still passed since they provide added director protections. Knyazeva et al. (2013) show that the local director labor market influences outside director recruiting. Echoing this view, we find that the effect of UD adoptions on outside director quality (measured by the experience metric) is stronger in firms near smaller pools of local director candidates, and therefore they face greater difficulties in recruiting outside director candidates.

Our primary contribution to the literature is to add to the limited evidence on the talent attraction and retention hypotheses that posit that stronger director legal liability protections help firms recruit and retain high caliber director candidates – a popular and widely held belief among

companies. Using a sample of reincorporations announced between 1980-1992, Heron and Lewellen (1998) find a positive market reaction if firms' stated reason for reincorporation is to limit director liability to attract outside directors. These firms subsequently increase outside director representation by 4.9% in two years after the reincorporation. Their study confirm that outside director candidates are concerned about the liability risk, but it does not examine whether there is a change in the quality of outside directors or the retention of high-quality outside directors.

In examining how director protections affect bond yields, Bradley and Chen (2011) employ a supplemental test that relates LLP protections in corporate charters/bylaws to the appointment and departure rates of high-quality directors. To the best of our knowledge, this is the only published study using U.S. data to test the talent attraction and retention hypotheses, but they find insignificant results. Measuring director quality by the number of outside directorships and the fraction of board members who are active executives at other firms, Bradley and Chen find no support for the talent attraction and retention hypotheses. This may not be surprising given that LLP provisions date back to the 1980s and therefore, the data may lack significant time-series variation. Also the LLP adoptions and reincorporations are invariably firm choices, which are generally endogenous.

Our study exploits exogenous changes in state law in comparison to endogenous LLP adoptions, reincorporations, or D&O insurance purchases. We find the first piece of U.S. based evidence that provides causal support for the widely claimed talent attraction and retention hypotheses. We also evaluate whether our findings can be driven by firms' higher demand for high-quality directors post-UD adoption, rather than by an improved supply of willing high-quality director candidates, and we conclude that this demand improvement argument is unlikely to hold. In particular, we note that in order to explain our results the demand improvement argument (if valid) must also be predicated on a larger supply and higher willingness of high-quality director candidates to serve, which is caused by UD adoption (see Section 4.8.2 for detail).

Our evidence, together with the abundant extant evidence on how litigation risk affects the incentives of directors (and officers), facilitates a better understanding of the pros and cons of

director legal protections (or liability).[9] The ongoing and lingering debate over director liability is vividly highlighted by the waves of legal changes made in the U.S. that sometimes reduce director protections and sometimes strengthen them. Notable changes include Delaware's 1985 ruling in the *Smith vs. Van Gorkom* case that reduced director protections and the ensuing state-level statutory changes that increased director protections, the state-level adoptions of Universal Demand laws that raised the bar for derivative suits, and two federal laws, namely the 1995 Private Securities Litigation Reform Act (PSLRA) that raised the hurdles for bringing securities class action lawsuits, and the 2002 Sarbanes-Oxley Act (SOX) that increased director liability.

We find some evidence that a large improvement in outside director quality following the UD adoption is associated with a more positive change in operating performance around UD adoption when close shareholder monitoring is able to constrain the adverse director incentives resulting from UD adoption. Our result that UD adoption makes it easier for firms to attract and retain high-caliber outside directors can help explain why on average UD adoption is only associated with a small reduction in firm value (Appel, 2019). It also partially explains why post UD adoption firms appear to make better M&A decisions (Chu and Zhao, 2019) and innovation decisions (Lin et al., 2020).

2. Institutional background and hypothesis development

2.1 Shareholder derivative suits and Universal Demand laws

Under state corporation law, the board has legal responsibility in lawsuits against third parties for harmful actions (e.g., directors of the firm). Therefore, before shareholders can bring a derivative suit, they are required to demand that the board take corrective actions. If the board responds positively to the demand, then it agrees either to take corrective actions or to sue the responsible directors and/or officers. At least some directors are typically named as defendants in derivative

[9] Some early event studies based on a small sample size (e.g., Netter and Poulsen, 1989; Janjigian and Bolster, 1990; Brook and Rao, 1994) find either insignificant or weakly negative market reactions to increasing director protections. Later studies (e.g., Chung and Wynn, 2008; Wynn, 2008; Zou et al., 2008; Lin et al., 2011, 2013, 2019; Aguir et al., 2014; Donelson and Yust, 2014; Appel, 2019) find evidence generally consistent with a net cost of director protections: protections tend to exacerbate agency problems by lowering the vigilance of directors and increasing their risk-taking. Some recent studies (e.g., Chu and Zhao, 2019; Guan et al., 2019; Lin et al., 2020) find that liability protections may also have a bright side by facilitating firms' innovation activities.

suits, and boards in most cases dismiss these shareholder demands. When a board rejects such a demand, courts typically do not second-guess a board's dismissal under the business judgement rule.

There is, however, a futility exception. This allows shareholders to bring a derivative suit without the consent of the board if they can show to the court that making a demand to the board would be futile. The futility exception can be nominally satisfied if shareholders strategically name either a majority of or all the directors as defendants in the suit so that the board is almost sure to dismiss shareholder demands. Before the passage of UDs, this litigation strategy was often used by shareholders to circumvent the onerous demand requirement. In addition, outside investors may not observe the actual diligence of individual directors and so may be unable to tell which directors have good or poor performance. As a result, director candidates regardless of their behavior or diligence face ex-ante litigation risk, which may lead them to refuse to serve on the board.

After a plaintiff files a derivative suit, the defendant seeks dismissal and the plaintiff has an opportunity to come before a judge and contest why demand is futile because of specific facts. This specific litigation process entails significant judicial time and resources and overburdens courts (Kinney, 1994). The futility exception also enabled some activists to abuse the opportunity to bring derivative suits. This led Romano (1991) to argue that many derivative suits are frivolous and primarily benefit the attorneys involved, leaving little financial returns for the company concerned.

To reduce frivolous derivative suits, further protect directors from litigation, and conserve judicial resources, 23 states between 1989 and 2005 adopted UDs that require shareholders to first obtain the board's consent prior to a derivative suit (i.e., mandating the demand requirement), unless doing so could result in irreparable harm to the firm. The court will not overrule the board's demand refusal so long as it falls within the business judgement rule where disinterested independent directors comprising a special litigation committee (SLC) of the board review the demand and decide to dismiss it.[10] Because of the steep legal barrier created by UDs, director litigation risk

[10] Curtis (2018) develops a model that incorporates meritless suits, value-decreasing suits, and self-interested plaintiffs' attorneys and shows that even given all these potential costs, permitting disinterested SLCs to dismiss shareholder derivative suits may decrease firm value by reducing the ex-ante deterrent threat of litigation. Consistent with this view, Appel (2019) finds that without monitoring by block holders, firm operating performance declines after their incorporation states pass a UD statute.

arising from derivative suits was significantly reduced. Table 1 reports the effective year of each state's UD adoption.

2.2 Hypotheses development

Companies frequently lament that litigation risk makes it difficult to attract and retain high caliber director candidates since outside candidates are typically risk-averse (Amihud and Lev, 1981; May, 1995; Davis, 2008) and director compensation is often small relative to potential legal liability risk (Romano, 1989). An important source of this risk is derivative suits brought by shareholders on behalf of the company that often allege directors have breached their fiduciary duties. Derivative suits may cover a wide range of causes of actions including misreporting and irregularities in disclosures, insider trading, board failure to prevent company misconduct, excessive executive compensation, and questionable M&A deals (Davis, 2008; Erickson, 2010). [11]

After the 1995 PSLRA enactment, which raised the hurdle for filing securities class action suits, shareholders responded by increasing the use of derivative suits (Davis, 2008) or simultaneously filing both securities class actions and derivative suits for the same cause of action (Erickson, 2010). As a result, shareholders tended to file more derivative suits than securities class actions, and derivative suits became a major tool for activist shareholders and attorneys eager to discipline company directors (Erickson, 2010). Ferris et al. (2007) find that firms with greater managerial agency problems are more likely to become targets of derivative suits, which sue a firm's board to improve board independence, among other governance changes. They conclude that derivative suits are not frivolous as is often claimed, and that they can instead serve as an effective governance enhancing mechanism. Curtis (2018) emphasizes that the value of derivative suits is not their ex-post remedial benefit (if any), but their ex-ante deterrence effect. Nevertheless, some derivative suits can be frivolous and there is an ongoing debate over the financial compensation effect and governance effects of derivative suits (Erickson, 2010). Regardless of whether derivative suits are

[11] For example, shareholders of Talmer Bancorp (the bidder) alleged that Talmer's board breached its fiduciary duty of care by pursuing a transaction with Chemical Financial Corp (the target) against the best interests of Talmer's shareholders, and for the benefit of certain board members. In 2017, Tesla's shareholders filed derivative and putative class action lawsuits alleging that Tesla's board and Elon Musk breached their fiduciary duties (of loyalty) by approving the acquisition of SolarCity (founded by Musk and his cousins) to the detriment of Tesla's shareholders.

frivolous or meritorious, they constitute a significant threat to all directors, especially new outside candidates who face additional legal liability risk by joining the board.

Derivative suits impose significant costs on directors in at least three ways. First, they expose directors to potential monetary losses. In most states, corporate indemnification of directors is limited to the defense costs in derivative suits, and it does not cover settlement and damage awards (in contrast, there is no such indemnification restriction in direct class action suits) (Romano, 1991). The monetary losses from lawsuit settlements, albeit rare, can discourage risk-averse candidates from serving as directors, including high-quality candidates committed to meeting their fiduciary duties.[12] Moreover, over time courts can change the standards needed to win lawsuits and the applicability of the business judgement rule (Ferrara et al., 2013).[13] Second, derivative suits may cause reputational damage to directors who are named as defendants, even if the plaintiffs of such suits do not prevail ex post (Erickson, 2010). Reputational damage may be material enough to have adverse labor market consequences for the directors involved. Brochet and Srinivasan (2014) provide evidence on this reputation risk for directors named as defendants in securities class actions, and it is reasonable to expect that a similar effect occurs in derivative suits. Third, the lengthy and complex legal procedure itself may consume significant amounts of director time and energy and distract their attention from important business decisions.

While directors are generally covered by D&O insurance, this coverage has some important limitations. First, D&O insurance may be insufficient to pay for the full settlement or damage award as it can be exhausted by exorbitant legal fees (Black et al., 2006). For example, the ten former directors of WorldCom and the ten former directors of Enron had to pay a combined total of $31 million to settle shareholder class actions against them after the claims exceeded the available D&O insurance coverage (see "U.S. Directors Fear for Own Pockets", Asian Wall Street Journal, January 14-16, 2005). Second, companies face some uncertainties about the applicability of D&O insurance

[12] While the chance of having an out-of-pocket settlement is low, the potential size of a settlement can easily far exceed a director's annual remuneration. This low chance of out-of-pocket settlement may deter risk-averse outside candidates from joining a board (because the remuneration is not worth the risk). Consistent with this argument, almost every outside director demands D&O insurance coverage before agreeing to join a board (Lin et al., 2013).

[13] Court cases can also change the level of director liability and the costs of settlement. Clearly, substantially greater penalties have been imposed on CEOs and other senior managers in recent years. Also, other common law countries have witnessed large director paid settlements such as in Australia.

coverage. D&O policies typically contain a cancellation provision, which allows an insurer to cancel its policy for any reason or no reason at all after a specified advance notice period (Romano, 1989; Ferrara et al., 2013). In addition, as in any other type of insurance contract, a D&O insurer has the right to rescind a policy based on a material (including innocent) misrepresentation or omission in the insurance application (Ferrara et al., 2013). While cancellation and rescission of D&O insurance policies have been traditionally uncommon, D&O insurers have increasingly looked for opportunities to rescind existing policies after a surge in D&O insurance claims following the 2008 financial crisis (Asadourian and Ross, 2017; also see a 2018 rescission case for Professional Collection Consultants discussed in LaCroix (2018)). Third, and more importantly, D&O insurance does not reduce the incidence of litigation, and it can actually *increase* its chances since litigation lawyers prefer to target companies with deep pockets, including the insurer's pockets (Gillan and Panasian, 2015). As a result, D&O insurance may not cover all settlements, and it clearly does not cover reputational damage or the cost of director time and effort involved in fighting litigation. Thus, it is unlikely that the existence of D&O insurance can fully alleviate outside director concerns about litigation risk, and indeed, UDs were passed in various states to provide further liability protections to directors.

UD adoptions make it difficult for plaintiff shareholders to get around the demand requirement by arguing for demand futility in bringing a derivative suit. It therefore significantly increases director protections by lowering the incidence of derivative suits (Appel, 2019; Lin et al., 2020). As a result, director concerns over this potential litigation risk can be mitigated when a candidate is considering joining a board, or an existing director is considering remaining on a board. This reasoning leads to the following hypotheses:

H1: Firms incorporated in states that adopted a UD exhibit a subsequent improvement in the quality of nominated outside directors (i.e., the "talent attraction hypothesis").

H2: Firms incorporated in states that adopted a UD subsequently exhibit a lower turnover of existing high-quality outside directors (i.e., the "talent retention hypothesis").

Two caveats are worth mentioning. UDs only lower the incidence of derivative suits, but not shareholder class action suits. In addition, directors already enjoy various other legal protections including liability-limiting provisions (LLPs) stipulated in a firm's charters or bylaws (to the extent permitted by state laws) and D&O insurance coverage. Thus, it is possible that UD adoptions offer directors only minimal incremental liability protection and so, it may have an insignificant effect on director recruiting and retention. These possibilities add tension to our hypotheses.

Faleye (2007) notes that factors affecting a director's retention are more complex than factors affecting a director's initial recruiting. Therefore, the predicted effects of director liability protections on director retention are likely to be weaker than on initial director recruiting for several reasons. First, after a director has been on the board for a term, he or she is likely to have a better understanding of the company (e.g., its culture, working atmosphere, risks) and may have developed closer company ties (e.g., developing close relationships with the CEO and other directors) and have built up substantial firm-specific human capital (Faleye, 2007). As a result, litigation risk may be only one of the many aspects that an incumbent director considers when deciding whether to leave a board. In contrast, when a new candidate is deciding whether to join a board, he or she has less in-depth understanding of the company and fewer ties with the firm's officers and directors. Thus, a new director candidate is likely to give more weight to potential liability risk. Second, whether a director is retained also depends on a director's performance. Brochet and Srinivasan (2014) provide evidence that directors who are named in shareholder litigation are more likely to depart, potentially at the board's request. Third, high-quality directors may leave the board for reasons unrelated to litigation risk such as to pursue better outside opportunities. Fourth, director turnover often occurs following CEO turnover since a new CEO often seeks to bring in new directors whom they know to replace some of the existing directors (Faleye, 2007).

3. Research design, sample selection, and summary statistics

3.1 Data and sample selection

UDs were adopted by 23 U.S. states on a staggered basis between 1989 (in Georgia and Michigan) and 2005 (in Rhode Island and South Dakota) as documented in Table 1. We identify all non-financial firms (SIC codes outside the 6000-6999 range in our sample period) incorporated in a state that adopted a UD as treatment firms. We obtain each firm's historical incorporation state and headquarters state data from EDGAR and backfill the missing data for earlier years with the first non-missing record reporting their incorporation or headquarters state.

We obtain financial statement data from Compustat and require our treatment firms to be incorporated in one of the 23 UD-adoption states and to have market capitalization data available from the year before UD adoption through the year after adoption. We drop firms that changed their state of incorporation over the seven-year event window [-3, +3] straddling the year of the law's adoption year (i.e., event year 0) (because such re-incorporations to another state are endogenous decisions that can bias our analysis), and drop firms without proxy statement filings available in years [-1, +1] from EDGAR, Thomson One, SEC Online (accessed via LexisNexis), or from hard copies of corporate filings that we ordered from Thomson Reuters for earlier years before electronic filings were available on EDGAR.

Following Masulis and Mobbs (2011, 2014), we construct a matched control sample. This approach offers three advantages. First, it enables us to conduct a fixed-window analysis (3 years) around the event year to minimize the influence of confounding factors that can arise over a long continuous sample period. Second, it helps mitigate concerns that treatment firms and control firms might differ in important firm characteristics, and that these sample differences may drive any observed differential change in the quality of outside directors between treatment and control firms around these statutory changes. Third, using a matched control sample makes the workload associated with hand collection of individual director's biographic information more feasible.

Firm size is shown to be a good proxy for director reputation incentives (Knyazeva et al., 2013; Masulis and Mobbs, 2014) and shareholder litigation exhibits industry patterns (Lin et al., 2011). Thus, our control firms comprise one-to-one size (equity market value) matched firms incorporated in states that do not have a UD as of the end of the sample period and belong to the same Fama and French (FF) 49 industry in the year before UD adoption. Importantly, once a matched pair of

treatment and control firms is formed in the year = -1, we follow this pair of firms through the event window [-3, +3] to obtain a panel data set that enables us to include firm fixed effects in a difference-in-differences framework. We impose the same data availability requirements on the control firms: having proxy statement available in the event period [-1, +1] and having experienced no change in the state of incorporation over the event years [-3, +3]. Our final matched sample contains 375 treatment firms from the 23 states that adopted a UD, and their one-to-one industry-size-year matched control firms from other states without a UD.[14] For each treatment and control firm, we hand collect director biographic information for up to three years before, and up to three years after the UD adoption year subject to the availability of firm proxy statements.

Directors can be divided into three categories, namely, firm insiders or executives (E), affiliated, grey or linked outsiders (L), and independent outsiders (I) based on the information provided for each director in the proxy statements. We focus on outside directors (both independent and linked) throughout our analysis for three reasons. First, unlike outside directors, executive directors are less free to choose to join or to depart from the board because they are company employees. Executive directors are therefore excluded from our analysis. Second, linked directors could provide valuable advisory services to the firm because they can be retired executives of the company, or executives of business suppliers/service providers and thus, they can have in-depth knowledge and understanding of the firm and its industry. Third, most UDs were implemented before 2000 when there is no clear and consistent definition of independent directors in director disclosure requirements.[15] Thus, we include both independent and linked director candidates who are nominated for election at the annual shareholder meetings to test the talent attraction hypothesis. For non-classified boards, all board seats are up for election each year; for staggered boards, typically one third of the directors are up for election each year. We control for the percentage of linked directors in the firm-level regressions and employ an indicator for linked directors in the

[14] Once a matched pair is found, we assign a pseudo-event year to the matched control firm and the pseudo-event year equals the event year of its corresponding treatment firm.

[15] Consistent with this view, we observe, in our process of manual data collection, that firms do at times regard linked outside directors as independent directors despite their discernible linkage (e.g., former employment, business relation) with the company. We correct this misclassification by firms when we find evidence in the filing that a director is not truly independent.

director-level regressions to account for the possibility that linked directors differ from independent director candidates in quality. As a robustness check, we also separately examine independent directors, and find broadly consistent results in this subsample of outside directors.[16]

3.2 Measures for the quality of outside director candidates

3.2.1 The director quality measures

Based on the information provided in director biographies disclosed in annual proxy statements for each firm-year, we focused on ten director quality characteristics, and divide them into two broad categories. The characteristics in the first category capture an outside director's experience before nomination. The characteristics in the second category reflect an outside director's educational (i.e., degree) and professional (i.e., financial, legal, and industry) background.

For the experience measure, we employ five quality characteristics. The importance of the experience of director candidates is echoed by Tom Neff, Chairman of Spencer Stuart, who said in 2005 that "some of the most *experienced* board members are unavailable [after SOX]." Our first quality measure is whether an outside director is an *active* key executive of another company before nomination (*Key_exec*). Following Knyazeva et al. (2013), we define an active key executive as an executive holding one or more of the following management titles: chief executive officer (CEO), president, chairman, chief financial officer (CFO), chief information officer (CIO), chief operating officer (COO), vice president (VP), executive VP, senior VP, partner, managing director, or treasurer. To identify whether any of the above titles is current and active, we read each biography and manually code each item. Masulis and Mobbs (2014) use this executive position measure to capture a director's general managerial skills and experience.

Superior firm performance could reflect director quality, and directors of such companies are often rewarded with more directorships in the labor market (Fama, 1980; Fama and Jensen, 1983). We therefore include an indicator denoting whether an outside director is from a public company with above median industry performance, measured by return on assets (ROA) in the year before nomination (*HP_firm*). Industries are defined using the Fama-French (FF) 49 industry classification.

[16] Unless stated otherwise, directors from now on refer to nominated outside directors.

Innovation is vital to the development of a firm's core competitive advantage (Solow, 1957) and is the growth engine of a firm (Kang et al., 2018), and this is particularly true in today's knowledge-based economy. A firm's success in innovation may reflect the quality of its directors which we capture by an indicator variable for whether an outside director comes from a firm whose number of patent grants exceeds the industry median in the year prior to nomination (*HI_patents*). Patent data are obtained from Kogan et al. (2017), which cover all U.S. patents granted by the U.S. Patent and Trademark Office (USPTO) over the 1926-2010 period.

Another experience measure is whether an outside candidate is a director of an S&P 1500 company before nomination (*S&P 1500*). We also use whether an outside director holds more than one corporate board seat before nomination (*Multiple_seats*) as an experience proxy, since directors holding multiple outside directorships tend to be more experienced.[17] The variable takes the value of one if an outside director in the year before nomination is employed at a S&P 500 index firm, equals 2/3 if an outside director comes from a S&P midcap index firm, equals 1/3 if an outside director comes from a S&P small-cap index firm, in the year before nomination, and equals zero otherwise. Directors serving in large S&P 500 companies are likely to have wider horizons and better judgement in decision making (Masulis and Mobbs, 2014).

To account for educational background, we focus on the highest university degree held by an outside candidate (*Degree*), which equals one for a doctorate degree, 2/3 for a Master degree, and 1/3 for a Bachelor degree. Given an MBA degree's importance to business education and firm management, we include a separate indicator variable to denote an outside director candidate with an MBA degree (*MBA*). Director financial and legal expertise has become more important after the enactment of SOX, which imposes a financial expertise requirement on boards (Linck et al., 2008). To capture this, we include professional background indicators for whether an outside director has financial expertise (captured by a *Financial* indicator, which equals one if an outside director has a financial background (is/was a CFO, a treasurer, a banker, an accountant, an auditor, or a securities broker; or worked/is working in venture capital, private equity, or investment banking; or majored

[17] Nevertheless, our results remain similar if we use an alternative quality measure based on whether an outside director holds 1~3 board seats, and therefore, this multiple outside directorship measure does not simply capture busyness.

in finance or accounting at university), legal expertise (captured by a *Legal* indicator, which equals one if a director was/is an attorney, a legal counsel, a lawyer or majored in law), and same-industry expertise (captured by an *Industry* indicator, which equals one if an outside candidate is/was an executive or a director of a listed company in the same FF49 industry as the focal company). Wang et al. (2015) show that relevant industry expertise helps an outside director better monitor the firm in which she serves. Please see Appendix A for details of the variable definitions.

Following the approach of Callahan et al. (2003), Dey (2008) and Qin et al. (2018), we annually extract the first principal component of the first five director characteristics (i.e., *Key_exec, HP_firm, HI_patents, Multiple_seats, S&P 1500*) to capture director experience, and denote it by *Experience*. We use the first principal component of the remaining five director characteristics (i.e., *Degree, MBA, Financial, Legal, Industry*) to capture a director's educational and professional background, which we denote by *Educ & Prof Backg*.

Holding their incentives constant, high-quality directors should be able to make better business decisions and add more to firm value. This should be especially the case when such business decisions are complex and involve significant judgment. To validate our two director quality measures, we show in regression analysis reported in Appendix B that they are positively related to the success of two important complex investment decisions, namely large M&A deals (as measured by higher deal announcement returns) and innovation or patent success (as measured by the average and total market value of patents granted).

Panel A of Table 2 reports the means of the ten director characteristics and two first principal component-based composite quality metrics for nominated outside directors in each firm-year, as well as other major firm characteristics. We winsorize the continuous variables at the 1st and 99th percentiles. Panels B and C of Table 2 display the correlation between the two first principal components and their individual components, respectively: the correlations are generally positive and large.

3.2.2 Comparison of firm characteristics of treatment and control firms

We further examine the difference in firm characteristics of treatment and control firms in the year prior to a state's UD adoption. Table 2 Panel D reports the comparison results, and this evidence

shows that there is no significant difference in the observed major firm characteristics as well as the expected compensation of outside director candidates between treatment and control firms, suggesting that there is close matching between treatment firms and control firms. In addition, the average year-to-year growth rates of the two director quality metrics are similar between treatment and control firms, suggesting that the parallel trend assumption before UD adoptions is likely to be satisfied. Nevertheless, this assumption is more formally tested in Section 4.3.

3.3 Model specification

To test the effects of staggered UD adoptions across states on a firm's ability to recruit director talent, we follow Bourveau et al. (2018), Houston et al. (2018) and Appel (2019) and use a difference-in-differences (DiD) analysis:

$$Director\ quality_{iks,t} = \alpha + \beta UD_{s,t} + \gamma X_{iks,t-1} + \theta_i + \delta_{k,t} + \varepsilon_{iks,t} \qquad (1)$$

where $Director\ quality_{iks,t}$ is one of the two composite quality metrics (i.e., *Experience* or *Educ & Prof Backg*) of nominated outside directors at firm *i* incorporated in state *s* and headquartered in state *k* in year *t.* The main variable of interest is $UD_{s,t}$, an indicator that equals one if a firm's state of incorporation *s* has enacted a UD by year *t*, and zero otherwise. A positive and statistically significant β is consistent with the talent attraction hypothesis. Unlike studies relying on a single shock, a key advantage of using these staggered exogenous shocks (e.g., UD adoptions) is that they minimize the chance of an unobserved confounding shock coinciding with a single event year.

We include in the full model a set of control variables $X_{iks,t-1}$ measured in the year before the nomination year to mitigate the concern that treatment firms and their industry-size-year matched control firms differ in some other dimensions beyond the matching criteria variables. Specifically, *LnCashPay* is the natural logarithm of (annual cash retainer fee + the expected number of regular board meetings in a year × attendance fee per meeting for an outside director +1), which represents the cash-based pay that an outside director expects to receive if he or she attends all the regular board meetings. This pay measure is a conservative figure as we do not include the extra (often marginally higher) pay earned from serving on key board committees or as a committee chair, or from attending any non-regular board meetings. We use this as our ex-ante measure of expected director compensation when a candidate is evaluating whether to join a board. We control for other

compensation components by including *StkPay* (an indicator variable that equals one if a firm's outside directors receive equity-based compensation, e.g., restricted stock or stock option grants).

Outside candidates are predicted to be more likely to join boards of large and less risky firms. Thus, we control for firm size measured by the natural logarithm of market value (*LnMktVal*) and conventional firm risk measures including financial leverage (*Leverage*) and stock return volatility (*Stk volatility*), defined as the natural logarithm of the annual standard deviation of a firm's percentage daily stock return. We also include the percentage of linked directors on the board (*Linked (%)*) to control for potential differences in the quality of outside linked directors versus independent directors.

In addition to firm-level controls, we include a set of fixed effects to absorb the influences of unobserved factors. θ_i represent firm fixed effects to control for unobserved firm-specific time-invariant factors and they enable us to compare the quality of a firm's outside directors before and after UD adoptions. $\delta_{k,t}$ represent headquarters state-by-year fixed effects, which are used to control for any unobserved time-varying local economic trends in a firm's headquarters state (*k*) on director recruiting and retention.[18] Note that a state's UD governs all firms *incorporated* in that state and this is why headquarters state fixed effects can be included in the model. Inclusion of these multi-dimensional fixed effects enables us to conduct a sharper DiD test. We also cluster firm standard errors by state of incorporation *s* to account for potential cross-sectional correlations among firms incorporated in the same state.

In addition to our firm-level DiD analysis, we first conduct a similar DiD analysis at the director-level as a robustness check of the firm-year-level test of the talent attraction hypothesis by estimating the following model:

$$Director\ quality_{\ jiks,t} = \alpha + \beta UD_{s,t} + \gamma \Psi_{jiks,t-1} + \theta_i + \delta_{k,t} + \varepsilon_{jiks,t} \qquad (2)$$

where $Director\ quality_{\ jiks,t}$ is one of the two composite quality metrics *Experience* and *Educ & Prof Backg* for an outside director *j* nominated by firm *i* incorporated in state *s*, and headquartered in state *k* in year *t.* Ψ is a vector of firm-level and director-level control variables. In addition to the

[18] We do not further include industry-by-year fixed effects in the model, since the treatment firms and control firms have been exactly matched by Fama-French 49 industries.

firm-level controls and a set of fixed effects used in Eq. (1), we also include two other director characteristics (*Age* and *Female*) to control for a firm's potential age and gender preferences in selecting outside directors, and an indicator for linked directors (*Linked*). The other variables are defined in Eq. (1). For the talent retention hypothesis, we need to conduct a *director-level* test because director retention or departure is largely an individual director-specific decision. We discuss the details of the model specification in Section 4.6.2.

4. Empirical results

4.1 Validating the UD adoption experiment

Before we conduct our main test, we verify that a state's decision to adopt a UD is not associated with the quality of outside directors in firms incorporated in that state. The purpose of this test is to examine whether firms facing difficulties in recruiting high-quality directors lobby their states of incorporation to pass a UD earlier or more quickly. If the answer is yes, then it suggests that UD adoptions are partially endogenous with respect to outside director quality in firms incorporated in those states. The following test represents our initial effort to assess this issue.

We use a Weibull hazard model where the dependent variable is the log of the expected time until UD adoption. The time until UD adoption is defined as the year in which a UD is adopted in the state minus 1986 (the first year of our sample period). If a state has not passed a UD by the end of our sample period, the expected time of passage is set to the value of (2008 minus 1996), where 2008 is the last year of our sample period. Observations are dropped from the analysis once a state has adopted a UD since we are interested in examining the timing of UD adoption.

In each state-year, we calculate the means for our two outside director quality metrics using all the sample firms incorporated in the state to obtain state-wide director quality measures. Apart from the two state-level director quality metrics, we include a number of time-varying state characteristics (GDP, population, unemployment rate, poverty rate, the log number of firms incorporated in the state, and passage of second-generation antitakeover laws) to capture key state macroeconomic conditions.

Table 3 shows the Weibull hazard model estimates of the expected time until UD adoption. Importantly, we find insignificant coefficients on the state's two lagged average outside director quality metrics for firms incorporated in the state. This is consistent with the average quality of outside directors at firms incorporated in the state not significantly affecting the speed of a state's UD adoption. This suggests that a state's UD adoption is unrelated to the prior quality of the outside directors of firms incorporated in that state. Moreover, we find that states with a lower GDP and a larger population tend to adopt UDs more quickly. To further validate UD adoptions as a quasi-exogenous shock, we assess the validity of the parallel trends assumption as well as test for the effect of UD adoption in Pennsylvania through a ruling of Pennsylvania Supreme Court, which rules out endogeneity as a result of firms lobbying legislators for the law's passage (both pieces of evidence are reported in Section 4.3).

4.2 Baseline results: Effects of UD adoption on talent attraction

4.2.1 Univariate DiD

Before we formally estimate DiD regressions, we undertake a preliminary analysis of our data by conducting a univariate DiD. Specifically, we first compare the mean change in the average quality of nominated outside directors from the Pre-UD adoption to Post-UD adoption period for treatment and control firms, respectively; we then compare the difference in the quality changes between the treatment and control groups. The results are reported in Panel A of Table 4. As seen from comparing the Pre-event to Post-event periods, the average quality of outside directors in treatment firms experiences an improvement (0.114) when director quality is measured by the composite experience metric, and the change is statistically significant at the 1% level. By contrast, the same change in the control group is a smaller 0.035, and statistically insignificant. The difference in the mean change around UD adoptions between treatment and control groups is 0.079, which is statistically significant at the 10% level (t = 1.76). This result shows that post-UD, treatment firms exhibit improved outside director experience relative to that of control firms.

When we measure outside directors' quality by the educational and professional background metric, we observe neither a significant improvement in the treatment group, nor in the control

group. There is also no significant difference between treatment and control groups in terms of the pre-to-post UD adoption period change in the second composite director quality metric.

The evidence in the univariate DiD analysis indicates that if we observed significant in director quality from a regression-based DiD analysis, which is presented in the next section, it is not simply due to changes in control firms from the pre-to-post UD adoption period. Nevertheless, a caveat about this univariate DiD analysis is that it does not control for year fixed effects or time-varying headquarters state fixed effects. Thus, we next present a formal regression-based DiD analysis where we control for state-by-year fixed effects to capture potential confounding effects of unobserved shocks unique to each headquarters state and year. We note that controlling for state-by-year fixed effects is much more stringent than simply controlling for year fixed effects.

4.2.2 Regression DiD

We estimate Eq. (1) and test how outside director quality changes after a UD adoption. The results are reported in Panel B of Table 4. Columns (1) and (2) employ *Experience* as the director quality metric, while Columns (3) and (4) employ *Educ & Prof Backg* as the quality metric. While Columns (1) and (3) contain no firm-level control variables, Columns (2) and (4) include controls for firm characteristics that are lagged by one year relative to the dependent variable, except for *Linked (%)* that is measured contemporaneously to capture the potential difference in the quality of linked and independent outside directors.

The results reported in Columns (1) and (2) show that UD adoptions, which substantially reduce the threat of shareholder derivative suits, lead to a statistically significant improvement in nominated outside directors based on the experience quality metric. The result is consistent with the univariate DiD findings. The point estimate of 0.151 for *UD* in Column (1) is about 14% of the standard deviation of this director quality metric, which represents a tangible improvement in director quality.[19] This represents our first piece of causal evidence that greater director liability protections help a company attract more capable outside director candidates with better experience.

[19] While our clustering of standard errors at the state of incorporation level to account for cross-sectional correlations across firms incorporated in the same state induced by the adoption of a UD law is standard in the literature exploiting staggered law changes (e.g., Gormley and Matsa, 2016; Houston et al., 2018; Lin et al., 2020), we find similar patterns when we cluster standard errors at the firm level (results are not reported for brevity).

To the best of our knowledge, this is the first evidence in the literature to report support for the talent attraction hypothesis (H1).

Interestingly, Columns (3) and (4) show that the significant improvement in director quality does not carry over to directors' educational, financial, legal, and industry backgrounds. One possible explanation is that candidates with stronger experience are more sensitive to litigation risk because of their greater reputation capital exposure. It is also possible that more experienced directors are harder to recruit due to their limited supply, while candidates with other credentials (degrees, financial, legal and industry background) are in greater supply.

4.3 Verifying the parallel-trend assumption

The results of our baseline DiD analysis can only be interpreted as causal if UD adoption is exogenous. One possible concern is that UD adoption could be a result of lobbying by some firms. For example, firms having difficulty recruiting high caliber directors could lobby their state legislature to pass a UD statute to reduce director legal exposure to shareholder derivative suits (hereafter, this behavior is termed the political economy hypothesis). However, several studies of UDs (e.g., Appel, 2019; Houston et al., 2018; Lin et al., 2020) and our test reported in Section 4.1 suggest that UD adoption is unlikely to be the result of corporate lobbying. Nevertheless, we attempt to rule out the political economy hypothesis using two alternative approaches.

First, we conduct a dynamic DiD analysis specified in Eq. (3) below (with a model setup closely following Bertrand and Mullainathan (2003)). This analysis enables us to assess whether observed improvements in the quality of outside directors in treatment relative to control firms occurred prior to UD adoptions (and if so, our finding could be capturing a pre-existing trend):

$$\begin{aligned} Director\ quality_{iks,t} &= \alpha + \beta_1 UD(-1)_{s,t} + \beta_2 UD(0)_{s,t} + \beta_3 UD(+1)_{s,t} \\ &+ \beta_4 UD(+2)_{s,t} + \beta_5 UD(+3)_{s,t} + \gamma X_{iks,t-1} + \theta_i + \delta_{k,t} + \varepsilon_{iks,t} \end{aligned} \quad (3)$$

where we break the indicator variable *UD* in Eq. (1) into a series of indicator variables reflecting the event time dynamics relative to each state's UD adoption year (i.e., year 0). Specifically, we use $UD(-1)_{s,t}$, $UD(0)_{s,t}$, and $UD(+1)_{s,t}$ as indicator variables for the year immediately prior to, the adoption year, and the year following adoption, respectively. Likewise, $UD(+2)_{s,t}$ and $UD(+3)_{s,t}$

are indicator variables that equal one if firm *i*'s state of incorporation *s* adopts a UD two and three years earlier, respectively. Other control variables are identical to those in Eq. (1). According to Bertrand and Mullainathan (2003), an insignificant coefficient on $UD(-1)_{s,t}$ would support the validity of the parallel trend assumption for treatment and control firms before a UD adoption.

We find the coefficient of $UD(-1)_{s,t}$ is not statistically significant in any of the models reported in Table 5. These results are consistent with the existence of a parallel trend in the quality of outside directors in the treatment and control firms prior to UD adoption. It also confirms the similar growth rates in director quality measures between treatment and control firms as seen in Panel D of Table 2. In addition, the coefficients of $UD(0)_{s,t}$, $UD(+1)_{s,t}$, $UD(+2)_{s,t}$ and $UD(+3)_{s,t}$ are consistently positive and significant in Columns (1) and (2), suggesting that the quality of nominated outside directors improves from the UD adoption year, and the improvement persists thereafter. A graphical presentation of the dynamic treatment effects of UD adoptions on the quality of outside directors is shown in Figure 1. Unlike many ex-post business decisions, the recruitment and retention of high-quality directors can be implemented relatively quickly, and therefore, a change in board composition can be observed almost immediately as long as high-quality candidates' willingness to serve is significantly raised by UD adoption.

Second, unlike the remainder of the UD adoption sample, Pennsylvania is unique in that it did not adopt UD through the passage of a statute by the state legislature, but rather as a result of a Pennsylvania Supreme Court ruling in *Cuker v. Mikalauskas* (1997). The impartiality of court ruling ensures that the UD adoption in Pennsylvania was not due to corporate lobbying. In the test reported in Table 6, we include only firms incorporated in Pennsylvania as treatment firms along with their matched control firms. Following the court ruling ushering in UD within Pennsylvania, the quality of outside directors, measured by the experience metric, significantly improves for Pennsylvania-incorporated firms relative to their one-to-one industry-size-year matched control firms. It is also noteworthy that we observe a significant improvement in director quality for this subsample when it is alternatively measured by the director educational and professional background metric. Overall, we conclude that our baseline findings are not driven by firms that could benefit from successfully lobbying their state legislature to pass a UD.

4.4 Robustness of the results

In this section, we conduct additional sensitivity tests to check the robustness of our key finding regarding the improvement in the quality of nominated outside directors, and then consider the credibility of some alternative interpretations of our results.

4.4.1 Results using firms headquartered in the same or an adjacent state as controls

Thus far, we find a significant improvement in the quality of nominated outside directors for firms incorporated in UD-states, where director quality is measured by the experience metric relative to industry-size-year matched control firms incorporated in non-UD states. We earlier included headquarters state-by-year fixed effects to control for potential confounding effects of unobserved shocks to a firm headquarters state's economic environment. As an alternative approach to controlling for potentially confounding effects of differences in state environments, such as varying supplies of local directors or the quality of the local business environment, among other potentially relevant variables, we further require industry-size-year matched control firms to be headquartered in the same or an adjacent state.

This approach of using control firms in the same or an adjacent state provides sharper identification since treatment and control firms are exposed to the same or a very similar economic environment and cultural influences, with the difference between treatment and control firms primarily reflecting different corporate legal codes that shape the litigation risk level faced by outside directors. If we continue to find robust results, then we have greater confidence that the difference in director liability protections channel (which is shaped by the law in a firm's state of incorporation) is responsible for our findings. While the sample size is reduced significantly by imposing this stricter matching criterion, the baseline DiD results reported in Table 7 are qualitatively similar to those reported earlier in Table 4. These results provide further evidence that UD adoptions, by significantly strengthening the legal liability protections of outside directors, lead high-quality directors to be more willing to join corporate boards.

4.4.2 Controlling for confounding antitakeover laws

Several forms of state antitakeover laws were adopted in the period between 1980 and 2010 that overlap with UD adoptions in some of the same states. Thus, another potential concern is that

our documented changes in outside director quality are actually caused by the adoption of state antitakeover statutes. We follow Karpoff and Wittry (2018) to control for confounding effects of several forms of state antitakeover laws including business combination (*BC*), director duties (*DD*), control share acquisition (*CSA*), fair price (*FP*), and poison pill (*PP*) statutes. $BC_{s,t}$ equals one if state *s* in which a firm is incorporated passed a BC law by year *t*, and it equals zero otherwise. *DD, CSA, FP*, and *PP* are defined analogously. *AT statutes* is a simple aggregate index of the five statute indicators, namely *DD, CSA, BC, FP* and *PP*. The results are reported in the Panel A of Table IA1 of Internet Appendix, where we find the effect of UD adoption remains qualitatively unchanged under these specifications. When we control for the five antitakeover statute indicators separately in unreported results, we also find qualitatively similar results.

4.4.3 Are the results due to the 2008 financial crisis?

The last year of our sample period coincides with the 2008 financial crisis. In this period, stock crash risk rose dramatically, as did the likelihood of firms becoming targets of shareholder litigation. In effect, the financial crisis raised the litigation risk that directors faced and made it more difficult for firms to recruit high-quality candidates, which predicts just the opposite effect to our empirical findings. Nevertheless, when we drop year 2008 from our analysis, our results remain qualitatively unchanged as shown in the Panel B of Table IA1 of Internet Appendix. Thus, we conclude that the 2008 financial crisis is unlikely to be responsible for our findings.

4.4.4 Are the results due to SOX and the associated exchange listing rule changes?

The Sarbanes-Oxley Act (SOX) became law on July 30, 2002 and it placed new requirements on boards of U.S. listed companies. Linck et al. (2008) find that the effects of SOX and the ensuing new NYSE and NASDAQ listing rules requiring a majority of independent directors are two-fold: on one hand, it reduces director supply by increasing director workload and liability risk; on the other hand, it increases corporate demand for directors by requiring many listed firms to recruit added independent directors, which makes the recruiting of high caliber directors more difficult.[20] Therefore, SOX and the new listing requirements have the effect of increasing director liability, and

[20] The governance proposals of the NYSE and NASDAQ, referred to as Public Law 107-204, were issued on July 30, 2002, and mandated firms to have more than 50% of independent directors on their boards.

this goes in the *opposite* direction to the effect of UD adoption since UD adoption lowers director legal liabilities. Thus, the passage of SOX cannot explain our findings, as it biases against the finding that we observe. In addition, our DiD analysis captures the difference in changes between treatment and control firms, while SOX affects both treatment and control firms. It is unlikely that SOX differentially affects treatment and control firms in terms of director liability given that the classification of treatment and control firms is based on state of incorporation that is determined long before the passage of SOX.

Nevertheless, we perform two tests in Table IA2 of Internet Appendix to further mitigate the concern about the potential confounding effects of SOX. In Panel A, we use all UD adoption events, but we partially control for the effect of exchange listing rules regarding board independence by including the lagged percentage of independent directors in our baseline DiD model. The rationale is that firms with less independent boards are more affected by the 2002 regulatory changes regarding board independence. In Panel B, we provide a sharper test by only including UD adoptions that occurred no later than 1998 and these events are clearly not affected by SOX and the associated new exchange listing rules on board independence or the anticipation of these changes. In both tests, our results remain qualitatively the same. Thus, we conclude that the exchange listing rule changes are unlikely to be responsible for our findings.

4.4.5 Effects of UD adoptions on the attraction of talented directors (director-year-level analysis)

Our talent attraction analysis thus far is at the firm-year level. In this section, we conduct a director-year-level analysis to check the robustness of our results. To this end, we estimate Eq. (2) with additional director characteristics (e.g., indicators for over 65 years old and gender) beyond the firm-level control variables in Eq. (1) to further test how outside director quality changes after UD adoption. We replace firm-level director quality measures with their corresponding director-level equivalents and use them as dependent variables. Our regression sample contains nominated outside directors for each firm-year. The results are reported in Table IA3 of Internet Appendix.

Columns (1) and (2) use the experience metric, and Columns (3) and (4) use the educational and professional background metric. Again, Columns (1) and (3) include no firm- or director-level control variables, while Columns (2) and (4) do. The results from the director-level analysis are

consistent with the previous findings based on our firm-year-level analysis reported in Table 4. Moreover, the size of the director quality improvement based on the director experience metric is comparable to the results in Table 4 based on a firm-year-level analysis.

4.4.6 Results from examining independent directors

Our analysis thus far has focused on all outside directors. In this section, we rerun the baseline and dynamic DiD regressions for independent directors only. As we discuss in Section 3.1, most of the UD adoption events occurred before 2000 when there was no consistent or standard definition of independent directors, which adds noise to the classification of independent directors. Bearing this caveat in mind, we repeat our baseline DiD analysis using independent directors and the results are reported in Table IA4 of Internet Appendix.

The results suggest that after UD adoptions, the experience metric of independent directors in treatment firms exhibits a significant improvement relative to that of the matched control firms at the 95% confidence level. In contrast, independent directors in treatment firms exhibit no significant improvement in their educational and professional background metric, which is broadly in line with our earlier results examining all outside directors.

4.4.7 Are the results robust to a simple aggregation of director quality items?

Our analysis thus far uses the first principal component of the five quality characteristics reflecting director experience or alternatively reflecting director educational and professional background. The results reported in Table IA5 of Internet Appendix show that our key results on the improvement in outside directors' experience metric are robust to using a simple aggregation of the five respective binary quality variables. Notably, we also find some evidence of improvement in outside directors' educational and professional background metric.

4.5 Do firms affected by UDs attract more high-quality directors from other states?

While we have shown that UD adoptions help firms recruit outside directors with more experience. A related question is where these high caliber candidates come from. If concerns about litigation risk previously deterred high-quality director candidates from serving on corporate boards, then we would expect to see a rise in the proportion of high caliber outside directors recruited from states that never passed a UD. To investigate whether this is true, we calculate the proportion of

nominated outside directors who come from a firm incorporated in a non-UD state,[21] while their *Experience* quality metric (or *Educ & Prof Backg* quality metric) is in the top tercile of the director sample's distribution. We then use this as the dependent variable and repeat our DiD estimation. The results are reported in Table 8.

The DiD results reported in Columns (1) and (2) show a positive and statistically significant coefficient on *UD* when director quality is measured by the composite experience metric. Thus, UD adoptions appear to make high-quality director candidates from non-UD states more willing to serve at firms incorporated in UD states. This result further corroborates the findings regarding the talent attraction hypothesis. In Columns (3) and (4), we measure the quality of outside directors by the educational and professional background metric, and we also find evidence that UD adoptions attract high-quality candidates from non-UD states to join the boards of treatment firms.

4.6 Heterogeneity in the effects of UD adoptions on talent attraction

4.6.1 Do firms facing higher pre-event litigation risk benefit more from UD adoptions?

Our baseline finding is consistent with litigation risk impeding the successful recruiting of high caliber outside director candidates. To provide more direct evidence on the litigation risk channel, we conduct a difference-in-difference-in-differences (DDD) analysis. This analysis shows that the director quality improvement following UD adoptions is more pronounced in firms that face higher litigation risk (and hence should have greater difficulty in attracting talented outside candidates).

We first measure a firm's pre-event litigation risk by the frequency of M&A deals. The reasoning behind this approach is that M&A-related lawsuits are the principal litigation risk faced by directors in fiduciary duty lawsuits (Thompson and Thomas, 2004; Lin et al., 2011). Shareholders can bring both direct class actions and derivative suits to challenge M&A deals under state corporation law (Thompson and Thomas, 2004; Krishnan et al., 2012; Chu and Zhao, 2019).[22] Chu and Zhao (2010) report that 23% of shareholder lawsuits targeting M&A transactions that are filed in federal courts between 2000 and 2012 are derivative suits. A limitation of this M&A-based

[21] The nominated candidate can be a current director or an active executive of a firm incorporated in a state without a UD, and does not need to quit his/her current position after being nominated to the board of a firm incorporated in a state that passed a UD.

[22] See Krishnan et al. (2012) for evidence on how shareholders use class actions to police low-ball bids and force offer price improvement.

litigation risk measure is that it not only measures the risk of derivative suits, but also the risk of a class action suit. Thus, we also use the total number of derivative suits in the firm's Fama-French 49 industry as an alternative measure of the probability of a firm within the same industry being targeted by a derivative suit. The data on derivative suits are obtained from the Audit Analytics database and the earliest shareholder derivative suit it records starts in 1996.

We follow Gormley and Matsa (2016) and use a cohort-based DDD approach. The sample construction for this test is as follows. Each UD adoption year constitutes a cohort year. All firms incorporated in states that adopted a UD statute in a given year are classified as a treatment firm cohort. For each treatment firm involved in a cohort year, we take its yearly observations over the event window [-3, +3] and then take similar observations over the same [-3, +3] time period for its industry-size matched control firm following the same procedure described in section 3.1. We repeat this sampling procedure for all other UD adoption event years (cohorts) and then pool observations from all UD adoption event years to form the final sample used in our DDD analysis. Since this procedure can result in repeated observations of the same matched control firms across cohorts, we control for higher-order cohort-based fixed effects. Specifically, we replace firm fixed effects in the baseline model with two-way firm-cohort fixed effects and replace headquarters state-year fixed effects with three-way headquarters state-year-cohort fixed effects. This is a conservative approach because it allows the fixed effects to vary by cohorts, rather than forcing them to be the same across cohorts (Gormley and Matsa, 2016).

Both litigation risk measures are defined in the year *before* UD adoption to avoid any feedback effects from the UD adoptions per se (and for the same reason, the partitioning variables used in other interaction tests in Section 4.6 are measured in the year before UD adoptions). We use inverse indicators of litigation risk so that the coefficient on *UD* can be conveniently interpreted to reflect the effect of UD adoptions on the quality of outside directors in firms that are subject to *higher* litigation risk – the focus of the heterogeneity tests. Specifically, *Low M&A* (activity) is an indicator variable that equals one if a firm's total number of completed M&A deals is in the bottom tercile of the sample distribution. *Low derivative suit risk* is an indicator variable that equals one if the total number of derivative suits that occurred in a firm's Fama-French 49 industry is within the bottom

tercile of the sample distribution. We then interact each of the above indicators with the *UD* indicator. If UD adoptions improve outside director quality through the litigation risk channel, then we expect the *UD* coefficient to be positive and statistically significant, and the coefficients of the interaction terms *UD* × *Low M&A* and *UD* × *Low derivative suit risk* to be significantly negative.

The DDD analysis is reported in Table 9.[23] In Columns (1) and (2) of Panel A, the coefficients on *UD* are positive and statistically significant at the 1% level, with the magnitude of the coefficients doubling the coefficient estimates in the baseline results reported in the Column (2) of Table 4 Panel B. This indicates that firms engaged in more M&A deals or operating in an industry more commonly targeted by shareholder derivative suits (and hence facing higher litigation risk), experience a large increase in outside director quality in the post-adoption period. However, the benefit of director protections afforded by UD adoptions is less pronounced for firms that face lower litigation risk as indicated by the negative coefficients of the interaction terms, *UD* × *Low M&A* and *UD* × *Low derivative suit risk*, which are statistically significant at the 5% and 10% level, respectively. These results indicate that firms facing higher (lower) litigation risk, which should raise (reduce) the difficulty in attracting high caliber outside candidates (measured by the director experience metric), should stand to benefit more (less) from UD protection. Thus, our DDD evidence on the litigation risk channel supports the DiD results reported in Table 4. Note that even for firms facing lower litigation risk, the quality of nominated outside directors improves as indicated by the statistical significance of ($\beta_1 + \beta_2$) reported in the lower section of Panel A.[24]

In Panel B, we measure director quality by their educational and professional backgrounds. The coefficient on *UD* is positive and statistically significant at the 5% level in Column (2), suggesting that treatment firms operating in industries that face higher risk of derivative suits also experience a significant improvement in the quality of outside directors as measured by the educational and professional backgrounds. The coefficient on the interaction term (β_2) is negative, but statistically insignificant in Columns (1) and (2).

[23] Note that $UD_{s,t}$ can be conceptually understood as $Treat_s \times Post_t$.
[24] A caveat is that the test in Column (2) uses a reduced sample size because the Audit Analytics database only covers derivative litigation data starting in 1996.

High-technology firms typically have many growth opportunities, which requires them to make substantial R&D investments with highly uncertain outcomes and a high probability of failure (Kang et al., 2018). As a consequence, these firms can face higher litigation risk due to higher stock return volatilities or investments that have gone bad (Guan et al., 2019). Such firms may need more director liability protection to successfully recruit high-quality directors, who are better able to make the risky investment decisions required to take up these growth opportunities (Guan et al., 2019; Lin et al., 2020). To test this proposition, we follow Barron et al. (2002) in defining high-technology companies as firms in the following three-digit SIC codes: 283 (Drugs), 284 (Chemicals), 357 (Computer and Office Equipment), 366 (Communications Equipment), 367 (Electronics), 371 (Motor Vehicles), 382 (Measurement and Control Devices), 384 (Medical Instruments), and 737 (Software). The remaining industries are deemed to be non-high technology and firms in these industries are captured by an indicator variable (*Non-Hi tech*), which equals one if a firm's three-digit SIC code is not in the above high-technology industries category in the year before UD adoption and equals zero otherwise.

To test whether boards in high-technology firms benefit more from UD adoptions, we examine the *Non-Hi tech* indicator variable and its interaction with the *UD* indicator variable to look for a differential effect of UD adoptions (if any) on the quality of nominated outside directors. The results are reported in Table IA6 of Internet Appendix. When director quality is measured by the experience metric, the coefficients on *UD* (β_1) are positive and statistically significant, and the interaction terms (β_2) have negative and statistically significant coefficients, while the sum of the coefficients of ($\beta_1 + \beta_2$) denoting the change in the quality of outside directors in *Non-Hi tech* firms are also positive and significant. Therefore, while all treatment firms are able to recruit better outside directors after UD adoptions, the effect is stronger for high-technology companies. When we measure director quality by educational and professional background, there is no such evidence, which is broadly consistent with the baseline findings in Table 4.

Taken together, we find support for the view that the improvement in the quality of outside directors following UD adoption is more pronounced in firms that face higher litigation risk before

its adoption (and hence they face greater difficulty in attracting talented outside candidates), particularly when measuring director quality by the experience metric.

4.6.2 Does the effect of UD protections vary with existing firm-level protections?

Firms often have liability-limiting provisions (LLPs) specified in a firm's charters/bylaws to the extent permitted by state laws prior to their incorporation state's adoption of a UD.[25] It is therefore interesting to examine whether the effect of UD legal protections on director recruiting varies with the level of LLP protection.

Following Bradley and Chen (2011), we look at three items from the G-index as measures of firm-level director protections: the director indemnification provision (*Dir ind*), the director liability limitation provision (*Dir liab*), and indemnification contracts (*Dir indc*) in corporate charters/bylaws when allowed by state laws. We define an index of LLP protections (*LLP protection index*) as the sum of these three LLP items. A higher value of the LLP protection index indicates more director protections. We include in the model an interaction term *UD* × *LLP protection index* to test whether the effect of UD legal protections on director recruiting varies with existing LLP protections. Note that only S&P 1500 firms have LLP protection data available for the tests. The results are reported in Column (3) of Table 9, Panels A and B.

The coefficient of *UD* is positive and significant at the 5% level in Column (3) of Panel A when director quality is measured by director experience. This indicates that firms without LLP protections experience a significant improvement in director quality after UD adoption. The interaction coefficient *UD* × *LLP protection index* is negative (albeit insignificant) in Column (3) of Panel A. This evidence suggests that the effect of UD protection on outside director quality holds even when firm-level LLP protections are in place.[26] The result also suggests that legal protection afforded by a UD statute is distinct because it reduces the number of shareholder derivative suits. In contrast, LLP protections have no such effect, but instead limit the size of director liability in the

[25]Almost every U.S. listed firm carries D&O insurance (details are not publicly available) and there is no reason to believe firm purchases of D&O insurance change significantly around UD adoptions. Any change is likely to reduce D&O insurance coverage because directors face lower litigation risk following the passage of a UD, and such a reduction in D&O coverage (if any) should bias against our finding an improvement in the quality of outside directors.
[26] If we alternatively measure LLP protection by an LLP-indicator variable that equals one if a firm has any of the three LLP features as of the year before UD adoption, the results are qualitatively similar.

event of a derivative suit. This may explain why 23 states passed a UD to provide additional director liability protection, even though most firms incorporated in those states had previously adopted some legal protections for directors in their corporate charters/bylaws.

When director quality is measured by the educational and professional background metric in Column (3) of Panel B, the *UD* coefficient (that measures the UD effect in firms without LLP protections) and the interaction term coefficient are insignificant. These results are consistent with our baseline findings that show a lack of a significant improvement in outside directors' educational and professional background in the full sample following UD adoptions as shown in Table 4.

4.6.3 Do firms with a smaller local director pool benefit more from UD adoptions?

Knyazeva et al. (2013) show that the size of the local pool of director candidates directly affects the likelihood of independent director appointments. This suggests that the effect of UD adoptions on director recruiting is likely to vary with the size of the local pool of director candidates. To test this, we follow Knyazeva et al. (2013) and measure the size of the local supply of director talent as the number of non-financial S&P 1500 firms whose business addresses are within 60 miles (approximately 100 kilometers) of a firm's headquarters, excluding firms in the same 4-digit SIC industry (that are likely competitors of the focal firm, whose executives are unlikely to be serious director candidates due to competitive concerns).

Large local pool is an indicator variable that equals one if a firm's local pool of director candidates is in the top tercile of the sample. Since it is easier for firms surrounded by a larger local pool of director talent to recruit high-quality directors, it follows that the passage of a UD is less likely to have as strong an effect on director recruiting at these firms. Thus, we expect the interaction coefficient *UD* × *Large local pool* to be significantly negative.

The results of the above test are reported in Column (4) of Table 9 Panels A and B. In Column (4) of Panel A, the *UD* coefficient is positive and significant at the 1% level when director quality is measured by the experience metric. This indicates that firms facing a smaller local pool of director talent experience a significant improvement in director quality after UD adoptions. The coefficient of *UD* × *Large local pool* is negative and significant at the 5% level and the test of the combined coefficient ($\beta_1 + \beta_2$) is statistically insignificant, suggesting that the beneficial effect of UD

adoptions on recruiting of outside directors with more experience does not exist for firms with a large local pool of director candidates. These results are broadly consistent with the finding of Knyazeva et al. (2013) on the important role that the local supply of director candidates plays in corporate board composition.

Similar to the results from the previous heterogeneity tests, when director quality is measured by the educational and professional background metric in Column (4) of Table 9 Panel B, the coefficient of *UD* is positive as predicted, but insignificant (t = 1.49). The coefficient of the interaction term of *UD* × *Large local* pool is positive and significant at the 10% level, suggesting that treatment firms headquartered in a place with a larger pool of local directors are able to recruit outside directors with better educational and professional background after UD adoptions.

Taken together, we find evidence that a low local director supply can adversely affect the recruiting of directors with better experience, while there is weak evidence of an opposite effect on the recruiting of directors with good financial, legal, educational or industry background. Thus, UD adoption is more beneficial for firms with smaller pools of director candidates when quality is measured by experience and more beneficial for firms with a larger pool of director candidates when quality is measured by educational and professional background.

4.7 Effects of UD adoptions on the retention of talented directors

In this section, we test the talent retention hypothesis – i.e., whether director protections afforded by UD adoptions help a firm retain high-quality outside directors (H2). Since whether an outside director departs from a board is largely an individual decision, we perform the test of the talent retention hypothesis at the director-year level using the following model:

$$\begin{aligned} Voluntary\ departure_{\ jiks,t+1} &= \alpha + \beta_1 UD_{s,t} + \beta_2 Low\ quality_{\ jiks,t} \times UD_{s,t} + \beta_3 Treat_s \\ &\times Low\ quality_{\ jiks,t} + \beta_4 Post_t \times Low\ quality_{\ jiks,t} \\ &+ \beta_5 Low\ quality_{\ jiks,t} + \gamma X'_{jiks,t} + \theta_i + \delta_{k,t} + \varepsilon_{jiks,t} \end{aligned} \quad (4)$$

where the dependent variable, $Voluntary\ departure_{\ jiks,t+1}$, equals one if an incumbent outside director *j* of firm *i* incorporated in state *s* and headquartered in state *k* leaves the board in year *t*+1 for voluntary reasons. Voluntary departures do not include "reach the maximum tenure period",

"died", "sick", "departure due to the violation of law", or "accept a position in the government".[27] $UD_{s,t}$ (i.e., $Treat_s \times Post_t$) is an indicator variable that equals one if state *s* where the firm is incorporated has passed a UD by year *t*, and zero otherwise.

Estimating the Eq. (4) regression allows us to test whether a UD adoption leads to a change in the probability of a high-quality outside director's voluntary departure, as captured by the coefficient estimate of *UD* (β_1). We estimate a linear probability model with various fixed effects. The talent retention hypothesis predicts a negative and statistically significant coefficient of β_1. $Low\ quality_{jiks,t}$ is an indicator variable that equals one if the value of an outside director's composite quality metric (i.e., *Experience* or *Educ & Prof Backg*) is below the top tercile of the sample distribution in year *t*. The combined coefficient of ($\beta_1 + \beta_2$) captures the probability of a voluntary departure by low-quality outside directors. In this test, we include two more director level controls. First, we add an indicator for an outside director's poor meeting attendance in the past year as a rough proxy for his/her performance. The indicator *Attendance<75% (0/1)* equals one if an outside director has attended less than 75% of firm board meetings in the past year and zero otherwise. Second, we control for the proportion of firm shares held by an incumbent outside director (*Dirown*). As ownership in the firm rises, a director's incentives to voluntarily depart should decline. The other variables are the same as in Eqs. (1) and (2). Similarly, we use a cohort-based DiD analysis and include cohort-based fixed-effects to deal with repetition in some of the control firms. Since firms with a classified board, elect only 1/3 of directors each year, this feature could confound the test of the talent retention hypothesis. Thus, we limit our analysis to non-classified boards for a sharper test of the talent retention hypothesis.

The results of this analysis are reported in Table 10. We find that the *UD* coefficient is negative and statistically significant at the 10% level or better in both Columns (1) - (2) when director quality is measured by the *Experience* metric and in Columns (3) - (4) when director quality is measured by the *Educ & Prof Backg* metric. These results suggest that UD adoptions lower the likelihood of voluntary departures of high-quality outside directors by approximately 7% as indicated by the coefficients reported in Columns (2) and (4). The coefficient of *UD* × *Low quality* is insignificant,

[27] Our results remain similar if we categorize "accept a position in the government" as a voluntary departure reason.

suggesting that UD adoptions do not differentially affect the turnover of high-quality outside directors more than low-quality outside directors. In fact, like high-quality outside directors, the turnover rate of low-quality outside directors also drops significantly as indicated by the negative and statistically significant sum of coefficients of $(\beta_1 + \beta_2)$ reported near the bottom of Table 10. The coefficients of the indicator variable *Attendance<75% (0/1)* are positive, suggesting that director meeting attendance problems tends to increase a director's departure rate in the next period, although the relation is not statistically significant. Also, outside directors holding a higher proportion of firm shares are less likely to leave as suggested by the negative (albeit insignificant) coefficients on *Dirown*. Overall, we find some limited support for the talent retention hypothesis.

As pointed out by Faleye (2007), director retention determinants are more complex than factors affecting a director's initial decision to join a board. For example, other than litigation risk, the relationships a director has developed with the CEO and other directors, a director's understanding and like/dislike of a firm's culture, and his/her other outside options, as well as likely board changes after a CEO turnover can affect a director's retention outcome. In particular, a high-quality director should have better outside options (e.g., more invitations to join boards of larger firms), and so they may have a higher chance of leaving a board than other outside directors. This adds tension to the talent retention hypothesis. In contrast, when a candidate is deciding whether to first join a board, these factors are less influential given a candidate's weaker relationship to the board and limited knowledge of the firm. Thus, non-incumbent candidates are likely to give more weight to potential liability risk. This could explain why the evidence on the talent attraction hypothesis is stronger. [28]

4.8 Alternative explanations

4.8.1 Can our main results be due to a change in director compensation policy?

Another possible concern with our finding of an improvement in outside director quality following UD adoptions is that firms could pay higher compensation to outside directors after UD adoptions. This concern, however, is unlikely to drive our findings since Aguir et al. (2014) find

[28] In unreported analysis, we find when we interact *UD* with low-litigation-risk measures (having fewer M&A deals or firms operating in industries that experience fewer derivative suits before UD adoption as in Table 9) to investigate whether the change in the voluntary departure rate of high-quality outside directors around UD adoptions varies with the pre-event level of a firm's litigation risk, we find that the interaction term coefficients are not statistically significant.

that director protections and compensation tend to be substitutes. To the extent that a UD increases director protections, firms could choose to pay *lower* rather than higher compensation. Nevertheless, we test whether there is a change in the way firms remunerate their outside directors around UD adoptions. We use two measures of director compensation, namely, *LnCashPay* and *StkPay*. *LnCashPay* represents the total cash compensation that an outside director candidate expects to receive (see discussion in Section 3.3). *StkPay* is an indicator variable that equals one if a firm grants equity-based compensation (stock and/or options) to its outside directors.

The results of this analysis are reported in Table 11. They show that companies do not significantly change the way they compensate outside directors around UD adoptions. This evidence indicates that our finding of an increase in outside director quality around UD adoptions is unlikely to be driven by a rise in director compensation.

4.8.2 Can our results be driven by a change in firms' demand for high-quality directors?

While we interpret our finding of an improvement in outside director quality around UD adoptions as primarily reflecting an improved supply of high-quality directors, one could conjecture that the finding could be attributable to firms' having a higher post-UD demand for high-quality directors. We have several reasons to believe that this is unlikely to be the case.

First, firms are always seeking to recruit high-quality directors, and there is no compelling reason to expect this demand to change around UD adoptions. For example, before UD adoption, firms could be more concerned about shareholder litigation risk that arises from inefficient or failed R&D investment or M&A transactions. As a consequence of this concern, these firms could have a larger demand for high-quality directors to help them improve their business decisions, so as to lower their litigation risk. Second, even if a firm's demand changes for high-quality directors, it is not clear why a firm's demand for high-quality directors should rise when shareholder litigation risk falls after UD adoption. It is also not clear why firms with deteriorating corporate governance after UD adoption as found by Appel (2019) necessarily have a larger demand for high-quality directors. While arguably shareholders might want to see a change in board composition in response to deteriorating corporate governance and more entrenched officers and directors, in practice

shareholders in the U.S. have very limited power to successfully nominate directors (Bebchuk, 2003; Cai et al., 2009).

Third, more importantly even if firms have a higher demand for high-quality directors post-UD adoption, there will *not* be an increase in outside director quality if director candidates are still concerned about litigation risk and remain unwilling to come onboard without a substantial increase in compensation. This reasoning implies that the above demand argument must also be predicated on the larger supply of high-quality candidates willing to accept nomination, presumably caused by UD adoption in order to explain our results. Taken together, our results are mainly attributable to a rise in director supply as UD adoption reduces director litigation risk, especially for high quality director candidates leading them to be more willing to come onboard.

4.9 The performance effects of improvements in director quality

A natural question is whether the change in the quality of outside directors has any performance implications. The effects of UD adoption on the performance of treatment firms are two-fold: on one hand, more director protections may help improve director quality by facilitating hiring of better candidates (as we have shown); on the other hand, more director protections can also generate adverse incentive effects (Lin et al., 2013). Consistent with the latter view, Appel (2019) finds that UD adoption is associated with an increase in the adoption of governance provisions commonly opposed by shareholders (e.g., classified boards) and weaker operating performance (i.e., ROA) in firms with lax shareholder monitoring (proxied by less blockholder monitoring). UD adoption also appears to result in an increase in a firm's cost of equity (Houston et al., 2018) and cost of debt (Ni and Yin, 2018). Hence, in this section we test whether after UD adoption, the observed improvement in outside director quality in treatment firms has any performance implications. Since closer blockholder monitoring should help limit the adverse director incentive effects engendered by UD adoption and may enable improved director quality to subsequently translate into an increase in firm performance, we predict that in firms with more blockholder monitoring, large improvements in director quality should lead to a more positive change in ROA around UD adoption.

To operationalize the test, we follow Gormley and Matsa (2011) and focus on treatment firms in the analysis (i.e., firms incorporated in a state that passed a UD between 1989 and 2005). Since

it may take time for the effects of business decisions made by the board to show up in operational performance, we focus on the window of [-3, +5] around UD law adoption in analyzing a firm's pre-to-post change in average ROA (i.e., ΔROA) *Quality improvement* is an indicator variable that equals one if a firm's pre-to-post change in the average proportion of nominated high-quality outside directors is in the top tercile of the measure's sample distribution and zero otherwise. The definition of a nominated high quality outside director follows the definition in Table 8 and is explained in the legend to Table 12. *High blockholder* is an indicator variable that equals one if a firm's number of institutional blockholder (ownership > 5%) is above the sample median in the year before UD adoption and the firm does not experience a significant deterioration in blockholder monitoring over the post-event window; otherwise, *High blockholder* is set to 0. We interpret there to be a significant deterioration in blockholder monitoring after the UD law's passage if a firm's pre-to-post change in the number of blockholders (i.e., Post-event mean number of blockholders – the number of blockholders in the year before UD adoption) is below the 10th percentile level across the sample (which corresponds to a loss of one blockholder).[29]

In the spirit of Gormley and Matsa (2011), we estimate OLS models to examine how the pre-to-post change in treatment firms' ROA around UD adoption changes when there is a large improvement in outside director quality, conditional on the firm having close blockholder monitoring. We control for event year fixed effects and cluster standard errors at the incorporation-state level. The results are reported in Table 12. But first, we verify that the mean of ΔROA is negative and statistically significant at the 1% level in an unreported test. This result implies an average decline in operating performance around UD adoption, which is consistent with Appel's (2019) finding.

In Columns (1) and (2) of Table 12, we measure director quality by the experience metric. β_1 captures the effect of improved outside director quality on the ΔROA in firms that are subject to less blockholder monitoring. The β_1 coefficient in Column (1) is negative, but statistically insignificant. More importantly, the coefficient of its interaction with blockholder monitoring (β_2) is positive and

[29] The results are robust if we impose a more stringent requirement – the pre-to-post change in the number of blockholders should be non-negative.

statistically significant at the 5% level, suggesting that firms subject to more blockholder monitoring experience a more positive post-UD change in ROA. In addition, the combination of $(\beta_1 + \beta_2)$ reported in the lower section of Column (1) is positive and significant, consistent with firms benefitting from blockholder monitoring and improved director quality exhibiting a more positive post-UD change in ROA. In Column (2), we further control for the pre-to-post change in firms' average assets (logged) and leverage ratio and find that our inferences are qualitatively unaffected.

In Columns (3) and (4), we repeat the analysis by measuring director quality by educational and professional background. We find that the coefficient of the interaction term is statistically insignificant (albeit positive as predicted). This result is consistent with the weaker results associated with the educational and professional background quality measure observed in the previous tables.

In summary, we find evidence that improved outside director quality following UD adoption is beneficial when blockholder monitoring helps constrain the self-serving actions of directors who are facing weakened post-UD incentives. Our finding that UD adoption makes it easier for firms to attract and retain high-caliber outside directors could also help explain why on average there is only weak evidence that firm value drops post-UD adoption, even though director incentives are weakened (Appel, 2019). This may also partially explain the several findings that after UD adoption, firms appear to realize better M&A decisions (Chu and Zhao, 2019) and better innovation decisions (Lin et al., 2020), which may also result in better operating performance. With respect to this last set of findings, our results in Table IA6 also show that the improvement in outside director quality is more pronounced in high-tech firms.

5. Conclusion

The success of a company depends crucially on the quality of its outside directors. Companies frequently lament that outside director candidates are concerned about legal liability risk and such director concerns inhibit firms from recruiting and retaining high caliber outside directors. Despite the important policy implications of this widespread claim, empirical tests of this proposition have received limited attention in the literature. Moreover, empirical tests are hampered by the difficulty

in measuring director liability protections and director quality, and a limited amount of time series variation in these measures. These factors make it difficult to establish causal relationships. We help fill this gap in the literature by exploiting the staggered adoption of state UDs as quasi-exogenous shocks to test whether the widely asserted director talent attraction and retention hypotheses can be validated empirically.

Using a difference-in-differences approach, we find that the quality of nominated outside directors improves with increased director liability protections resulting from a state's UD adoption when director quality is measured by a director's composite experience metric. As expected, this effect is stronger for firms that face higher litigation risk or are surrounded by smaller local pools of director candidates before UD adoption. On average, we do not find a significant improvement in the quality of nominated outside directors when it is measured by their educational and professional backgrounds around UD adoption in the full sample. However, we do find some evidence of improvements in this second director quality dimension for firms operating in industries experiencing more shareholder derivative suits prior to UD adoption or incorporated in Pennsylvania. We also show that the improvement in the quality of nominated outside directors after UD adoption is in part due to firms' improved ability to attract outside directors of better quality from non-UD states.

We also find some support for the talent retention hypothesis. Specifically, UD adoptions lower the voluntary departure rate of high-quality directors. However, the effect of UD adoptions on lowering the director turnover rate is similar for high-quality as well as for other lower quality outside directors. It is likely that in addition to litigation risk, other factors (e.g., relationship with the CEO, availability of outside options, and possible board changes following a CEO turnover) have a large bearing on whether a director retains a board seat (Faleye, 2007). The differing results for the two broad dimensions of director quality suggest that more experienced directors are more time constrained and more concerned about the potentially larger reputational loss arising from litigation, which make them less easily recruited to a board. In contrast, candidates with other credentials (degrees, financial, legal and industry background) may be more readily available.

Overall, our study provides the first piece of evidence for U.S. companies in support of the widely discussed director talent attraction and retention hypotheses and contributes important new evidence to the ongoing debate over the costs and benefits of director liability protections. Large improvement in outside director quality following UD adoption is associated with a more positive change in operating performance around UD adoption when institutional investor monitoring helps constrain the weakened post-UD director incentives. Our finding that UD adoption makes it easier for firms to attract and retain high-caliber outside directors can also help explain some of the findings of several contemporary studies on the benefits of UD laws to firm outcomes.

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Table 1 Staggered adoptions of a Universal Demand statute

This table reports the adoption year of a UD across 23 states in the U.S. from 1989 to 2005. The event list is the same as that is used in Houston et al. (2018) and Appel (2019).

Effective year	State abbreviation	States adopting a UD
1989	GA	Georgia
1989	MI	Michigan
1990	FL	Florida
1991	WI	Wisconsin
1992	MT	Montana
1992	UT	Utah
1992	VA	Virginia
1993	MS	Mississippi
1993	NH	New Hampshire
1995	NC	North Carolina
1996	AZ	Arizona
1996	NE	Nebraska
1997	CT	Connecticut
1997	ME	Maine
1997	PA	Pennsylvania
1997	TX	Texas
1997	WY	Wyoming
1998	ID	Idaho
2001	HI	Hawaii
2003	IA	Iowa
2004	MA	Massachusetts
2005	RI	Rhode Island
2005	SD	South Dakota

Table 2 Summary statistics

We use ten measures to capture an outside director candidate's quality. *Key_exec* is an indicator variable that equals one if an outside director candidate is a key executive in another company before nomination. *HP_firm* is an indicator variable that equals one if an outside director candidate comes from a public company with ROA above its industry (FF49) median in the year before nomination. *HI_patents* is an indicator variable that equals one if an outside director candidate comes from another company whose number of patents granted is above its (FF49) industry median in the year before nomination. *Multiple_seats* is an indicator variable that equals one if an outside director holds more than one company board seat in the year before nomination. Our results are similar under an alternative quality measure defined as whether an outside director candidate holds 1~3 board seats. *S&P 1500* is an indicator that equals one if an outside director candidate comes from a firm in the S&P 500 index, equals 2/3 if an outside director candidate comes from a firm in the S&P midcap index, equals 1/3 if an outside director candidate comes from a firm in the S&P small-cap index, in the year before nomination, and equals zero otherwise. *Degree* is a measure for an outside director candidate's highest academic degree. It equals one for a doctorate degree, 2/3 for a Masters degree, 1/3 for a Bachelor degree, and zero otherwise. *MBA* is an indicator variable that equals one if an outside director candidate has an MBA degree. *Financial* is an indicator variable that equals one if an outside director candidate has a financial background. *Legal* is an indicator variable that equals one if an outside director candidate has a legal background. *Industry* is an indicator variable that equals one if an outside director candidate is/was an executive or a director in another company within the same FF49 industry. *Experience* is the first principal component of the first five quality indicators (i.e., *Key_exec, HP_firm, HI_patents, Multiple_seats, S&P 1500*) to reflect an outside candidate's experience, and *Educ & Prof Backg* is the first principal component of the second five quality indicators (i.e., *Degree, MBA, Financial, Legal, Industry*) to reflect an outside candidate's educational and professional background. Panel A reports the summary statistics of the ten quality measures and two first principal components-based quality metrics of nominated outside directors at the firm-year level, and some firm characteristics. Panels B and C display the correlation between the two first principal components and their individual components, respectively. Panel D reports a comparison of firm characteristics between treatment and control firms in the year prior to UD adoption. In Panel D, standard errors are reported in the parentheses below the sample means for treatment and control firms, respectively. The last column of Panel D reports the *t*-statistic for the difference in means between the treatment and control firms. Please refer to Appendix A for detailed variable definitions. Continuous variables are winsorized at the 1st and 99th percentiles.

Panel A: Summary statistics of variables at the firm-year level

Variables	N	Mean	SD	p25	p50	p75
Experience	4310	-0.144	1.077	-1.067	-0.431	0.455
Educ & Prof Backg	4310	0.036	0.890	-0.379	-0.265	0.108
Key_exec	4310	0.043	0.128	0	0	0
HP_firm	4310	0.248	0.297	0	0.167	0.500
HI_patents	4310	0.142	0.236	0	0	0.250
Multiple_seats	4310	0.340	0.331	0	0.333	0.500
S&P 1500	4310	0.113	0.192	0	0	0.167
Degree	4310	0.130	0.238	0	0	0.200
MBA (0/1)	4310	0.033	0.129	0	0	0
Financial (0/1)	4310	0.262	0.282	0	0.200	0.500
Legal (0/1)	4310	0.103	0.193	0	0	0.167
Industry (0/1)	4310	0.099	0.210	0	0	0.100
LnCashPay	4310	8.716	2.925	8.854	9.680	10.200
StkPay (0/1)	4310	0.759	0.427	1	1	1
LnMktVal	4268	5.712	1.933	4.316	5.623	7.075
Leverage	4308	0.227	0.201	0.039	0.204	0.356
Stk volatility	4063	1.062	0.575	0.647	1.036	1.460

Panel B: The Pearson correlation between Experience and its five quality components

Correlation	*Experience*	*Key_exec*	*HP_firm*	*HI_patents*	*Multiple_seats*	*S&P 1500*
Experience	1.000					
Key_exec	0.288	1.000				
HP_firm	0.826	0.154	1.000			
HI_patents	0.783	0.140	0.542	1.000		
Multiple_seats	0.731	0.087	0.545	0.429	1.000	
S&P 1500	0.789	0.184	0.545	0.555	0.432	1.000

Panel C: The Pearson correlation between Educ & Prof Backg and its five quality components

Correlation	*Educ & Prof Backg*	*Degree*	*MBA*	*Financial*	*Legal*	*Industry*
Educ & Prof Backg	1.000					
Degree	0.726	1.000				
MBA	0.744	0.344	1.000			
Financial	0.218	-0.004	0.126	1.000		
Legal	-0.146	0.004	-0.047	-0.067	1.000	
Industry	-0.012	0.003	0.009	0.012	-0.023	1.000

(Except for the last row of Panel C, all the above correlations reported in the first column of Panels B and C are statistically significant at the 5% level or better)

Panel D: Comparison of firm characteristics in the year prior to UD adoption

Variables	Treatment firms	Control firms	*T*-statistic of the difference
LnMktVal	5.509	5.465	-0.11
	(0.214)	(0.348)	
Leverage	0.218	0.232	0.36
	(0.020)	(0.032)	
Stk volatility	1.047	1.093	0.24
	(0.096)	(0.170)	
LnCashPay	8.558	8.353	-0.35
	(0.310)	(0.497)	
StkPay	0.744	0.675	-0.53
	(0.067)	(0.112)	
Growth rate of Experience	-0.111	0.293	1.25
	(0.220)	(0.239)	
Growth rate of Educ & Prof Backg	-0.207	-0.343	-0.56
	(0.165)	(0.180)	

Table 3 Validating the UD adoption setting

This table reports the results from a Weibull duration regression model under an accelerated failure-time (AFT) formulation. The sample period is from 1986-2008. The dependent variable is the logged expected time to a state's UD adoption year. If a state had no UD by the end of our sample period, the expected time of passage is set to be the value of 2008 minus 1986. State-years are dropped from the analysis once they have adopted a UD. *Experience_mean* is the simple average of the *Experience* quality metric of nominated outside directors for all sample firms incorporated in a state in a year. *Educ & Prof Backg_mean* is the simple average of the *Educ & Prof Backg* quality metric of nominated outside directors for all sample firms incorporated in a state in a year. The model controls for a state's macroeconomic condition and adoption of antitakeover laws including business combination laws (*BC*), control share acquisition laws (*CSA*), fair price laws (*FP*), director duty laws (*DD*), and poison pill laws (*PP*). *AT statutes* is a simple aggregation index of the five law indicator variables, namely *BC, DD, CSA, FP*, and *PP. BC* is an indicator variable that equals one if the state in which a firm is incorporated has passed a BC law, and zero for other firm-years within our sample. *DD, CSA, FP*, and *PP* are defined analogously. All explanatory variables are measured at the state level and lagged by one year. See Appendix A for detailed variable definitions. Robust standard errors are clustered at the incorporation state level, with standard errors reported in parentheses, *, **, and *** denote statistical significance level at the 10%, 5%, and 1% level (two-tailed), respectively.

Duration model	Weibull (AFT formulation)		
Y = *Ln(Expected time)*	(1)	(2)	(3)
Ln(State GDP)	1.586***	1.234	1.195
	(0.475)	(0.900)	(0.912)
Ln(State population)	-1.551**	-1.090	-1.049
	(0.525)	(1.006)	(1.010)
State unemployment rate (%)	-0.032	-0.022	-0.016
	(0.058)	(0.136)	(0.136)
Poverty rate (%)	0.039	0.040	0.038
	(0.033)	(0.060)	(0.061)
Ln(# of incorporated firms)	-0.012	0.405	0.413
	(0.087)	(0.336)	(0.336)
AT statutes	-0.067	-0.135	-0.127
	(0.051)	(0.121)	(0.111)
Experience_mean		0.039	
		(0.141)	
Educ & Prof Backg_mean			-0.060
			(0.192)
Observations	822	370	370

Table 4 Baseline results: Effects of UD adoptions on outside director quality

Panel A reports the results from a univariate DiD, where we compare the mean change from the Pre-event to Post-event period in the quality of nominated outside directors for treatment and control firms. For each treatment (control) firm, we first calculate the mean change in the average quality of nominated outside directors from the Pre-event period to the Post-event period, and then take the average to obtain the mean of the change in director quality from the Pre-event to Post-event period for the treatment (control) group. We then take the difference in the mean change in director quality from the Pre-event to the Post-event period for the treatment and control groups to obtain the difference-in-differences estimate and test its significance with Student *t*-tests. Panel B reports the results from difference-in-differences (DiD) regressions regarding the impact of UD adoptions on the quality of nominated outside directors. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* for nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* for nominated outside directors in a firm-year. $UD_{s,t}$ equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Control variables are lagged by one year relative to the dependent variable unless stated otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Panel A: Univariate DiD

	Mean of the change from the Pre-event to the Post-event period		Difference-in-Differences	
	Treatment firms (1)	Control firms (2)	Difference in change (1) – (2)	*t*-statistic for (1) – (2)
Experience	**0.114*****	0.035	**0.079***	1.76
Educ & Prof Backg	-0.032	0.005	-0.037	-1.06

Panel B: Regression DiD

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.151*****	**0.154*****	**0.033**	**0.039**
	(0.029)	**(0.028)**	**(0.095)**	**(0.097)**
Linked (%)		-0.005***		-0.001
		(0.002)		(0.002)
LnCashPay		-0.001		0.007
		(0.007)		(0.011)
StkPay (0/1)		-0.086		-0.017
		(0.067)		(0.054)
LnMktVal		0.058*		-0.054
		(0.031)		(0.034)
Leverage		-0.143		0.074
		(0.113)		(0.093)
Stk volatility		-0.060		-0.017
		(0.045)		(0.062)
Observations	4,309	4,060	4,309	4,060
Adjusted R^2	0.566	0.564	0.644	0.649
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table 5 Dynamic analysis of UD adoption effects on outside director quality

This table reports the results from dynamic DiD regressions examining the impact of UD adoptions on the quality of nominated outside directors. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats, and S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal, and Industry* of nominated outside directors in a firm-year. The dynamic DiD model setup closely follows Bertrand and Mullainathan (2003). *UD (-1*) equals one if a firm is incorporated in a state one year before the state adopted a UD, and it equals zero otherwise. *UD (0)* equals one if a firm is incorporated in a state in the year it adopted a UD, and it equals zero otherwise. *UD (+1*) equals one if a firm is incorporated in a state that adopted a UD one year ago, and it equals zero otherwise. *UD (+2*) and *UD (+3)* are defined analogously. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)
Y =	*Experience*	*Educ & Prof Backg*
UD (-1)	**0.044**	**0.021**
	(0.061)	**(0.050)**
UD (0)	0.156***	0.025
	(0.048)	(0.085)
UD (+1)	0.139***	0.035
	(0.051)	(0.104)
UD (+2)	0.126**	-0.009
	(0.061)	(0.090)
UD (+3)	0.317***	0.156
	(0.095)	(0.134)
Observations	4,309	4,309
Adjusted R^2	0.565	0.644
Firm FE	YES	YES
State-Year FE	YES	YES

Table 6 Evidence from the UD adoption in Pennsylvania

This table reports the baseline results from DiD regressions examining the impact of UD adoption on the quality of nominated outside directors in firms incorporated in Pennsylvania and their industry-size-year matched control firms. Pennsylvania's adoption of UD was implemented by the ruling of the Supreme Court of Pennsylvania in 1997 via *Cuker v. Mikalauskas* (1997). *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year.*UD_Penn* equals one if a firm is incorporated in Pennsylvania in 1997 or thereafter, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all the regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD_Penn (0/1)	**0.233*** (0.055)**	**0.222*** (0.046)**	**0.106* (0.056)**	**0.099** (0.044)**
Observations	988	940	988	940
Adjusted R^2	0.547	0.538	0.596	0.575
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table 7: Effects of UD on the quality of outside directors: Evidence from matched sample firms headquartered in the same or adjacent state

This table reports the results from DiD regressions examining the impact of UD adoptions on the quality of nominated outside directors using a subsample of treatment firms and matched control firms headquartered in the same or an adjacent state. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.211****	**0.274*****	**-0.051**	**-0.010**
	(0.078)	**(0.059)**	**(0.034)**	**(0.037)**
Observations	793	748	793	748
Adjusted R^2	0.526	0.521	0.626	0.637
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table 8 The change in the proportion of high-quality outside directors hired from firms incorporated in states without a UD

This table reports the results from difference-in-differences (DiD) regressions examining the proportion of high-quality nominated outside directors hired from states without a UD. The dependent variable is the proportion of nominated outside directors whose *Experience* quality metric or *Educ & Prof Backg* quality metric is in the top tercile of the sample distribution in a year and whose firms are incorporated in states without a UD, among the number of nominated outsider directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Y= *Proportion of high-quality outside directors from states without a UD*	(1)	(2)	(3)	(4)
	Experience		*Educ & Prof Backg*	
UD (0/1)	**0.024****	**0.024****	**0.025****	**0.029*****
	(0.011)	**(0.010)**	**(0.011)**	**(0.010)**
Observations	4,309	4,060	4,309	4,060
Adjusted R^2	0.468	0.462	0.391	0.397
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table 9 Heterogeneity in the effects of UD adoptions on the quality of outside directors

This table reports the results from cohort-based DiD regressions examining how the impact of UD adoptions on the quality of nominated outside directors varies with two measures of a firm's pre-event litigation risk (the frequency of engaging in M&As, or the corresponding industry risk of derivative suits) (Columns (1) and (2)), the existing firm-level LLP protections (Column (3)), or the size of the local pool of director candidates (Column (4)). A cohort includes all firms incorporated in states that adopted a UD in the same year (treatment firms) and their industry-size-year matched control firms incorporated in states without a UD. For all firms in a cohort, observations over the window [-3, +3] are included, subject to data availability. *Low M&A* is an indicator for low M&A activity, and it equals one if the total number of a firm's completed M&A deals in the year before UD adoption is in the bottom tercile of the sample distribution. *Low M&A* is associated with low litigation risk. *Low derivative suit risk* is an indicator variable that equals one if the total number of derivative suits in the Fama-French 49 industry to which a firm belongs in the year before UD adoption is in the bottom tercile of the sample distribution. *LLP protection index* is the sum of three director liability limiting provisions (LLPs) including the director liability limitation provision (*Dir liab*), the indemnification provision (*Dir ind*), and indemnification contracts (*Dir indc*) in a firm's corporate charter/bylaws in the year before UD adoption. *Large local pool* is an indicator variable that equals one if a firm's local pool of director candidates is in the top tercile of the sample distribution in the year before the UD adoption. Detailed variable definitions are provided in Appendix A. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* where a firm is incorporated has passed a UD statute by year *t*, and zero for otherwise. *Post* is an indicator that equals one for the year from the adoption year onward. Control firms follow the *Post* definition of their matched treatment firms. We include firm-cohort fixed effects (Firm-Cohort FE) and headquarters state-year-cohort fixed effects (State-Year-Cohort FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Panel A reports the heterogeneous effect on nominated outsider directors' *Experience* quality metric, and Panel B reports the heterogeneous effect on nominated outsider directors' *Educ & Prof Backg* quality metric. We use the same control variables as in Table 6. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Panel A: Heterogeneous effect on outside director quality (Experience)

	(1)	(2)	(3)	(4)
	Pre-event characteristic =			
Y= *Experience*	*Low M&A*	*Low derivative suit risk*	*LLP protection index*	*Large local director pool*
UD (0/1) (β_1)	0.319***	0.578***	0.311**	0.310***
	(0.075)	(0.106)	(0.117)	(0.034)
UD×Pre-event characteristic (β_2)	**-0.173****	**-0.205***	**-0.035**	**-0.270****
	(0.083)	**(0.113)**	**(0.093)**	**(0.109)**
Post×Pre-event characteristic	0.135**	0.081	0.027	0.212
	(0.062)	(0.098)	(0.064)	(0.158)
Observations	4,100	1,162	2,228	2,317
Adjusted R^2	0.555	0.450	0.482	0.511
$\beta_1 + \beta_2$	0.146***	0.373***	0.280***	0.040
$\beta_1 + \beta_2 (or\ \beta_2 \times$ Mean LLP)=0 *p*-value	0.002	0.000	0.001	0.678
Firm controls in Table 4	YES	YES	YES	YES
Firm-Cohort FE	YES	YES	YES	YES
State-Year-Cohort FE	YES	YES	YES	YES

Panel B: Heterogeneous effect on outside director quality (Educ & Prof Backg)

	(1)	(2)	(3)	(4)
	Pre-event characteristic =			
Y= *Educ & Prof Backg*	*Low M&A*	*Low derivative suit risk*	*LLP protection index*	*Large local director pool*
UD (0/1) (β_1)	-0.032	0.212**	-0.080	0.055
	(0.089)	(0.098)	(0.079)	(0.037)
UD×Pre-event characteristic ($\boldsymbol{\beta_2}$)	**0.099**	**-0.155**	**-0.004**	**0.061***
	(0.104)	**(0.113)**	**(0.051)**	**(0.033)**
Post×Pre-event characteristic	-0.063	-0.025	-0.021	-0.029
	(0.094)	(0.091)	(0.043)	(0.042)
Observations	4,100	1,162	2,228	2,317
Adjusted R^2	0.624	0.638	0.594	0.596
$\beta_1 + \beta_2$	0.067	0.057	-0.084	0.115*
$\beta_1 + \beta_2 (or\ \beta_2 \times$ Mean LLP)=0 *p*-value	0.584	0.302	0.126	0.064
Firm controls in Table 4	YES	YES	YES	YES
Firm-Cohort FE	YES	YES	YES	YES
State-Year-Cohort FE	YES	YES	YES	YES

Table 10 Effects of UD adoptions on the retention of incumbent outside directors

This table reports the results from cohort-based director-year-level DiD regressions regarding the impact of UD adoptions on the retention of incumbent outside directors. We test whether the chance of a high-quality outside director's voluntary departure changes around the adoption of a UD, as captured by the coefficient estimate of *UD* (β_1). *Voluntary departure* is an indicator variable that equals one if an outside director voluntarily leaves the board in year *t*+1. *Experience* is the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of a nominated outside director, and *Educ & Prof Backg* is the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of a nominated outside director. *Low quality* is an indicator variable that equals one if the value of an outside director's corresponding quality measure is below the top tercile of the sample distribution in a year. $UD_{s,t}$ is an indicator variable (i.e., *Treat*×*Post*) that equals one if the state (*s*) in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. *Treat* is an indicator variable that equals one if a firm is incorporated in a state that adopted a UD in the sample period, and zero otherwise. *Post* is an indicator variable that equals one for treatment firms from the adoption year onward; control firms follow the *Post* definition of their matched treatment firms. Detailed variable definitions are provided in Appendix A. Firms in a cohort includes all firms incorporated in states that adopted a UD in the same year (treatment firms) and their matched control firms incorporated in states without a UD. For all firms in a given cohort, observations over the window [-3, +3] are included (with the adoption year being year 0), subject to data availability. We include firm-cohort fixed effects (Firm-Cohort FE) and headquarters state-year-cohort fixed effects (State-Year-Cohort FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively. Only outside directors from non-classified boards are included in the analysis.

	(1)	(2)	(3)	(4)
Y= *Voluntary departure (0/1)*	*Experience*		*Educ & Prof Backg*	
UD (0/1) ($\boldsymbol{\beta_1}$)	**-0.057***	**-0.069****	**-0.077***	**-0.077****
	(0.032)	**(0.033)**	**(0.040)**	**(0.037)**
UD×Low quality (β_2)	-0.013	0.001	0.015	0.013
	(0.016)	(0.018)	(0.030)	(0.027)
Treat×Low quality	0.007	-0.004	0.016	0.008
	(0.017)	(0.018)	(0.020)	(0.017)
Post×Low quality	0.013	0.003	0.012	0.018
	(0.014)	(0.013)	(0.021)	(0.013)
Low quality (0/1)	0.000	0.008	-0.008	-0.012
	(0.014)	(0.012)	(0.017)	(0.013)
Age>65 (0/1)		0.029***		0.029***
		(0.006)		(0.006)
Female (0/1)		-0.014		-0.014
		(0.018)		(0.018)
Linked (0/1)		0.012		0.012
		(0.008)		(0.008)
Attendance<75% (0/1)		0.036		0.035
		(0.024)		(0.024)
Dirown		-0.033		-0.035
		(0.106)		(0.109)
Observations	9,211	8,452	9,211	8,452
Adjusted R^2	0.063	0.062	0.064	0.062
$\beta_1 + \beta_2$	-0.071**	-0.068**	-0.062**	-0.064**
$\beta_1 + \beta_2$=0 *p*-value	0.033	0.039	0.050	0.048
Firm controls in Table 4	NO	YES	NO	YES
Firm-Cohort FE	YES	YES	YES	YES
State-Year-Cohort FE	YES	YES	YES	YES

Table 11 Can the improvement in outside director quality be due to an improvement in director compensation policy?

This table reports the difference-in-differences (DiD) regressions regarding the impact of UD adoptions on a firm's compensation policy for outside directors as measured by two variables, *LnCashPay* and *StkPay (0/1)*. *LnCashPay* is the natural logarithm of (annual cash retainer fee + total board meeting fee + 1). *StkPay* is an indicator variable that equals one if a firm grants stocks or stock options to outside directors. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Control variables are lagged by one year relative to the dependent variable. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*LnCashPay*		*StkPay (0/1)*	
UD (0/1)	**0.151**	**-0.085**	**0.002**	**0.014**
	(0.138)	**(0.170)**	**(0.022)**	**(0.024)**
Linked (%)		-0.008		-0.001
		(0.006)		(0.001)
LnMktVal		0.050		-0.001
		(0.129)		(0.015)
Leverage		0.279		-0.065**
		(0.602)		(0.029)
Stk volatility		-0.080		-0.014
		(0.116)		(0.022)
Observations	4,380	4,127	4,380	4,127
Adjusted R^2	0.781	0.795	0.776	0.780
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table 12 Value effects of improvement in director quality

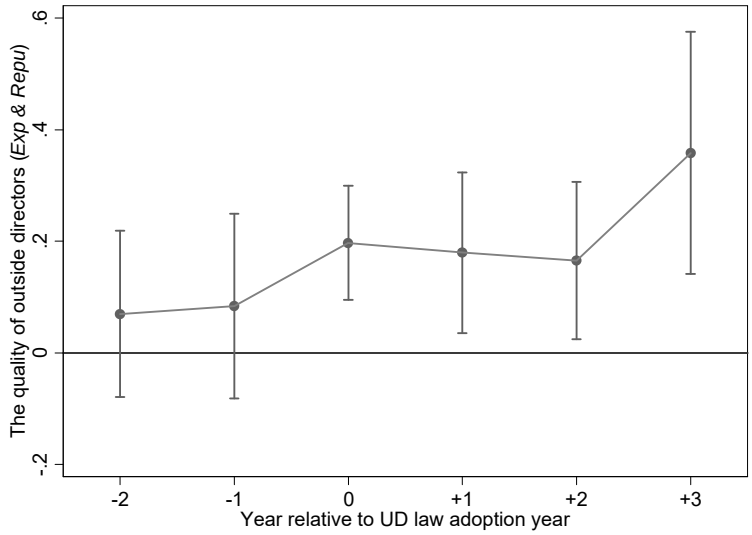
This table reports the effects of treatment firms' change in director quality on the change in average ROA conditional on the intensity of firms' shareholder monitoring over the window of [-3, +5] around UD law adoption. Following Gormley and Matsa (2011), only treatment firms (i.e., those that are incorporated in states that passed a UD law between 1989 and 2005) are included in the analysis. ΔROA is a firm's pre-to-post change in average ROA over the window [-3, +5]. We examine five years post UD-adoption to allow more time for the effects of director decisions to show up in operating performance. *Quality improvement* is a dummy variable that equals one if a firm's pre-to-post change in the average proportion of nominated high-quality outside directors is in the top tercile of the measure's sample distribution and zero otherwise. A nominated outside director is deemed to be of high quality if his/her *Experience* quality metric or *Educ & Prof Backg* quality metric is in the top tercile of the sample distribution in a year. *High blockholder* is a dummy variable that equals one if a firm's number of institutional blockholder (ownership >5%) is above the sample median in the year before UD law passage and does not experience a significant deterioration in blockholder monitoring after UD law passage; otherwise, *High blockholder* is set to 0. We consider that there is a significant deterioration in blockholder monitoring after UD law passage if the pre-to-post change in the number of blockholders (i.e., Post-event mean number of blockholders – the number of blockholders in the year before UD adoption) is below the 10th percentile of the variable (which corresponds to a value of -1). Control variables are measured in the pre-to-post change in the average of the corresponding variables. Event year FE are dummy variables denoting each UD law passage year. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
	Director quality =			
Y = ΔROA[-3, +5]	*Experience*		*Educ & Prof Backg*	
Quality improvement (β_1)	-0.013	-0.014	0.009	0.001
	(-0.68)	(-0.87)	(0.25)	(0.03)
***High blockholder*×*Quality improvement*(β_2)**	**0.053****	**0.051****	**0.004**	**0.013**
	(2.68)	**(2.71)**	**(0.09)**	**(0.33)**
High blockholder	-0.002	0.001	0.016	0.014
	(-0.24)	(0.13)	(1.09)	(0.95)
Δ*LnAT*		0.012		0.011
		(0.88)		(0.78)
Δ*Leverage*		-0.273***		-0.275***
		(-2.88)		(-3.04)
Observations	365	365	365	365
Adjusted R^2	-0.004	0.041	-0.010	0.036
$\beta_1 + \beta_2$	0.040***	0.037***	0.013	0.014
$\beta_1 + \beta_2$ *p*-value	0.000	0.000	0.290	0.302
Event year FE	YES	YES	YES	YES

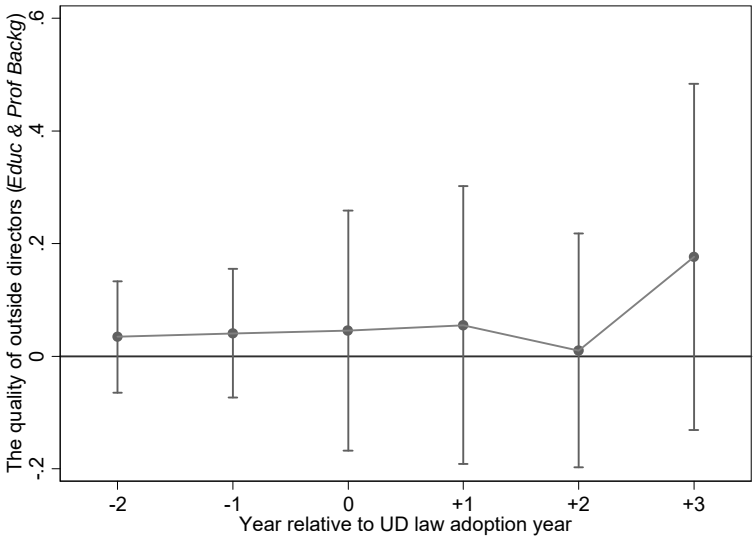
Figure 1: Dynamic treatment effects of UD adoption on the quality of outside directors

This Figure shows the dynamic treatment effects of UD adoption on the quality of nominated outside directors, and the 95% confidence intervals for such effects. Panel A reports the results on the quality of outside directors measured by the experience metric (*Experience*), which is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year. Panel B reports the results on the quality of outside directors measured by the educational and professional background of nominated outside directors (*Educ & Prof Backg*), which is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year.

Panel A: Dynamic treatment effects on Experience



Panel B: Dynamic treatment effects on Educ & Prof Backg



Appendix A: Variables definitions

Variable	Definition
Director quality measures	
The quality metric on an outside director candidate's experience	
Experience	The composite metric for a candidate's experience, which is the first principal component of the five director quality measures capturing a candidate's experience (i.e., *Key_exec, HP_firm, HI_patents, Multiple_seats, S&P 1500*).
Alt Experience	The alternative composite metric for a candidate's experience, which is the simple aggregation of the five director quality measures capturing a candidate's experience (i.e., *Key_exec, HP_firm, HI_patents, Multiple_seats, S&P 1500*).
Key_exec (0/1)	An indicator variable that equals one if an outside director candidate is a key executive with one, or some, of the titles: chief executive officer (CEO), president, chairman, chief financial officer (CFO), chief information officer (CIO), chief operating officer (COO), vice president (VP), executive VP, senior VP, partner, managing director, or treasurer (Knyazeva et al., 2013) in another company before nomination.
HP_firm (0/1)	An indicator variable that equals one if an outside director candidate comes from a public company with ROA above its Fama-French 49 industry median in the year before nomination.
HI_patents (0/1)	An indicator variable that equals one if an outside director candidate comes from a company whose number of patents granted is above its Fama-French 49 industry median in the year before nomination.
Multiple_seats (0/1)	An indicator variable that equals one if an outside director candidate holds more than one company board seat before being nominated; it equals zero otherwise.
S&P 1500	An indicator that equals one if an outside director candidate comes from a firm in the S&P 500 index, equals 2/3 if an outside director comes from a firm in the S&P midcap index, equals 1/3 if an outside director comes from a firm in the S&P small-cap index, in the year before nomination, and equals zero otherwise.
The quality metrics on educational and professional background of an outside director candidate	
Educ & Prof Backg	The composite metric for an outside director candidate's educational and professional background, which is the first principal component of the five director quality measures capturing a candidate's educational and professional background (i.e., *Degree, MBA, Financial, Legal, Industry*).
Alt Educ & Prof Backg	The alternative composite metric for an outside director candidate's educational and professional background, which is the simple aggregation of the five director quality measures capturing a candidate's educational and professional background (i.e., *Degree, MBA, Financial, Legal, Industry*).
Degree	A measure for an outside director candidate's highest academic degree. It equals one for a doctorate degree, 2/3 for a Master degree, 1/3 for a Bachelor degree, and zero otherwise.
MBA (0/1)	An indicator variable that equals one if an outside director candidate has a Master of Business Administration (MBA) degree, and zero otherwise.
Financial (0/1)	An indicator variable that equals one if an outside director candidate has a financial background (is/was a CFO, a treasurer, a banker, an accountant, an auditor, or a securities broker; or worked/is working in a venture capital, a private equity, an investment bank; or majored in finance or accounting).
Legal (0/1)	An indicator variable that equals one if an outside director candidate has a legal background (is/was an attorney, a legal counsel, a lawyer; or majored in law).

Industry (0/1)	An indicator variable that equals one if an outside candidate is/was an executive or a director of a listed company in the same FF49 industry as the focal company.

Key explanatory variables

UD (0/1)	$UD_{s,t}$ equals one if state *s* in which a firm is incorporated has passed a Universal Demand law (UD) by year *t*, and zero for otherwise. *UD* in our matched sample fixed window analysis can be conceptualized as *Treat*×*Post*, where *Treat* is an indicator variable that equals one if the firm's state of incorporation passed a UD statute; it equals zero otherwise. *Post* is an indicator variable that equals one for the UD adoption year and thereafter for treatment firms; control firms' pseudo *Post* follows the *Post* definition of their matched treatment firms.
UD (-1), UD (0), UD (+1), UD (+2), UD (+3)	Indicator variables: *UD (-1*) equals one if a firm is incorporated in a state one year before the state adopted a UD, and zero otherwise. *UD (0)* equals one if a firm is incorporated in a state in the year the state adopted a UD, and zero otherwise. *UD (+1*) equals one if a firm is incorporated in a state that adopted a UD one year ago, and zero otherwise. *UD (+2*) and *UD (+3)* are defined analogously.
AT statutes	A simple aggregation of the five anti-takeover statute adoption indicator variables, namely *DD, CSA, BC, FP* and *PP*. Those law indicator variables equal one if the state in which a firm is incorporated has passed a director duty law (DD), a control share acquisition law (CSA), a business combination law (BC), a fair price law (FP), or a poison pill law (PP) by a year, and zero otherwise.
Low M&A (0/1)	An indicator variable for low M&A activity, and it equals one if the total number of a firm's completed M&A deals in the year before UD adoption is in the bottom tercile of the sample distribution, and zero otherwise.
Low derivative suit risk (0/1)	An indicator variable that equals one if the total number of derivative suits in the Fama-French 49 industry to which a firm belongs in the year before UD adoption is in the bottom tercile of the sample distribution, and zero otherwise. Derivative lawsuits are sourced from the Audit Analytics database that provides derivative lawsuit details since 1996.
Large local pool (0/1)	An indicator variable that equals one if a firm's local pool of director supply is in the top tercile of the sample distribution in the year before the adoption of a UD, and zero otherwise. Following Knyazeva et al. (2013), a firm's local pool of director supply is defined as the number of non-financial S&P 1500 firms whose business addresses are within 60 miles of a firm's headquarters, excluding firms in the same 4-digit SIC industry (as they are likely competitors of the firm concerned). The latitude and longitude information of a firm's business address is obtained from the data compiled by Prof. Bill McDonald.
LLP protection index	The sum of the existence of the following three provisions limiting director liability in corporate charters/bylaws: the director liability limitation provision (*Dir liab*), the director indemnification provision (*Dir ind*), and indemnification contracts (*Dir indc*) in the year before UD adoption (Bradley and Chen, 2011).

Firm characteristics

Leverage	Book leverage, defined as book value of long-term debt (DLTT) plus short-term debt (DLC) scaled by book value of total assets (AT).
Stk volatility	Natural logarithm of the standard deviation of a firm's percentage daily stock return in a year.
LnMktVal	Natural logarithm of the market value of firm (AT-CEQ+PRCC_F×CSHO)
ROA	Return on assets, defined as income before extraordinary items (IB) scaled by average total assets (AT) in a year.

Board characteristics

LnCashPay	Expected cash pay to an outside director, defined as the natural logarithm of (annual cash retainer fee + the number of regular board meetings a year × attendance fee per meeting for an outside director +1). The pay is measured in dollars before the log transformation.
StkPay (0/1)	An indicator variable that equals one if a firm has a policy of granting stocks or stock options to outside directors, and zero otherwise.
Linked (%)	The percentage of linked directors in a board.

Director characteristics

Age>65 (0/1)	An indicator variable that equals one if the age of an outside director is over 65.
Female (0/1)	An indicator variable that equals one if an outside director is female.
Linked (0/1)	An indicator variable that equals one if an outside director is a linked/grey/affiliated director.
Attendance<75%(0/1)	An indicator variable that equals one if an outside director attended less than 75% of board meetings in a year.
Voluntary departure (0/1)	An indicator variable that equals one if an outside director voluntarily leaves the board in next period for reasons other than "reach the maximum of contract term period", "died", "sick", "departure due to the violation of law" and "accept a position in the government".
Dirown	Number of shares held by an outside director, scaled by a firm's total number of shares outstanding.

State characteristics

Ln(State GDP)	Natural logarithm of total GDP (in million dollars) in a state, obtained from the Bureau of Economic Analysis.
Ln(State population)	Natural logarithm of population (in persons) in a state, obtained from the Bureau of Economic Analysis.
State unemployment rate (*%*)	The unemployment rate in a state, obtained from the U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics and Current Population Survey.
Poverty rate (*%*)	The poverty rate in a state, obtained from the U.S. Bureau of the Census, Current Population Survey, Annual Social and Economic Supplements.
Ln(# of incorporated firms)	Natural logarithm of the number of firms incorporated in a state.

Appendix B: Validation of the director quality measures

Holding director incentives constant, higher quality directors should generally make better business decisions and add more to firm value. This should be especially the case when such business decisions are complex and involve sophisticated judgment. In this section, we validate our director quality measures using two important complex investment decisions as a lens that involves substantial expertise and judgment; specifically large M&A deals (that involve large investments and significant uncertainty) and innovation decisions (that are very risky, have typically low salvage values and are long-term in nature). The long-term success of a firm is strongly influenced by the success of these two important investment decisions. Thus, these two decisions offer a useful lens through which to evaluate the quality of board decisions. Good board decision making depends on directors' ability, experience, and judgment in executing these complex actions, and data on these outcomes are readily available. These business decisions can provide a more direct validation of our director quality measures than do ROA or Tobin's Q, given that the latter conventional performance metrics are affected by many other factors not specifically related to director ability and judgement.

We expect that a firm-year's proportion of high-quality outside directors to be positively associated with positive M&A announcement returns and more valuable innovation outcomes. We define an outside director as "high quality" if his/her quality metric *Experience* (or *Educ & Prof Backg*) is in the top tercile of the sample distribution in a given year. We then use the proportion of high-quality outside directors to total outside directors in a firm-year. One caveat with these tests is that since we only have manually collected director quality data for our matched treatment and control firms over a maximum of seven years centered around the cohort year, the results may not generalized to the population of Compustat firms.

Note that the purpose of these validation tests is not to examine how UD law affects the quality of innovation and M&A deals, which are the subjects of other studies (i.e., Chu and Zhao, 2019; Lin et al., 2020). Our purpose is to show that there is a positive relation between our two director quality measures and these important value-enhancing firm decision outcomes for our sample of firms. Therefore, by design, these tests are not couched in a difference-in-differences framework. We should also note that neither the regressions of outside director quality on M&A profitability, nor those on the value of innovation outputs provide direct causal evidence. Nevertheless, a positive association would support the relevance of our director quality measures.

We first relate our director quality measures to the profitability of large M&A decisions measured by an acquirer's bid announcement returns. Following Masulis and Simsir (2018), we focus on M&A deals over a seven-year period where we have director quality data for sample firms made by U.S. public acquirers that have a minimum transaction value of $5 million to focus on economically large M&A deals. We follow Lin et al. (2011) and compute stock cumulative abnormal returns over event days (-2, 2) where day 0 is defined as the M&A deal announcement date or the first trading day thereafter when day 0 is not a trading day. Each day's abnormal return is the difference between its raw stock return on that day and the predicted return obtained from a market model estimated over the (-210, -11) estimation period. The market return used in estimating predicted returns is the CRSP equal-weighted stock return index.

Panel A of Table B.1 reports the results of regressing M&A quality measures on the lagged proportion of high-quality outside directors. To capture whether investors perceive an announced M&A deal as value enhancing, we define the dependent variable as an indicator variable that equals one if the M&A announcement *CAR (-2, 2)*>0 and is zero otherwise. We use common acquirer and deal characteristics as control variables and include firm fixed effects to control for omitted factors that are time-invariant or have minimal time-series variation over the short seven-year event window (e.g., corporate governance). We find in Columns (1) and (2) that the coefficient of high-quality outside directors is positive and significant using the *Experience* metric (Column (1)), and is positive, but statistically insignificant using the *Educ & Prof Backg* metric (Column (2)). The point estimate in Column (1) of Panel A shows that a one-standard-deviation rise in the proportion of high-quality outside directors (0.26) increases the frequency of positive M&A announcement CARs by 7.8%. Given that a typical M&A deal has a 55% probability of having a positive *CAR (-2,2)*, this is an economically significant benefit.

A limitation of the above test is that while we know the likelihood that high-quality directors make value-increasing M&A deals, the indicator variable does not reflect the magnitude of the economic gain, i.e., *CAR (-2,2)*. Thus, we alternatively use a continuous dependent variable Max *(0, CAR (-2,2))* to capture the magnitude of a positive CAR and report the results in Columns (3) and (4). The earlier results for the proportion of high-quality directors measured by *Experience* is robust. Interestingly, the coefficient of the proportion of high-quality outside directors measured by *Educ & Prof Backg* is also positive and significant, suggesting that a director's educational and

professional background also facilitates more value enhancing M&A decisions. We conclude that outside directors of higher quality are likely to make better large-scale M&A decisions.

We turn next to the effect of high-quality outside directors on innovation outcomes measured by patent activity. Data on patent values are taken from Kogan et al. (2017). The authors compute the market value of each patent by its three-day market-adjusted CAR over event window (0, 2) (where day 0 is defined as the patent grant date) multiplied by the equity market capitalization of the patent-filing firm on the day prior to the patent grant announcement date. *LnAvePatVal* is Log(1 + total dollar market value of patents granted/number of patents granted) for a given firm-year, and *LnSumPatVal* is Log(1 + total dollar market value of patents granted) for a firm-year.

Panel B of Table B.1 reports the results of regressing innovation outcome measures on the lagged proportion of high-quality outside directors. We follow Guan et al. (2019) and control for the common determinants of firms' innovation outputs, and these determinants are lagged with respect to the dependent variable in the model.[30] In Columns (1) and (2) of Panel B, we first examine a firm's average market value per patent granted in a year (*LnAvePatVal*); we then examine the total market value of a firm's innovation output in a year (*LnSumPatVal*) in Columns (3) and (4). We measure director quality by *Experience* in Columns (1) and (3) and by *Educ & Prof Backg* in Columns (2) and (4). The proportion of high-quality outside directors has a positive and significant coefficient in all columns regardless of how we measure outside director quality.

The magnitude of the effects is economically meaningful. For example, the coefficient estimates reported in Columns (1) and (3) indicate that a one-standard-deviation (0.26) rise in the proportion of high-quality outside directors (measured by the *Experience* metric) raises the average market value of patents granted by about 4.5% (= exp(0.171*0.26) -1) and raises the total dollar market value of patents granted by 9.3% (= exp(0.341*0.26) -1). These results suggest that more high-quality outside directors are associated with more valuable innovation outcomes.

Taken together, we show that high-quality directors measured by better experience, and stronger educational and professional background are associated with more profitable M&A outcomes and more valuable innovation outcomes that have an important impact on a firm's long-term success. This evidence suggests that our measures of director quality, especially *Experience*, are empirically relevant measures of director effectiveness and capability.

[30] Given that more than half of the sample observations have a zero patent, we include industry fixed effects (Ind FE) instead of firm fixed effects to maintain the power of the test.

Table B.1: Effect of outside director quality and the quality of complex investment decisions

This table reports the regression results from examining the effect of outside director quality on the quality of firms' complex investment decisions (large M&As and innovation). A high-quality outside director is an outside director whose *Experience* quality metric or *Educ & Prof Backg* quality metric is in the top tercile of the sample distribution for all outside directors in a year. The proportion of high-quality directors is the number of high-quality outside directors scaled by the total number of outside directors in the board for a firm-year. We measure the quality of M&As in two ways: 1) whether *CAR (-2, 2)* is positive; 2) *Max (0, CAR(-2,2))* to capture the magnitude of a positive *CAR (-2, 2)*. *CAR (-2, 2)* is the five-day cumulative abnormal return calculated using a market model estimated over the period (-210, -11) relative to the deal announcement date (day 0) of an acquirer. The quality of innovation decision is measured by the logged average market value per patent grant announcement (*LnAvePatVal*) in a firm-year or the logged total market value of patent grant announcements in a firm-year (*LnSumPatVal*). Data on patent market value are sourced from Kogan et al. (2017). The authors compute the market value of each patent as the three-day CAR over the event window of (0, 2) (with day 0 defined as the patent grant date) times the market capitalization of the patent-filing firm on the day prior to the announcement of the patent grant. Specifically, *LnAvePatVal* is the log of (1 + total dollar market value of patents granted / number of patents granted in a year) and *LnSumPatVal* is the log of (1 + total dollar market value of patents granted). Panel A reports the results from regressing the binary variable *CAR (-2, 2)>0* and continuous *Max (0, CAR(-2,2))* on the proportion of high-quality outside directors. We follow Lin et al. (2011) in including the control variables for deal announcement returns. Panel B reports the results from regressing innovation quality on the proportion of high-quality outside directors. We follow Guan et al. (2019) in including the control variables of innovation outputs. As more than half of the sample observations have a zero patent, we include industry fixed effects (Ind FE) instead of firm fixed effects in Panel B to retain the power of the test. Firm-level explanatory variables are lagged by one year with respect to the dependent variable. *LnMktVal* is the log of the market value of a firm's equity. *Leverage* is a firm's book leverage ratio. *Tobin's Q* is a firm's market-to-book ratio. *Relative deal size* is the deal value scaled by the acquirer's market value measured at event day -11. *Unrelated deal (1/0)* is an indicator variable that equals one for a deal in which the acquirer and target do not belong to the same two-digit SIC industry. *All-cash deal (1/0)* is an indicator variable that equals one for an all-cash-financed deal. *Stock deal (1/0)* is an indicator variable that equals one if a deal is at least partially financed by stock. *Friendly deal (1/0)* is an indicator variable that equals one for a friendly negotiated deal. *Private target (1/0)* and *Subsidiary target (1/0)* are indicator variables that equal one if the target is a private firm or a subsidiary, respectively. *LnAge* is the log number of years since a firm is first listed in Compustat. *Tangibility* is net property, plant & equipment scaled by total asset. *Herfindahl* is the sales-based Herfindahl index of a Fama-French 49 industry to which a firm belongs. *Institutional ownership* is the proportion of institutional ownership in the firm. *R&D* is research and development (R&D) expenditure scaled by sales. Estimates are based on OLS regressions with robust standard errors clustered at the firm level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Panel A: The effect of outside director quality on the quality of firms' large M&A decisions

	(1)	(2)	(3)	(4)
	Y= *CAR (-2, 2)>0*		*Y= Max (0, CAR (-2, 2))*	
Director quality measure =	*Experience*	*Educ & Prof Backg*	*Experience*	*Educ & Prof Backg*
% of high-quality directors	**0.299***	**0.236**	**0.030****	**0.049****
	(0.158)	**(0.197)**	**(0.015)**	**(0.022)**
LnMktVal	-0.033	-0.045	-0.000	-0.002
	(0.053)	(0.053)	(0.006)	(0.006)
Leverage	0.132	0.111	-0.001	-0.006
	(0.282)	(0.285)	(0.035)	(0.034)
Tobin's Q	-0.004	-0.002	-0.004	-0.004
	(0.041)	(0.041)	(0.004)	(0.004)
Relative size	0.112*	0.114*	0.027***	0.027***
	(0.064)	(0.063)	(0.009)	(0.009)
Unrelated deal (1/0)	0.111**	0.118**	-0.000	0.000
	(0.048)	(0.048)	(0.004)	(0.004)
All-cash deal (1/0)	0.018	0.026	0.002	0.003
	(0.048)	(0.049)	(0.004)	(0.004)
Stock deal (1/0)	0.102	0.093	0.000	-0.001
	(0.064)	(0.064)	(0.005)	(0.005)
Friendly deal (1/0)	-0.092	-0.092	-0.007	-0.007
	(0.132)	(0.132)	(0.010)	(0.010)
Private target (1/0)	0.121**	0.119**	0.015***	0.014***
	(0.058)	(0.059)	(0.005)	(0.005)
Subsidiary target (1/0)	0.160***	0.164***	0.013***	0.013***
	(0.059)	(0.060)	(0.005)	(0.005)
Observations	1,006	1,006	1,006	1,006
Adjusted R^2	0.080	0.077	0.250	0.255
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Panel B: The effect of outside director quality on the quality of firms' innovation decisions

	(1)	(2)	(3)	(4)
	Y= *LnAvePatVal*		*Y= LnSumPatVal*	
Director quality measure =	*Experience*	*Educ & Prof Backg*	*Experience*	*Educ & Prof Backg*
% of high-quality directors	**0.171***	**0.188****	**0.341****	**0.416*****
	(0.090)	**(0.077)**	**(0.169)**	**(0.157)**
LnMktVal	0.258***	0.269***	0.454***	0.476***
	(0.022)	(0.023)	(0.044)	(0.044)
Leverage	0.109	0.098	0.172	0.145
	(0.112)	(0.110)	(0.210)	(0.206)
LnAge	0.047	0.065*	0.107	0.146**
	(0.036)	(0.036)	(0.071)	(0.072)
Tangibility	0.053	0.034	0.088	0.050
	(0.163)	(0.163)	(0.293)	(0.292)
Tobin's Q	-0.037**	-0.043**	-0.076**	-0.088***
	(0.018)	(0.018)	(0.033)	(0.033)
Herfindahl	-2.656*	-2.843*	-0.978	-1.374
	(1.590)	(1.575)	(3.194)	(3.168)
$Herfindahl^2$	3.949	4.179	0.081	0.565
	(3.050)	(3.019)	(6.020)	(5.954)
Institutional ownership	0.055	0.072	0.244	0.279
	(0.118)	(0.117)	(0.242)	(0.242)
R&D	0.294**	0.288**	0.678***	0.661***
	(0.127)	(0.125)	(0.245)	(0.242)
Observations	4,278	4,278	4,278	4,278
Adjusted R^2	0.375	0.376	0.411	0.414
Ind FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Internet Appendix for

Director Liability Protection and the Quality of Outside Directors

Table IA1: Are the results due to confounding law enactments and the 2008 financial crisis?

This table reports the DiD results after controlling for the effects of confounding laws including directors' duties (DD), business combination (BC), control share acquisition (CSA), fair price (FP), and poison pill (PP) laws. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. *AT statutes* is a simple aggregation index of the five law indicator variables, namely *DD, CSA, BC, FP* and *PP*. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. *BC* is an indicator variable that equals one if the state in which a firm is incorporated has passed a BC law, and zero for other firm-years within our sample. *DD, CSA, FP*, and *PP* are defined analogously. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Panel A: Are the results due to confounding law enactments?

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.157*** **	**0.153*** **	**0.015**	**0.018**
	(0.034)	**(0.033)**	**(0.114)**	**(0.110)**
AT statutes	-0.023	0.005	0.066	0.078
	(0.057)	(0.046)	(0.066)	(0.049)
Observations	4,309	4,060	4,309	4,060
Adjusted R^2	0.565	0.564	0.644	0.649
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Panel B: Excluding the 2008 financial crisis period (observations in 2008)

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.151*** **	**0.154*** **	**0.033**	**0.039**
	(0.029)	**(0.028)**	**(0.095)**	**(0.097)**
Observations	4,297	4,048	4,297	4,048
Adjusted R^2	0.566	0.564	0.644	0.649
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table IA2: Are the results due to SOX and related exchange listing requirements?

This table reports the results from tests regarding the confounding effect of SOX. Panel A reports the results after controlling for the lagged percentage of independent directors, because corporate boards that are less independent are more affected by the exchange listing requirements on board independence following the passage of SOX. Panel B reports the results from DiD regressions regarding the impact of UD adoption on the quality of nominated outside directors only using events up to 1998 and these events are not affected by SOX. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. $UD_{s,t}$ equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

Panel A: Controlling for the lagged percentage of independent directors

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.115****	**0.136*****	**0.064**	**0.090**
	(0.046)	**(0.043)**	**(0.090)**	**(0.102)**
Observations	3,617	3,471	3,617	3,471
Adjusted R^2	0.562	0.559	0.652	0.657
Lagged % of independent directors	YES	YES	YES	YES
Control variables in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Panel B: Using UD adoption events up to 1998 only

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.120*****	**0.129*****	**0.030**	**0.042**
	(0.035)	**(0.038)**	**(0.107)**	**(0.109)**
Observations	3,403	3,201	3,403	3,201
Adjusted R^2	0.599	0.598	0.635	0.640
Control variables in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table IA3 Effects of UD on the quality of outside directors: Director-year-level results

This table reports the results from DiD regressions examining the impact of UD adoptions on the quality of nominated outside directors. The analysis is conducted at the director-year level. *Experience* is the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats, S&P 1500* of a nominated outside director, and *Educ & Prof Backg* is the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal, Industry* of a nominated outside director. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1)	**0.168*** **	**0.190*** **	**0.058**	**0.074**
	(0.031)	**(0.028)**	**(0.073)**	**(0.078)**
Age>65 (0/1)		-0.062		-0.134***
		(0.064)		(0.032)
Female (0/1)		-0.155*		-0.003
		(0.091)		(0.062)
Linked (0/1)		-0.393***		-0.197***
		(0.063)		(0.036)
Observations	16,568	15,801	16,568	15,801
Adjusted R^2	0.295	0.302	0.352	0.360
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table IA4 Robustness check: Effects of UD adoptions on the quality of independent directors

This table reports the results from difference-in-differences (DiD) regressions examining the impact of UD adoptions on the quality of nominated independent directors. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated independent directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated independent directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Robust standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD	**0.097****	**0.109****	**0.030**	**0.032**
	(0.042)	**(0.049)**	**(0.130)**	**(0.143)**
Observations	4,006	3,788	4,006	3,788
Adjusted R^2	0.559	0.555	0.659	0.665
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table IA5: Are the results robust to a simple aggregation of director quality items?

This table reports the results from difference-in-differences (DiD) regressions regarding the impact of UD adoptions on the quality of nominated outside directors. *Experience_alter* is the mean of the simple aggregate quality index of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg_alter* is the mean of the simple aggregate quality index of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. Detailed variable definitions are provided in Appendix A. We include firm fixed effects (Firm FE) and headquarters state-by-year fixed effects (State-Year FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Alt Experience*		*Alt Educ & Prof Backg*	
UD (0/1)	**0.102*** (0.028)**	**0.104*** (0.028)**	**0.028* (0.014)**	**0.029* (0.016)**
Observations	4,309	4,060	4,309	4,060
Adjusted R^2	0.583	0.582	0.581	0.584
Firm controls in Table 4	NO	YES	NO	YES
Firm FE	YES	YES	YES	YES
State-Year FE	YES	YES	YES	YES

Table IA6: The moderating effect of Non-high-technology industry

This table tests whether high-technology companies disproportionately benefit more from the liability protections of a UD in terms of the recruiting of high caliber outside directors. Following Barron et al. (2002), we define high-technology manufacturing companies as firms whose three-digit SIC codes equals 283 (Drugs), 284 (Chemicals), 357 (Computer and Office Equipment), 366 (Communications Equipment), 367 (Electronics), 371 (Motor Vehicles), 382 (Measurement and Control Devices), 384 (Medical Instruments), or 737 (Software). *Non-Hi tech* is an indicator variable that equals one if a firm's three-digit SIC code does not belong to any of the above high-technology categories in the year before a UD adoption. *Experience* is the mean of the first principal component of the following five quality measures: *Key_exec, HP_firm, HI_patents, Multiple_seats,* and *S&P 1500* of nominated outside directors in a firm-year, and *Educ & Prof Backg* is the mean of the first principal component of the following five quality measures: *Degree, MBA, Financial, Legal,* and *Industry* of nominated outside directors in a firm-year. $UD_{s,t}$ is an indicator variable, and it equals one if state *s* in which a firm is incorporated has passed a UD by year *t*, and zero for otherwise. *Post* is an indicator variable that equals one for the year from the UD adoption year onward. Control firms follow the *Post* definition of their matched treatment firms. We include firm-cohort fixed effects (Firm-Cohort FE) and headquarters state-year-cohort fixed effects (State-Year-Cohort FE) in all regressions. Estimates are based on OLS regressions with robust standard errors clustered at the incorporation-state level. We use the same control variables as in Table 6. Standard errors are reported in parentheses. Significance at the 10%, 5% and 1% level (two-tailed) is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
Y=	*Experience*		*Educ & Prof Backg*	
UD (0/1) (β_1)	0.343***	0.433***	-0.013	0.078
	(0.074)	(0.071)	(0.150)	(0.173)
UD×Non-Hi tech (β_2)	**-0.217****	**-0.287*****	**0.051**	**-0.050**
	(0.099)	**(0.095)**	**(0.115)**	**(0.121)**
Post×Non-Hi tech (0/1)	0.150***	0.197***	0.017	0.130
	(0.046)	(0.038)	(0.102)	(0.094)
Observations	4,351	4,100	4,351	4,100
Adjusted R^2	0.559	0.556	0.623	0.624
$\beta_1 + \beta_2$	0.125**	0.146**	0.037	0.028
$\beta_1 + \beta_2$=0 *p*-value	0.011	0.005	0.709	0.769
Firm controls in Table 4	NO	YES	NO	YES
Firm-Cohort FE	YES	YES	YES	YES
State-Year-Cohort FE	YES	YES	YES	YES

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities.*

The ECGI will produce and disseminate high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It will draw on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

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