# Employee-Friendliness and Corporate Innovation: Evidence from Quasi-Exogenous Natural Experiments


## Abstract

Are happy employees more creative? We explore this question by examining the relationship between employee-friendliness and corporate innovation. We first document a strong positive association between a firm's employee-friendliness and its innovation success. We then use the staggered adoption of the Inevitable Disclosure Doctrine (IDD) by various U.S. states as an exogenous shock that shuts off an important external source of employee motivation to innovate. Innovation within employee-friendly firms appears to be largely immune to this external shock, whereas unfriendly firms suffer significant declines in innovation outputs. This is because the intrinsic motivation provided to the employees is powerful enough to make external motivators such as mobility less important. We also corroborate this evidence by looking at the effect of the opposite shock of IDD rejections on firm innovation. Our findings suggest that a firm's investments in the satisfaction of employees play an important innovation enhancing role.



JEL: J24, J28, J50, K11, K12, K31, O31, O32, O34

Keywords: Innovation, R&D, Inevitable Disclosure Doctrine, Employee-friendly firms, Corporate Social Responsibility

## 1. Introduction

The human capital intensity of corporate innovation suggests that employee welfare should play a critical role in determining innovation success (Zingales, 2000). Indeed, a large literature suggests that employees are not just a simple production input whose costs should be minimized and output maximized. Rather, a firm's investments in the satisfaction of its employees can increase its productivity and market value (Edmans, 2011).

In this paper, we explore the relationship between employee-friendliness and corporate innovation. The key question that motivates our research is whether happier employees are more innovative. The human relations and psychology literature have long proposed that human happiness has a positive effect on creativity. For instance, Fredrickson (1998) conjectures that "*positive emotions prompt individuals to discard time-tested or automatic behavioral scripts and to pursue novel, creative, and often unscripted paths of thought and action".*[1] Much of the evidence that supports this notion has been generated in experimental settings where stimuli designed to induce changes in happiness are used to assess its effects on productivity and creativity by using simple stylized tasks. Our study builds on the above evidence by examining how employee satisfaction affects an economically important real-life outcome, corporate innovation, and thus provides insights into the human factors that explain an important source of technological progress.

One important reason that experimental studies have been used to assess the effect of human factors on innovation is that observational studies can be plagued by endogeneity concerns. For example, an association between employee-friendliness measures and corporate innovation could arise because successful resource-rich firms (i.e., firms that have successfully innovated in the past) are more capable of investing in the satisfaction of employees, and the direction of causality could be the opposite of what we want to study.

---

[1] Vernon (1970) provides anecdotes that also support this notion. For example, the French mathematician, Henri Poincare reported that he experienced creative breakthroughs while on vacation, relaxed and comfortable, or Mozart, who claimed that pleasant moods were most conducive to his creativity: " *When I am, as it were, completely myself, entirely alone, and of good cheer—say, traveling in a carriage, or walking after a good meal, or during the night when I cannot sleep; it is on such occasions that my ideas flow best and most abundantly*"

To overcome such concerns, we employ an exogenous legislative shock that limits the mobility of employees and thus shuts off an important motivation to innovate that is *external* to the firm. We use this shock to assess the value of a firm's *internal* efforts to ensure the well-being of the employees. The ability of employees to move from one firm to another is an important motivating force to innovate because it ensures that effort exerted on innovative activity is adequately recognized and rewarded. This is because an active external labour market for innovation talent provides employees with valuable outside employment options that enable them to bargain for a greater share of any ex-post surpluses generated from successful innovation. This provides a mechanism for employees to realise the value of the effort investments they make in developing their innovation-relation human capital (Fulghieri and Sevilir, 2011).

Our empirical analysis begins by documenting a strong positive association between corporate innovation and employee-friendliness of the firm[2]. However, to understand the extent to which this association is due to the causal effect employee-friendliness on innovation, we rely on external disruptions to the equilibrium level of incentives to innovate created by a shock to labour market mobility. If being more employee-friendly on the part of the firm does indeed lead to employees becoming more innovative, then employee-friendliness should insulate a firm's corporate innovation activity from the effects of a negative external shock to employee motivation to innovate. Understood in a different way, the role that employee mobility plays in motivating innovation could be moderated in firms with high employee-friendliness because the employees are not looking to move because the intrinsic motivation provided within the firm is powerful enough to make external motivators less important. This is exactly what we find - a higher level of employee satisfaction due to employee-friendly practices of a firm can negate the detrimental effect of negative shocks to employees' incentive to invest in firm-specific human capital and innovate.

[2] Chen et al. (2016), Chen, Leung, and Evans (2016), Mao and Weathers (2015) and Mayer, Warr, and Zhao (2015) also find positive association between employee-friendliness and corporate innovation during overlapping period with our study.

To measure employee-friendliness, we use MSCI ESG STATS dataset which provides extensive information on the ratings given to firms in relation to their employee treatment status to measure employee satisfaction at the firm level during 1991-2008.[3] Bae, Kang, and Wang (2011) argue that this is the most comprehensive dataset available of employee treatment standards. To show that employee satisfaction positively affects corporate innovation, we use a large panel of innovation measures, collected from Kogan, Papanikolaou, Seru, and Stoffman (2017) (henceforth KPSS).

An exogenous change in the external motivator for innovation is made possible by the *staggered* recognition (or adoption) of the Inevitable Disclosure Doctrine (henceforth IDD) by various U.S. States that creates legal barriers to employment mobility[4]. Fulghieri and Sevilir (2011) argue that reduction in employees' outside employment options should have a significant negative effect on their incentive to invest in firm-specific human capital[5] which, in turn, would be detrimental for innovation productivity for firms[6]. Empirically, this is exactly what we find - firms in states that adopted the IDD saw large declines in innovative output when compared to unaffected firms in other states. Gu et al. (2018) show that these shocks also have large effects on employees' mobility across firms, which is also supportive of the above line of argument.[7]

It is important to note that the staggered adoption of IDD across states is not a firm-level decision and hence not endogenously determined by firm-specific characteristics. Furthermore, the staggered nature of adoption of the IDD by various U.S. states partially mitigates concerns about the violation of parallel trends assumption which is crucial for identification in a difference-in-differences setup. Since shocks occur at different times affecting

---

[3] Recent studies such as Lins, Servaes and Tamayo (2017, Cronqvist and Yu (2017), Hong and Kostovetsky (2012) also use this database.

[4] IDD is a legal doctrine which states that a firm's former employees can be prevented from working for a rival if this would "inevitably" lead the employee to divulge the firm's trade secrets to the rivals.

5 Garmaise (2009) also shows (both theoretically and empirically) such disincentivizing effects of reduction in outside employability on corporate outcomes.

[6] Orly Lobel in her book "*Talents want to be free: Why we should learn to love leaks, raids and free riding*" argues that innovation is positively linked to dynamic flows of information and people, stemming from motivational and aggregate benefits of the freedom to move among ventures.

[7] Gu et al. (2018) show that within-State inventor mobility falls dramatically in IDD adopting States and that inventors also do not move to other States.

one set of firms - those in the IDD adopting state - while leaving firms in other states unaffected, it is quite unlikely that parallel trend assumption is violated for *each* unique shock. Nevertheless, we conduct various checks of whether the *parallel trends* assumption is violated and find no evidence that it is. In addition, we test and find the *ex-ante* firm covariates just before the shocks to be largely balanced between treatment and control firms.

Our main argument is that in firms that engage in employee-friendly practices, external mobility is not likely to be an important motivator for innovation. Therefore, in such firms we expect the negative effect of IDD adoption on innovation output to be mitigated. Our empirical results strongly support this. The negative effect of restricting employee mobility on innovation output is seen only among the firms that are not employee-friendly, but not in those that are. These patterns hold for the number of patents, patent citations, and well as the value of patents (measured as in KPSS). This evidence shows that a friendly relation between a firm and its employees has an important role in creating a conducive environment for corporate innovation.[8]

To corroborate this effect of employee-friendliness on corporate innovation, we also rely on the opposite shock – rejections of IDD. These shocks *increased* the mobility of employees of firms in affected states. We find that IDD rejection leads to an increase in innovation output compared to unaffected firms in other states. However, in employee-friendly firms (i.e., firms when external mobility is not the main motivator for innovation), we should not expect a strong effect of increased mobility on innovation output, since mobility is a relatively less important motivator for the employees of these firms. Our empirical results strongly support this hypothesis as well. Obtaining consistent evidence across exogenous shocks that shift the incentive equilibrium in opposite directions, provides a higher degree of confidence that the economic mechanism we propose is, in fact, the driver of the observed empirical results.

[8] Lins, Sarvaes and Tamayo (2017) show that trust between firms and stakeholders such as employees, customers, built through investments in social capital, pays off when the overall level of trust in corporations and markets suffers a negative shock.

We next conduct another test of the disincentivizing effect of IDD on innovation based on the location of a firm's inventors. Since IDD adoptions legally affect the inventors within the headquarter state of the focal firm, one would expect to see that the inventors located in the headquarter state of a focal firm to be more disincentivized to innovate compared to other inventors from the same firm, but which invent outside the headquarter state. This, in turn, should be reflected in the quantity (# of patents), the quality of patents (Citations and Patent value), and the value of the patents that are registered by the in-state inventors and out-of-state inventors of the focal firms. Our results show that this indeed seems to be the case. In-state inventors' outputs are more markedly affected by IDD shocks than those of out-of-state inventors.

We also examine the extent to which employee-friendliness moderates the effect of IDD adoptions, for in-state innovation relative to out-of-state innovation. Consistent with our earlier evidence, we find that value of patents generated by a firm's in-state inventors significantly declines after an IDD adoption. However, this decline is significantly moderated for firms that are employee-friendly. In contrast, we find that there is no moderating effect of employee-friendliness when using the value of a firm's out-of-state patents as the dependent variable. This supports our initial conjecture that out-of-state inventors are less likely to be affected by the IDD adoptions by the state court in a firms' headquarter states and lends further credence to our hypothesis.

Our study makes several contributions to the literature. First, we connect the innovation literature with the growing literature on firms' treatment of their employees.[9] The modern theory of the firm highlights the importance of employees or human capital as the most important capital vis-à-vis physical capital (Rajan and Zingales 1998; Carlin and Gervais, 2009; Berk, Stanton and Zechner, 2010))[10]. We show that firms' employees specifically, satisfied

---

[9] Innovation literature broadly focuses on how firm-level characteristics and decisions that can influence corporate innovation such as financial structure (Hall, 2001: Almeida et al., 2011; Brown et al., 2012), IPOs (Bernstein, 2015), Financial constraints (Almeida et al. 2013), corporate governance structure (Sapra et al., 2014), board structure (Balsmeier et al., 2017), institutional ownership ( Aghion et al., 2013), product market competition (Aghion et al., 2005) failure-tolerance (Manso, 2011; Tian and Wang, 2014), corporate control contest (Atanassov, 2013; Bena and Li, 2014).

[10] In 2006, The Economist declared that the world's most valuable commodity is "Talent". See https://www.economist.com/node/8000879

employees are indeed a very important determinant of corporate innovation. This is indeed consistent with Zingales (2000) who argues that "human capital is emerging as the most crucial asset" in today's world. Liu, Mao, and Tian (2017) also show that compared to firms' organizational capital, human capital embedded in inventors explains a majority of the variation in innovation performance.[11] They also argue that inventors contribute more when they are better networked and in firms with higher inventor mobility. We exploit barriers to mobility as a source of identification and show that indeed, reduced mobility across firms triggered by exogenous shocks in legal structure reduces corporate innovation. However, our important novel contribution to the literature is that such reduction in corporate innovation could be mitigated when employees are more satisfied due to better treatment by their firm.

Second, we contribute to the literature on the effect of changes in the legal environment on corporate strategic investments such as innovation. Chava et al. (2013) and Cornaggia et al. (2015) show how banking deregulation and banking competition affect innovation. Utilizing the State-level staggered adoption of stringent Wrongful Discharge Law (WDL), Acharya et al. (2013) show that such legal structure provides employees with greater defense against holdup by the employers which ultimately has important implications for corporate innovation. Garmaise (2009) shows that stricter enforceability of Non-Compete Covenant Clause (NCC) discourages managers from investing in their own human capital. This evidence is very consistent with the effect that we document.

Finally, utilizing a quasi-natural experiment, we corroborate the findings in the literature that shows a positive correlation between employee-satisfaction and corporate innovation. Thus, we contribute to the literature on the impact of intangibles on firm-level value creation. Chen et al. (2016), Chen, Leung, and Evans (2016), Mao and Weathers (2015) and Mayer, Warr, and Zhao (2015) also consider the association between employee-friendliness and corporate innovation. Our paper differs from these papers in a fundamentally important way. We rely on a quasi-exogenous natural experiment as an identification. Specifically, we

[11] Some studies also try to link corporate innovation to managerial characteristics such as CEO overconfidence (Hirshleifer et al., 2012), CEO sensation seeking (Sunder et al., 2017), CEO generalist managerial experience (Custodio et al., 2017), CEO inventor experience (Islam and Zein, 2018) and CEO incentive pay (Ederer and Manso, 2013).

use the exogenous variations in the equilibrium level of incentives to innovate caused by the staggered adoption of IDD by various U.S. states, to identify the value of firms' internal effort to be employee-friendly. Thus, our identification strategy to assess the effect of firms' employee-friendliness on corporate innovation differs markedly from these papers that depend on either instrumental variable (IV-2SLS) approach or first-difference approach instead. Additionally, extant literature suggests a robust correlation between employee satisfaction and firm value (e.g., Edmans, 2011; Faleye and Trahan, 2011: Edmans 2012). Using a difference-in-differences methodology that exploits the enactment of State-level constituency statues, Flammer and Kacperczyk (2015) show that a positive *stakeholder* orientation spurs corporate innovation. Our study, while consistent with their general picture, differs from theirs in that we show that employee satisfaction, as compared to broad *stakeholder* level Corporate Social Responsibility (CSR), is beneficial for firms. Our study uncovers a probable channel, corporate innovation, that potentially explains sources of such positive value implications of intangibles such as employee satisfaction. Specifically, our study highlights how higher levels of employee satisfaction can deter the detrimental effect of negative shocks on employees' incentive to invest in firm-specific human capital.

The rest of the paper is organized as follows: section 2 provides the related literature, section 3 summarizes the data and methodology, and section 4 provides the main results. We conclude the paper in section 5.

## 2. Related Literature

Innovation is risky and failure-intensive and thus may deter optimal effort from employees who, in the face of career concerns, may have disincentives to invest in their firm-specific human capital. Employees risk being terminated by failing to innovate successfully. Employees also risk being terminated even if the project is successful, especially in the absence of legal protection such as enforceability of Wrongful Discharge Law (WDL) as shown in Acharya, Baghai, and Subramanian (2013). As a result, employees may be discouraged to invest in their own human capital. Firms may attenuate such career concerns through signaling credibly that firms genuinely care about employees. For example, firms may have incentive schemes in place to share profit with employees or may have more performance-linked long-term compensation contracts which encourage optimal employee efforts and contribute to long-term value creation (Flammer and Bansal, 2017). In addition, firms may have generous health and safety programs for the employees and thus can credibly commit to the long-term benefits of the employees. For example, Holland (2017) shows that higher investments in employee health capital positively affect firm value and overall productivity. We argue that firms' investments in employee satisfaction help to overcome the disincentive problem faced by the employees and thus provide the corporate culture conducive to high impact corporate innovation. We show that firms that have higher investments or efforts to be employee-friendly are associated with both higher quality and quantity of corporate innovation.

The classical papers that provide the theoretical foundation of property rights (Grossman and Hart, 1986; Hart and Moore, 1990; Hart 1995) suggest that bilateral contracts are subject to holdup problems when contracts are incomplete. Acharya, Baghai and Subramanian (2013) argue that "Indescribable contingencies" (Tirole 1999), that are inevitable hallmarks of innovative projects- which are failure-intensive and hence require extensive exploration (Manso 2011), make it less likely that firms and employees will be able to contract upon the specific details of either the employee's effort or the nature of the signal by the firms. Acharya et al. (2013) show, both theoretically and empirically, that state-level staggered adoption of stringent Wrongful Discharge Law (WDL) provides employees with greater defense against holdup by the firms (employers). They further show that such reduction in holdup by the firms increases the outside option and thereby increases the share of the surplus generated when the project is successful and hence argue that stricter enforceability of WDL increases the employees' efforts when contracts are incomplete. We argue that by providing employees with higher levels of satisfaction or by better treating the employees, firms provide credible signal that firms (employers) suffer relatively less from the holdup problems which in turn would reduce holdup by the employees. These less pronounced holdups, in turn, would spur firm-level innovation for employee-friendly firms.

The literature on corporate innovation shows that innovation is value enhancing (Hall, Jaffe and Trajtenberg, 2005) and provides the competitive edge in a hyper-competitive business environment (Porter, 1990) where innovation activity becomes a life-and-death matter for the firms (Baumol, 2002). Despite a well-established theoretical foundation on the effect of employee satisfaction on firm value, albeit with conflicting predictions, there is a dearth of empirical evidence on the effect of employees' satisfaction on corporate outcomes[12]. Although some empirical evidence in the literature suggests that employee satisfaction has long-term value implications for organizations in general (Edmans, 2011), the specific channels for such value implications for the corporations are relatively underexplored. We fill this gap in the literature and argue that employee satisfaction creates substantial market valuation as shown in Edmans (2011) through the channel of corporate innovation.

There is a growing literature on the effect of recognition of IDD on various firm outcomes. In this paper, we utilize the staggered adoption of IDD to induce exogenous variations in employee mobility to assess the value of employee-friendliness on firm-level innovation. Since IDD reduces the mobility of employees across firms, employees outside employment options become limited. On the one hand, this disincentivizes talented knowledge-workers such as scientists and R&D people in providing optimal effort in innovation. Garmaise (2009) show that reduced outside employment options discourages managers from investing in their own human capital. Marx et al. (2015) provide empirical evidence on reduced within-state mobility as well as inter-state 'brain-drain' of knowledge workers (elite inventors) following reduced outside employment options, especially for employees whose work is more impactful. Gu et al. (2018) also show that in-state mobility of inventors falls quite dramatically for IDD adopting states, however, do not find any significant job-hopping across states. On the other hand, from a theoretical standpoint, the prediction on the effect of reduced mobility of employees on investments in innovation by the firms is mixed. Reduced employee mobility may encourage firms to invest more in human capital development. The restricted mobility of employees suggests that firms have a higher probability of reaping the benefits from the costs involved with employees' skills development programs such as employee training schemes since employees/managers are more likely to remain with the firms. Thus, the restricted mobility

[12] Traditional theories (e.g. Taylor, 1911) that view employees as, yet another input of production argue that employee satisfaction reduces firm value since satisfaction arises if employees are overpaid or underworked. However, human relation theories (e.g., Maslow, 1943; Hertzberg, 1959; Mcgregor, 1960) that view employees as key organizational assets argue that employees can create substantial value by inventing new products or building client relationships as argued in Edmans (2011).

may encourage firms to invest incrementally more in R&D projects. Nevertheless, Fulghieri and Sevilir (2011) theoretically show that due to the weak incentive effect of the employees, firms may not find it worthwhile to invest towards innovation. Indeed, Garmaise (2009) shows that such an environment with restricted employee mobility is also associated with reduced capital expenditures per employee. Empirical evidence in Klasa et al. (2017) suggests that IDD ruling has no effect on R&D spending (scaled by sales), capital expenditures and advertisement expenditures by the firms.

## 3. Sample and Data:

### 3.1. Sample Construction and Variable Description

Our primary dataset is an unbalanced panel dataset of all U.S. public firms with headquarters in the U.S. from CRSP-Compustat merged dataset. The sample excludes financial (Standard Industrial Classification (SIC) codes 6000–6999) and utility (SIC codes 4900–4999) firms considering the differential regulatory environment of these firms. After the exclusion of financial and regulated utility firms, the primary dataset includes 13,471 unique firms from 1977 to 2011.

#### 3.1.1 Measuring Innovation at the Firm-Level:

Since our main dependent variables of interest are innovation measures, we collect innovation data from Kogan, Papanikolaou, Seru, and Stoffman (2017) (henceforth KPSS). Particularly, the KPSS (2017) dataset provides information on the number of patents, the market value of patents and the number of citations received by each patent filed with the U.S. Patent and Trademark Office (USPTO) from 1926-2010. After merging CRSP-Compustat merged dataset with KPSS (2017), our sample covers 13,176 unique firms for which we have data on all the required control variables of the baseline specification during 1977-2008. We restrict our sample up to 2008 to address truncation bias. Patents applied for after 2008 may not appear in the dataset until 2010 (the final year of data) because of the time lag in granting patents. Moreover, the data coverage on the number of patents has declined significantly after 2008.

Following innovation literature[13], we measure firm's quantity of innovations using the number of patents applied for (and subsequently granted). We also use the number of citations received by these patents to measure the quality of innovation that allows us to distinguish major technological breakthroughs from incremental technological improvements. Considering existing innovation literature, we use the natural logarithm of patents counts (*'Patents'*) and forward citations (*'Citations'*) as the measures of innovation. In addition to a measure of scientific value, we also utilize data on the economic value of firm's innovation imputed from the market response to the grants of patents ('*Patent Value*') by the USPTO as reported in KPSS (2017)[14].

### 3.1.2 Identifying Exogenous Shocks to Employee Mobility

Next, we identify the U.S. states that have been affected by the adoption or rejection of Inevitable Disclosure Doctrine (IDD) following the list of the legal cases as discussed in Klasa, Ortiz-Molina, Serfling and Srinivasan (2017) (henceforth KOSS (2017))[15]. States adopting IDD recognized IDD through court rulings in which the court's decision acknowledged that the IDD could be used to prevent a firm's former employee from working at a rival firm and there was no evidence of the use of the IDD by referring to an earlier case in the same state that used the IDD (KPSS (2017)). On the other hand, states rejecting IDD states are those states that had previously adopted IDD and then rejected the IDD through legal processing. Moreover, the case decision to reject IDD was the first rejection decision in that state. KOSS (2017) document 16 states that have adopted the IDD and 3 states that rejected the previously adopted IDD and other states without any change in recognition of IDD during the sample period. In our analysis, *'IDD'* is an indicator variable equals one for a State starting from the first year the state's court recognizes the adoption of IDD in a precedent-setting case. If any State, after adopting the IDD, rejects the IDD in another precedent-setting case, the *'IDD'* is coded as zero from the first year of rejecting the IDD. For all other states, the *'IDD'* indicator variable is assigned a value of zero (See, KOSS (2017) for

[13] See, for example, Hirshleifer et al. (2012), Seru (2014), Tian and Wang (2014), Sevilir and Tian, He and Tian (2013), Hsu, Tian and Xu (2014), Fang, Tian and Tice (2014), Chemmanur and Tian (2013).

[14] See Kogan et al. (2017) for a detail description of this construct of innovation.

[15] See Klasa et al. (2017) for a comprehensive discussion and details of these legal doctrines and a list of IDD adoptions and rejections.

details). In the merged CRSP-Compustat-KPSS sample, we find 6,430 (772) firms having headquarters in states which adopted (rejected) IDD.

#### 3.1.3 Identifying Employee-Friendly Firms:

Since our main hypothesis is that firms' employee-friendly policies positively affect corporate innovation, we construct a proxy for employee-friendliness at the firm-level. To identify employee-friendly firms in our sample, we collect information on firms' policies towards employees from the MSCI ESG STATS dataset that provides yearly ratings on firm's employee relations. Bae, Kang, and Wang (2011) argue that this is the most comprehensive dataset available for evaluating a firms' strength in employee relations. The merged CRSP-Compustat-KPSS-MSCI ESG STATS Dataset includes 2604 unique firms and 14,270 firm-year observations from 1991-2008.

As in Bae et al. (2011), we use five indicators of employee relations from MSCI ESG STATS dataset: 'Union Relations,' 'Cash Profit Sharing,' 'Employee Involvement,' 'Retirement Benefit Strength,' and 'Health and Safety Strength' as proxies for firms' employee-friendly policies. Among these factors, '*Union Relation*' represents firms' policy of treating unionized workforce fairly. 'Cash Profit Sharing' represents whether the firm has a cash-profit sharing program through which it has recently made distributions to a majority of its employees. 'Employee Involvement' suggests whether the firm strongly encourages worker involvement or ownership through stock option plans that it makes available to a majority of its employees. 'Retirement Benefit Strength' represents whether the firms have a notably strong retirement benefits program. And finally, 'Health and Safety Strength' represents whether the firm has a strong health and safety program.

For each of these five factors, we use MSCI ESG STATS data on the *strengths* of employee relations. The strength of firms-employees relation potentially reflects whether firms do care about employees' betterment and whether firms pay attention to adopting employee - friendly policies. To measure employee-friendliness, we construct an indicator 'Employee-Friendly Firm (EFF)', if the firm has a positive indicator for any of these above-mentioned policies of being employee-friendly. This construct of employee-friendliness serves as the first point for analyzing the effect of employee-friendliness on corporate innovations. Presumably, firms with positive indicators of employee-friendliness in multiple categories are more likely to be even more employee-friendly. Therefore, considering all these five factors related to firms' treatment of their employees, we construct a continuous measure, 'Employee-Friendly Index" with values ranging from 0 to 5. The higher value of this construct reflects the greater level of employee-friendly policies.

### 3.2. Baseline Control Variables:

Following the innovation literature, we control for standard covariates that can potentially affect corporate innovation. Large and profitable firms with access to stable resources may have the discretion to provide a more satisfying working environment which may improve, inter alia, employees' productivity, efficiency, and creativity. As such, we control for 'Firm Size,' 'Profitability' and 'Cash Flow Volatility' in our baseline specification. We use the natural logarithm of the book value of total assets as a proxy for 'Firm Size' and firm's operating income before depreciation scaled by the book value of assets as a proxy for 'Profitability.' We use the standard deviation of a firm's profitability over the previous five years as a proxy for 'Cash Flow Volatility.' We also control for investments in 'R&D,' R&D expenditure scaled by book value of assets, to ensure that we focus on innovation efficiency of the employee-friendly firms. Besides the proxy for firm size, we also control for firms' investment in fixed assets. Since market value is highly correlated with the number of patent citations, we also control for the 'Market-to-Book Asset' ratio of the firm (see, for example, Aghion et al. (2013)).

### 3.3. Summary Statistics:

In panel A of Table 1, we show descriptive statistics for some firm characteristics and our main dependent variables for all sample firms during 1977-2008. In panel B of Table 1, we report statistics for employee-friendly firms. We report the same for the firms which are not employee-friendly in panel C. In this panel, we also report the differences of means test for the key variables. The average employee-friendly firms are larger, more profitable, have less volatile cash-flow and have a higher market-to-book ratio. Importantly, these firms have negligible differences in investments in R&D compared to the non-employee friendly firms. However, employee-friendly firms have larger quantity and quality of innovations underscoring the efficiency of their R&D investments. More specifically, the mean value of patents in employee-friendly firms is 1.351 compared to 0.65 for that in non-employee friendly firms.

These patents are cited more often (mean forward citations of 2.15 compared to 0.959) underscoring the scientific importance of the patents filed by the employee-friendly firms. More importantly, from the shareholders perspective, these patents are economically more valuable. Specifically, the average value of patents in employee-friendly firms is 2.402 compared to 1.113 in non-employee friendly firms. In panel D of Table 1, we also report the correlation matrix of the key variables used in the study.

<<<<<<<<<<<<Insert Table 1 about here>>>>>>>>>>>>

## 4. Baseline Results:

### 4.1 Employee-Friendly Firms and Firm-Level Innovation

To establish a baseline correlation between employee-friendliness and corporate innovation, we estimate the following OLS regression:

$$Innovation_{i,j,s,t+1} = \alpha + \alpha_j + \alpha_t + \beta\, Employee - Friendly\, Firm_{i,t} + \delta Controls_{i,t} + \epsilon_{i,t} \quad (1)$$

Where $i$ indexes firms; $j$ indexes industry; $s$ indexes the state of headquarter; $t$ indexes time; and $\alpha_j$ and $\alpha_t$ are industry and time fixed effects, respectively. The standard errors in our estimations are clustered at the firm-level.[16] We also include $\alpha_{s,t}$, state-year interacted fixed effects, in our regressions as alternative fixed effects (instead of the simple year-fixed effects) to control for the time-varying state-level factors affecting corporate innovation. We do not include firm-fixed effects in this specification since the 'Employee-Friendly Firm' indicator does not show significant within-firm variation over time.[17] Instead, there are significant cross-sectional variations in this variable.

The dependent variables include 'Patents', defined as logarithm (1+# of patents filed at time t+1), 'Citations', defines as logarithm (1+# of forward citations received by patents filed at time t+1), 'Patent Value', defined as logarithm (1+ average value of patents applied

[16] The statistical significance of our results is qualitatively unaffected if standard errors are clustered by the state of headquarter instead.

[17] The correlation of this variable at the time (t-1) and time t is 0.874 suggesting its very slow-moving nature. The correlation of this variable at the time (t-4) and time t, that is 4 years apart is as high as .638 which also suggests that there is an insufficient within-firm variation of this variable.

at time t+1)[18]. These dependent variables are winsorized at the 5th percentile (in the upper tail) considering the high skewness of the distribution of these variables[19].

The results from the baseline estimation are presented in Table 2. In models (1) through (12), no matter what measures of innovation are used, we find a robust positive association between the ‘Employee-Friendly Firm’ and innovation. This association is statistically highly significant. More importantly, the economic magnitude of this association is very large. For example, the coefficient of 0.222 (with t-statistic= 5.32) on ‘Employee-Friendly Firm’ in column (3) suggests that employee-friendly firms, on an average, file 24.85% more patents relative to comparable non-employee-friendly firms.[20] The coefficient (0.291 with t-statistic=4.09) in column (7) suggests that these patents are, on average, cited 33.78% more than those filed by the employee-non-friendly firms. Focusing on the market response to the grant of patents by the USPTO (US patent office), patents filed by the ‘Employee-Friendly Firm’ are, on average, 42.47% more valuable (Column (11)). This suggests the economic value creation, from the shareholders perspective, is much larger through inventions that employee-friendly firms file with the US patent office. The sign and magnitude of other control variables are broadly consistent with the previous findings in the literature. For example, the coefficient of *R&D* is positive and significant in all our specifications. Larger firms are also associated with both higher quality and quantity of innovation.

<<<<<<<<<<<Insert Table 2 about here>>>>>>>>>>>>

The association that we present here are broadly consistent with the association documented in the extant literature (e.g., Chen et al. (2016); Chen, Leung, and Evans (2016); Mao and Weathers (2015)). Nevertheless, to check the robustness of our baseline association between employee-friendliness and innovation, we also conduct some additional tests. Firstly,

[18] In unreported tests, we find that our results remain qualitatively similar if we use the main dependent variables at time (t+2) or (t+3) considering the significant time required to produce patentable outcomes.

[19] Our results are robust to use of other reasonable natural cut-offs (e.g.; 1% and 2% level in the upper tail) for winsorization of the dependent variables. We report the results utilizing winsorization at the 2% level in the Appendix TA 6).

[20] Economic magnitudes are calculated by taking the exponential of the relevant coefficient and subtracting 1 since the dependent variables are measured in one plus the innovation proxies. For example, in column (3) the coefficient is derived from $e^{0.222} - 1 = 0.24857$.

in our specifications that include R&D as a control variable, the coefficient of 'Employee-Friendly Firm,' $\beta$ would indicate whether firms with higher level of employee-friendliness garner more innovations from their R&D investments. In other words, it would reflect R&D productivity. If we exclude R&D from the specification, the coefficient of 'Employee-Friendly Firm,' $\beta$ would reflect both R&D productivity and any incremental effect of employee-friendliness in enhancing innovation. After excluding R&D from the specification, we find that our baseline association is qualitatively similar. For example, in columns (2), (6) and (10), we do not control for R&D investment and find qualitatively similar results (with a larger economic magnitude and higher statistical significance).

Secondly, we also employ other specifications similar to that in equation (1). Specifically, we replace the indicator variable, 'Employee-Friendly Firm' with a continuous measure 'Employee-Friendliness Index,' the summation of all the indicators for each separate proxy of employee friendliness. We find qualitatively similar results that we report in Table 1 in the Appendix (TA 1).

Thirdly, it is also possible that state-specific factors may determine both the firm-level policies of employee-friendliness and the corporate innovation. For example, some states are perceived to be more pro-employees, such as California, that discourage *Non-Compete Covenant*- a post-employment restriction for employees, whereas some other states are not. This employee-friendliness, or its lack thereof, is embedded in the culture of these states and in their respective infrastructure (both legal and physical) [21]. As such, to control for this possibility of state-level differences that may confound our estimation, we also employ a more restrictive specification replacing year fixed effects with state-year interacted joint fixed effects that control for any time-varying state-level factors along with the baseline industry fixed effects. We report the results of these specifications in columns (4), (8) and (12). The baseline association is qualitatively unaffected in this powerful specification.

[21] For example, Orly (2013) argues that each of Silicon Valley and the high-tech hub of Massachusetts Route 128 benefits from having established cities (San Francisco and Boston), strong nearby universities (Berkley/Stanford and Harvard/MIT) and large pool of talented employees. Orly (2013) further argues that the distinguishing factor, however, for the development of the Valley is how much it values openness, change, and mobility whereas for Massachusetts, a culture of secrecy, hierarchy, protection and, and a certain conservative spirit.

### 4.2 Changes in External Motivator and Firm-Level Innovation: Employee Mobility Across Firms

So far, we have documented a robust association, between employee-friendliness and corporate innovation, which cannot be explained away by differences in systematic variability that are related to industry, time, and/ or time-varying state level condition. Nevertheless, this documented association is subject to endogeneity concerns, a common challenge that we encounter in empirical studies in finance and labor economics, among other fields. To facilitate a causal interpretation of the association that we document, we rely on a set of quasi-exogenous shocks in the surrounding legal environment. Our identification works on the premise that changes in the legal environment that impede employee mobility across firms (to a rival or competitor firm) serve as a powerful shock to employees' incentive to innovate. This exogenous variation in the employee incentive to innovate is generated by the staggered adoption if IDD by the various U.S. states.

The staggered nature of the adoption of IDD by U.S State courts over time provides us with a powerful setting where some firms in the certain state are affected by the adoption or recognition of IDD while firms in other states (that do not recognize IDD by that time) are not. The staggered nature also provides us with a set of dynamic counterfactuals which are time-varying, meaning that some of the firms that are in the control group may end up in the treatment group at a different time. More specifically, the treatment group is the set of firms that are headquartered in the state where the state court adopted or recognized IDD (through precedent-setting legal verdict). The control group contains all other firms headquartered in states those that have not yet adopted IDD. Therefore, firms that are headquartered in states that have never adopted IDD are always in the control group. Importantly, firms that are headquartered in the state that adopted IDD will remain part of the control group for the period prior to the adoption of IDD by the state court.

It is important to note that the adoption of IDD by the state court is clearly not a firm-level decision. It is also very unlikely that one particular firm may unduly influence the decision of the state court in favor (against) of any verdict through lobbying which is typically argued in settings involving the state-level adoption of Business Combination (BC) law (see, for example, Karpoff and Wittry (2015)).

Empirical evidence suggests that these shocks have an economically large effect on employees' mobility across firms[22]. Thus, it appears these shocks are strong enough to disrupt the equilibrium level of incentives to innovate (see, e.g., Klassa, Ortiz-Molina, Serfling & Srinivasan, (2017)). Nevertheless, to check the validity of these shocks on the incentives of employees to innovate, we estimate the following regression specification utilizing this dynamic assignment of firms into treatment and control group induced by the exogenous changes in the legal environment:

$$Innovation_{i,t+1} = \alpha_i + \alpha_t + \varphi \, IDD_{i,t} + \delta Controls_{i,t} + \epsilon_{i,t} \quad (2)$$

Where *IDD* is an indicator variable which is set equal to one in the period after IDD is adopted (recognized) by the state court decision in a precedent-setting case and zero otherwise. In this specification, firm-fixed effects, $\alpha_i$ control for fixed differences across firms. Hence, these subsume any fixed differences across firms in the control and treated groups. In addition, $\alpha_t$ controls for year effects. Essentially, this is a difference-in-difference estimation providing the *causal* effect of adoption (recognition) of IDD on innovation. The coefficient of IDD, $\varphi$ captures the differential change in the innovation of the treated firms due to the IDD adoption, relative to the change in the innovation of the control group firms over the same period.

In addition, in this set up we could estimate the specification for all firms in the merged CRSP-Compustat-KPSS sample during 1977-2008 (since we do not require data on employee-friendliness of firms from MSCI ESG STATS dataset) as described in the data section. This panel dataset includes multiple staggered shocks. More importantly, since we have multiple staggered shocks, it is also unlikely that the parallel trend assumption is violated for *each* unique shock. Rather we argue that the treatment effect is likely to be similar across exogenously different time periods and that treatment effect is unlikely to be driven by a unique set of firms.

To better understand the evolution of corporate innovation surrounding these exogenous shocks and to test the parallel trends assumption formally, in Figure 1 we plot the

[22] Gu et al. (2018) show that within-State inventor mobility falls dramatically in IDD adopting States and that inventors also do not move to other States. Klasa et al. (2017) report qualitatively similar effect for mobility of employees, especially the mobility of individuals in managerial and related occupation.

estimates from a fully saturated model of innovation proxies on *IDD* after controlling for firm-fixed effects and year-fixed effects (without any control variables) with standard errors clustered at the firm level. Specifically, we plot the timing of changes in firms' patents (Panel A), forward citations (Panel B) and patent values (Panel C) with respect to adoption of IDD in event time. Visual inspection strongly supports the notion that adoption of the IDD is *quasi-random* since there seems to be no clear pattern in any of the innovation proxies before the shock. However, as one would expect, we find a strong decline in all the innovation measures that we consider in this paper. Importantly, these reductions in corporate innovation seem to have a lasting detrimental effect and have not been reversed to the previous levels for up to 5 years or beyond.

The results reported in Table 3 echo the broad picture in Figure 1 and show the effect of adoption of IDD on innovation for firms, in general, more formally. In column (1), we do not control for any firm-level characteristics to establish an independent *causal* effect of adoption of IDD on innovation. The coefficient of *IDD* is negative with high statistical significance (t-statistic= -3.721). The economic magnitude is sizable and would translate to approximately 4.4% reduction in patenting, on average, for affected firms in states that adopted IDD. These patents filed by the affected firms are also of relatively low quality and are less valuable. Specifically, these patents are cited approximately 11.3% less and are 4.02% less valuable as reported in columns (4) and (7), respectively.

<<<<<<<<<<<Insert Table 3 about here>>>>>>>>>>>

The passage of IDD can also affect other firm variables, which in turn could affect innovation. The economic magnitude of the effect of IDD on innovation mentioned earlier includes such indirect channels. These should be included if one is interested in the total effect of the passage of IDD on innovation activities. It is also interesting to understand the extent of the impact of IDD on innovation that does not flow through its effect on other important firm-level outcomes. Controlling for other firm-level covariates such as 'Firm Size' and 'Profitability' leaves the estimates relatively unaltered in columns (2), (5), and (8). Additional controls such 'Cash-Flow Volatility,' 'R&D,' 'Fixed Assets' and 'Market-to-Book Asset' are also considered in extended specifications in columns (3), (6), and (9). We continue to find a causal negative effect of IDD on corporate innovation. While we do not take a strong stand on the precise reason as to why IDD reduces innovation, a likely reason is that the adoption of IDD shuts off an important motivator for innovation[23], and the employees then respond by reducing efforts. This is because, with IDD adoption, employees lose important outside employment options that are essential in their ex-post renegotiation (bargaining power in extracting surpluses from successful innovation). Gu et al. (2018) also report a negative effect of IDD on a sample of VC-backed firms from 1980-2016 and argue that this reduction stems from the reduced mobility of key talent (inventors). They show that exogenous reduction in human capital mobility (through staggered adoptions of IDD) reduces VCs' investment propensity and successful exits. Although different in focus, their explanation supports the main economic argument that we propose.

We also reproduce qualitatively similar effects on innovation from the adoption of IDD using a shorter panel from 1991-2008. This shorter panel necessarily includes fewer IDD shocks compared to the full sample. We reproduce this results and report in Appendix TA 2 to show that the effect of IDD on innovation is not limited to any sample period. More importantly, this is the period for which we have data on employee-friendliness of firms from MSCI ESG STAT.

### 4.3 Changes in External Motivator and Firm-Level Innovation: Moderating Effect of Employee-Friendliness

As discussed before, reduction in incentives to innovate is apparent from the reduced corporate innovations for firms in general. Theoretical arguments and empirical evidence suggest that IDD may have a negative effect on corporate innovation, mostly stemming from the reduced level of employee efforts. Nevertheless, some firms that enter the shock regime with higher levels of employee-friendliness may encounter a different situation. By pursuing higher levels of employee-friendly policies, these firms signal credibly that they care about their employees' long-term welfare or satisfaction. As such, the negative effect of IDD on corporate innovation may not be as pronounced as it is for other firms that enter the shock regime with lower levels of employee-friendly policies or firms with dissatisfied employee pool.

[23] Orly (2013) provides evidence supporting the notion that to spur innovation in firms, employers must overcome control mentality.

In other words, higher levels of employee satisfaction in employee-friendly firms may put the brakes on the reduction in corporate innovation.

To test whether the IDD adoptions have different effects on the innovation performance of firms that have been employee-friendly *before* the adoption of IDD, we identify '*pre-shock employee-friendly firms'*, $EFF_{pre\text{-}shock}$ by considering the rolling average values of the employee-friendliness policies up to 2 years *before* the IDD adoption. Specifically, this is an indicator variable that takes the value of one if the firm has a positive rolling average value of Employee-Friendly Index in two years leading up to the IDD shock[24]. We argue that firms that have been treating their employees better even *before* the shock regime compared to other firms that have not (including those that have started treating employees well *after* these negative shocks) would not be affected severely by the adoption of IDD. We condition on the *pre-shock* value of employee-friendliness in this construct since the *post-shock* measure of employee-friendliness could be affected by the adoptions of IDD. For example, some firms could choose to become employee-friendly in response to IDD adoption because the IDD adoption shock hit them especially hard. Using the *post-shock* employee-friendliness suffers from the concern that it captures aspects other than the general tendency of the firm to be employee-friendly, like how much employee mobility matters for them. In this regard, Flammer and Kacperczyk (2017) show that firms reacted to the threat of knowledge spillover by increasing their CSR (including employee-friendly CSR) after the rejection of IDD. Therefore, if we use the *post-shock* employee-friendliness measure, we would lose the *exogeneity* aspect of the treatment and hence would end up using a *contaminated* measure of employee-friendliness that would aggravate the endogeneity concern rather than mitigating.

For employees of $EFF_{pre\text{-}shock}$ firms, outside employment options, presumably, is less strong of a motivator for innovating in the first place. The internal employee-friendly environment of the $EFF_{pre\text{-}shock}$ firms provides enough motivation that they are not too concerned about the reduced incentives to innovate like the employees in other firms face when the external motivator (outside employment options) are taken away by exogenous changes

[24] We derive and report qualitatively similar inference when we use 2 years average (Appendix Table 4 panel A) or a four-year rolling average (Appendix Table 4 panel B) of Employee-Friendly policies instead.

that are external to the firm. We estimate the following model for all firms in our sample for which have data on employee-friendliness from MSCI ESG STATS dataset:

$$Innovation_{i,s,t+1} = \alpha_i + \alpha_t + \beta\, EFF_{pre-shock} + \gamma\, EFF_{pre-shock} * IDD\ Adoption_{i,t} + \varphi\, IDD\ Adoption_{i,t} + \delta Controls_{i,t} + \epsilon_{i,t} \quad (3)$$

This specification is equivalent to a triple-difference approach (compared to specification 2) in which the coefficient $\varphi$ captures the effect of IDD adoption on firms that do not have employee-friendly policies. The coefficient of the interactions term, $\gamma$ captures the additional effect of IDD adoption on the innovation of $EFF_{pre-shock}$ firms, relative to firms which are not employee-friendly. In specification (3), firm-fixed effects control for fixed differences across firms, which would subsume any fixed differences between firms in the treated group and the control group[25]. In addition, we include year fixed effects in this specification. We estimate this specification with (without) extended set of controls.

The argument made earlier for using the pre-shock value of Employee-Friendly Index also holds for the other covariates. Therefore, we use the pre-shock values of the other covariates when we interact them with the *IDD Adoption* variable. This is also the right control since one might be concerned about employee-friendly firms being larger. Since the employee-friendliness variable comes from before the shock, the corresponding variable that needs to be controlled for should also be measured at that time.

This test helps to assess the value of *internal* efforts by the firms to satisfy employees when other *external* motivators of innovations are taken away by factors that are external to the firm (derived from the surrounding legal infrastructure). This also sheds light on the context when employee-friendliness may indeed be valuable: an environment characterized by a crisis of confidence among employers and employees.

### 4.3.1 Parallel Trends Assumption:

Our specification (3), essentially, is a *DiD-Continuous* (or *DiD plus sensitivity* design)[26] where we consider differences in response variable conditioning on employee-friendliness of

---

[25] $EFF_{pre-shock}$ indicator variable would be spanned by firm-fixed effects. Hence, it is not reported in the results.
[26] See Atanasov and Black (2015) for a detailed discussion on this design.

firms. One important identifying assumption using this *DiD* framework is that the two sets of firms would follow parallel trends, but for the IDD shock. However, as discussed in Atanasov and Black (2015), the threat of non-parallel trends becomes less of a concern since we study a large number of similar exogenous shocks, at different times in different states, for which the timing appears to be random. Nevertheless, for the IDD adopting states, we show the pre-shock differences in means test for employee-friendly firms and employee non-friendly firms for the main dependent variables (Patents) in the appendix (Table TA 3 panel A). The same panel also presents the post-shock evolution of corporate innovation to show that indeed a meaningful divergence (statistically significant) is evident *only* in the post-shock periods. Also, Figure 2 provides a visual inspection which clearly shows that parallel trends assumption is likely to hold for the employee-friendly firms and employee non-friendly firms in IDD adopting states.

#### 4.3.2 Covariate Balance Tests:

To test whether the treatment is as good as randomly assigned, we also test the balance of the *ex-ante firm characteristics.* In the pre-shock period (at 1 year before the IDD shock), we do not find any significant differences in majority of the observable characteristics such as firm size, market to book assets, and R&D among the treated (with positive 'Employee-Friendly Index' value) and control (with an 'Employee-Friendly Index' value of zero) firms[27]. However, we note differences in profitability among the treated and control firms, a characteristic that we control for in the empirical specification.

#### 4.3.3 Results on Moderating Effect of Employee-Friendliness:

We present the results from this quasi-natural experiment (specification 3) in Table 4. In columns (1) through (3), we do not include any time-varying firm-level covariates following Gormley and Matsa (2016). This is one possible way of avoiding the "bad controls" problem[28].

[27] See, Appendix Table TA 3 panel B.

[28] If the adoption of IDD affects some firm-level characteristics such as Size, Profitability, R&D investments, then these time-varying firm-level covariates can become invalid controls (See, Angrist and Pischke (2009), Gormley and Matsa (2016), Atanasov and Black (2015), and Gormley and Matsa (2011) for a detailed discussion).

Chen, Gao, and Ma (2017) show that firms headquartered in IDD adopting states experience a significant increase in the likelihood of being acquired compared to firms headquartered in states that do not adopt IDD. Their finding is stronger for human-capital intensive firms and for firms whose employees have better *ex-ante* employment mobility. Therefore, size of the firms in the IDD adopting states is likely to be affected through the adoption of this legal doctrine, rendering *Firm Size* a potentially bad control. This phenomenon may also affect the profitability of competing firms. Gu et al. (2018) show that adoption of IDD also affected the investment propensity and successful exits of VCs through the channel of employee mobility. Klasa et al. (2017) show that IDD affected the financial structure of the firms.

In columns (4) through (9), we control for *pre-shock demeaned* values of 'Firm Size' and 'Profitability' and 'R&D.' Results reported in Table 4 suggest a significant reduction in innovation for affected firms in general in IDD adopting states. More importantly, we find that, relative to employee non-friendly firms, the innovation of employee-friendly firms has increased using all the proxies of innovation. In column (1), for example, because the coefficient of *IDD Adoption* is -0.092 (*t*-statistic=-2.299), on average, the negative effect through the reduced innovation incentives (due to the lost outside employability) is more than offset by the moderating role of internal motivator (employee-friendliness of the firms) for innovation (the coefficient of $EFF_{pre\text{-}shock}$. = 0.165 with *t*-statistic= 2.349). The net effect of IDD adoptions on the number of patents filed by the employee-friendly firms, as captured by the sum of the coefficient for IDD Adoption (-0.192) and the coefficient for interactions term $(EFF_{pre-shock} * IDD\ Adoption), \gamma$ is not significantly different from zero (F-statistic=0.221).

<<<<<<<<<<<Insert Table 4 about here>>>>>>>>>>>>

We also find similar results for 'Citations' and 'Patent Value' measure of innovation. The results reported in columns (4) through (9) broadly suggest that negative effect of IDD adoptions on corporate innovation is largely moderated through the counteracting positive effect stemming from having a satisfied employee pool.

Following the literature, in unreported tests, we also consider including some state-level control variables such as state GDP growth rate and state political balance (defined following KOSS (2017)) and find consistent results.

### 4.4 IDD and In-state (vs. Out-of-State) Innovation: Moderating Effect of Employee-Friendliness

In this section, we delve into a more direct analysis of the disincentivizing effect of IDD on innovation considering the employees' perspective. Since, adoption of IDD affects the employability of the inventors with competing firms *within* the state of headquarter of the focal firm, one would expect to see that the inventors of a focal firm who invent *within* the headquarter state to be disincentivized (affected) disproportionately *more* compared to other inventors of the same firm but invent *outside* the headquarter state. This, in turn, should be reflected in quantity (# of patents) and quality of patents (Citations and Patent value) that are registered by the in-state inventors and out-of-state inventors of the focal firms.

To identify the patents that are registered by the inventors of a firm from within the headquarter state, we utilize the granularity of the U.S. Patent Inventor Database from Li et al. (2014) (henceforth PID). This dataset contains more than 8 million patent observations filed from 1901 through 2010 at the USPTO including detailed information on each of the inventor (patentee) such as country, state, ZIP code, and inventor sequence, among others. To classify a patent as an "in-state" patent, we make a simple assumption (following norms). Since, in scientific inventions, the contributors are generally listed in order of contribution, the first patentee of a registered patent is supposedly the most important innovator.

We classify a patent to be an "in-state" patent if the state of the *first* inventor of a patent (identified from the 'inventor sequence' variable form PID) is the same as the headquarter state of the focal firm. We believe this procedure is simple enough to provide reasonably correct information about the origination location of innovation. If the state of the *first* inventor of a patent is *not* the same as the headquarter state, for example, and from an establishment such as a research center/ division of the focal firm situated outside the usual headquarter state, we classify it as an "out-of-state" patent. Once we split the total number of patents into "in-state" and "out-of-state", we run the baseline specification involving the adoption of IDD (i.e., equation 2), however, with different dependent variables- the logarithm (1+# average value of in-state patents) and the logarithm (1+average value of out-of-state patents), separately. Similarly, we also define the logarithm (1# of in-state patents), the logarithm (1# of out-of-state patents), the logarithm (1# of citations to in-state patents), the logarithm (1# of citations to out-of-state patents) following a similar procedure. We report only the results based on the patent value in Table 5 [29].

<<<<<<<<<<<Insert Table 5 about here>>>>>>>>>>>>

In columns (1) through (3), we report the results from the regressions of "in-state" innovation measure. Similar to those in Table (3), we find that in-state innovation with the proxy 'Patent Value' has declined significantly. We report the results for the same test involving "out-of-state" innovation in columns (4) through (6). Somewhat surprisingly, the out-of-state innovation has also been negatively affected. However, the average decline in out-of-state innovation measures is less pronounced and statistically significant.[30] This supports the notion that inventors in IDD adopting states are disproportionately affected more by the IDD rulings than those in states that did not adopt IDD. This suggests that inventors indeed took this (dis)incentives from IDD adoption into consideration while exerting innovative efforts.

More importantly, we are interested in examining whether firms that entered the shock regime with a reputation for being employee-friendly are affected less. As such, we re-run the test that is structurally similar to that in equation (3). Consistent with the baseline findings of the moderating effect of employee-friendliness documented in Table 4, we report the results of regressions utilizing *in-state* patent value and *out-of-state* patent value in columns (7) through (9) and columns (10) through (12), respectively. These tests are based on a necessarily small sample since we require data availability on employee-friendliness from the MSCI ESG STATS dataset.

Consistent with the broad causal evidence presented in Table 4, we find that value of in-state patents has declined for firms that are non-employee friendly. In column (7), the coefficient of *IDD* Adoption is -0.148 (*t*-statistic=-2.264) suggests that, on average, the negative effect through the reduced innovation effort (lost outside employability) is negated by the damage-controlling role of internal motivator (employee-friendliness of the firms) for

[29] We do not report the results based on other dependent variables for the brevity of reporting.
[30] In unreported results, we formally test this difference in decline in innovation (in-state patents minus out-of-state patents) in a regression framework similar to that in the specification (2).

innovation (the coefficient of $EFF_{pre\text{-}shock.}$ = 0.239 with *t*-statistic= 1.712). The net effect of IDD adoptions on the value of *in-state* patents filed by the employee-friendly firms (captured by the sum of the coefficient of IDD Adoption and the coefficient of interactions term $(EFF_{pre-shock} * IDD\ Adoption)$ is statistically indistinguishable from zero (F-statistic=0.620). Though negative in direction, the effect of IDD adoption on the value of out-of-state patents is not statistically distinguishable from zero. This supports our initial conjecture that out-of-state inventors are less likely to be affected by the adoption of IDD by the state court in firms' headquarter state.

Since scientific inventions are often carried out in teams of talented inventors, reduced innovation incentives of any of the team members may affect the final outcomes (i.e., patentable inventions). For example, in a team composed of 3 inventors if the second important contributor (inventor) are affected by the adoption of IDD in the headquarter state, while the first and third inventors are not affected (they are not from the affected headquarter state), the output of the team may yet be negatively affected. This suggests that considering the *first* inventor only while defining the *in-state* and *out-of-state* patents may affect our estimation presented in this section. Considering this possibility, we conduct a robustness test. Specifically, we consider up to *first* 4 inventors while defining the *in-state* and *out-of-state* patents. If at least one of the first 4 inventors in a patent is from the headquarter state, we classify it as an *in-state* patent. The results utilizing this restrictive definition are qualitatively similar to the results presented earlier considering only the *first* inventor.[31]

### 4.5 Reversal of IDD Shocks and Corporate Innovation: Moderating Role of Employee-Friendliness

Some of these states, after adopting IDD in a precedent-setting case, rejected IDD in the later period in other precedent-setting cases. Serendipitously, this provides us with a reversal of the original shock and thus enables us to design a sharper test with opposite predicted sign. Specifically, the rejection of IDD *increases* the mobility of employees of firms in affected states. Hence, this should lead to an increase in innovation output for firms in

[31] We report the results from this more carefully defined dependent variables in the Appendix (Table TA 5).

affected states compared to unaffected firms in other states. More importantly, for pre-shock employee-friendly firms, where external motivator (that became available exogenously) is not the main motivator, we do not expect a strong effect of increased outside employment option on corporate innovation. To test this conjecture, we run the following regression specification which is similar to equation (3):

$$Innovation_{i,s,t+1} = \alpha_i + \alpha_t + \beta\, EFF_{pre-shock} + \gamma\, EFF_{pre-shock} * IDD\ Rejection_{i,t} + \varphi\, IDD\ Rejection_{i,t} + \delta Controls_{i,t} + \epsilon_{i,t} \quad (4)$$

where, $IDD\ Rejection_{i,t}$ is an indicator variable which is set equal to one in the period after IDD is rejected by the state court decision in a precedent-setting case and zero otherwise. $EFE_{pre-shock}$ is an indicator variable that takes the value of 1 if the firm has a positive rolling average value of Employee-Friendly Index in two years leading up to the *rejection* of IDD by the state court. We report the results from these tests in Table 6.

<<<<<<<<<<<Insert Table 6 about here>>>>>>>>>>>>

Consistent with conjecture, we find that rejection of IDD increases innovation for the firm in general. For example, column (1) in Table 6, suggests that with the rejection of IDD, firms in affected states have experienced a 7.25% surge in the number of patents filed with the USPTO. This magnitude is economically sizable and statistically highly significant *(t-*statistic=3.524). We present similar effects of rejection of IDD on *Citations* in columns (4) through (6) and Patent Values in columns (7) through (9).

In columns (10) through (12), we examine whether this effect of IDD rejection is different across firms that are employee-friendly versus those that are not. While there is a strong positive effect of IDD rejection on the firms that had not adopted employee-friendly policies, this effect is somewhat attenuated for firms that are employee-friendly. This is consistent with the results presented for IDD adoption. Being able to move is not as much as a motivator to innovate in firms that are employee-friendly. Therefore, when the ability to move goes up for employees, this matters much less for employee-friendly firms as compared to the other firms. This effect is seen as a negative coefficient on the interaction term of *IDD*

*Rejection* and $EFI_{pre\text{-}shock}$. Finding the differential effect across employee-friendly firms versus the others even for the opposite shock (i.e., IDD rejection) instills greater confidence in our interpretation of the effects we document earlier.

## 5 Conclusion:

Utilizing multiple staggered shocks in the surrounding legal environment regarding intellectual property allocation, we provide robust evidence that employee-friendliness provides firms with a competitive edge in innovation activity and innovation success. Initially, we establish a robust association between employee-friendliness and corporate innovation. Since this association clearly suffers from endogeneity concern, we utilize exogenous variations in the availability of an *external* motivator to assess the importance of *internal* motivator- employee-friendly policies. Specifically, we utilize the state level staggered adoption of the Inevitable Disclosure Doctrine (IDD) that disincentivizes employees to invest in firm-specific human capital. Adoption of IDD implies a reduction in outside employment options for the employees since human-capital becomes less transferrable across firms within the state and thus the marginal value from incremental human capital is lower from the perspective of the employees.

Thus, IDD adoption by the state court leads to a reduction of an external motivator (i.e., transferability of human capital) for employees (inventors) of the firms in that state. This should affect corporate innovation negatively for firms in general. Indeed, we find that corporate innovation declines in the post-IDD adoption periods for firms in the affected states. However, for the firms that are employee-friendly in the pre-shock period, this negative effect on corporate innovation may be attenuated. Indeed, we find that such negative effect of IDD on innovation is largely counteracted for firms that are employee-friendly. We also utilize the rejection of a previously adopted IDD by some of the states in our sample and find evidence consistent with the notion that employee-friendliness enhances corporate innovation.

Thus, our paper argues that employee-friendliness indeed provides firms with an advantage in innovation activity which may be a source of value creation in employee-friendly firms documented in prior work (Edmans, 2011). Our paper also highlights the contextual value of employee-friendliness and echoes the evidence in Lins, Servaes, and Tamayo (2017) who show that the value of trust between a firm and its stakeholders - built through investments in social capital- pays off when the overall level of trust in corporations and markets suffers a negative shock.

## References:


Acharya, V. V., Baghai, R. P., & Subramanian, K. V. (2013). Labor laws and innovation. *The Journal of Law & Economics*, *56*(4), 997-1037.

Aghion, P., Van Reenen, J., & Zingales, L. (2013). Innovation and institutional ownership. *The American Economic Review*, *103*(1), 277-304.

Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition & innovation: An inverted-U relationship. *The Quarterly Journal of Economics*, *120*(2), 701-728.

Almeida, H., M. Campello, & D. Hackbarth (2011). Liquidity mergers. *Journal of Financial Economics,* 102, 526-558.

Almeida, H., P.-H. Hsu, & D. Li. (2013). Less is more: Financial constraints and innovative efficiency. *Working Paper*.

Angrist, J. D., & Pischke, J. S. (2010). The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *Journal of Economic Perspectives*, *24*(2), 3-30.

Atanassov, J. (2013). Do hostile takeovers stifle innovation? Evidence from antitakeover legislation and corporate patenting. *The Journal of Finance,* 68: 1097–1131.

Atanasov, V., & Black, B. (2015). Shock-based causal inference in corporate finance research. *Critical Finance Review*.

Bae, K. H., Kang, J. K., & Wang, J. (2011). Employee treatment and firm leverage: A test of the stakeholder theory of capital structure. *Journal of Financial Economics*, *100*(1), 130-153.

Balsmeier, B., Fleming, L., & Manso, G. (2017). Independent boards and innovation. *Journal of Financial Economics*, *123*(3), 536-557.

Baumol WJ (2002) The Free-Market Innovation Machine. *(Princeton University Press, Princeton, NJ*).

Bena, J., & K. Li. 2014. Corporate innovations and mergers and acquisitions. *The Journal of Finance,* 69:1923–1960.

Berk, J. B., Stanton, R., & Zechner, J. (2010). Human capital, bankruptcy, and capital structure. *The Journal of Finance*, *65*(3), 891-926.

Bernstein, S. (2015). Does going public affect innovation? *The Journal of Finance* 70:1365-1403.

Brown, J. R., G. Martinsson, & B. C. Petersen (2012). Do financing constraints matter for R&D?. *European Economic Review,* 56:1512-1529.

Chava, S., A. Oettl, A. Subramanian, & K. V. Subramanian (2013). Banking deregulation and innovation. *Journal of Financial Economics,* 109:759–774.

Chemmanur, T. J., & Tian, X. (2013). Do anti-takeover provisions spur corporate innovation? *In AFA 2012 Chicago Meetings Paper*.

Chen, D., Gao, H., & Ma, Y. (2017). Human capital driven acquisition: Evidence from the inevitable disclosure doctrine. SSRN

Chen, C., Chen, Y., Hsu, P. H., & Podolski, E. J. (2016). Be nice to your innovators: Employee treatment and corporate innovation performance. *Journal of Corporate Finance*, 39, 78-98.

Chen, J., Leung, W. S., & Evans, K. P. (2016). Are employee-friendly workplaces conducive to innovation? *Journal of Corporate Finance*, *40*, 61-79.

Cornaggia, J., Y. Mao, X. Tian, & B. Wolfe (2015). Does banking competition affect innovation?. *Journal of Financial Economics,* 115:189–209.

Cronqvist, H., & Yu, F. (2017). Shaped by their daughters: Executives, female socialization, and corporate social responsibility. *Journal of Financial Economics*, 126(3), 543-562.

Custódio, C., Ferreira, M. A., & Matos, P. (2017). Do general managerial skills spur innovation? *Management Science*.

Edmans A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics* 101(3): 621–640.

Edmans, A. (2012). The link between job satisfaction and firm value, with implications for corporate social responsibility. *The Academy of Management Perspectives*, *26*(4), 1-19.

Ederer, F., & G. Manso. (2013). Is Pay for Performance Detrimental to Innovation? *Management Science,* 59:1496–1513

Faleye, O., & Trahan, E. A. (2011). Labor-friendly corporate practices: Is what is good for employees good for shareholders? *Journal of Business Ethics*, *101*(1), 1-27.

Fang, V., Tian, X., Tice, S., (2014). Does stock liquidity enhance or impede firm innovation? *Journal of Finance*, 69, 2085–2125.

Flammer, C., & Bansal, P. (2017). Does a long-term orientation create value? Evidence from a regression discontinuity. *Strategic Management Journal*.

Flammer, C., & Kacperczyk, A. (2015). The impact of stakeholder orientation on innovation: Evidence from a natural experiment. *Management Science*, *62*(7), 1982-2001.

Flammer, C., & Kacperczyk, A. (2016). The risk of knowledge spillovers and corporate social responsibility: Evidence from the inevitable disclosure doctrine.

Fredrickson, B. L. (1998). Cultivated emotions: Parental socialization of positive emotions and self-conscious emotions. *Psychological Inquiry*, 9(4), 279-281.

Fulghieri, P., & Sevilir, M. (2011). Mergers, spinoffs, and employee incentives. *The Review of Financial Studies*, *24*(7), 2207-2241.

Garmaise, M. J. (2009). Ties that Truly Bind: Noncompetition Agreements, Executive Compensation, and Firm Investment. *Journal of Law and Economics*, 376-425.

Gormley, T. A., & Matsa, D. A. (2011). Growing out of trouble? Corporate responses to liability risk. *The Review of Financial Studies*, *24*(8), 2781-2821.

Gormley, T. A., & Matsa, D. A. (2016). Playing it safe? Managerial preferences, risk, and agency conflicts. *Journal of Financial Economics*, *122*(3), 431-455.

Gu, L., Huang, R., Mao, Y., & Tian, X. (2018). How Does Human Capital Matter? Evidence from Venture Capital. Kelley School of Business Research Paper No. 17-72

Hall, B. H., A. B. Jaffe, & M. Trajtenberg (2001). The NBER patent citation data file: Lessons, insights and methodological tools. *Working Paper.*

Hart, O. (1995). Firms, contracts, and financial structure. *Clarendon Press*.

Hart, O., & Moore, J. (1990). Property Rights and the Nature of the Firm. *Journal of Political Economy*, *98*(6), 1119-1158.

Hertzberg, F. (1959). The Motivation to Work. *J. Wiley & Sons, New York*.

Hirshleifer, D., Low, A., & Teoh, S. H. (2012). Are overconfident CEOs better innovators? *The Journal of Finance*, *67*(4), 1457-1498.

Hong, H., & Kostovetsky, L. (2012). Red and blue investing: Values and finance. *Journal of Financial Economics*, 103(1), 1-19.

Hsu, P. H., Tian, X., & Xu, Y. (2014). Financial development and innovation: Cross-country evidence. *Journal of Financial Economics*, 112(1), 116-135.

Ian Carlin, B., & Gervais, S. (2009). Work ethic, employment contracts, and firm value. *The Journal of Finance*, *64*(2), 785-821.

Islam, Emdad and Zein, J, (2018). Inventor CEOs. *UNSW Business School working paper*.

Klasa, S., Ortiz-Molina, H., Serfling, M., & Srinivasan, S. (2017). Protection of trade secrets and capital structure decisions. *Forthcoming, Journal of Financial Economics*.

Kogan, L., Papanikolaou, D., Seru, A., & Stoffman, N. (2017). Technological innovation, resource allocation, and growth. *The Quarterly Journal of Economics*, *132*(2), 665-712.

Liu, T., Mao, Y., & Tian, X. (2016). The Role of Human Capital: Evidence from Patent Generation. *Kelley School of Business Research Paper*, (16-17).

Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance*.

Lobel, Orly. Talent Wants to Be Free: Why We Should Learn to Love Leaks, Raids, and Free Riding, Yale University Press, 2013.

Manso, G. (2011). Motivating innovation. *The Journal of Finance*, *66*(5), 1823-1860.

Mao, C. X., & Weathers, J. (2015). Employee treatment and firm innovation. Working paper SSRN

Maslow, A., (1943). A theory of human motivation. *Psychological Review*, 50, 370–396.

Marx M, Singh, J & Fleming, L.2015. Regional disadvantages? Employee non-compete agreements and brain drain. *Research Policy* 44(2015)394-404

Mayer, R., Warr, R., & Zhao, J. (2016). Does employee treatment and workforce diversity impact corporate innovative efficiency? Working paper. SSRN

Porter M (1990) The Competitive Advantage of Nations. *Free Press, New York*.

Rajan, R. G., & Zingales, L. (1998). Power in a Theory of the Firm. *The Quarterly Journal of Economics*, *113*(2), 387-432.

Sara B. Holland. *(2017).* Firm investment in human health capital. *Journal* of *Corporate Finance,* 46*,* 374-390

Sapra, H., A. Subramanian, and K. V. Subramanian (2014). Corporate governance and innovation: Theory and evidence. *Journal of Financial and Quantitative Analysis.* 49, 957-1003.

Sevilir, M. & Tian, X. (2012). Acquiring innovation. *AFA Meeting*, *SSRN.*

Seru, A. (2014). Firm boundaries matter: Evidence from conglomerates and R&D activity. *Journal of Financial Economics*, 111(2), 381-405.

Sunder, J., Sunder, S. V., & Zhang, J. (2017). Pilot CEOs and corporate innovation. *Journal of Financial Economics*, *123*(1), 209-224.

Taylor, F., (1911). The Principles of Scientific Management. *Harper Brothers, New York*.

Tian, X., and T. Y.Wang. 2014. Tolerance for failure and corporate innovation. *Review of Financial Studies,* 27, 211–255.

Tirole, J. (1999). Incomplete contracts: Where do we stand? *Econometrica*, *67*(4), 741-781.

Vernon, P. E. 1970 *Creativity*. Middlesex, UK: Penguin Books.

Zingales, L. (2000). In search of new foundations. *The journal of Finance*, *55*(4), 1623-1653.

## Table 1: Summary Statistics

This table reports summary statistics for the variables used in the analysis. The sample is constructed after merging CRSP-Compustat merged sample with KPSS (2017). The sample excludes regulated utilities and financial firms. 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. 'Employee-Friendly Firm' is an indicator equal to one if the 'Employee-Friendly Index' is equal to at least one, zero otherwise. Data used for 'Employee-Friendly Index,' 'EFF, Panel B and Panel C are from 1991-2008. 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Panel B includes summary statistics of the 'Employee-Friendly Firms.' Panel C includes summary statistics of the firms that did not adopt an employee-friendly policy. The difference of means test (clustered by the firm) of variables are reported in the last column of Panel C. Panel E includes correlation of variables used in the analysis.

| Panel A: Summary Statistics of the Full Sample during 1977-2008 | | | | | |
|---|---|---|---|---|---|
| Variables | Mean | Sd (Std Dev) | $25^{th}$ Perc. | Median | $75^{th}$ Perc. |
| Patents | 0.458 | 0.871 | 0.000 | 0.000 | 0.693 |
| Citations | 0.924 | 1.734 | 0.000 | 0.000 | 0.693 |
| Patent Value | 0.664 | 1.398 | 0.000 | 0.000 | 0.266 |
| Firm Size | 5.318 | 2.009 | 3.853 | 5.208 | 6.662 |
| Profitability | 0.080 | 0.198 | 0.048 | 0.118 | 0.178 |
| Cash Flow Volatility | 0.083 | 0.118 | 0.025 | 0.046 | 0.090 |
| $R\&D_{(t)}$ | 0.050 | 0.136 | 0.000 | 0.000 | 0.051 |
| Fixed Assets | 0.293 | 0.218 | 0.121 | 0.241 | 0.414 |
| Market-to-Book Assets | 1.866 | 1.579 | 1.027 | 1.352 | 2.028 |
| Sample during 1991-2008 | | | | | |
| Employee-Friendly Index | 0.337 | 0.657 | 0.000 | 0.000 | 1.000 |

| Panel B: Summary Statistics of the Employee-Friendly Firm Sample during 1991-2008 | | | | | |
|---|---|---|---|---|---|
| Variables | Mean | Sd (Std Dev) | 25$^{th}$ Perc. | Median | 75$^{th}$ Perc. |
| Patents | 1.351 | 1.292 | 0.000 | 1.099 | 2.890 |
| Citations | 2.155 | 2.292 | 0.000 | 1.099 | 4.970 |
| Patent Value | 2.402 | 2.188 | 0.000 | 2.746 | 4.762 |
| Firm Size | 8.067 | 1.567 | 6.945 | 8.085 | 9.387 |
| Profitability | 0.149 | 0.125 | 0.102 | 0.152 | 0.207 |
| Cash Flow Volatility | 0.046 | 0.056 | 0.017 | 0.030 | 0.054 |
| R&D$_{(t)}$ | 0.046 | 0.091 | 0.000 | 0.021 | 0.057 |
| Fixed Assets | 0.324 | 0.221 | 0.146 | 0.278 | 0.470 |
| Market-to-Book Assets | 2.275 | 1.571 | 1.323 | 1.747 | 2.638 |

| Panel C: Summary Statistics of the NOT Employee-Friendly Firm Sample during 1991-2008 | | | | | | |
|---|---|---|---|---|---|---|
| Variables | Mean | Sd (Std Dev) | 25$^{th}$ Perc. | Median | 75$^{th}$ Perc. | Difference of Means Test |
| Patents | 0.650 | 1.041 | 0.000 | 0.000 | 1.099 | - 11.33 *** |
| Citations | 0.959 | 1.752 | 0.000 | 0.000 | 1.099 | - 11.23*** |
| Patent Value | 1.113 | 1.770 | 0.000 | 0.000 | 2.151 | - 12.65*** |
| Firm Size | 6.957 | 1.460 | 5.897 | 6.864 | 7.942 | - 14.14*** |
| Profitability | 0.115 | 0.148 | 0.079 | 0.130 | 0.186 | - 7.21*** |
| Cash Flow Volatility | 0.057 | 0.082 | 0.018 | 0.032 | 0.061 | 5.09*** |
| R&D$_{(t)}$ | 0.047 | 0.101 | 0.000 | 0.003 | 0.054 | 0.38 |
| Fixed Assets | 0.259 | 0.214 | 0.091 | 0.199 | 0.367 | - 6.22*** |
| Market-to-Book Assets | 2.141 | 1.442 | 1.275 | 1.687 | 2.457 | - 1.94* |

| Panel D: Correlation Matrices | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Employee-Friendly Firm | Patents | Citations | Patent Value | Firm Size | Profitability | Cash Flow Volatility | R&D $_{(t)}$ | Fixed Assets | Market-to-Book Assets |
| Employee-Friendly Firm | 1 | | | | | | | | | |
| Patents | 0.265 | 1 | | | | | | | | |
| Citations | 0.264 | 0.925 | 1 | | | | | | | |
| Patent Value | 0.285 | 0.956 | 0.897 | 1 | | | | | | |
| Firm Size | 0.308 | 0.344 | 0.372 | 0.421 | 1 | | | | | |
| Profitability | 0.102 | 0.033 | 0.082 | 0.071 | 0.266 | 1 | | | | |
| Cash Flow Volatility | -0.061 | -0.030 | -0.051 | -0.056 | -0.368 | -0.411 | 1 | | | |
| R&D $_{(t)}$ | -0.006 | 0.168 | 0.104 | 0.130 | -0.325 | -0.497 | 0.434 | 1 | | |
| Fixed Assets | 0.129 | -0.077 | -0.020 | -0.043 | 0.259 | 0.207 | -0.170 | -0.294 | 1 | |
| Market-to-Book Assets | 0.039 | 0.116 | 0.101 | 0.125 | -0.207 | 0.064 | 0.307 | 0.333 | -0.176 | 1 |

## Table 2: Employee-Friendly firms and corporate innovation

This table reports the results from OLS regression estimates examining the impact of employee-friendliness on firm's innovation outcomes. Models include Compustat firms from 1991-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. *'Employee-Friendly Firm'* is an indicator equals to one if firm's 'Employee-Friendly Index' value is equal to at least one. 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Standard errors are clustered at the firm level. t-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

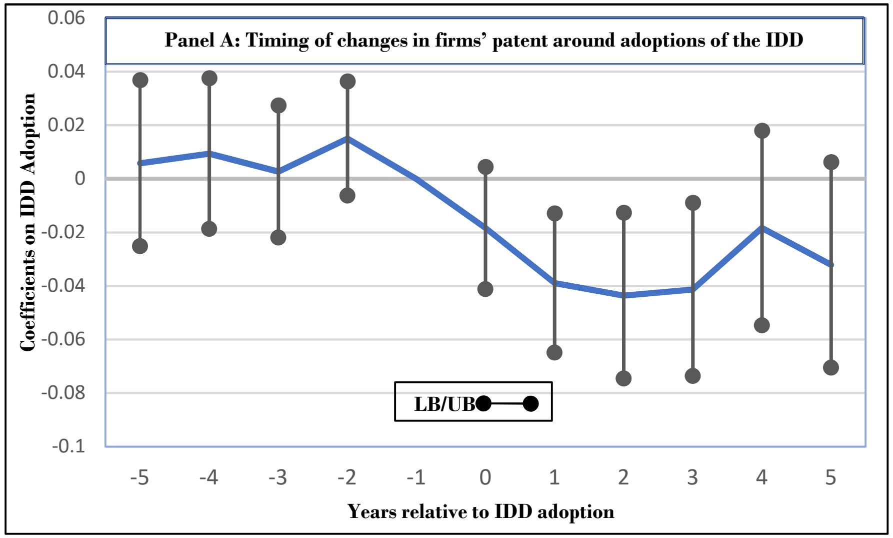
| Variables | Patents | | | | Citations | | | | Patent Value | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Employee-Friendly Firm | 0.453*** | 0.266*** | 0.222*** | 0.193*** | 0.652*** | 0.359*** | 0.291*** | 0.255*** | 0.836*** | 0.439*** | 0.354*** | 0.323*** |
| | (9.574) | (6.149) | (5.320) | (4.503) | (8.214) | (4.910) | (4.096) | (3.561) | (10.356) | (6.200) | (5.256) | (4.686) |
| Firm Size | | 0.229*** | 0.269*** | 0.271*** | | 0.352*** | 0.418*** | 0.415*** | | 0.475*** | 0.552*** | 0.551*** |
| | | (17.623) | (19.895) | (19.373) | | (16.310) | (18.418) | (17.946) | | (22.205) | (25.658) | (24.807) |
| Profitability | | -0.195** | 0.153 | 0.131 | | -0.083 | 0.399** | 0.315* | | -0.140 | 0.362** | 0.336* |
| | | (-2.041) | (1.370) | (1.150) | | (-0.574) | (2.419) | (1.936) | | (-0.910) | (2.079) | (1.916) |
| Cash Flow Volatility | | | 0.212 | 0.062 | | | 0.830*** | 0.523** | | | 0.395 | 0.154 |
| | | | (1.290) | (0.371) | | | (3.197) | (2.025) | | | (1.542) | (0.595) |
| $R\&D_{(t)}$ | | | 1.503*** | 1.336*** | | | 1.848*** | 1.627*** | | | 2.403*** | 2.115*** |
| | | | (6.099) | (5.574) | | | (5.495) | (5.086) | | | (6.143) | (5.589) |
| Fixed Assets | | | -0.134 | -0.092 | | | -0.111 | -0.056 | | | -0.196 | -0.137 |
| | | | (-1.092) | (-0.719) | | | (-0.524) | (-0.254) | | | (-0.986) | (-0.655) |
| Market-to-Book Assets | | | 0.058*** | 0.056*** | | | 0.099*** | 0.095*** | | | 0.139*** | 0.137*** |
| | | | (5.142) | (5.010) | | | (5.466) | (5.358) | | | (7.812) | (7.805) |
| Industry Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | N | Y | Y | Y | N | Y | Y | Y | N |
| State x Year Fixed Effects | N | N | N | Y | N | N | N | Y | N | N | N | Y |
| Observations | 14,270 | 14,270 | 13,810 | 13,724 | 14,270 | 14,270 | 13,810 | 13,724 | 14,270 | 14,270 | 13,810 | 13,724 |
| R-squared | 0.405 | 0.473 | 0.496 | 0.527 | 0.454 | 0.510 | 0.528 | 0.562 | 0.386 | 0.488 | 0.516 | 0.546 |

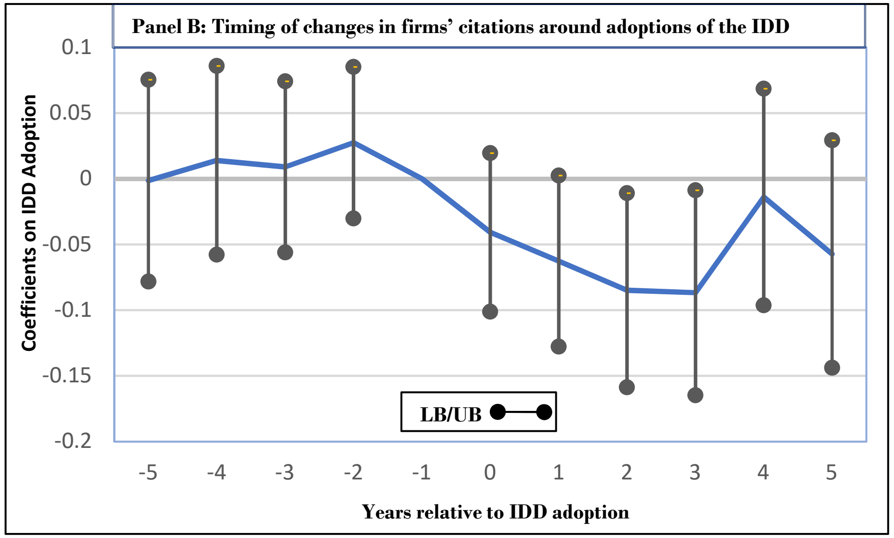
## Table 3: Adoption of Inevitable Disclosure Doctrine (IDD) and corporate innovation

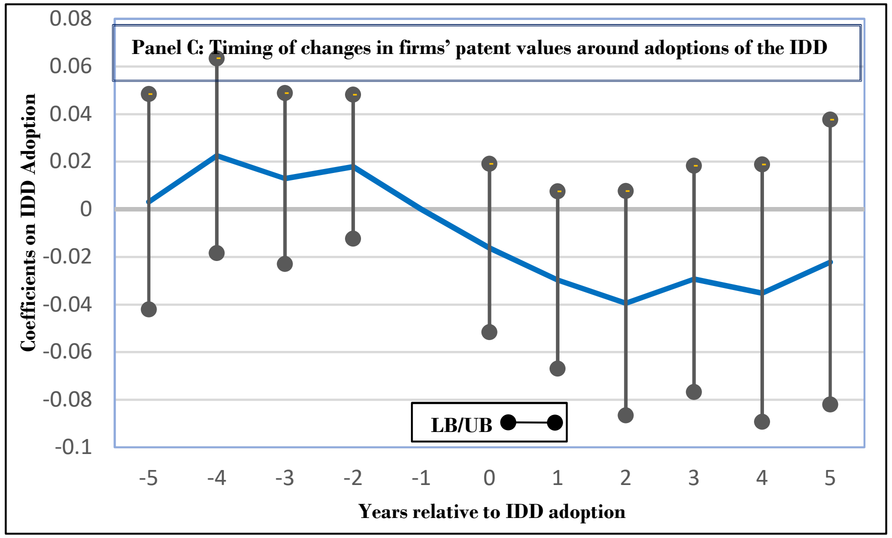
This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on firm's innovation outcomes. Models include Compustat firms from 1977-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Standard errors are clustered at the firm level. t-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | Patents | | | Citations | | | Patent Value | | |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| IDD Adoption | -0.045*** | -0.039*** | -0.040*** | -0.118*** | -0.109*** | -0.103*** | -0.045** | -0.037** | -0.041** |
| | (-3.721) | (-3.347) | (-3.263) | (-4.495) | (-4.210) | (-3.777) | (-2.355) | (-1.978) | (-2.131) |
| Firm Size | | 0.100*** | 0.107*** | | 0.158*** | 0.176*** | | 0.147*** | 0.164*** |
| | | (16.074) | (15.422) | | (12.659) | (12.374) | | (14.480) | (14.404) |
| Profitability | | -0.014 | -0.009 | | 0.018 | 0.027 | | 0.024 | 0.035 |
| | | (-0.920) | (-0.501) | | (0.491) | (0.635) | | (1.140) | (1.491) |
| Cash Flow Volatility | | | 0.048 | | | 0.139* | | | 0.078* |
| | | | (1.422) | | | (1.857) | | | (1.693) |
| $R\&D_{(t)}$ | | | 0.104*** | | | 0.328*** | | | 0.153*** |
| | | | (3.181) | | | (4.102) | | | (3.550) |
| Fixed Assets | | | 0.051* | | | 0.229*** | | | 0.091* |
| | | | (1.708) | | | (3.470) | | | (1.900) |
| Market-to-Book Assets | | | 0.020*** | | | 0.042*** | | | 0.045*** |
| | | | (8.739) | | | (7.957) | | | (12.499) |
| Firm Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 |
| R-squared | 0.778 | 0.782 | 0.788 | 0.709 | 0.711 | 0.719 | 0.806 | 0.810 | 0.816 |

Figure 1: Evolution of innovation outputs and adoption of Inevitable Disclosure Doctrine (IDD)

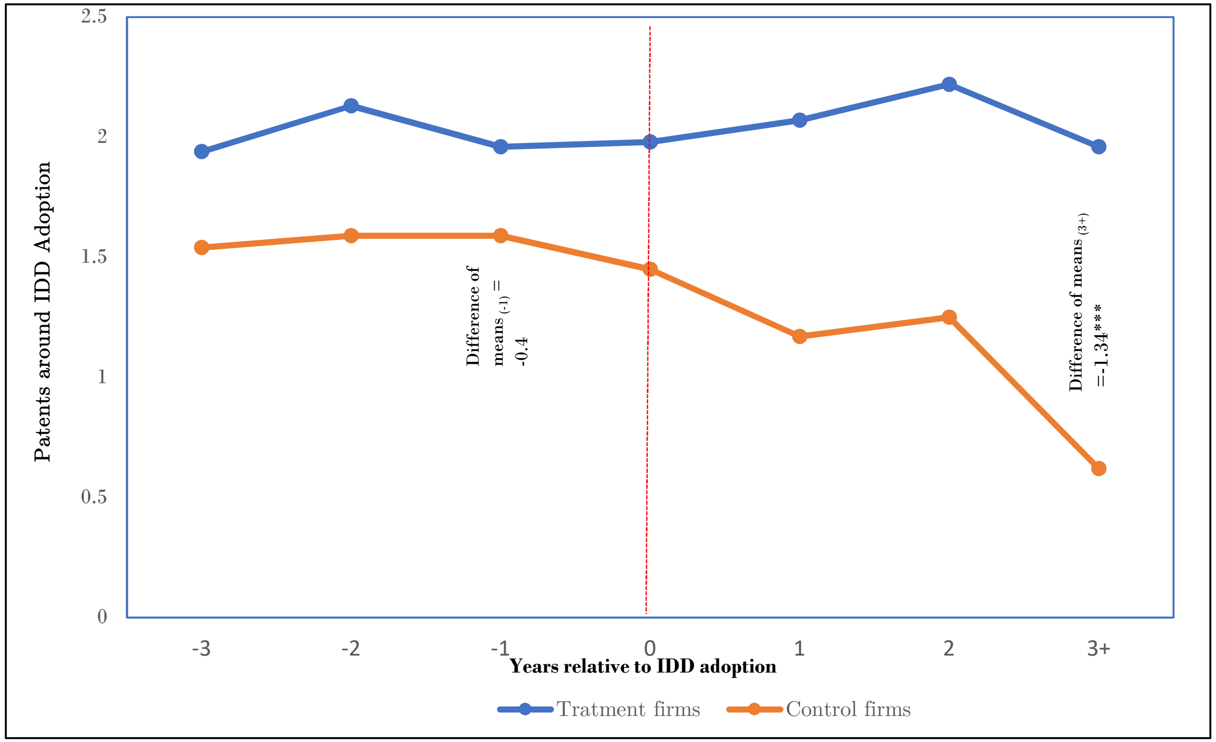


## Figure 2: Parallel trends in innovation for treated and control firms before the adoption of Inevitable Disclosure Doctrine (IDD)

This graph shows the innovation of the firms during pre and post-IDD period. Innovation is measured by 'Patents.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Treatment Firms' ('Control Firms') are firms that adopted (did not adopt) employee-friendly policy before the adoption of IDD in the states. We consider that a firm adopted an employee-friendly policy before IDD adoption if the firm's two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period. 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset.



## Table 4: Adoption of Inevitable Disclosure Doctrine (IDD) and innovation outputs in employee-friendly firms

This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on innovation outcomes of employee-friendly firms. Models include Compustat firms from 1991-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. '$Firm\ Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | Patents | Citations | Patent Value | Patents | Citations | Patent Value | Patents | Citations | Patent Value |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | 0.165** | 0.370** | 0.282* | 0.180** | 0.370* | 0.324** | 0.180*** | 0.376** | 0.315** |
| | (2.349) | (1.989) | (1.815) | (2.528) | (1.917) | (2.007) | (2.596) | (1.964) | (2.062) |
| IDD Adoption | -0.092** | -0.252** | -0.133* | -0.218** | -0.499* | -0.507*** | -0.218** | -0.491* | -0.519** |
| | (-2.299) | (-2.327) | (-1.902) | (-2.256) | (-1.908) | (-2.585) | (-2.172) | (-1.843) | (-2.563) |
| IDD Adoption x $Firm\ Size_{Pre\text{-}shock}$ | | | | 0.034* | 0.047 | 0.099** | 0.034 | 0.044 | 0.104** |
| | | | | (1.652) | (0.838) | (2.192) | (1.549) | (0.765) | (2.134) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | 0.037 | 0.902 | 0.143 | 0.039 | 0.933 | 0.093 |
| | | | | (0.079) | (0.709) | (0.185) | (0.083) | (0.741) | (0.118) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | 0.018 | 0.320 | -0.504 |
| | | | | | | | (0.031) | (0.236) | (-0.455) |
| Firm fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.861 | 0.838 | 0.846 | 0.861 | 0.838 | 0.846 | 0.861 | 0.838 | 0.846 |
| Prob>F: Joint Hypothesis: B1+B2=0 | 0.221 | 0.447 | 0.293 | | | | | | |

## Table 5: Adoption of Inevitable Disclosure Doctrine (IDD) and state-level innovation outputs

This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on state-level innovation outcomes. Models include Compustat firms from 1977-2008 for models (1)-(6) and from 1991-2008 for models (7)-(12). The dependent variable is 'Patent Value.' 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. 'Firm Size' is measured by the natural logarithm of firm's asset. '$Firm\ Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Models (1)-(3) and (7)-(9) represent patent value for the patents where the reported state of the first inventor of a patent and firm's headquarter state are the same. Models (4)-(6) and (10)-(12) represent patent value for the patents where the reported state of the first inventor of a patent and firm's headquarter state are different. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | In-State Patent Value | | | Out of State Patent Value | | | In-State Patent Value | | | Out of State Patent Value | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | | | | | | | 0.239* | 0.250* | 0.240* | 0.074 | 0.091 | 0.080 |
| | | | | | | | (1.712) | (1.744) | (1.728) | (0.754) | (0.886) | (0.809) |
| IDD Adoption | -0.043*** | -0.038** | -0.038** | -0.038*** | -0.031** | -0.034** | -0.148** | -0.473*** | -0.490*** | -0.081 | -0.237 | -0.253 |
| | (-2.785) | (-2.517) | (-2.384) | (-2.588) | (-2.190) | (-2.290) | (-2.264) | (-2.749) | (-2.791) | (-1.251) | (-1.607) | (-1.604) |
| Firm Size | | 0.079*** | 0.090*** | | 0.127*** | 0.138*** | | | | | | |
| | | (10.646) | (10.672) | | (14.461) | (14.071) | | | | | | |
| Profitability | | 0.039** | 0.042** | | -0.041** | -0.032 | | | | | | |
| | | (2.319) | (2.177) | | (-2.479) | (-1.635) | | | | | | |
| Cash Flow Volatility | | | 0.024 | | | 0.052 | | | | | | |
| | | | (0.623) | | | (1.597) | | | | | | |
| $R\&D_{(t)}$ | | | 0.093*** | | | 0.062** | | | | | | |
| | | | (2.793) | | | (2.203) | | | | | | |
| Fixed Assets | | | 0.078** | | | 0.030 | | | | | | |
| | | | (2.054) | | | (0.800) | | | | | | |
| Market-to-Book Assets | | | 0.029*** | | | 0.031*** | | | | | | |
| | | | (10.314) | | | (10.178) | | | | | | |
| IDD Adoption x Firm $Size_{Pre\text{-}shock}$ | | | | | | | | 0.072* | 0.077* | | 0.042 | 0.048 |
| | | | | | | | | (1.869) | (1.892) | | (1.351) | (1.380) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | | | | | 0.792 | 0.728 | | 0.041 | -0.024 |
| | | | | | | | | (1.081) | (0.980) | | (0.059) | (-0.035) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | | | -0.633 | | | -0.649 |
| | | | | | | | | | (-0.630) | | | (-0.596) |
| Firm Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.741 | 0.743 | 0.749 | 0.740 | 0.744 | 0.750 | 0.774 | 0.774 | 0.774 | 0.786 | 0.786 | 0.786 |
| Prob>F: Joint Hypothesis: B1+B2=0 | | | | | | | 0.620 | | | 0.713 | | |

## Table 6: Rejection of Inevitable Disclosure Doctrine (IDD) and innovation outputs in employee-friendly firms

This table reports the results from OLS models that estimate the impact of the rejection of the Inevitable Disclosure Doctrine (IDD) on firm's innovation outcomes. Models include Compustat firms from 1977-2008 for models (1)-(9) and from 1991-2008 for models (10)-(12). The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'IDD Rejection' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts reject to recognize the IDD, and zero otherwise. 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. 'Firm Size' is measured by the natural logarithm of firm's asset. 'Firm $Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | | Patents | | | Citations | | | Patent Value | | Patents | Citations | Patent Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| IDD Rejection x EFI$_{\text{Pre-shock}}$ | | | | | | | | | | -0.110 | -0.515** | -0.249 |
| | | | | | | | | | | (-1.260) | (-2.109) | (-1.427) |
| IDD Rejection | 0.070*** | 0.063*** | 0.069*** | 0.309*** | 0.297*** | 0.302*** | 0.091*** | 0.080** | 0.086*** | 0.248*** | 0.930*** | 0.448** |
| | (3.524) | (3.216) | (3.451) | (6.300) | (6.100) | (6.029) | (2.768) | (2.478) | (2.620) | (3.014) | (4.708) | (2.351) |
| Firm Size | | 0.100*** | 0.107*** | | 0.158*** | 0.175*** | | 0.147*** | 0.164*** | | | |
| | | (16.052) | (15.379) | | (12.649) | (12.343) | | (14.450) | (14.361) | | | |
| Profitability | | -0.014 | -0.010 | | 0.016 | 0.024 | | 0.023 | 0.034 | | | |
| | | (-0.935) | (-0.560) | | (0.438) | (0.572) | | (1.120) | (1.419) | | | |
| Cash Flow Volatility | | | 0.046 | | | 0.137* | | | 0.075 | | | |
| | | | (1.374) | | | (1.824) | | | (1.629) | | | |
| R&D$_{(t)}$ | | | 0.103*** | | | 0.324*** | | | 0.151*** | | | |
| | | | (3.163) | | | (4.082) | | | (3.533) | | | |
| Fixed Assets | | | 0.048 | | | 0.221*** | | | 0.088* | | | |
| | | | (1.631) | | | (3.364) | | | (1.829) | | | |
| Market-to-Book Assets | | | 0.020*** | | | 0.041*** | | | 0.044*** | | | |
| | | | (8.677) | | | (7.877) | | | (12.484) | | | |
| IDD Rejection x Firm Size$_{\text{Pre-shock}}$ | | | | | | | | | | 0.025* | 0.056 | 0.062* |
| | | | | | | | | | | (1.789) | (1.552) | (1.760) |
| IDD Rejection x Profitability$_{\text{Pre-shock}}$ | | | | | | | | | | -0.266 | 0.074 | -0.814 |
| | | | | | | | | | | (-0.667) | (0.073) | (-1.122) |
| IDD Rejection x R&D$_{\text{Pre-shock}}$ | | | | | | | | | | 0.386 | 1.787 | 0.290 |
| | | | | | | | | | | (0.673) | (1.330) | (0.252) |
| Firm Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.778 | 0.782 | 0.788 | 0.709 | 0.711 | 0.719 | 0.806 | 0.810 | 0.816 | 0.861 | 0.838 | 0.846 |

## Appendix TA 1: Employee-Friendly firms and corporate innovation

This table reports the results from OLS regression estimates examining the impact of employee-friendliness on firm's innovation outcomes. Models include Compustat firms from 1991-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). *'Employee-Friendly Index'* is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | Patents | | | | Citations | | | | Patent Value | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Employee-Friendly Index | 0.306*** | 0.170*** | 0.139*** | 0.128*** | 0.456*** | 0.244*** | 0.197*** | 0.189*** | 0.570*** | 0.283*** | 0.223*** | 0.215*** |
| | (8.905) | (5.344) | (4.610) | (4.147) | (7.780) | (4.483) | (3.730) | (3.592) | (9.925) | (5.489) | (4.616) | (4.342) |
| Firm Size | | 0.228*** | 0.268*** | 0.269*** | | 0.348*** | 0.415*** | 0.409*** | | 0.473*** | 0.551*** | 0.548*** |
| | | (17.064) | (19.309) | (18.796) | | (15.813) | (17.907) | (17.427) | | (21.517) | (24.881) | (24.048) |
| Profitability | | -0.192** | 0.158 | 0.133 | | -0.080 | 0.403** | 0.314* | | -0.134 | 0.370** | 0.339* |
| | | (-2.003) | (1.411) | (1.164) | | (-0.554) | (2.439) | (1.931) | | (-0.874) | (2.117) | (1.929) |
| Cash Flow Volatility | | | 0.208 | 0.053 | | | 0.819*** | 0.504* | | | 0.387 | 0.138 |
| | | | (1.257) | (0.314) | | | (3.139) | (1.947) | | | (1.505) | (0.531) |
| $R\&D_{(t)}$ | | | 1.514*** | 1.340*** | | | 1.856*** | 1.626*** | | | 2.420*** | 2.122*** |
| | | | (6.141) | (5.594) | | | (5.522) | (5.090) | | | (6.187) | (5.613) |
| Fixed Assets | | | -0.129 | -0.089 | | | -0.109 | -0.060 | | | -0.188 | -0.133 |
| | | | (-1.044) | (-0.698) | | | (-0.512) | (-0.271) | | | (-0.941) | (-0.634) |
| Market-to-Book Assets | | | 0.057*** | 0.055*** | | | 0.098*** | 0.094*** | | | 0.139*** | 0.136*** |
| | | | (5.100) | (4.939) | | | (5.405) | (5.258) | | | (7.775) | (7.735) |
| Industry Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | N | Y | Y | Y | N | Y | Y | Y | N |
| State x Year Fixed Effects | N | N | N | Y | N | N | N | Y | N | N | N | Y |
| Observations | 14,270 | 14,270 | 13,810 | 13,724 | 14,270 | 14,270 | 13,810 | 13,724 | 14,270 | 14,270 | 13,810 | 13,724 |
| R-squared | 0.406 | 0.472 | 0.495 | 0.527 | 0.456 | 0.510 | 0.528 | 0.563 | 0.388 | 0.487 | 0.515 | 0.546 |

## Appendix TA 2: Adoption of Inevitable Disclosure Doctrine (IDD) and corporate innovation during 1991-2008

This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on firm's innovation outcomes. Models include Compustat firms from 1991-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D expenditures$_{(t)}$ scaled by total assets$_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | Patents | | | Citations | | | Patent Value | | |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| IDD Adoption | -0.047*** | -0.043*** | -0.045*** | -0.139*** | -0.132*** | -0.135*** | -0.059*** | -0.053*** | -0.054*** |
| | (-3.939) | (-3.578) | (-3.594) | (-4.637) | (-4.435) | (-4.374) | (-2.977) | (-2.716) | (-2.629) |
| Firm Size | | 0.077*** | 0.087*** | | 0.099*** | 0.127*** | | 0.084*** | 0.104*** |
| | | (11.880) | (11.989) | | (6.813) | (7.742) | | (8.414) | (9.267) |
| Profitability | | -0.001 | 0.003 | | 0.046 | 0.056 | | 0.045* | 0.050* |
| | | (-0.052) | (0.140) | | (1.000) | (1.067) | | (1.737) | (1.731) |
| Cash Flow Volatility | | | 0.087** | | | 0.269*** | | | 0.084 |
| | | | (2.067) | | | (3.004) | | | (1.497) |
| $R\&D_{(t)}$ | | | 0.070** | | | 0.227*** | | | 0.124*** |
| | | | (2.203) | | | (3.107) | | | (3.037) |
| Fixed Assets | | | 0.110*** | | | 0.400*** | | | 0.173*** |
| | | | (2.850) | | | (4.636) | | | (2.979) |
| Market-to-Book Assets | | | 0.021*** | | | 0.050*** | | | 0.040*** |
| | | | (9.159) | | | (8.823) | | | (11.114) |
| Firm Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 64,827 | 64,827 | 58,652 | 64,827 | 64,827 | 58,652 | 64,827 | 64,827 | 58,652 |
| R-squared | 0.785 | 0.787 | 0.794 | 0.708 | 0.708 | 0.718 | 0.807 | 0.808 | 0.815 |

## Appendix TA 3: Pre-shock co-variates balance tests

This table reports the difference in means tests on the innovation outcomes of the employee-friendly firms (treatment firms) against the other firms around the recognition of the Inevitable Disclosure Doctrine (IDD). 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Treatment Firms' ('Control Firms') are firms that adopted (did not adopt) employee-friendly policy before the adoption of IDD in the states. We consider that a firm adopted an employee-friendly policy before IDD adoption if the firm's two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period. 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. Panel A includes innovation of the firms during pre and post-IDD period. Innovation is measured by 'Patents.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). Panel B reports ex-ante characteristics of the treatment and control firms. 'Firm size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'R&D$_{(t)}$' is R&D expenditures$_{(t)}$ scaled by total assets$_{(t-1)}$. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. t-ratios are clustered at the Industry-level. Significance levels: *=10%; **=5%; ***=1%.

### Panel A: Test of parallel trend assumption for IDD adopting States

| Year Relative to IDD Adoption | Treatment Firms | Control Firms | Difference of Means | t-ratio* |
|---|---|---|---|---|
| -3 | 1.94 | 1.54 | -0.40 | -0.92 |
| -2 | 2.13 | 1.59 | -0.54 | -1.33 |
| -1 | 1.96 | 1.59 | -0.37 | -1.13 |
| 0 | 1.98 | 1.45 | -0.53 | -1.50 |
| 1 | 2.07 | 1.17 | -0.90 | -2.61*** |
| 2 | 2.22 | 1.25 | -0.97 | -3.10*** |
| 3+ | 1.96 | 0.62 | -1.34 | -8.56*** |

### Panel B: Ex-ante firm characteristics (one year before the adoption of IDD)

| Covariate Balance in the year before IDD was adopted, year $_{(t-1)}$ | | | | |
|---|---|---|---|---|
| Variables | Treatment Firms | Control Firms | Difference of Means | t-ratio* |
| R&D$_{(t)}$ | 0.023 | 0.018 | -0.005 | -0.81 |
| Firm Size | 7.868 | 7.627 | -0.241 | -0.94 |
| Market-to-Book Asset | 1.871 | 1.872 | 0.002 | 0.01 |
| Profitability | 0.176 | 0.148 | -0.028 | -2.01** |

## Appendix TA 4: Adoption of Inevitable Disclosure Doctrine (IDD) and innovation outputs in employee-friendly firms

This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on innovation outcomes of employee-friendly firms. Models include Compustat firms from 1991-2008. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. In panel A, '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. In panel B, '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the four-year rolling average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. 'Firm $Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. Standard errors are clustered at the firm level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

**Panel A:**

| Variables | Patents | Citations | Patent Value | Patents | Citations | Patent Value | Patents | Citations | Patent Value |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | 0.170** | 0.378** | 0.286* | 0.184*** | 0.377* | 0.326** | 0.184*** | 0.383** | 0.316** |
| | (2.408) | (2.025) | (1.826) | (2.579) | (1.952) | (2.007) | (2.649) | (2.000) | (2.062) |
| IDD Adoption | -0.092** | -0.253** | -0.133* | -0.217** | -0.497* | -0.503*** | -0.217** | -0.489* | -0.516** |
| | (-2.335) | (-2.350) | (-1.916) | (-2.257) | (-1.907) | (-2.584) | (-2.171) | (-1.841) | (-2.561) |
| IDD Adoption x Firm $Size_{Pre\text{-}shock}$ | | | | 0.033 | 0.046 | 0.098** | 0.033 | 0.044 | 0.103** |
| | | | | (1.637) | (0.826) | (2.185) | (1.534) | (0.752) | (2.128) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | 0.037 | 0.903 | 0.149 | 0.039 | 0.934 | 0.098 |
| | | | | (0.079) | (0.710) | (0.193) | (0.083) | (0.742) | (0.125) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | 0.018 | 0.319 | -0.512 |
| | | | | | | | (0.032) | (0.236) | (-0.461) |
| Firm fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.861 | 0.838 | 0.846 | 0.861 | 0.838 | 0.846 | 0.861 | 0.838 | 0.846 |
| Prob>F: Joint Hypothesis: B1+B2=0 | 0.201 | 0.423 | 0.286 | | | | | | |

Panel B:

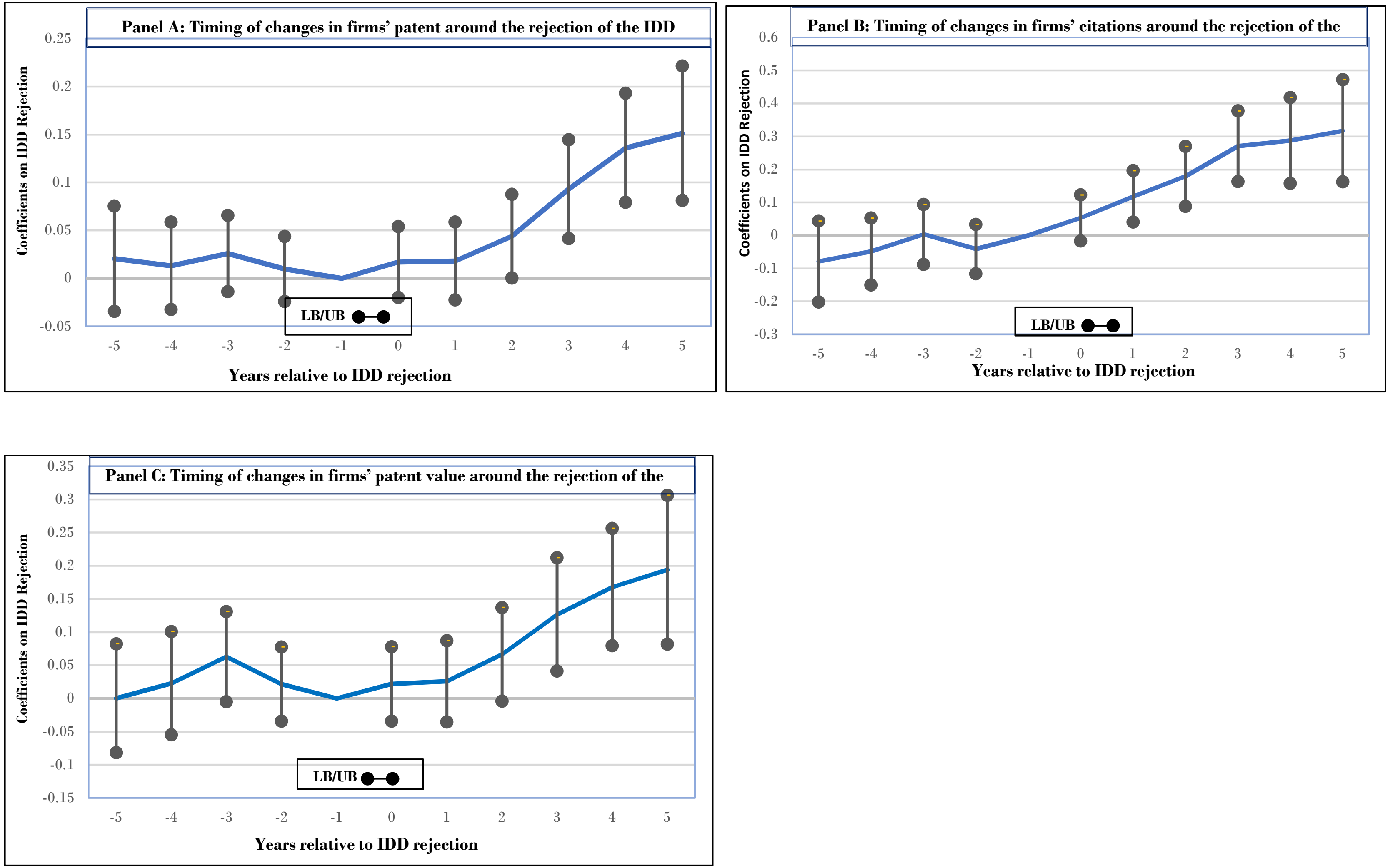
| Variables | Patents | Citations | Patent Value | Patents | Citations | Patent Value | Patents | Citations | Patent Value |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | 0.189*** | 0.436** | 0.303** | 0.200*** | 0.433** | 0.335** | 0.203*** | 0.446** | 0.326** |
| | (2.731) | (2.389) | (2.025) | (2.868) | (2.298) | (2.183) | (2.972) | (2.372) | (2.262) |
| IDD Adoption | -0.104** | -0.285** | -0.147** | -0.223** | -0.516** | -0.506*** | -0.220** | -0.503* | -0.515*** |
| | (-2.559) | (-2.567) | (-2.044) | (-2.337) | (-1.994) | (-2.635) | (-2.232) | (-1.909) | (-2.603) |
| IDD Adoption x Firm $Size_{Pre\text{-}shock}$ | | | | 0.032 | 0.045 | 0.096** | 0.031 | 0.040 | 0.100** |
| | | | | (1.606) | (0.813) | (2.176) | (1.466) | (0.703) | (2.101) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | 0.009 | 0.821 | 0.122 | 0.020 | 0.874 | 0.086 |
| | | | | (0.020) | (0.653) | (0.158) | (0.044) | (0.704) | (0.109) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | 0.118 | 0.572 | -0.383 |
| | | | | | | | (0.214) | (0.427) | (-0.349) |
| Firm fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year fixed effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.861 | 0.838 | 0.846 | 0.862 | 0.838 | 0.846 | 0.862 | 0.838 | 0.846 |
| Prob>F: Joint Hypothesis: B1+B2=0 | 0.141 | 0.305 | 0.244 | | | | | | |

## Appendix TA 5: Adoption of Inevitable Disclosure Doctrine (IDD) and state-level innovation outputs considering the first four inventors

This table reports the results from OLS models that estimate the impact of the recognition of the Inevitable Disclosure Doctrine (IDD) on state-level innovation outcomes. Models include Compustat firms from 1977-2008 for models (1)-(6) and from 1991-2008 for models (7)-(12). The dependent variable is 'Patent Value.' 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. 'Firm Size' is measured by the natural logarithm of firm's asset. '$Firm\ Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. Models (1)-(3) and (7)-(9) represent patent value for the patents where the reported state of any of the first four inventors of a patent and firm's headquarter state are the same. Models (4)-(6) and (10)-(12) represent patent value for the patents where the reported state of the first inventor of a patent and firm's headquarter state are different. Standard errors are clustered at the firm level. *t*-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | In-State Patent Value | | | Out of State Patent Value | | | In-State Patent Value | | | Out of State Patent Value | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | | | | | | | 0.246* | 0.252* | 0.240* | 0.095 | 0.118 | 0.109 |
| | | | | | | | (1.722) | (1.692) | (1.728) | (0.948) | (1.149) | (1.099) |
| IDD Adoption | -0.042*** | -0.037** | -0.037** | -0.036** | -0.029** | -0.031** | -0.124** | -0.453*** | -0.490*** | -0.086 | -0.230 | -0.243 |
| | (-2.686) | (-2.399) | (-2.257) | (-2.517) | (-2.124) | (-2.187) | (-1.997) | (-2.606) | (-2.791) | (-1.379) | (-1.567) | (-1.546) |
| Firm Size | | 0.087*** | 0.099*** | | 0.121*** | 0.131*** | | | | | | |
| | | (11.255) | (11.295) | | (14.065) | (13.549) | | | | | | |
| Profitability | | 0.040** | 0.043** | | -0.048*** | -0.042** | | | | | | |
| | | (2.261) | (2.169) | | (-2.992) | (-2.224) | | | | | | |
| Cash Flow Volatility | | | 0.041 | | | 0.021 | | | | | | |
| | | | (1.019) | | | (0.682) | | | | | | |
| $R\&D_{(t)}$ | | | 0.107*** | | | 0.049* | | | | | | |
| | | | (3.046) | | | (1.774) | | | | | | |
| Fixed Assets | | | 0.072* | | | 0.029 | | | | | | |
| | | | (1.815) | | | (0.812) | | | | | | |
| Market-to-Book Assets | | | 0.031*** | | | 0.029*** | | | | | | |
| | | | (10.504) | | | (9.721) | | | | | | |
| IDD Adoption x Firm $Size_{Pre\text{-}shock}$ | | | | | | | | 0.067* | 0.071* | | 0.042 | 0.047 |
| | | | | | | | | (1.718) | (1.735) | | (1.373) | (1.357) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | | | | | 1.044 | 0.991 | | -0.126 | -0.176 |
| | | | | | | | | (1.464) | (1.360) | | (-0.197) | (-0.279) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | | | -0.536 | | | -0.509 |
| | | | | | | | | | (-0.568) | | | (-0.474) |
| Firm Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 105,873 | 105,873 | 93,150 | 105,873 | 105,873 | 93,150 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.752 | 0.754 | 0.760 | 0.741 | 0.745 | 0.752 | 0.785 | 0.785 | 0.785 | 0.785 | 0.786 | 0.786 |
| Prob>F: Joint Hypothesis: B1+B2=0 | | | | | | | 0.346 | | | 0.910 | | |

Appendix Figure A1: Evolution of innovation outputs and the rejection of Inevitable Disclosure Doctrine (IDD)



## Appendix TA 6: Employee-Friendly Firms, IDD, and Corporate Innovation

This table reports the results from OLS regression estimates examining the impact of satisfaction of employees and adoption of IDD on firm's innovation outcomes winsorized at the 2% level. Models include Compustat firms. The dependent variables are 'Patents,' 'Citations' and 'Patent Value.' 'Patents' are defined as the logarithm of one plus number of patents granted in the period (t+1). 'Citations' are the logarithm of one plus number of citations received by patents granted in the period (t+1). 'Patent Value' is the logarithm of one plus average value of patents applied at the time (t+1) as computed in KPSS (2017). 'Employee-Friendly Index' is a continuous measure reflecting firms' relationship with employees based on the summation of indicator variables for union relations, cash profit sharing, employee involvement, retirement benefits, and health and safety strengths from MSCI ESG STATS dataset. 'Employee-friendly Firm' is an indicator equals to one if firm's 'Employee-Friendly Index' is equal to at least one. 'IDD Adoption' is an indicator variable equal to one if the headquarter of the firm is in a state whose courts recognize the IDD, and zero otherwise. 'EFI' is an indicator equal to one if the two-year average value of the 'Employee-Friendly Index' is positive in the pre-shock period, zero otherwise. 'Firm Size' is measured by the natural logarithm of firm's asset. 'Profitability' is firm's operating income before depreciation scaled by the book value of assets. 'Cash Flow Volatility' is the standard deviation of a firm's profitability over the previous five years. '$R\&D_{(t)}$' is R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. 'Fixed Assets' is measured by firm's property, plant, and equipment scaled by the book value of assets. 'Market-to-Book Assets' is the market value of total assets divided by the book value of assets. '$EFF_{Pre\text{-}shock}$' is an indicator equal to one if the two-year moving average value of the 'Employee-Friendly Index' is greater than zero in the pre-shock period, zero otherwise. 'Firm $Size_{Pre\text{-}shock}$' is the pre-shock value of the demeaned natural logarithm of firm's asset. '$Profitability_{Pre\text{-}shock}$' is the pre-shock value of the demeaned operating income before depreciation scaled by the book value of assets. '$R\&D_{Pre\text{-}shock}$' is the pre-shock value of the demeaned R&D $expenditures_{(t)}$ scaled by total $assets_{(t-1)}$. Standard errors are clustered at the firm level. t-ratios are in parentheses. Significance levels: *=10%; **=5%; ***=1%.

| Variables | Patents | Citations | Patent Value | Patents | Citations | Patent Value | Patents | Citations | Patent Value |
|---|---|---|---|---|---|---|---|---|---|
| Models | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Employee-Friendly Firm | 0.317*** | 0.331*** | 0.478*** | | | | | | |
| | (5.726) | (4.077) | (5.647) | | | | | | |
| IDD Adoption | | | | -0.039*** | -0.109*** | -0.040* | -0.277** | -0.448 | -0.617** |
| | | | | (-2.744) | (-3.657) | (-1.811) | (-2.153) | (-1.471) | (-2.563) |
| IDD Adoption x $EFF_{Pre\text{-}shock}$ | | | | | | | 0.247*** | 0.408* | 0.395** |
| | | | | | | | (2.923) | (1.908) | (2.242) |
| Firm Size | 0.377*** | 0.487*** | 0.747*** | 0.134*** | 0.195*** | 0.198*** | | | |
| | (20.444) | (18.652) | (26.223) | (15.541) | (12.677) | (14.415) | | | |
| Profitability | 0.190 | 0.422** | 0.417** | -0.030 | 0.021 | 0.033 | | | |
| | (1.410) | (2.319) | (2.009) | (-1.555) | (0.481) | (1.239) | | | |
| Cash Flow Volatility | 0.377* | 0.958*** | 0.619** | 0.046 | 0.127 | 0.082* | | | |
| | (1.913) | (3.335) | (2.028) | (1.314) | (1.634) | (1.658) | | | |
| $R\&D_{(t)}$ | 1.695*** | 2.009*** | 2.624*** | 0.100*** | 0.360*** | 0.156*** | | | |
| | (5.771) | (5.411) | (5.789) | (2.941) | (4.253) | (3.399) | | | |
| Fixed Assets | -0.175 | -0.141 | -0.301 | 0.059* | 0.278*** | 0.096* | | | |
| | (-1.031) | (-0.559) | (-1.155) | (1.721) | (3.955) | (1.777) | | | |
| Market to Book Assets | 0.082*** | 0.119*** | 0.209*** | 0.024*** | 0.044*** | 0.056*** | | | |
| | (5.899) | (5.762) | (9.250) | (9.340) | (8.067) | (13.622) | | | |
| IDD Adoption x Firm $Size_{Pre\text{-}shock}$ | | | | | | | 0.034 | 0.018 | 0.100* |
| | | | | | | | (1.266) | (0.269) | (1.695) |
| IDD Adoption x $Profitability_{Pre\text{-}shock}$ | | | | | | | 0.308 | 1.239 | 0.614 |
| | | | | | | | (0.517) | (0.877) | (0.623) |
| IDD Adoption x $R\&D_{Pre\text{-}shock}$ | | | | | | | -0.058 | -0.232 | -0.830 |
| | | | | | | | (-0.084) | (-0.144) | (-0.609) |
| Industry Fixed Effects | Y | Y | Y | N | N | N | N | N | N |
| Firm Fixed Effects | N | N | N | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 13,810 | 13,810 | 13,810 | 93,150 | 93,150 | 93,150 | 13,845 | 13,845 | 13,845 |
| R-squared | 0.515 | 0.539 | 0.547 | 0.816 | 0.738 | 0.838 | 0.883 | 0.853 | 0.873 |