MANAGEMENT SCIENCE
Vol. 62, No. 7, July 2016, pp. 1982–2001
ISSN 0025-1909 (print) | ISSN 1526-5501 (online)

http://dx.doi.org/10.1287/mnsc.2015.2229


# The Impact of Stakeholder Orientation on Innovation: Evidence from a Natural Experiment

Caroline Flammer
Ivey Business School, University of Western Ontario, London, Ontario N6G 0N1, Canada, cflammer@ivey.uwo.ca

Aleksandra Kacperczyk
Sloan School of Management, Massachusetts Institute of Technology, Cambridge, Massachusetts 02142, olenka@mit.edu

In this study, we assess the causal impact of stakeholder orientation on innovation. To obtain exogenous variation in stakeholder orientation, we exploit the enactment of state-level constituency statutes, which allow directors to consider stakeholders' interests when making business decisions. Using a difference-in-differences methodology, we find that the enactment of constituency statutes leads to a significant increase in the number of patents and citations per patent. We further argue and provide evidence suggesting that stakeholder orientation sparks innovation by encouraging experimentation and enhancing employees' innovative productivity. Finally, we find that the positive effect of stakeholder orientation on innovation is larger in consumer-focused and less eco-friendly industries.

Data, as supplemental material, are available at http://dx.doi.org/10.1287/mnsc.2015.2229.

*Keywords*: innovation; stakeholder view; long-term orientation; constituency statutes; difference-in-differences
*History*: Received November 17, 2013; accepted March 4, 2015, by Lee Fleming, entrepreneurship and innovation. Published online in *Articles in Advance* November 12, 2015.

## 1. Introduction

A long-standing literature acknowledges the significance of innovation for economic growth (e.g., Aghion and Howitt 1992; Grossman and Helpman 1990, 1994; Jones 1995; Romer 1990) and firms' survival (e.g., Baumol 2002, Porter 1990, Schumpeter 1942). For example, (Baumol 2002, p. 1) argues that "[u]nder capitalism, innovative activity (…) becomes mandatory, a life-and-death matter for the firm." In particular, the ability to innovate is central to responding to changes in the business environment (e.g., Eisenhardt and Brown 1998, Eisenhardt and Martin 2000) and establishing market leadership (e.g., Porter 1990). Accordingly, understanding what conditions foster innovation within the firm is an important question for academics and business practitioners alike.

Research in strategy, organization theory, and economics has tackled this question, emphasizing the difficulty of crafting incentive schemes and monitoring devices to encourage the pursuit of innovative activities within firms (e.g., Aghion and Tirole 1994, Balkin et al. 2000, Baysinger et al. 1991, David et al. 2001, Graves 1988, Hansen and Hill 1991, Hill and Snell 1988, Hoskisson et al. 2002, Kochhar and David 1996, Manso 2011, Zahra 1996). While this literature focuses on how *shareholders* can provide appropriate incentives for executives to pursue innovation, the role of *stakeholders*—i.e., "any group or individual who can affect or is affected by the achievement of an organization's purpose" (Freeman 1984, p. 53)—has remained mostly unexplored. With the exception of a few studies that examine the potential influence of employee-friendly policies on innovation (e.g., Azoulay et al. 2011), very little is known about the impact of stakeholder orientation (i.e., the attention to nonfinancial stakeholders) on innovation.

Yet anecdotal evidence abounds with examples of innovative companies engaged in vigorous interactions with nonfinancial stakeholders, including employees, customers, and community groups. In fact, attending to nonfinancial stakeholders is often claimed to drive the firm's ability to innovate. At General Electric (GE), for example, executives view the firm's innovativeness as a function of its external focus on nonfinancial stakeholders, including "customers, governments, regulators, community groups and others" (*New York Times* 2012a). Similarly, one of the stated objectives of IBM's social business platform is to "engage all key stakeholders whether an employee, customer, or partners in order to accelerate innovation" (*Computer Weekly News* 2013).[1] Despite the prevalence of such anecdotes, empirical research on this topic remains scarce.

[1] Relatedly, in a recent survey of International Data Corp (IDC), 700 businesses were asked why they are using social business platforms. The top response was "involving stakeholders in the innovation process" (*The Edge Financial Daily* 2013).

In this study, we examine the potential impact of corporate attention to nonfinancial stakeholders on innovation. This question is difficult to address empirically since stakeholder orientation is likely endogenous with respect to innovation. In particular, finding a positive relationship between stakeholder orientation and innovation may be spurious if such relationship is driven by unobserved firm characteristics that enhance a firm's propensity to engage in both innovation and stakeholder-friendly initiatives. This concern is particularly severe given that firm-level attributes, such as slack resources or managerial ability, while difficult to observe, are likely to drive a firm's investments in innovation and stakeholder orientation alike. Moreover, the relationship between stakeholder-friendly policies and innovation is subject to reverse causality concerns. For example, a positive correlation between stakeholder orientation and innovation may indicate that innovative firms generate more slack resources, which can be, in turn, allocated to cater to the interests of stakeholders. In short, while empirically challenging, leveraging a research design that provides a clean causal estimate is central to understanding the impact of a firm's stakeholder orientation on innovation.

We address this empirical challenge by exploiting a quasi-natural experiment provided by the enactment of constituency statutes in 34 states between 1984–2006. These statutes allow corporate directors to consider stakeholders' interests when making business decisions, and hence they provide exogenous variation in the weight that U.S. public corporations give to the interest of nonfinancial stakeholders (Orts 1992). Using a difference-in-differences methodology—with the "treatment" group composed of states that adopted the statutes, and the "control" group composed of states that did not—we find that the enactment of constituency statutes leads to a significant increase in the number of patents and citations per patent. These findings indicate that stakeholder orientation does indeed foster innovation.

We further argue that stakeholder orientation promotes employees' experimentation and trial and error. Consistent with this argument, we find that the enactment of constituency statutes leads to more innovations in the tails of the distribution (i.e., more hits but also more failures) as well as more original and somewhat more general innovations. We also find that the enactment of constituency statutes leads to an increase in innovative productivity (i.e., patents per employee and citations per employee), suggesting a greater engagement of employees in the innovation process. Finally, our results show that the positive impact of constituency statutes on innovation is larger for firms in consumer-focused industries (i.e., the business-to-consumer sector), and firms in less eco-friendly industries (i.e., high-polluting industries).

Lastly, we examine how the enactment of constituency statutes affects firm performance. We observe an increase in long-term performance, while this pattern is only marginally significant. This is suggestive of a temporal trade-off—although stakeholder orientation seems to pay off in the long run, it does not yield immediate benefits. Hence, without a legal tool such as a constituency statute, market pressure may prevent shareholder-oriented companies from becoming more stakeholder friendly in the first place.

Overall, our findings support the view that stakeholder orientation plays an important role in fostering innovation. In the following, we develop the theoretical arguments in detail, describe the methodology, present the empirical results, and conclude.

## 2. Theory and Hypotheses

### 2.1. Stakeholder Orientation and Innovation

Though innovation is an important determinant of firm value and competitive strength, it also entails considerable risks. Scholars commonly argue that innovative activities are uncertain and difficult to discern partly because they are long term, nonroutine, and subtle in nature, with long gestational periods and unpredictable outcomes (e.g., Aghion and Tirole 1994, Griliches 1990, Hall et al. 2005, Holmstrom 1989). Given the precarious nature of innovative activities, successfully engaging key stakeholders, such as employees and customers, raises significant challenges for the firm.

First, innovation hinges on entrepreneurial initiatives of employees and managers. Undertaking innovative projects poses, however, considerable career risks as the uncertainty inherent in these projects increases the probability of employees' termination. As a result, employees tend to refrain from investing effort in innovation, preferring instead to focus on activities that are incremental and have more predictable outcomes (Wiseman and Gomez-Mejia 1998).[2] Similarly, while companies' payoffs from innovation accrue over the long run, employees and managers generally prefer to invest in short-term projects, unless provided with long-term incentives, such as long-term compensation (Ederer and Manso 2013, Holthausen et al. 1995, Lerner and Wulf 2007), or funding policies with long-term horizons (Azoulay et al. 2011).

Second, the pursuit of innovative projects may lead to a decline in customer loyalty and commitment to

[2] Some companies explicitly recognize this challenge. For example, in evaluating their employees, DreamWorks and General Electric explicitly acknowledge the need to take risk and tolerate failure (*New York Times* 2012a).

a firm's products and services. In particular, high rates of failure associated with new products may trigger customer dissatisfaction, threatening a firm's relation with its customers. For example, Apple's release of the iPhone 4S was followed by a wave of complaints from customers concerned about the new iPhone's battery life (*Forbes* 2011a). Relatedly, the pursuit of innovation may be difficult for customers and investors to evaluate with precision. Indeed, a number of studies suggest that capital markets tend to be myopic, leading to systematic undervaluation of corporate investments in long-run projects such as innovation (e.g., Froot et al. 1992, Hall and Hall 1993).

Given the challenges inherent in innovation, stakeholder orientation is likely to have important implications for a firm's ability to develop innovative capabilities. Much like innovation, stakeholder orientation focuses on long-term horizons rather than immediate payoffs (Slawinski and Bansal 2012, Wang and Bansal 2012). Benefits from stakeholder orientation materialize in the long run as firms acquire intangible resources (e.g., Hart 1995; Jones 1995; Porter and Kramer 2006, 2011; Russo and Fouts 1997). For example, by catering to the interests of consumers, employees, and the natural environment, firms are able to secure intangible assets such as legitimacy, reputation, and trust (e.g., Luo and Bhattacharya 2006, Sen and Bhattacharya 2001, Turban and Greening 1996), which may lead to a sustainable competitive advantage (e.g., Barney and Hansen 1994, Hillman and Keim 2001, Teece 1998).

By fostering long-term horizons, stakeholder orientation is likely to relieve key stakeholders, such as customers and employees, from short-termism, which generally hinders innovation. In particular, catering to nonfinancial stakeholders may encourage employees to engage in innovative activities despite the long horizon and high uncertainty of doing so. Likewise, stakeholder orientation may foster customer loyalty and willingness to tolerate potential failure and uncertainty associated with the development of new products. Overall, we expect stakeholder orientation to enhance the innovative process, increasing the quantity and quality of innovative output.

Hypothesis 1. *An increase in a firm's stakeholder orientation leads to an increase in innovation.*

Naturally, the alternative hypothesis is that increased stakeholder orientation may lead to a decrease (or no change) in innovation. Several arguments would point to this alternative hypothesis. For example, stronger stakeholder orientation may draw limited financial and physical resources away from other investment opportunities, which may lead to a decline in innovation. This argument is in line with, e.g., the Friedman (1962, 1970) shareholder view, according to which companies' attention to stakeholders may divert valuable resources away from profit-maximizing activities. Another argument is that increased stakeholder orientation may make employees and managers feel too comfortable, leading them to shirk and enjoy a "quiet life" (Bertrand and Mullainathan 2003). In turn, such behavior could lead to lower innovation. In this vein, Atanassov (2013) and Sapra et al. (2014) argue that weaker corporate governance—and hence weaker discipline—may hurt innovation.

**2.1.1. Experimentation.** Attending to nonfinancial stakeholders may increase innovation by offsetting the risks associated with high unpredictability and long-term horizons, inherent to the pursuit of innovation. In particular, by strengthening employee relations, companies may foster a work environment that is characterized by long-term commitment to employees and high tolerance for failure. Such an environment likely encourages employees' engagement in experimentation and trial and error, leading to an increase in innovative output. In support of this argument, a number of empirical studies demonstrate that employees are more motivated and willing to invest effort in risky, innovative projects, when they are protected from dismissal and are safe to fail. For example, in their study of life scientists, Azoulay et al. (2011) find that freedom to experiment and tolerance for failure foster creativity and innovation in scientific research. Similarly, Tian and Wang (2014) document that firms backed by venture capitalists who tolerate failure are significantly more innovative than firms backed by venture capitalists less tolerant of failure. Finally, Shleifer and Summers (1988) argue that managers are reluctant to invest in projects with risky payoffs, when they face uncertainty about long-term employment.

Given the arguments above, we expect stakeholder orientation to relieve employees from short-termism, redirecting their attention toward the pursuit of long-term, unpredictable initiatives, such as innovative projects. Accordingly, following the adoption of stakeholder-friendly policies, we expect employees to experiment more and hence generate (i) more original innovations, (ii) more general innovations, as well as (iii) more innovations in the tails of the distribution (i.e., more hits but also more failures). The latter argument is related to Azoulay et al. (2011) finding that greater job security leads to more innovations that are either "hits" or "flops." In sum, the above considerations motivate the following hypothesis:

Hypothesis 2A. *An increase in a firm's stakeholder orientation leads to more experimentation, and hence innovations that are* (i) *more original*, (ii) *more general*, *and* (iii) *more often in the tails of the distribution* (*"hits and flops"*).

**2.1.2. Innovative Productivity.** Besides fostering experimentation, stakeholder orientation may also increase innovative output by enhancing employees' innovative productivity. For example, by attending to stakeholders, firms may improve employees' job satisfaction, and hence commitment and retention among employees (e.g., Herzberg et al. 1959, Maslow 1943, McGregor 1960). A number of empirical studies provide evidence in support of this argument: firms that cater to stakeholders are better able to attract a higher-quality workforce (e.g., Albinger and Freeman 2000, Greening and Turban 2000, Turban and Greening 1996), foster employees' commitment to organizational values and practices, and retain talented employees (e.g., Huselid 1995, Sheridan 1992, Vogel 2005).

Employees' job satisfaction has important implications for a firm's ability to innovate. Scholars have long attributed creativity and engagement in innovative tasks to job satisfaction. In particular, workers who are satisfied with their jobs are more likely to adopt long-term horizons and generate novel, potentially valuable ideas for new products, services, and processes (Aiken and Hage 1971, Amabile et al. 1996, Oldham and Cummings 1996).[3] In line with this argument, stakeholder orientation is likely to foster employees' engagement with innovation. Accordingly, we expect stakeholder orientation to have a positive impact on employees' innovative productivity.

Hypothesis 2B. *An increase in a firm's stakeholder orientation leads to an increase in employees' innovative productivity.*

**2.1.3. Moderators.** We further expect that by implementing stakeholder-friendly policies, firms are able to generate positive attitudes among other stakeholders such as customers. Much like with employees, stakeholder-friendly initiatives can help attract and retain customers, as the latter develop positive attitudes, loyalty, and stronger brand recognition in response to stakeholder orientation (e.g., Brown and Dacin 1997, Fournier 1998, Kotler et al. 2012, Luo and Bhattacharya 2006, Sen and Bhattacharya 2001). Similarly, catering to stakeholders may enhance firm's reputation among customers, and other stakeholders alike (Porter and Kramer 2006, Williams and Barrett 2000).

Consumers may contribute to the positive impact of stakeholder orientation on innovation in at least three ways. First, positive attitudes among customers have been linked to greater demand for the firm's products and services (Lev et al. 2010). There is further evidence that rising demand leads to an increase in innovation (Schmookler 1962, 1966) because firms have a stronger incentive to work on an unsolved problem and invest vast resources into the development of expensive and uncertain R&D activities, if they know there is a market for the product.

Second, stakeholder orientation may encourage innovation by generating a buffer in which it is safer for the firm to experiment with novel ideas and technologies. Firms may be more willing to take on risks when experimenting with new, failure-prone technologies, if their customers are committed and loyal. For example, Apple's customer loyalty is believed to have facilitated the willingness to experiment with innovative but often risky technologies, given that "whenever Apple has problems with its products, its customers are incredibly forgiving and patient" (*Forbes* 2011a).

Third, stakeholder orientation may encourage customers to act as a key source of new ideas and valuable know-how. For example, the car manufacturer Audi initiated an online development project called "Virtual Lab," where customers and enthusiasts participate in an exchange of ideas in order to develop new products and processes. Similarly, Nike enthusiasts participate in the "NikeTalk" in order to generate new shoe designs incorporating customers' preferred features (Fueller et al. 2008). More generally, satisfied consumers are more motivated to engage in new product development and the improvement of existing ones, acting as an important determinant of the firm's ability to innovate (Bogers et al. 2010; Chatterji and Fabrizio 2014; Fueller et al. 2008; Sawhney et al. 2005; von Hippel 1976, 1978).

Overall, the above arguments imply that consumers may contribute to the positive impact of stakeholder orientation on innovation. Accordingly, we expect the effect of catering to nonfinancial stakeholders to be stronger in consumer-focused industries (i.e., industries in which goods and services are sold directly to individual customers).[4]

Hypothesis 2C. *The positive impact of firms' stakeholder orientation on innovation is amplified in consumer-focused industries.*

Finally, we expect stakeholder orientation to spark innovation by attending to the natural environment. For example, GE's green technology and sustainability initiative "Ecomagination" shows commitment to building innovative solutions for today's environmental challenge. Using the creativity of countless

[3] Recent anecdotal evidence further supports this argument. For example, Google engineers are encouraged to take 20% of their time to work on something company related that interests them personally. When describing this policy, a software engineer at Google noted "It sounds obvious, but people work better when they're involved in something they're passionate about, and many cool technologies have their origins in 20% time" (*New York Times* 2007).

[4] Relatedly, Lev et al. (2010) show that, in such industries, clients are more sensitive to the social engagement of companies.

startups and research centers around the world, GE encourages innovation for a smart grid, clean energy, as well as eco-friendly homes, buildings, and cars (*Forbes* 2011b, *GreenBiz* 2010). By addressing environmental challenges and improving their own environmental footprint, companies can appeal to various stakeholders.[5] In particular, environmentally friendly firms benefit from higher reputation and cleaner work environment, improving the satisfaction of employees and consumers (e.g., Bansal and Roth 2000, Hart 1995, Russo and Fouts 1997), which may further enhance innovation. Accordingly, we expect stakeholder orientation to have a stronger impact on innovation in industries engaged in less eco-friendly activities.

Hypothesis 2D. *The positive impact of firms' stakeholder orientation on innovation is amplified in industries engaged in less eco-friendly activities.*

### 2.2. Financial Performance

The previous arguments imply that stakeholder orientation has a positive impact on innovation—an outcome that is closely aligned with shareholders' interests. Naturally, this raises the question of what market imperfection prevents shareholder-oriented companies to become more stakeholder friendly and, as a result, more innovative.

On one hand, stakeholder orientation focuses on long-term horizons, rather than immediate payoffs (Kacperczyk 2009, Slawinski and Bansal 2012, Wang and Bansal 2012). Benefits from stakeholder orientation accrue in the long run as firms acquire intangible resources (e.g., Hart 1995; Jones 1995; Luo and Bhattacharya 2006; Porter and Kramer 2006, 2011; Russo and Fouts 1997; Sen and Bhattacharya 2001; Turban and Greening 1996) and develop their innovative capabilities.

Managers, on the other hand, are faced with tradeoffs between short- and long-term payoffs in their daily decision making (Flammer and Bansal 2015). Shareholders devise a series of mechanisms to keep managers on their toes—such mechanisms are valuable, as managers would otherwise enjoy the "quiet life" (Bertrand and Mullainathan 2003). Under shareholder primacy, the manager's decision is guided by the principle of shareholder value maximization, where shareholder value is measured by the daily stock price. Focusing on the short-term stock market performance pressures managers to deliver short-term results, leading them to favor projects that pay off in the short run (e.g., Stein 1988). This preference is further reinforced by myopic capital markets that tend to undervalue corporate investments in long-term projects (e.g., Froot et al. 1992, Hall and Hall 1993). Accordingly, shareholder pressure for short-term results may prevent managers from becoming more stakeholder friendly.

In sum, we posit that becoming more stakeholder friendly presents a temporal trade-off—stakeholder orientation boosts long-term financial performance, but does not yield immediate benefits. This motivates the following hypothesis:

Hypothesis 3. *An increase in a firm's stakeholder orientation leads to an increase in financial performance in the long run, but not in the short run.*

Given this temporal trade-off, shareholders' myopic behavior can lead to the paradoxical situation in which shareholder value maximization prevents managers from acting in shareholders' (long-term) best interest. Leading innovative companies have recognized this market imperfection and counter the negative influence of short-term pressure by employing specific measures. For example, Alibaba, Facebook, Google, and LinkedIn try to weaken shareholder pressure by introducing a dual stock structure, permitting their managers to focus on innovation and long-term financial performance (*Forbes* 2013; *New York Times* 2012b, 2013).[6] Relatedly, we argue that providing corporate leaders with a legal tool—such as constituency statutes—to shift their focus away from shareholder primacy toward all (i.e., nonfinancial and financial) stakeholders may enable companies to overcome this paradox and ultimately become more innovative.

## 3. Data and Methodology

### 3.1. Data and Variable Definitions

**3.1.1. Constituency Statutes.** Identifying the causal effect of stakeholder orientation on innovation is challenging because of potential endogeneity concerns. First, the relation between stakeholder orientation and innovation could be spurious if both are driven by a third, difficult-to-observe, variable. Moreover, a potential correlation between stakeholder orientation and innovation could be driven by reverse causation if higher innovation leads the firm to cater to nonfinancial stakeholders. Given those empirical challenges, estimating the effect of stakeholder orientation on innovation hinges on finding an empirical context in which variation in stakeholder orientation arises exogenously. The specific source of exogenous

[5] Anecdotal evidence further suggests that sustainability benefits the environment and other stakeholders alike. For example, in referring to eco-friendly business practices, the CEO of Seventh Generation said: "Sustainability is no longer optional. Companies that fail to adopt such practice will perish. They will not only lose on a cost basis, they will also suffer in recruiting employees as well as attracting consumers" (*Forbes* 2011c).

[6] With the exception of China-based Alibaba, all these companies are incorporated in California—a state without constituency statute.

variation we exploit in this paper is the enactment of state-level constituency statutes.

Constituency statutes are the statutory result of a longstanding academic debate over the corporations' purpose and legal obligation to society (e.g., Bainbridge 1992, Orts 1992). The debate originated in the 1930s, when scholars debated whether the corporation's responsibility is to serve its shareholders exclusively or to serve a broader social purpose (Berle 1931, Dodd 1932). This debate was revitalized with the development of stakeholder management theories in the 1980s (e.g., Freeman 1984). On one side, scholars argued for the primacy of shareholder interests. Corporate leaders were not permitted to consider stakeholders' interests because their fiduciary duties required them to act in accordance with shareholders' interests. Historically, this "shareholder primacy" view prevailed in court (e.g., Orts 1992).[7] As a result, companies refrained from diverting their attention away from shareholders in order to prevent the risk of potential lawsuits. Others argued that corporate actions affect not only shareholders, but also a variety of nonshareholding constituencies having legitimate interests in the corporation's actions. The proponents sought to change corporate law to reflect their belief that corporations are more than just investment vehicles for owners of financial capital (Bainbridge 1992).

Derived from the scholarly debates in the 1980s, constituency statutes provided corporate leaders with a legally enforceable mechanism—beyond case law and the business judgment rule—for considering stakeholder interests without breaching their fiduciary obligations to shareholders (Orts 1992, Stout 2012). The statutes' core principle is that a corporation should, or at least may, be run in the interests of more groups than just shareholders. Hence, under these statutes, a corporation's officers and directors are allowed to consider the interests of employees, customers, suppliers, the environment, the local community, and any other potentially affected constituency (e.g., Orts 1992). For example, the Pennsylvania statute reads as follows:

> In discharging the duties of their respective positions, the board of directors, committees of the board and individual directors of a domestic corporation may, in considering the best interests of the corporation, consider the effects of any action upon employees, upon suppliers and customers of the corporation and upon communities in which offices or other establishments of the corporation are located, and all other pertinent factors. (15 Pa. Cons. Stat. §516(a))

Though the language may be state specific, the core content of the legislation remains the same: constituency statutes emphasize the importance of considering the interests of nonfinancial stakeholders and hence pursuing interests that are not restricted to the bottom line. In fact, most statutes give corporate leaders permission to consider stakeholder interests in any circumstance, including any structural and operational decisions, or whenever corporate leaders wish to consider them. Although the statutes are only permissive in nature, they are legally enforceable and marked an important shift away from the one-dimensional shareholder primacy (Orts 1992, Stout 2012).[8]

By the year 2006, a total of 34 states in the United States had adopted constituency statutes. Table 1 lists all 34 states along with the enactment years (this list is adapted from Barzuza 2009, pp. 2040–2041).[9] We use the enactment of these constituency statutes as a quasi-natural experiment to examine the impact of a firm's stakeholder orientation on innovation. Because the introduction of the statutes does not reflect any firm's strategic decision, such statutes offer plausibly exogenous variation in a firm's orientation toward stakeholders.

**3.1.2. Data Sources and Sample Selection.** The data on innovation are obtained from the National Bureau of Economic Research (NBER) Patent Data Project database, which contains annual information on patent assignee names, the number of patents, the number of citations per patent, and the year of patent application. The NBER data are available from 1976 to 2006. We merge the NBER database with Standard & Poor's Compustat, which contains detailed accounting information as well as additional firm-level attributes (e.g., state of incorporation) for publicly traded companies. We exclude companies that are incorporated outside the United States. In addition, we only include firm-year observations for which the necessary accounting variables (e.g., book

[7] The seminal case embodying the shareholder primacy view is Dodge vs. Ford Motor Co., 170 N.W. 668 (Mich. 1919), in which the Michigan Supreme Court stated the following: "A business corporation is organized and carried on primarily for the profit of the shareholders. The powers of the directors are to be employed for that end. The discretion of directors is to be exercised in the choice of means to attain that end, and does not extend to a change in the end itself, to the reduction of profits, or to the nondistribution of profits among stockholders in order to devote them to other purposes."

[8] The enforceability of the statutes is reflected in business case law. For example, in the federal bankruptcy case, In re McCalla Interiors, Inc., 228 B.R. 657 (United States Bankruptcy Court, N.D. Ohio 1998), the court cited the Ohio constituency statute to defend the interests of employees and customers.

[9] For more details on the constituency statutes, as well as their institutional background, see the law review articles by Bainbridge (1992), Barzuza (2009), and Bisconti (2009). Also, note that Nebraska passed a constituency statute in 2007, but since our sample ends in 2006 (the last year in which patent data are available) the Nebraska statute is not considered in our analysis.

**Table 1 Constituency Statutes**

| State | Year |
|---|---|
| Ohio | 1984 |
| Illinois | 1985 |
| Maine | 1986 |
| Arizona | 1987 |
| Minnesota | 1987 |
| New Mexico | 1987 |
| New York | 1987 |
| Wisconsin | 1987 |
| Idaho | 1988 |
| Louisiana | 1988 |
| Tennessee | 1988 |
| Virginia | 1988 |
| Florida | 1989 |
| Georgia | 1989 |
| Hawaii | 1989 |
| Indiana | 1989 |
| Iowa | 1989 |
| Kentucky | 1989 |
| Massachusetts | 1989 |
| Missouri | 1989 |
| New Jersey | 1989 |
| Oregon | 1989 |
| Mississippi | 1990 |
| Pennsylvania | 1990 |
| Rhode Island | 1990 |
| South Dakota | 1990 |
| Wyoming | 1990 |
| Nevada | 1991 |
| North Carolina | 1993 |
| North Dakota | 1993 |
| Connecticut | 1997 |
| Vermont | 1998 |
| Maryland | 1999 |
| Texas | 2006 |

value of total assets) are not missing. The list of accounting variables used in this study is provided below. These selection criteria yield a sample of 159,558 firm-year observations.[10]

**3.1.3. Dependent Variables.** To measure innovation, we follow common practice in the innovation literature and construct two patent-based metrics (e.g., Hall et al. 2005, Seru 2014, Tian and Wang 2014). The first metric ("patents") is the patent count for each firm in each year. More precisely, this variable counts the number of patent applications filed in a year that are eventually granted. The relevant year is the application year (as opposed to the year in which the patent is granted) since it is very close to the actual innovation (see, e.g., Griliches et al. 1987, Hall et al. 2001). The number of patents is subject to a truncation problem, because patents appear in the NBER database only after they are granted, and the lag between patent applications and patent grants is about two years on average. Accordingly, as we approach the last few years of the sample (i.e., 2005 and 2006), the number of patent applications that are eventually granted decreases because many patent applications filed during these years were still under review and had not been granted by 2006. To correct for this truncation problem, a common approach (e.g., Hall et al. 2001, 2005) is to divide the patent count by the total number of patent applications in the same year or, equivalently, to include year fixed effects in the regressions. We follow the latter approach throughout this paper.

The second metric is a measure of innovation quality. Griliches et al. (1987) show that the distribution of patents' value is extremely skewed, with most of the value being concentrated in a small number of very important and highly cited patents. Accordingly, to measure patents' quality, we compute the number of citations in subsequent years divided by the number of patents for any given firm and year ("citations"). This second metric is again subject to a truncation problem. By construction, a 2005 patent will receive fewer citations than a 1990 patent (all else being equal) because we only observe citations received up to 2006. To account for this truncation problem, we multiply the number of citations by the adjustment factor of Hall et al. (2001), provided in the NBER database.[11]

In auxiliary analysis, we use the measures of generality and originality constructed by Hall et al. (2001). Generality is defined as one minus the Herfindahl-Hirschman index of citations that the patent receives over patent classes. The idea is that if citations to a patent are spread over a larger number of technology classes, the cited patent is to be regarded as more "general," in that it presumably spilled over a broader range of fields (see Hall et al. 2001). Originality is defined similarly, but with respect to citations given to other patents. To obtain firm-level measures of generality and originality, we compute the average across all patents for any given firm and year.

We further construct a measure of hits and flops. Following Azoulay et al. (2011), we code a patent as being a hit (flop) if the number of citations it receives is above (below) the highest (lowest) citation quartile across all patents in the same technology class (using

[10] The constituency statutes also apply to private firms. Accordingly, one potential extension of our analysis would be to contrast the effect of constituency statutes for public versus private firms. Constituency statutes may matter less for private firms—e.g., because their shareholders are more likely to be friends and family. Unfortunately, such analysis is difficult to conduct since comprehensive data on private firms (e.g., their state of incorporation) are not readily available.

[11] This adjustment factor is obtained by estimating the shape of the citation-lag distribution across time periods and technological classes. See Hall et al. (2001) for details.

all patents in the NBER database). To obtain a firm-level measure of hits and flops, we divide the number of hits and flops by the number of patents for any given firm and year.

Finally, we construct two measures of innovative productivity, which are obtained by dividing the number of patents and citations, respectively, by the number of employees (from Compustat).

**3.1.4. Independent Variables.** In our baseline regressions (see §3.2), we control for a vector of firm-level characteristics that may affect innovation. All control variables are obtained from Compustat. Specifically, we control for size, age, return on assets (ROA), market-to-book ratio, cash holdings, leverage, and R&D (research and development) expenditures. Size is the natural logarithm of one plus the book value of total assets. Age is the natural logarithm of one plus the number of years since the company was first covered by Compustat. ROA is the ratio of operating income before depreciation to the book value of total assets. The market-to-book ratio is the ratio of the market value of total assets (obtained as the book value of total assets plus the market value of common stock minus the sum of the book value of common stock and balance sheet deferred taxes) to the book value of total assets. Cash holdings is the ratio of cash and short-term investments to the book value of total assets. The leverage ratio is the sum of long-term debt and debt in current liabilities divided by the book value of total assets. R&D is the ratio of R&D expenses to the book value of total assets. A well-known issue with Compustat is that R&D is missing for many companies. To avoid losing observations, we follow common practice in the literature and set the missing values equal to zero. We then include as additional control a dummy variable ("R&D dummy") that indicates whether R&D is zero (see, e.g., Hall et al. 2005).

In auxiliary analysis, we further examine whether the effect of stakeholder orientation on innovation differs depending on industry characteristics. To distinguish between the business-to-consumer (B2C) and business-to-business/government (B2B/G) sectors, we use the partition of (Lev et al. 2010, p. 188) based on four-digit Standard Industrial Classification (SIC) codes. We refer to B2C industries as "consumer-oriented industries." Finally, the U.S. Environmental Protection Agency (EPA) identifies seven industry sectors that account for 92% of all disposal and other releases of TRI (toxic release inventory) chemicals (EPA 2013, p. 17).[12] We refer to companies in these sectors as operating in "less eco-friendly industries."

## 3.2. Methodology

**3.2.1. Difference in Differences.** To examine whether an increase in a firm's orientation toward stakeholders fosters innovation, we use a difference-in-differences methodology based on the enactment of the 34 constituency statutes listed in Table 1 ("treatments"). We very closely follow the Bertrand and Mullainathan (2003) application of the difference-in-differences methodology in the presence of staggered treatments at the state level. Specifically, we estimate the following regression:

$$y_{ilst} = \alpha_i + \alpha_t + \alpha_l \times \alpha_t + \beta \times \mathit{ConstituencyStatute}_{st} + \boldsymbol{\gamma}'\mathbf{X}_{ilst} + \varepsilon_{ilst}, \tag{1}$$

where $i$ indexes firms; $t$ indexes years; $l$ indexes states of location; $s$ indexes states of incorporation; $\alpha_i$, $\alpha_t$ and $\alpha_l \times \alpha_t$ are firm, year, and state (of location) times year fixed effects, respectively. The dependent variable of interest is $y$, which is either $\log(1 + \text{patents})$ or $\log(1 + \text{citations}/\text{patents})$. We set citations/patents to zero if the company has no patent (see, e.g., Atanassov 2013).[13] *Constituency Statute* is the "treatment dummy"—i.e., a dummy variable that equals one if the company is incorporated in a state that has passed a constituency statute by year $t$.[14] $\mathbf{X}$ is the vector of control variables, which includes size, age, ROA, market to book, cash, leverage, R&D, and the R&D dummy. All control variables are lagged by one year. $\varepsilon$ is the error term. The regression is estimated by ordinary least squares (OLS). To account for serial correlation of the error term, we cluster standard errors at the state of incorporation level. The coefficient of interest is $\beta$, which measures the effect of the constituency statutes on innovation.[15] Hypothesis 1 predicts that $\beta$ should be positive and significant.

Our identification strategy can be illustrated with an example. Assume we want to measure the effect

[12] The seven high-polluting sectors are metal mining (NAICS 212), electric utilities (2211), chemicals (325), primary metals (331), paper (322), food, beverages, and tobacco (311 and 312), and hazardous waste management (5622 and 5629). We use the North American Industrial Classification (NAICS)-SIC bridge of the U.S. Census Bureau to match these sectors to four-digit SIC codes.

[13] In robustness checks, we show that we obtain similar results if we exclude companies with zero patents (see §4.5).

[14] The state of incorporation is a legal concept that determines which constituency statute, if any, applies to a given company (the state of incorporation does not need to coincide with the state of location of the company's headquarters). We obtain information on states of incorporation from Compustat. A caveat is that Compustat only reports the state of incorporation for the latest available year. Nevertheless, this caveat is unlikely to matter for our results. Anecdotal evidence suggests that changes in states of incorporation are very rare (e.g., Romano 1993). Along similar lines, Cheng et al. (2004) report that none of the 587 Forbes 500 firms in their panel had changed their state of incorporation during their sample period from 1984 to 1991.

[15] Because of the logarithmic specification of the dependent variable, $\beta$ measures the percentage change in innovation.

of Georgia's 1989 constituency statute on the number of patents. We would subtract the number of patents after 1989 from the number of patents before 1989 for Georgia-incorporated firms ("treated firms"). However, other events may have happened around 1989, exerting a potential influence on innovation. For example, there may have been an economy-wide boom that translates into higher profits and hence more resources available to develop patents after 1989. To account for such contemporaneous effect, we use a control group. For example, we could look at Alabama-incorporated firms ("control firms") and compute the corresponding difference in patents before and after 1989 (no constituency statute was passed in Alabama). By computing the difference between these two differences, we then obtain an estimate of Georgia's 1989 constituency statute on innovation controlling for contemporaneous changes in innovation that are due to changes in economic conditions. An important difference between this example and the regression specification is that the latter accounts for the fact that the introduction of the constituency statutes is staggered over time. Accordingly, the composition of both the treatment and control groups changes over time as more states are progressively treated.

An appealing feature of specification (1) is the inclusion of state (of location) by year fixed effects ($\alpha_l \times \alpha_t$). We are able to include them because of the lack of congruence between states of location and states of incorporation (for details, see Bertrand and Mullainathan 2003). These fixed effects tighten our identification since they account for any local shock (e.g., changes in local economic conditions) that may affect innovation and, at the same time, coincide with the treatment.

### 3.3. Validity of the Identification Strategy

To be valid, our identification strategy needs to satisfy two requirements—the inclusion and exclusion restrictions. First, the treatments (i.e., the enactment of constituency statutes) need to trigger *relevant* changes in corporate behavior. Second, the treatments need to be *exogenous* with respect to innovation. In the following, we discuss both requirements.

**3.3.1. Inclusion Restriction.** Although constituency statutes are legally enforceable, this characteristic alone does not guarantee that they lead to an actual change in corporate behavior. To satisfy the inclusion restriction, constituency statutes need to lead to relevant changes in companies' stakeholder orientation.

Prior work by Luoma and Goodstein (1999) suggests that they do. Specifically, the authors show that companies incorporated in states that have enacted constituency statutes increased stakeholder representation on their board of directors.

To obtain additional evidence, we examine whether the enactment of stakeholder-friendly legislation leads to an increase in the number of stakeholder-friendly provisions at the firm level. To do so, we construct a firm-level measure of stakeholder orientation using the Kinder, Lydenberg, and Domini (KLD) database. This database contains social ratings of companies along several dimensions that reflect how well they cater to, e.g., the community, the natural environment, employees, diversity, human rights, product quality, as well as whether firms' operations are related to alcohol, gambling, firearms, nuclear power, and military contracting. For each dimension, strengths and concerns are measured to evaluate positive and negative aspects of corporate actions toward stakeholders. Since the KLD data start in 1991, the sample period considered for this analysis is from 1991 to 2006. To account for stakeholder orientation, we focus on firms' attention to employees, customers, the natural environment, and society at large (community and minorities). We then construct a composite KLD-index by summing up all strengths along these dimensions.[16]

To examine whether the enactment of constituency statutes leads to an increase in the KLD-index, we estimate specification (1) using the KLD-index as dependent variable. The results are provided in column (1) of Online Appendix Table I (online appendix available as supplemental material at http://dx.doi.org/10.1287/mnsc.2015.2229). As is shown, the coefficient on the treatment dummy is positive and significant. Since the average KLD-index is 1.37 (see Table 2 in §4), the estimate of 0.253 implies that stakeholder orientation increases by 18% following the treatment. This finding indicates that the enactment of constituency statutes brings about a substantial increase in stakeholder orientation.[17]

[16] In addition to strengths, the KLD database also contains a list of weaknesses, labeled as "concerns." Accordingly, an alternative approach is to construct a "net" KLD-index by subtracting the concerns from the strengths. However, recent research suggests that this approach is methodologically questionable. Because KLD strengths and concerns lack convergent validity, using them in conjunction fails to provide a valid measure of stakeholder orientation (e.g., Kacperczyk 2009, Mattingly and Berman 2006). For this reason, our analysis relies on the composite index of KLD strengths.

[17] As can be seen from Table 1, only six states passed a constituency statute after 1991. Accordingly, a caveat of this analysis is that it relies on a small number of treatments. Mindful of this caveat, we can build on this analysis to conduct an instrumental variable (IV) estimation. The regression in column (1) of Online Appendix Table I is the first stage in which we instrument the KLD-index with the treatment. In the second stage, provided in columns (2) and (3), we find that the (instrumented) KLD-index leads to a significant increase in innovation. In columns (4) and (5), we further report the OLS regressions (i.e., the regressions using the noninstrumented KLD-index). As is shown, the OLS coefficients are smaller than the IV coefficients. Accordingly, not accounting for the potential endogeneity of the KLD-index may lead to an understatement of the effect of the KLD-index on innovation.

**3.3.2. Exclusion Restriction.** Our identification strategy relies on the assumption that the enactment of constituency statutes is exogenous with respect to innovation. In the following, we discuss potential identification concerns and describe how our difference-in-differences specification helps address them.

*Lobbying.* A potential concern is that constituency statutes reflect a firm's choice, because firms may lobby for the enactment of constituency statutes. In particular, if firms that are characterized by high innovative output tend to be successful at lobbying for constituency statutes (e.g., as a way to reward their employees), then our results would be driven by reverse causation. To rule out this concern, we first search for qualitative evidence that would be suggestive of this possibility. Specifically, we search the *Lexis-Nexis* database for press releases indicating that innovative firms actively lobbied for the constituency statutes. Not surprisingly, we find no such evidence. Although the absence of qualitative evidence helps mitigate reverse causality concerns, it does not provide rigorous empirical evidence. Therefore, we perform additional empirical analyses to further examine the potential (reverse) effect of innovation on the constituency statutes. Specifically, we examine the dynamics of the treatment effect. If our results are driven by reverse causation, the constituency statutes should have a positive and significant "effect" already before they had been enacted. Nevertheless, when we look at the dynamic effect of the treatment, we find no evidence for such preexisting trends (see §4.2).

*Political Economy of the Constituency Statutes.* A related concern is that changes in local economic conditions may be driving both the introduction of constituency statutes *and* increases in innovation. For example, suppose a state's economy is booming. Politicians may seize this opportunity to introduce a constituency statute (e.g., because companies are less likely to oppose regulations in good times). At the same time, the favorable economic conditions may be conducive to innovation.

Nevertheless, this concern is minimized for two reasons. First, as discussed in the methodology section, the lack of congruence between states of location and states of incorporation allows us to include state (of location) by year fixed effects in all regressions. These fixed effects account for any state trend that may confound our results. Second, in robustness checks, we show that we obtain similar results if we use a matching approach (see §4.5). Specifically, we match each treated firm to a control firm on the basis of several observable characteristics, and further require that each control firm be located in the *same* state as the treated firm (while being incorporated in a different state). Thus, by construction, treated and matched control firms face virtually identical local economic conditions.

*Unobserved Differences Between Treated and Control Firms.* Another potential concern is that treated and control firms may differ along *unobservable* characteristics that may affect both innovation and the treatment. Nevertheless, this concern is unlikely to explain our results, for the following reasons.

First, as discussed above, we find no evidence of preexisting trends. This implies that treated and control firms are on similar trends prior to the treatment. Second, because of the staggered introduction of the constituency statutes, the eventually treated firms are first in the control group, and only later in the treatment group (i.e., once they have been treated). Accordingly, we can reestimate our difference-in-differences specification using *only* the eventually treated firms—in this case, the control group consists exclusively of firms that are eventually treated (for a similar test, see Bertrand and Mullainathan 2003). When we do so, we find that our results are robust (see §4.5).

*Other Laws.* Finally, the enactment of constituency statutes may coincide with the enactment of other state-level legislations that may also affect innovation. In this case, our results could be spurious, merely capturing the effect of other laws. In particular, our sample period witnessed the enactment of state-level antitakeover laws (e.g., Atanassov 2013, Sapra et al. 2014) and bank deregulation laws (e.g., Amore et al. 2013, Chava et al. 2013), which have been shown to affect innovation. Although it is unclear how such contemporaneous laws would bias our results—for example, the Atanassov (2013) findings point toward a *negative* relationship between antitakeover laws and innovation—we show in robustness checks that our results are unchanged if we exclude the confounded states from our analysis (see §4.5).

## 4. Results

### 4.1. Summary Statistics

Table 2 provides descriptive statistics for the variables used in this paper, as well as the corresponding correlation matrix. The first two rows contain the main dependent variables—i.e., $\log(1+\text{patents})$ and $\log(1+\text{citations}/\text{patents})$.[18] As shown, there is a large positive correlation between the two, suggesting that firms that generate more patents also receive more citations per patent. Interestingly, the correlation between the KLD-index and both measures of innovation is positive (the correlation with the number of

[18] The average number of patents per firm is 3.9, and the average number of citations per patent is 60.9.

**Table 2 Descriptive Statistics and Correlation Matrix**

| Variable | Mean | Median | SD | Min | Max | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 *Patents* (log) | 0.32 | 0.00 | 0.87 | 0.00 | 8.38 | | | | | | | | | | | | | | | | | | |
| 2 *Citations* (log) | 0.40 | 0.00 | 0.98 | 0.00 | 5.84 | 0.75 | | | | | | | | | | | | | | | | | |
| 3 *Size* (log) | 4.58 | 4.52 | 2.47 | −6.91 | 14.22 | 0.26 | 0.13 | | | | | | | | | | | | | | | | |
| 4 *Age* (log) | 2.46 | 2.48 | 0.77 | 0.69 | 4.04 | 0.21 | 0.12 | 0.41 | | | | | | | | | | | | | | | |
| 5 *Tobin's Q* | 2.33 | 1.25 | 3.75 | 0.52 | 30.11 | 0.00 | 0.01 | −0.39 | −0.18 | | | | | | | | | | | | | | |
| 6 *Return on assets* | 0.04 | 0.09 | 0.20 | −0.55 | 0.28 | 0.11 | 0.09 | 0.43 | 0.25 | −0.42 | | | | | | | | | | | | | |
| 7 *Leverage* | 0.26 | 0.20 | 0.28 | 0.00 | 1.89 | −0.07 | −0.09 | −0.08 | 0.04 | 0.20 | −0.15 | | | | | | | | | | | | |
| 8 *Cash holdings* | 0.16 | 0.07 | 0.21 | 0.00 | 0.92 | 0.03 | 0.06 | −0.27 | −0.23 | 0.28 | −0.32 | −0.28 | | | | | | | | | | | |
| 9 *R&D* | 0.04 | 0.00 | 0.10 | 0.00 | 0.68 | 0.12 | 0.14 | −0.27 | −0.14 | 0.35 | −0.48 | −0.02 | 0.37 | | | | | | | | | | |
| 10 *Patents/emp.* (log) | 0.29 | 0.00 | 0.80 | 0.00 | 8.29 | 0.63 | 0.67 | −0.03 | −0.03 | 0.11 | −0.11 | −0.11 | 0.24 | 0.31 | | | | | | | | | |
| 11 *Citations/emp.* (log) | 0.38 | 0.00 | 1.13 | 0.00 | 10.54 | 0.41 | 0.80 | −0.08 | −0.07 | 0.08 | −0.07 | −0.10 | 0.19 | 0.24 | 0.82 | | | | | | | | |
| 12 *Hits and flops* | 0.07 | 0.00 | 0.22 | 0.00 | 1.00 | 0.59 | 0.78 | 0.10 | 0.10 | 0.00 | 0.06 | −0.07 | 0.06 | 0.12 | 0.55 | 0.63 | | | | | | | |
| 13 *Originality* | 0.09 | 0.00 | 0.23 | 0.00 | 1.00 | 0.70 | 0.75 | 0.15 | 0.15 | 0.01 | 0.05 | −0.08 | 0.08 | 0.16 | 0.66 | 0.59 | 0.61 | | | | | | |
| 14 *Generality* | 0.08 | 0.00 | 0.22 | 0.00 | 1.00 | 0.69 | 0.85 | 0.13 | 0.15 | −0.01 | 0.09 | −0.07 | 0.02 | 0.10 | 0.59 | 0.65 | 0.64 | 0.74 | | | | | |
| 15 *KLD-index* | 1.37 | 1.00 | 1.93 | 0.00 | 19.00 | 0.28 | 0.18 | 0.45 | 0.27 | 0.03 | 0.12 | 0.06 | −0.08 | −0.01 | 0.13 | 0.03 | 0.15 | 0.18 | 0.19 | | | | |
| 16 *G-index* | 9.08 | 9.00 | 2.75 | 1.00 | 18.00 | 0.07 | 0.05 | 0.15 | 0.30 | −0.10 | 0.03 | 0.05 | −0.19 | −0.09 | −0.05 | −0.07 | 0.03 | 0.08 | 0.07 | 0.02 | | | |
| 17 *Institutional ownership* | 0.33 | 0.27 | 0.28 | 0.00 | 1.00 | 0.24 | 0.15 | 0.55 | 0.26 | −0.04 | 0.27 | −0.05 | 0.00 | −0.04 | 0.05 | −0.01 | 0.10 | 0.18 | 0.12 | −0.02 | 0.07 | | |
| 18 *High pollution industry* | 0.16 | 0.00 | 0.36 | 0.00 | 1.00 | 0.10 | 0.06 | 0.07 | 0.14 | 0.04 | −0.04 | 0.03 | 0.05 | 0.12 | 0.09 | 0.04 | 0.07 | 0.10 | 0.08 | 0.09 | 0.04 | 0.05 | |
| 19 *B2C industry* | 0.54 | 1.00 | 0.50 | 0.00 | 1.00 | −0.11 | −0.13 | 0.07 | −0.08 | −0.03 | −0.01 | −0.01 | −0.02 | −0.09 | −0.08 | −0.09 | −0.10 | −0.10 | −0.10 | 0.01 | −0.01 | −0.06 | −0.04 |

patents is 28%, and the correlation with the number of citations per patent is 18%). These correlations are suggestive of Hypothesis 1, according to which stakeholder orientation fosters innovation. In columns (4) and (5) of Online Appendix Table I, we further document that these correlations are robust to the inclusion of the various controls and fixed effects used in our baseline specification.

### 4.2. Main Results

The main results are presented in Table 3. All regressions are variants of the difference-in-differences specification in Equation (1). In columns (1) to (3), the dependent variable is log(1 + patents)—referred to as *Patents* in the table. The specification in column (1) includes the treatment dummy (*Constituency Statute*), year, firm, and state (of location) by year fixed effects. In column (2), we further include control variables.[19] As shown, the coefficient on the constituency statute dummy is remarkably stable across both specifications. It lies between 0.064 and 0.068, which implies that the number of patents increases by 6.4% to 6.8% following the enactment of constituency statutes. In columns (4) and (5), we repeat the same analysis using as dependent variable log(1 + citations/patents)—referred to as *Citations* in the table. The results mirror those we obtain for the number of patents. Specifically, we find that the number of citations per patent increases by 6.3% to 6.9%. These findings are in line with Hypothesis 1, indicating that stakeholder orientation leads to an increase in innovation.

In columns (3) and (6), we assess the dynamics of the treatment effect. To do so, we replace the treatment dummy with a set of nine dummy variables indicating the four years prior to the treatment (*Constituency Statute* (−4), *Constituency Statute* (−3), *Constituency Statute* (−2), and *Constituency Statute* (−1)); the year of the treatment (*Constituency Statute* (0)); the first, second, and third year after the treatment (*Constituency Statute* (1), *Constituency Statute* (2), and *Constituency Statute* (3), respectively); and four or more years after the treatment (*Constituency Statute* (4+)). As shown, for both measures of innovation, the coefficients of all pretreatment dummies are small and insignificant. This finding is reassuring, because it shows that there is no preexisting trend in the data. Interestingly, we find no effect in the year of the treatment either—the coefficient of *Constituency Statute* (0) is insignificant. In fact, as shown by the positive and statistically significant coefficient of *Constituency Statute* (1), it is only one year after the enactment year that the effect becomes large and significant.

[19] The coefficients of the control variables are reported in Online Appendix Table II.

**Table 3 The Impact of Stakeholder Orientation on Innovation**

| Dependent variable: | *Patents* | | | *Citations* | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *Constituency Statute* | 0.064*** | 0.068*** | | 0.063*** | 0.069*** | |
| | (0.021) | (0.023) | | (0.016) | (0.016) | |
| *Constituency Statute* (−4) | | | −0.012 | | | 0.012 |
| | | | (0.010) | | | (0.014) |
| *Constituency Statute* (−3) | | | −0.006 | | | −0.002 |
| | | | (0.011) | | | (0.018) |
| *Constituency Statute* (−2) | | | −0.018 | | | −0.001 |
| | | | (0.017) | | | (0.018) |
| *Constituency Statute* (−1) | | | −0.004 | | | 0.005 |
| | | | (0.019) | | | (0.019) |
| *Constituency Statute* (0) | | | 0.015 | | | 0.032 |
| | | | (0.023) | | | (0.022) |
| *Constituency Statute* (1) | | | 0.060** | | | 0.062** |
| | | | (0.030) | | | (0.026) |
| *Constituency Statute* (2) | | | 0.060** | | | 0.070** |
| | | | (0.026) | | | (0.030) |
| *Constituency Statute* (3) | | | 0.076*** | | | 0.073*** |
| | | | (0.027) | | | (0.028) |
| *Constituency Statute* (4+) | | | 0.080*** | | | 0.079*** |
| | | | (0.029) | | | (0.022) |
| Control variables | No | Yes | Yes | No | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| State × Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 159,558 | 159,558 | 159,558 | 159,558 | 159,558 | 159,558 |
| $R$-squared | 0.77 | 0.78 | 0.78 | 0.60 | 0.60 | 0.60 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

This suggests that it takes about 12 to 24 months for the increase in stakeholder orientation to translate into higher innovative output, which is consistent with the innovation lag found in previous studies (e.g., Acharya et al. 2014, Amore et al. 2013, Pakes and Schankerman 1984). Finally, the coefficients of *Constituency Statute* (2), *Constituency Statute* (3), and *Constituency Statute* (4+) remain large and significant, which indicates that stakeholder orientation has a long-lasting effect on innovation.

In Figures 1 and 2, we illustrate the dynamics of the treatment effect by plotting the evolution of *Patents* and *Citations* in the treatment (solid line) and control group (dashed line) four years before and after the treatment. As can be seen, innovation is trending upward in both the control and treatment groups. This underscores the importance of using a control group—not accounting for changes in innovation at the control group would overstate the effect of constituency statutes on innovation, because it would capture some of the time trend. Overall, the patterns in both figures mirror the patterns in columns (3) and (6) of Table 3. In particular, there is no preexisting trend, the effect comes with a lag of 12 to 24 months, and it is somewhat persistent in the longer run.

**Figure 1 Evolution of Patents in Control and Treatment Groups**

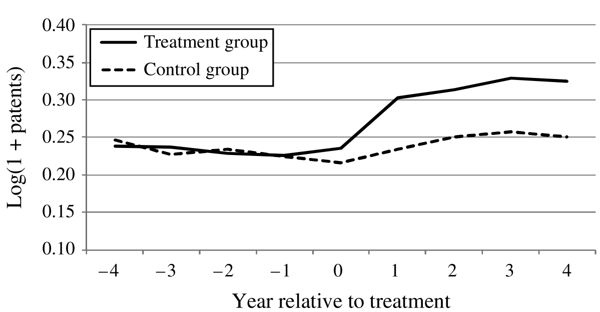


**Figure 2 Evolution of Citations in Control and Treatment Groups**

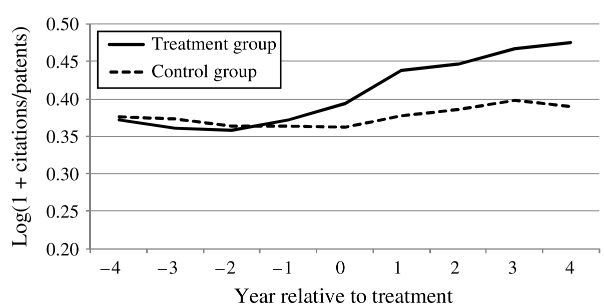

**Table 4 Auxiliary Analysis**

| | Hits and flops | | | | | | | B2C vs. B2B/G | | High vs. low pollution | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | *Hits and flops* | *Hits* | *Flops* | *Originality* | *Generality* | *Patents/emp.* | *Citations/emp.* | *Patents* | *Citations* | *Patents* | *Citations* |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| *Constituency Statute* | 0.036*** (0.009) | 0.025** (0.009) | 0.010 (0.008) | 0.026** (0.011) | 0.008 (0.006) | 0.022** (0.010) | 0.034** (0.016) | 0.046** (0.023) | 0.043** (0.018) | 0.057** (0.027) | 0.055*** (0.019) |
| *Constituency Statute × B2C industries* | | | | | | | | 0.045* (0.026) | 0.049** (0.024) | | |
| *Constituency Statute × High pollution* | | | | | | | | | | 0.061* (0.037) | 0.064** (0.031) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State × Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 24,663 | 24,663 | 24,663 | 24,663 | 24,663 | 148,037 | 148,037 | 159,558 | 159,558 | 159,558 | 159,558 |
| $R$-squared | 0.38 | 0.49 | 0.42 | 0.44 | 0.46 | 0.60 | 0.51 | 0.78 | 0.60 | 0.78 | 0.60 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006 (except in columns (1)–(5) where it is from 1976 to 2001).
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

### 4.3. Auxiliary Results

To the extent that stakeholder orientation leads to more experimentation, we expect to see more tail innovations (i.e., more hits and flops), more original innovations, and more general innovations following the enactment of constituency statutes. To examine whether this is the case, we reestimate our baseline specification using the metrics of hits and flops, originality, and generality as dependent variables. Since these measures are only defined for companies with nonzero patents, the relevant sample is smaller compared to our baseline sample. Moreover, since these measures require comprehensive citation data—and given the truncation of citation counts in the later years of the NBER database—we further restrict the sample to the years prior to 2002 (see Hall 2005). As is shown in column (1) of Table 4, the number of hits and flops increases significantly following the treatment. In columns (2) and (3), we further observe that the occurrence of *both* hits and flops increases after the treatment, although the effect is only significant for the number of hits.[20] In columns (4) and (5), we turn to the measures of originality and generality. As can be seen in column (4), we document a significant increase in originality. Similarly, in column (5), we observe an increase in generality, albeit not significant. Overall, these results are consistent with the experimentation argument formulated in Hypothesis 2A.

In columns (6) and (7), we further examine whether the enactment of constituency statutes leads to an increase in employees' innovative productivity. As can be seen, we find that both productivity measures—the number of patents per employee and the number of citations per employee, respectively—increase significantly after the treatment. These findings lend support to Hypothesis 2B.[21]

Next, we examine whether the positive effect of stakeholder orientation on innovation is stronger in consumer-focused industries. We do so in columns (8) and (9) by including an interaction term between the treatment dummy and a dummy variable indicating whether the company operates in the B2C sector. In line with Hypothesis 2C, we find that the treatment effect is significantly larger for companies in the B2C sector.

Finally, in columns (10) and (11), we examine whether the positive effect of stakeholder orientation on innovation is stronger for companies operating in high-polluting industries. To conduct this test, we include an interaction term between the constituency statute dummy and a dummy variable indicating whether the company operates in a high-polluting

[20] As discussed in §3.1, we code a patent as being a hit (flop) if the number of citations it receives is above (below) the highest (lowest) citation quartile across all patents in the same technology class (see Azoulay et al. 2011). In Online Appendix Table III, we show that our results are robust to using alternative cutoffs. Specifically, in column (1), we use the 10th and 90th percentiles in lieu of quartile cutoffs. In column (3), we use the 1st and 99th percentiles. In columns (2) and (4), we report variants of columns (1) and (3), coding as flops patents with zero citations. Finally, in column (5), we show that we obtain similar results if instead of OLS we use a Poisson regression (using the count of hits and flops as dependent variable).

[21] One potential concern with this analysis is that the number of employees may decrease after the treatment, which would bias our results toward finding a positive effect. In Online Appendix Table IV, we reestimate our baseline specification using log(employees) as dependent variable and find that the treatment has no significant effect on employment. Moreover, the coefficient is positive, which goes in the opposite direction.

industry.[22] Consistent with Hypothesis 2D, we find that the treatment effect is significantly larger for firms operating in high-polluting industries.[23]

### 4.4. Firm Performance

The results presented so far indicate that stakeholder orientation has a positive impact on innovation—an activity that is often considered value enhancing (e.g., Hall et al. 2005) and hence in shareholders' best interests. Accordingly, a natural question is why companies do not implement stakeholder-friendly policies on their own, i.e., even absent a constituency statute?

In the theory section, we argued that becoming stakeholder friendly presents an inherent temporal trade-off—it may benefit companies in the long run, but not in the short run. As a result, short-term market pressure may prevent companies from becoming more stakeholder oriented in the first place. To examine this hypothesis, we reestimate our baseline specification using measures of financial performance as dependent variables. The results are presented in Table 5.

In columns (1) and (2), the dependent variable is ROA. As can be seen in column (1), we observe a positive (albeit insignificant) increase in ROA following the enactment of constituency statutes. In column (2), we examine the dynamics of the effect. We find that ROA decreases slightly in the short run, but increases after three to four years. This increase is only marginally significant, though. Accordingly, although this pattern is suggestive of the temporal trade-off faced by managers in becoming more stakeholder oriented (Hypothesis 3), it remains somewhat inconclusive.

In columns (3) and (4), we repeat the previous analysis using Tobin's Q as a dependent variable. The overall pattern is similar, except that Tobin's Q does not decrease in the short run. Unlike ROA—which measures realized operating performance—Tobin's Q is a forward-looking measure (i.e., it accounts for all future cash flows of the company). Accordingly, the small economic magnitude of the short-run coefficients suggests that shareholders do not fully realize the future gains from stakeholder orientation. This is in line with prior research showing that the stock market tends to undervalue corporate investments in long-term projects such as innovation (e.g., Froot et al. 1992, Hall and Hall 1993).

To further shed light on this temporal trade-off, we assess the moderating role of shareholders' temporal orientation. Not all shareholders have a short-term horizon. In particular, it is often argued that institutional investors have a longer horizon.[24] Consistent with this argument, Aghion et al. (2013) and Bushee (1998) document a positive relationship between institutional ownership and innovation. To the extent that

**Table 5 Financial Performance**

| Dependent variable: | ROA | | Tobin's Q | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Constituency Statute* | 0.003 (0.002) | | 0.059* (0.034) | |
| *Constituency Statute* (−4) | | 0.001 (0.005) | | 0.013 (0.040) |
| *Constituency Statute* (−3) | | −0.002 (0.006) | | 0.011 (0.041) |
| *Constituency Statute* (−2) | | 0.003 (0.007) | | 0.029 (0.057) |
| *Constituency Statute* (−1) | | 0.002 (0.006) | | 0.010 (0.071) |
| *Constituency Statute* (0) | | −0.001 (0.007) | | 0.009 (0.070) |
| *Constituency Statute* (1) | | −0.005 (0.005) | | 0.010 (0.061) |
| *Constituency Statute* (2) | | 0.003 (0.005) | | 0.064 (0.060) |
| *Constituency Statute* (3) | | 0.007 (0.005) | | 0.097* (0.051) |
| *Constituency Statute* (4+) | | 0.008* (0.005) | | 0.093* (0.050) |
| Control variables | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| State × Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 159,558 | 159,558 | 159,558 | 159,558 |
| $R$-squared | 0.79 | 0.79 | 0.71 | 0.71 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

[22] The analysis of Hypotheses 2C and 2D in columns (8)–(11) is conducted by interacting the treatment dummy with cross-sectional characteristics (B2C industries and high-polluting industries, respectively). A caveat of this approach is that we do not have exogenous variation in the cross-sectional characteristics of interest, i.e., they may correlate with other variables. Accordingly, albeit informative, these results are merely suggestive and do not necessarily warrant a causal interpretation.

[23] In column (8), the coefficient of *Constituency Statute* measures the effect of the constituency statutes for companies outside of the B2C sector. The coefficient of *Constituency Statute* × *B2C industries* then measures the additional effect for companies in the B2C sector. Accordingly, the effect of the constituency statutes for companies in the B2C sector is given by the sum of the two coefficients, i.e., $0.046 + 0.045 = 0.091$. The $F$-test for the significance of this sum yields a $p$-value of 0.009, i.e., this effect is significant at the 1% level. Similarly, in column (9), the sum of the two coefficients is 0.092 ($p$-value $= 0.000$). Lastly, in columns (10) and (11), the effect of the constituency statutes for companies in high pollution industries is 0.118 ($p$-value $= 0.003$) and 0.119 ($p$-value $= 0.004$), respectively.

[24] Institutional investors are less focused on short-term financial performance as they are better informed and hence better able to infer the company's long-term fundamental value (e.g., Aghion et al. 2013, Bushee 1998).

**Table 6 Institutional Ownership**

| Dependent variable: | *Patents* | | *Citations* | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Constituency Statute* | 0.066*** | 0.094*** | 0.074*** | 0.098*** |
| | (0.023) | (0.028) | (0.024) | (0.026) |
| *Constituency Statute* × *High institutional ownership* | | −0.061** | | −0.049** |
| | | (0.029) | | (0.025) |
| Control variables | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| State × Year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 88,898 | 88,898 | 88,898 | 88,898 |
| $R$-squared | 0.80 | 0.80 | 0.63 | 0.63 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

companies with higher institutional ownership face less short-term pressure (already prior to the enactment of constituency statutes), we expect these companies to benefit less from the constituency statutes. To examine the potential role of shareholders' temporal orientation, we reestimate our baseline specification interacting the treatment dummy with a dummy variable indicating whether the company's institutional ownership is above the median across all companies in the year prior to the treatment (*high institutional ownership*). Institutional ownership is computed as the percentage of shares owned by institutional investors using data from Thomson-Reuters institutional holdings database. As shown in Table 6, we find that the treatment effect is indeed weaker for companies with higher institutional ownership.[25] This weaker effect suggests that stakeholder orientation and institutional ownership might act as substitutes in attenuating shareholders' short-term pressure. A caveat of this analysis, however, is that institutional ownership is potentially endogenous with respect to innovation. Hence, the results provided in Table 6 are merely suggestive and do not necessarily warrant a causal interpretation.

### 4.5. Robustness

This section presents various robustness checks and extensions of our baseline analysis. The underlying specification is the one used in columns (2) and (5) of Table 3, unless otherwise specified.

*Patenting vs. Nonpatenting Firms.* Our baseline sample consists of all Compustat firms, including those that do not patent throughout the sample period. Nonpatenting firms account for a large fraction of our sample (61.5% of all observations). Accordingly, one potential concern is that our results may be affected by nonpatenting firms. The inclusion of firm fixed effects—which account for, e.g., the "nonpatenting" attribute—helps mitigate this concern. In columns (1) and (2) of Online Appendix Table V, we further verify that our results are robust if we exclude nonpatenting firms.

*Compustat Firms with Unknown Match to the NBER Patent Database.* A related concern is that some firms that we code as nonpatenting firms may in fact have patents, yet we cannot identify these patents since there is no known match between these firms and the NBER patent database. The NBER classifies Compustat firms as "definite match," "definite nonmatch," and "unknown match/nonmatch." To ensure that our results are not affected by the latter category, we reestimate our baseline specification excluding these companies. As is shown in columns (3) and (4) of Online Appendix Table V, our results are robust to this exclusion.

*Coding of Zero Citations.* In our baseline specification, we set citations to zero if the company has no patents. This approach is common in the literature (e.g., Atanassov 2013, Tian and Wang 2014). An appealing feature of this approach is that it addresses any selection concern with respect to firms' decision to patent or not. However, a drawback is that a zero citation may simply capture a zero patent. To address this issue, we reestimate our baseline specification using only firm-year observations with nonzero patents. As is shown in column (1) of Online Appendix Table VI, our results are robust to this exclusion. A related concern is that citations are measured with much noise toward the end of the sample period—due to the truncation of citation counts in the later years of the NBER database. To mitigate this issue, we show in column (2) that our results are robust to restricting the sample to the years before 2002.

*Eventually Treated Companies.* In terms of the identification, a potential concern is that unobserved differences between treated and control firms may affect our results. To address this concern, we reestimate our baseline specification for the subsample of eventually treated firms. The results are presented in columns (1) and (2) of Online Appendix Table VII. Despite the smaller sample size (59,898 firm-year observations), our estimates of the treatment effect remain similar.

*Matching.* Another way to address the possibility that treated and control firms may differ along unobservable characteristics is to use a matching approach—i.e., construct a sample of matched control firms that are as similar as possible to the treated

[25] We can compute the effect of the constituency statutes for companies with high institutional ownership by adding up the two coefficients (and assess their joint significance using an $F$-test). In column (2), the effect is $0.094 - 0.061 = 0.033$ ($p$-value $= 0.087$). In column (4), the effect is 0.049 ($p$-value $= 0.007$).

firms ex ante. We follow very closely the matching algorithm described in Flammer (2015b). First, for each treated firm, we only consider companies that are located in the same state (but incorporated in nontreated states). Among the pool of candidates, we select the nearest neighbor on the basis of the following firm-level characteristics: size, age, market-to-book, ROA, leverage, cash holdings, and R&D expenses, all computed as average in the five years preceding the enactment of the constituency statute. The nearest neighbor is the firm with the lowest Mahalanobis distance to the treated firm across these seven matching characteristics.[26] For each treated firm and each matched control firm, we compute the average of $\log(1+\text{patents})$ in the five years following the treatment, and the corresponding average in the five years preceding the treatment. We compute $\Delta$ *Patents* as the difference between the two ($\Delta$ *Citations* is computed analogously). We then regress this difference on the treatment dummy. The results are provided in columns (3) and (4) of Online Appendix Table VII. As can be seen, the treatment effect is similar to before.

*Excluding Delaware.* An important feature of the U.S. corporate landscape is that more than half of U.S. public companies are incorporated in Delaware (see, e.g., Bebchuk and Cohen 2003, p. 389). Because Delaware has not introduced a constituency statute, Delaware-incorporated firms are in the control group. Accordingly, if Delaware companies are becoming less innovative over time, our results could be spurious, merely reflecting a Delaware effect. To address this concern, we reestimate our baseline specification excluding Delaware firms. The results are presented in columns (5) and (6) of Online Appendix Table VII. As is shown, excluding Delaware has little impact on our results.

*Alternative Time Period.* As can be seen from Table 1, the majority of the constituency statutes were passed between 1984 and 1990 (27 out of 34 states). Since our sample period ranges from 1976 to 2006, we have more "after" years than "before" years. To see whether this imbalance affects our results, we reestimate our baseline specification by truncating the sample in 1995. As shown in columns (7) and (8) of Online Appendix Table VII, doing so is immaterial for our results.

*Confounding Effects.* Another potential concern is that the increase in innovation in the posttreatment period may be due to confounding factors. In particular, it could be that treated and control firms are on different industry trends, that the enactment of constituency statutes coincides with the passage of other state-level laws, or that differences in corporate governance are driving our results. As can be seen in Online Appendix Table VIII, our results are unchanged if we include two-digit SIC industry by year fixed effects (columns (1) and (2)), if we exclude companies incorporated in states that have passed antitakeover laws or bank deregulation laws (columns (3) and (4)), or if we account for governance by including the *G*-index of Gompers et al. (2003) as control (columns (5) and (6)).[27]

*Citation-Weighted Patents.* In column (1) of Online Appendix Table IX, we reestimate our baseline specification using citation-weighted patent counts in lieu of patent counts (e.g., Trajtenberg 1990). The citation weights account for the fact that patents can vary greatly in their importance. As can be seen, the treatment effect is similar to before.

*Models for Count Variables.* Since the number of patents is a count variable, we can reestimate our baseline specification using count data models (instead of OLS). In columns (2) and (3) of Online Appendix Table IX, we use a Poisson and negative binomial regression, respectively. As can be seen, our results are robust to using count data models.

*Serial Correlation.* In our main specification, we account for serial correlation of the error term by clustering standard errors at the state of incorporation level. In Online Appendix Table X, we consider alternative methods to account for serial correlation. These methods are described in Bertrand et al. (2004).

The first method is parametric. We assume that the error term follows an AR(1) process and estimate the first-order autocorrelation coefficient by regressing the residuals from our baseline regressions on their lagged values. We then form an estimate of the covariance matrix of the residuals and reestimate our baseline specification using generalized least squares (GLS). As can be seen from columns (1) and (2), our results are robust to using this method.

The second method is block bootstrapping. The difference to standard bootstrapping is that instead of drawing single observations, we draw entire groups ("blocks") of observations. The idea, which is similar to clustering, is to preserve the existing correlation structure within each block while using the independence across blocks to consistently estimate standard errors. In analogy to our clustering approach,

[26] Formally, the Mahalanobis distance $\delta$ between treated firm $i$ and candidate firm $j$ is given by $\delta = [(\mathbf{X}_i - \mathbf{X}_j)'\Sigma^{-1}(\mathbf{X}_i - \mathbf{X}_j)]^{1/2}$, where $\mathbf{X}$ is a $(7\times 1)$ vector containing the seven matching variables and $\Sigma$ is the $(7\times 7)$ covariance matrix of these seven variables. For further details about this matching procedure, see Flammer (2015b).

[27] The list of antitakeover laws (business combination laws) is obtained from Bertrand and Mullainathan (2003, p. 1048). The list of bank deregulation laws is obtained from Amore et al. (2013, p. 838). The *G*-index is obtained from RiskMetrics. It is available for the years 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006. To fill in the missing years, we use the latest available value of the index. Since the *G*-index is not available prior to 1990, the sample period used in columns (5) and (6) is restricted to 1990–2006.

we construct blocks at the state of incorporation level. Specifically, we construct 200 bootstrap samples by drawing with replacement states of incorporation. For each bootstrap sample, we estimate our baseline specification and store the coefficients. The standard errors are then calculated based on the empirical distribution of these 200 sets of coefficients. As shown in columns (3) and (4), the significance levels are very similar to those we obtained in our baseline regressions.

The third method is to collapse the data into two periods, before and after the treatment, and run an OLS regression on this two-period panel. Because of the staggered enactment of the constituency statutes, "before" and "after" are not the same for each treated state. In addition, for control states, before and after are not well defined. To address these issues, we use the two-step procedure proposed by Bertrand et al. (2004, "residual collapsing"). In the first step, we regress patents (and citations, respectively) on fixed effects and covariates, except for the treatment dummy. For treated companies only, we store the residuals and compute the average residuals for the pretreatment and posttreatment periods. This provides us with a two-period panel, where the first period is before the treatment and the second period is after the treatment. In the second step, we regress the average residuals on the constituency statute dummy, and use White standard errors to correct for heteroskedasticity. As can be seen from columns (7) and (8), our results are robust to using this method.

## 5. Discussion and Conclusion

How can companies spark innovation? This question has received considerable attention in the literature. Yet very little is known about the role of stakeholder orientation. Motivated by this research gap, this study examines whether and how attending to the company's nonfinancial stakeholders affects innovative activity within the firm.

To examine the impact of stakeholder orientation on innovation, we exploit a quasi-natural experiment provided by the enactment of constituency statutes in 34 states between 1984–2006. These statutes encourage corporate directors to consider nonshareholder interests when making business decisions, and hence provide exogenous variation in the way public U.S. corporations cater to stakeholders. Using a difference-in-differences methodology, we find that the introduction of constituency statutes leads to a significant increase in innovation. Specifically, we find that firms incorporated in states that have enacted constituency statutes generate more patents and receive more citations per patent than firms incorporated in states that have not enacted such statutes. These findings are consistent with the view that stakeholder orientation fosters innovation.

We further argue that stakeholder orientation promotes experimentation. In support of this argument, we find that the enactment of constituency statutes leads to more innovations in the tails of the distribution, as well as more original and, to a lesser extent, more general innovations. We also find that the enactment of constituency statutes leads to an increase in innovative productivity, suggesting a greater engagement of employees in the innovation process. Finally, we find that the positive impact of stakeholder orientation on innovation is larger in consumer-focused and less eco-friendly industries.

Lastly, we document that the enactment of constituency statutes leads to an increase in long-term performance, although this pattern is only marginally significant. This evidence is suggestive of a temporal trade-off—while stakeholder orientation seems to pay off in the long run, it does not yield immediate benefits. Hence, without a legal tool such as a constituency statute, market pressure may prevent shareholder-oriented companies from becoming more stakeholder friendly in the first place.

To the best of our knowledge, this study is the first to examine whether stakeholder orientation plays a role in fostering innovation. Our study relates to the large body of literature on corporate governance, which focuses on how shareholders can provide appropriate incentives to overcome agency problems and limit managers' discretion to pursue ends other than shareholder value. In particular, the papers closest to our study are Atanassov (2013) and Sapra et al. (2014) who examine the relationship between corporate governance and innovation. While our study also examines how companies can encourage innovation, it offers a fundamentally distinct perspective and contribution: We hypothesize and show evidence that innovation increases as a function of corporate attention to multiple nonshareholding groups, including employees, customers, and the environment. Our findings suggest that by shifting firms' focus away from shareholder primacy toward a more stakeholder-friendly view relieves managers, employees, and consumers from myopic behavior and helps spark innovation.

Our study also contributes to the vibrant body of work examining the impact of various types of legislations on innovation. In addition to the studies on the effect of antitakeover legislation on innovation (Atanassov 2013, Sapra et al. 2014), prior research has examined the effect of bank deregulation laws (Amore et al. 2013, Chava et al. 2013, Cornaggia et al. 2015), bankruptcy laws (Acharya and Subramanian 2009, Cerqueiro et al. 2014), and wrongful discharge laws (Acharya et al. 2014). In this paper, we complement this line of research by studying the effect of constituency statutes on innovation.

Finally, our study contributes to the literature on the attention to stakeholders and performance outcomes. In particular, a growing literature focuses on the link between corporate social performance (CSP) and corporate financial performance (CFP) (e.g., Flammer 2013, 2015a; Margolis and Walsh 2003; Walsh et al. 2003). In their meta-analysis, Margolis et al. (2007) report that, in general, this literature points toward a positive relationship between CSP and CFP. Yet, the value-creating mechanisms behind CSP and CFP remain largely unexplored. Studies in this vein emphasize the role of CSP investments in generating high financial performance, e.g., by providing insurance against unexpected crises (Schnietz and Epstein 2005) or by establishing a unique customer base (Sen and Bhattacharya 2001). Given that innovative capabilities contribute to firms' competitive advantage and market leadership (e.g., Baumol 2002, Porter 1990, Schumpeter 1942), our study implies a novel mechanism behind the positive relationship between stakeholder orientation and financial performance—innovation.

A caveat of our study is that it is difficult to provide direct evidence on the causal mechanisms through which stakeholder orientation improves firms' innovativeness. For instance, in terms of a stronger employee orientation, what specific actions should firms undertake—should they, e.g., provide child care, encourage employees to participate in corporate decision making, improve the physical work environment? As this example illustrates, providing conclusive evidence on the underlying mechanisms is a challenging task that requires detailed micro data on the companies' operations and processes. Making ground on these mechanisms is a promising avenue for future research.

Lastly, our findings have potentially important implications for managers and policy makers. First, our findings indicate that the *net* effect of increased stakeholder orientation on innovation is positive. In other words—to the extent that stakeholder orientation can be both beneficial and detrimental to innovation—the positives (e.g., promoting employee-driven experimentation) outweigh the negatives (e.g., employees misusing employee-friendly policies to shirk instead of innovate). Accordingly, companies eager to innovate may find it worthwhile to design effective stakeholder policies.

Second, our findings have implications for policy makers. Encouraging innovation and therefore economic growth requires designing and implementing effective policies. Our results suggest that the enactment of constituency statutes is an effective tool to spark innovation and enhance the welfare of companies' stakeholders. Understanding and comparing the overall effect of constituency statutes relative to other policies (e.g., stronger patent rights, wrongful discharge laws, noncompete clauses, etc.) available to legislators to promote innovation is an important question that merits further inquiry.

## Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/mnsc.2015.2229.

## Acknowledgments

Both authors contributed equally. For helpful comments and suggestions, the authors are grateful to Lee Fleming (the department editor), an anonymous associate editor, three anonymous reviewers, Pierre Azoulay, Tima Bansal, Marc Gruber, Bryan Hong, Jennifer Howard-Grenville, and Michael Lenox, as well as seminar participants at Ivey Business School, Boston University, University of California at Berkeley, the 5th People and Organizations Annual Conference at Wharton, the 6th Alliance for Research on Corporate Sustainability Conference at Cornell, the 2014 Duke Strategy Conference, the Strategic Management Society Special Conference: Startup and Restart Strategies (Tel Aviv), and the 74th Annual Meeting of the Academy of Management (Philadelphia).

## References

Acharya VV, Subramanian KV (2009) Bankruptcy codes and innovation. *Rev. Financial Stud.* 22(12):4949–4988.

Acharya VV, Baghai RP, Subramanian KV (2014) Wrongful discharge laws and innovation. *Rev. Financial Stud.* 27(1):301–346.

Aghion P, Howitt P (1992) A model of growth through creative destruction. *Econometrica* 60(2):323–352.

Aghion P, Tirole J (1994) The management of innovation. *Quart. J. Econom.* 109(4):1185–1209.

Aghion P, Van Reenen J, Zingales L (2013) Innovation and institutional ownership. *Amer. Econom. Rev.* 103(1):277–304.

Aiken M, Hage J (1971) The organic organization and innovation. *Sociology* 5(1):63–82.

Albinger HS, Freeman SJ (2000) Corporate social performance and attractiveness as an employer to different job seeking populations. *J. Bus. Ethics* 28(3):243–253.

Amabile TM, Conti R, Coon H, Lazenby J, Herron M (1996) Assessing the work environment for creativity. *Acad. Management J.* 39(5):1154–1184.

Amore MD, Schneider C, Zaldokas A (2013) Credit supply and corporate innovation. *J. Financial Econom.* 109(3):835–855.

Atanassov J (2013) Do hostile takeovers stifle innovation? Evidence from antitakeover legislation and corporate patenting. *J. Finance* 68(3):1097–1131.

Azoulay P, Graff Zivin JS, Manso G (2011) Incentives and creativity: Evidence from the academic life sciences. *RAND J. Econom.* 42(3):527–554.

Bainbridge SM (1992) Interpreting nonshareholder constituency statutes. *Pepperdine Law Rev.* 19(3):971–1025.

Balkin DB, Markman GD, Gomez-Mejia LR (2000) Is CEO pay in high-technology firms related to innovation? *Acad. Management J.* 43(6):1118–1129.

Bansal P, Roth K (2000) Why companies go green: A model of ecological responsiveness. *Acad. Management J.* 43(4):717–736.

Barney JB, Hansen MH (1994) Trustworthiness as a source of competitive advantage. *Strategic Management J.* 15(S1):175–190.

Barzuza M (2009) The state of state antitakeover law. *Virginia Law Rev.* 95(8):1973–2052.
Baumol WJ (2002) *The Free-Market Innovation Machine* (Princeton University Press, Princeton, NJ).
Baysinger BD, Kosnik RD, Turk TA (1991) Effects of board and ownership structure on corporate R&D strategy. *Acad. Management J.* 34(1):205–214.
Bebchuk LA, Cohen A (2003) Firm's decisions where to incorporate. *J. Law Econom.* 46(2):383–425.
Berle AA Jr (1931) Corporate powers as powers in trust. *Harvard Law Rev.* 44(7):1049–1074.
Bertrand M, Mullainathan S (2003) Enjoying the quiet life? Corporate governance and managerial preferences. *J. Political Econom.* 111(5):1043–1075.
Bertrand M, Duflo E, Mullainathan S (2004) How much should we trust differences-in-differences estimates? *Quart. J. Econom.* 119(1):249–275.
Bisconti A (2009) The double bottom line: Can constituency statutes protect socially responsible corporations stuck in Revlon land. *Loyola Los Angeles Law Rev.* 42(3):765–806.
Bogers M, Afuah A, Bastian B (2010) Users as innovators: A review, critique, and future research directions. *J. Management* 36(4):857–875.
Brown TJ, Dacin PA (1997) The company and the product: Corporate associations and consumer product responses. *J. Marketing* 61(1):68–84.
Bushee BJ (1998) The influence of institutional investors on myopic R&D investment behavior. *Account. Rev.* 73(3):305–672.
Cerqueiro G, Hegde D, Penas MF, Seamans RC (2014) Debtor rights, credit supply, and innovation. Working paper, Tilburg Law and Economics Center, Tilburg, Netherlands.
Chatterji AK, Fabrizio KR (2014) Using users: When does external knowledge enhance corporate product innovation? *Strategic Management J.* 35(10):1427–1445.
Chava S, Oettl A, Subramanian A, Subramanian KV (2013) Banking deregulation and innovation. *J. Financial Econom.* 109(3): 759–774.
Cheng S, Nagar V, Rajan MV (2004) Identifying control motives in managerial ownership: Evidence from antitakeover legislation. *Rev. Financial Stud.* 18(2):637–672.
*Computer Weekly News* (2013) IBM named worldwide market share leader in social software for fourth consecutive year. (May 9).
Cornaggia J, Mao Y, Tian X, Wolfe B (2015) Does banking competition affect innovation? *J. Financial Econom.* 115(1):189–209.
David P, Hitt MA, Gimeno J (2001) The influence of activism by institutional investors on R&D. *Acad. Management J.* 44(1): 144–157.
Dodd EM Jr (1932) For whom are corporate managers trustees? *Harvard Law Rev.* 45(7):1145–1163.
Ederer F, Manso G (2013) Is pay for performance detrimental to innovation? *Management Sci.* 59(7):1496–1513.
Eisenhardt KM, Brown SL (1998) Time pacing: Competing in markets that won't stand still. *Harvard Bus. Rev.* 76(2):59–69.
Eisenhardt KM, Martin JA (2000) Dynamic capabilities: What are they? *Strategic Management J.* 21(10/11):1105–1121.
EPA (2013) *2011 Toxics Release Inventory National Analysis Overview* (EPA, Washington, DC).
Flammer C (2013) Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Acad. Management J.* 56(3):758–781.
Flammer C (2015a) Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Sci.* 61(11):2549–2568.
Flammer C (2015b) Does product market competition foster corporate social responsibility? Evidence from trade liberalization. *Strategic Management J.* 36(10):1469–1485.
Flammer C, Bansal P (2015) Does long-term orientation create value? Evidence from a regression discontinuity. Working paper, University of Western Ontario, London, ON.
*Forbes* (2011a) Is brand loyalty the core to Apple's success? (November 27).
*Forbes* (2011b) GE's new ecomagination chief: Green tech innovation goes global. (May 3).
*Forbes* (2011c) Seventh Generation's new CEO on why sustainability is necessary. (February 9).
*Forbes* (2013) Sorry CalPERS, dual class shares are a founder's best friend. (May 14).
Fournier SM (1998) Consumers and their brands: Developing relationship theory. *J. Consumer Res.* 24(4):343–373.
Freeman RE (1984) *Strategic Management: A Stakeholder Approach* (Pitman, Marshfield, MA).
Friedman M (1962) *Capitalism and Freedom* (University of Chicago Press, Chicago).
Friedman M (1970) The social responsibility of business is to increase its profits. *New York Times Magazine* (September 13) SM17.
Froot KA, Perold AF, Stein JC (1992) Shareholder trading practices and corporate investment horizons. *J. Applied Corp. Finance* 5(2):42–58.
Fueller J, Matzler K, Hoppe M (2008) Brand community members as a source of innovation. *J. Prod. Innov. Management* 25(6): 608–619.
Gompers P, Ishii J, Metrick A (2003) Corporate governance and equity prices. *Quart. J. Econom.* 118(1):107–156.
Graves SB (1988) Institutional ownership and corporate R&D in the computer industry. *Acad. Management J.* 31(2):417–428.
*GreenBiz* (2010) GE's ecomagination challenge: A smart way to spur innovation. (October 5).
Greening DW, Turban DB (2000) Corporate social performance as a competitive advantage in attracting a quality workforce. *Bus. Soc.* 39:254–280.
Griliches Z (1990) Patent statistics as economic indicators: A survey. *J. Econom. Literature* 28(4):1661–1707.
Griliches Z, Pakes A, Hall BH (1987) The value of patents as indicators of inventive activity. Dasgupta P, Stoneman P, eds. *Economic Policy and Technological Performance* (Cambridge University Press, Cambridge, UK), 97–124.
Grossman GM, Helpman E (1990) Trade, innovation, and growth. *Amer. Econom. Rev.* 80(2):86–91.
Grossman GM, Helpman E (1994) Endogenous innovation in the theory of growth. *J. Econom. Perspectives* 8(1):23–44.
Hall BH (2005) A note on the bias in Herfindahl-type measures based on count data. *Revue d'Economie Industrielle* 110(1): 149–156.
Hall BH, Hall RE (1993) The value and performance of U.S. corporations. *Brookings Papers on Econom. Activity* 1:1–34.
Hall BH, Jaffe AB, Trajtenberg M (2001) The NBER patent citations data file: Lessons, insights and methodological tools. NBER Working Paper 8498, National Bureau of Economic Research, Cambridge, MA. http://www.nber.org/papers/w8498.
Hall BH, Jaffe AB, Trajtenberg M (2005) Market value and patent citations. *RAND J. Econom.* 36(1):16–38.
Hansen GS, Hill CWL (1991) Are institutional investors myopic? A time-series study of four technology-driven industries. *Strategic Management J.* 12(1):1–16.
Hart SL (1995) A natural-resource-based view of the firm. *Acad. Management Rev.* 20(4):986–1014.
Herzberg F, Mausner B, Snyderman BB (1959) *The Motivation to Work* (John Wiley & Sons, New York).
Hill CWL, Snell SA (1988) External control, corporate strategy, and firm performance in research-intensive industries. *Strategic Management J.* 9(6):577–590.
Hillman AJ, Keim GD (2001) Shareholder value, stakeholder management, and social issues: What's the bottom line? *Strategic Management J.* 22(2):125–139.
Holmstrom B (1989) Agency costs and innovation. *J. Econom. Behav. Organ.* 12(3):305–327.
Holthausen RW, Larcker DF, Sloan RG (1995) Business unit innovation and the structure of executive compensation. *J. Account. Econom.* 19(2–3):279–313.
Hoskisson RE, Hitt MA, Johnson RA, Grossman W (2002) Conflicting voices: The effects of institutional ownership heterogeneity and internal governance on corporate innovation strategies. *Acad. Management J.* 45(4):697–716.

Huselid MA (1995) The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Acad. Management J.* 38(3):635–672.

Jones TM (1995) Instrumental stakeholder theory: A synthesis of ethics and economics. *Acad. Management Rev.* 20(2): 404–437.

Kacperczyk AJ (2009) With greater power comes greater responsibility? Takeover protection and corporate attention to stakeholders. *Strategic Management J.* 30(3):261–285.

Kochhar R, David P (1996) Institutional investors and firm innovation: A test of competing hypotheses. *Strategic Management J.* 17(1):73–84.

Kotler P, Hessekiel D, Lee NR (2012) *Good Works!*: *Marketing and Corporate Initiatives That Build a Better World . . . and the Bottom Line* (John Wiley & Sons, Hoboken, NJ).

Lerner J, Wulf J (2007) Innovation and incentives: Evidence from corporate R&D. *Rev. Econom. Statist.* 89(4):634–644.

Lev B, Petrovits C, Radhakrishnan S (2010) Is doing good good for you? How corporate charitable contributions enhance revenue growth. *Strategic Management J.* 31(2):182–200.

Luo X, Bhattacharya CB (2006) Corporate social responsibility, customer satisfaction, and market value. *J. Marketing* 70(4): 1–18.

Luoma P, Goodstein J (1999) Stakeholders and corporate boards: Institutional influences on board composition and structure. *Acad. Management J.* 42(5):553–563.

Manso G (2011) Motivating innovation. *J. Finance* 66(5):1823–1860.

Margolis JD, Walsh JP (2003) Misery loves companies: Rethinking social initiatives by business. *Admin. Sci. Quart.* 48(2): 268–305.

Margolis JD, Elfenbein HA, Walsh JP (2007) Does it pay to be good? A meta-analysis and redirection of research on the relationship between corporate social and financial performance. Working paper, Harvard Business School, Boston.

Maslow A (1943) A theory of human motivation. *Psych. Rev.* 50: 370–396.

Mattingly JE, Berman SL (2006) Measurement of corporate social action: Discovering taxonomy in the Kinder Lydenburg Domini ratings data. *Bus. Soc.* 45(1):20–46.

McGregor D (1960) *The Human Side of Enterprise* (McGraw-Hill, New York).

*New York Times* (2007) The Google way: Give engineers room. (October 21).

*New York Times* (2012a) Our workplace: How three companies innovate. (March 17).

*New York Times* (2012b) New share class gives Google founders tighter control. (April 13).

*New York Times* (2013) Alibaba chastises Hong Kong exchange. (September 27).

Oldham GR, Cummings A (1996) Employee creativity: Personal and contextual factors at work. *Acad. Management J.* 39(3): 607–634.

Orts EW (1992) Beyond shareholders: Interpreting corporate constituency statutes. *George Washington Law Rev.* 61(1):14–135.

Pakes A, Schankerman M (1984) The rate of obsolescence of patents, research gestation lags, and the private rate of return to research resources. Griliches Z, ed. *R&D, Patents, and Productivity* (University of Chicago Press, Chicago), 73–88.

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

Porter ME, Kramer MR (2006) Strategy and society: The link between competitive advantage and corporate social responsibility. *Harvard Bus. Rev.* 84(12):78–92.

Porter ME, Kramer MR (2011) The big idea: Creating shared value. *Harvard Bus. Rev.* 89(1/2):62–77.

Romano R (1993) Competition for corporate charters and the lesson of takeover statutes. *Fordham Law Rev.* 61(4):843–864.

Romer PM (1990) Endogenous technological change. *J. Political Econom.* 98(5):S71–S102.

Russo MV, Fouts PA (1997) A resource-based perspective on corporate environmental performance and profitability. *Acad. Management J.* 40(3):534–559.

Sapra H, Subramanian A, Subramanian KV (2014) Corporate governance and innovation: Theory and evidence. *J. Financial Quant. Anal.* 49(4):957–1003.

Sawhney M, Verona G, Prandelli E (2005) Collaborating to create: The Internet as a platform for customer engagement in product innovation. *J. Interactive Marketing* 19(4):4–17.

Schmookler J (1962) Economic sources of inventive activity. *J. Econom. History* 22(1):1–20.

Schmookler J (1966) *Invention and Economic Growth* (Harvard University Press, Cambridge, MA).

Schnietz KE, Epstein MJ (2005) Exploring the financial value of a reputation for corporate social responsibility during a crisis. *Corporate Reputation Rev.* 7(4):327–345.

Schumpeter JA (1942) *Capitalism, Socialism, and Democracy* (Harper, New York).

Sen S, Bhattacharya CB (2001) Does doing good always lead to doing better? Consumer reactions to corporate social responsibility. *J. Marketing Res.* 38(2):225–243.

Seru A (2014) Firm boundaries matter: Evidence from conglomerates and R&D activity. *J. Financial Econom.* 111(2):381–405.

Sheridan JE (1992) Organizational culture and employee retention. *Acad. Management J.* 35(5):1036–1056.

Shleifer A, Summers LH (1988) Breach of trust in hostile takeovers. Auerbach AJ, ed. *Corporate Takeovers*: *Causes and Consequences* (University of Chicago Press, Chicago), 33–68.

Slawinski N, Bansal P (2012) A matter of time: The temporal perspectives of organizational responses to climate change. *Organ. Stud.* 33(11):1537–1563.

Stein JC (1988) Takeover threats and managerial myopia. *J. Political Econom.* 96(1):61–80.

Stout L (2012) *The Shareholder Value Myth*: *How Putting Shareholders First Harms Investors, Corporations, and the Public* (Berrett-Koehler Publishers, San Francisco).

Teece DJ (1998) Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California Management Rev.* 40(3):55–79.

*The Edge Financial Daily* (2013) Global business goes social. (May 20).

Tian X, Wang T (2014) Tolerance for failure and corporate innovation. *Rev. Financial Stud.* 27(1):211–255.

Trajtenberg M (1990) A penny for your quotes: Patent citations and the value of innovations. *RAND J. Econom.* 21(1):172–187.

Turban DB, Greening DW (1996) Corporate social performance and organizational attractiveness to prospective employees. *Acad. Management J.* 40(3):658–672.

Vogel D (2005) *The Market for Virtue*: *The Potential and Limits of Corporate Social Responsibility* (Brookings Institution Press, Washington, DC).

von Hippel E (1976) The dominant role of users in the scientific instrument innovation process. *Res. Policy* 5(3):212–239.

von Hippel E (1978) Successful industrial products from customer ideas. *J. Marketing* 42(1):39–49.

Walsh JP, Weber K, Margolis JD (2003) Social issues and management: Our lost cause found. *J. Management* 29(6):859–881.

Wang T, Bansal P (2012) Social responsibility in new ventures: Profiting from a long-term orientation. *Strategic Management J.* 33(10):1135–1153.

Williams RJ, Barrett JD (2000) Corporate philanthropy, criminal activity, and firm reputation: Is there a link? *J. Bus. Ethics* 26(4):341–350.

Wiseman RM, Gomez-Mejia LR (1998) A behavioral agency model of managerial risk taking. *Acad. Management Rev.* 23(1): 133–153.

Zahra SA (1996) Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Acad. Management J.* 39(6):1713–1735.

**<u>ONLINE APPENDIX FOR</u>**

# "THE IMPACT OF STAKEHOLDER ORIENTATION ON INNOVATION: EVIDENCE FROM A NATURAL EXPERIMENT"

CAROLINE FLAMMER
Ivey Business School
University of Western Ontario
1255 Western Road, Office 3351
London, ON N6G 0N1, Canada
(519) 661-3144
cflammer@ivey.uwo.ca

ALEKSANDRA KACPERCZYK
Sloan School of Management
Massachusetts Institute of Technology
100 Main Street, E62-480
Cambridge, MA 02142
(617) 253-6618
olenka@mit.edu

**Appendix Table I. KLD-Index**

| | First stage | Second stage (IV) | | OLS | |
|---|---|---|---|---|---|
| Dependent variable | KLD-index | Patents | Citations | Patents | Citations |
| | (1) | (2) | (3) | (4) | (5) |
| Constituency Statute | 0.253*** | | | | |
| | (0.080) | | | | |
| KLD (instrumented) | | 0.168** | 0.194*** | | |
| | | (0.076) | (0.073) | | |
| KLD | | | | 0.132*** | 0.171*** |
| | | | | (0.035) | (0.036) |
| Control variables | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes |
| State × year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Observations | 14,968 | 14,968 | 14,968 | 14,968 | 14,968 |
| R-squared | 0.78 | 0.85 | 0.74 | 0.85 | 0.74 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1991 to 2006. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

## Appendix Table II. Control Variables

*Panel (A): Table 3*

| | (2) | (3) | (5) | (6) |
|---|---|---|---|---|
| Size | 0.071*** | 0.071*** | 0.035*** | 0.035*** |
| | (0.007) | (0.007) | (0.005) | (0.005) |
| Age | 0.081*** | 0.083*** | 0.131*** | 0.133*** |
| | (0.020) | (0.020) | (0.013) | (0.013) |
| Market-to-book | 0.011*** | 0.011*** | 0.010*** | 0.010*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Return on assets | -0.006 | -0.006 | 0.026** | 0.026** |
| | (0.005) | (0.005) | (0.013) | (0.013) |
| Leverage | -0.033* | -0.033* | -0.021** | -0.021** |
| | (0.018) | (0.018) | (0.010) | (0.010) |
| Cash | 0.063*** | 0.063*** | 0.125*** | 0.125*** |
| | (0.023) | (0.022) | (0.022) | (0.022) |
| R&D | 0.176*** | 0.175*** | 0.202*** | 0.202*** |
| | (0.033) | (0.033) | (0.048) | (0.048) |
| R&D dummy | -0.021** | -0.021** | -0.034*** | -0.034*** |
| | (0.009) | (0.010) | (0.012) | (0.012) |

*Panel (B): Table 4*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | -0.018*** | -0.023*** | 0.005 | 0.000 | 0.010*** | 0.019*** | -0.010 | 0.071*** | 0.035*** | 0.071*** | 0.035*** |
| | (0.004) | (0.003) | (0.003) | (0.004) | (0.004) | (0.004) | (0.009) | (0.007) | (0.005) | (0.007) | (0.005) |
| Age | -0.051*** | -0.090*** | 0.039*** | 0.040*** | -0.023** | -0.025* | -0.068** | 0.083*** | 0.131*** | 0.080*** | 0.130*** |
| | (0.012) | (0.011) | (0.009) | (0.010) | (0.010) | (0.013) | (0.032) | (0.019) | (0.013) | (0.020) | (0.013) |
| Market-to-book | -0.002* | -0.001* | -0.000 | 0.002* | 0.001 | 0.007*** | 0.006*** | 0.011*** | 0.010*** | 0.011*** | 0.009*** |
| | (0.001) | (0.001) | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Return on assets | -0.048*** | -0.021 | -0.028*** | -0.029* | 0.020* | 0.033*** | 0.059*** | -0.006 | 0.026** | -0.006 | 0.026** |
| | (0.017) | (0.019) | (0.006) | (0.016) | (0.011) | (0.010) | (0.014) | (0.005) | (0.013) | (0.005) | (0.013) |
| Leverage | -0.001 | 0.021 | -0.022** | -0.040** | 0.004 | -0.056*** | -0.030** | -0.033* | -0.021** | -0.033* | -0.021** |
| | (0.017) | (0.014) | (0.011) | (0.019) | (0.012) | (0.015) | (0.014) | (0.017) | (0.010) | (0.018) | (0.010) |
| Cash | 0.015 | 0.043 | -0.029 | 0.020 | -0.012 | 0.203*** | 0.293*** | 0.063*** | 0.126*** | 0.063*** | 0.126*** |
| | (0.024) | (0.027) | (0.019) | (0.020) | (0.014) | (0.027) | (0.035) | (0.023) | (0.022) | (0.023) | (0.022) |
| R&D | -0.077* | -0.032 | -0.048** | 0.002 | 0.048 | 0.389*** | 0.362*** | 0.176*** | 0.202*** | 0.176*** | 0.202*** |
| | (0.044) | (0.048) | (0.022) | (0.022) | (0.030) | (0.064) | (0.087) | (0.033) | (0.048) | (0.033) | (0.048) |
| R&D dummy | 0.000 | -0.001 | 0.001 | -0.002 | -0.006 | -0.013 | -0.023* | -0.021** | -0.034*** | -0.021** | -0.034*** |
| | (0.012) | (0.016) | (0.009) | (0.012) | (0.007) | (0.009) | (0.013) | (0.009) | (0.012) | (0.010) | (0.012) |

*Panel (C): Table 5*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Size | 0.083*** | 0.083*** | -0.778*** | -0.778*** |
| | (0.004) | (0.004) | (0.037) | (0.037) |
| Age | -0.040*** | -0.040*** | -0.432*** | -0.430*** |
| | (0.004) | (0.004) | (0.053) | (0.053) |
| Market-to-book | -0.026*** | -0.026*** | | |
| | (0.002) | (0.002) | | |
| Return on assets | | | -2.649*** | -2.649*** |
| | | | (0.122) | (0.122) |
| Leverage | -0.246*** | -0.246*** | 1.235*** | 1.235*** |
| | (0.007) | (0.007) | (0.094) | (0.094) |
| Cash | 0.016 | 0.016 | 2.042*** | 2.042*** |
| | (0.010) | (0.010) | (0.235) | (0.235) |
| R&D | -1.362*** | -1.362*** | 0.344 | 0.344 |
| | (0.039) | (0.039) | (0.364) | (0.364) |
| R&D dummy | -0.027*** | -0.027*** | 0.154*** | 0.154*** |
| | (0.005) | (0.005) | (0.052) | (0.052) |

*Panel (D): Table 6*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Size | 0.114*** | 0.111*** | 0.047*** | 0.045*** |
| | (0.010) | (0.011) | (0.008) | (0.007) |
| Age | 0.118*** | 0.121*** | 0.153*** | 0.155*** |
| | (0.022) | (0.020) | (0.024) | (0.024) |
| Market-to-book | 0.018*** | 0.017*** | 0.012*** | 0.012*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Return on assets | 0.058*** | 0.057*** | 0.106*** | 0.106*** |
| | (0.022) | (0.022) | (0.017) | (0.017) |
| Leverage | -0.074** | -0.072** | -0.060*** | -0.059*** |
| | (0.034) | (0.035) | (0.022) | (0.022) |
| Cash | 0.065** | 0.064** | 0.160*** | 0.159*** |
| | (0.025) | (0.026) | (0.035) | (0.035) |
| R&D | 0.530*** | 0.527*** | 0.512*** | 0.509*** |
| | (0.065) | (0.065) | (0.089) | (0.089) |
| R&D dummy | -0.022 | -0.022 | -0.019 | -0.019 |
| | (0.019) | (0.019) | (0.020) | (0.020) |

## Appendix Table III. Robustness—Hits and Flops

| Dependent variable | Hits and flops | | | | |
|---|---|---|---|---|---|
| | Alternative cutoffs | | | | Alternative specification |
| | Hits: cites > 90th pctl. Flops: cites < 10th pctl. | Hits: cites > 90th pctl. Flops: no cites | Hits: cites > 99th pctl. Flops: cites < 1st pctl. | Hits: cites > 99th pctl. Flops: no cites | Poisson regression |
| | (1) | (2) | (3) | (4) | (5) |
| Constituency Statute | 0.020*** | 0.026*** | 0.016** | 0.010** | 0.113** |
| | (0.005) | (0.006) | (0.007) | (0.005) | (0.052) |
| Control variables | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | No |
| State × year fixed effects | Yes | Yes | Yes | Yes | No |
| Observations | 24,663 | 24,663 | 24,663 | 24,663 | 24,663 |
| R-squared | 0.42 | 0.40 | 0.51 | 0.47 | – |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2001. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

## Appendix Table IV. Employment

| Dependent variable | Log(employees) |
|---|---|
| | (1) |
| Constituency Statute | 0.037 |
| | (0.029) |
| Control variables | Yes |
| Year fixed effects | Yes |
| Firm fixed effects | Yes |
| State × year fixed effects | Yes |
| Observations | 148,037 |
| R-squared | 0.95 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

**Appendix Table V. Robustness— Excluding Non-Patenting Firms**

| | Excluding companies with no patents | | Excluding companies with no match in NBER patent database | |
|---|---|---|---|---|
| Dependent variable | Patents | Citations | Patents | Citations |
| | (1) | (2) | (3) | (4) |
| Constituency Statute | 0.158*** | 0.113*** | 0.114*** | 0.093*** |
| | (0.039) | (0.028) | (0.033) | (0.024) |
| Control variables | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes |
| State × year fixed effects | Yes | Yes | Yes | Yes |
| Observations | 61,443 | 61,443 | 88,195 | 88,195 |
| R-squared | 0.75 | 0.51 | 0.77 | 0.56 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

**Appendix Table VI. Robustness— Excluding Zero-Citations due to Zero-Patents**

| Dependent variable | Citations | |
|---|---|---|
| | Sample period 1976-2006 | Sample period 1976-2001 |
| | (1) | (2) |
| Constituency Statute | 0.046** | 0.036** |
| | (0.021) | (0.018) |
| Control variables | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Firm fixed effects | Yes | Yes |
| State × year fixed effects | Yes | Yes |
| Observations | 25,171 | 24,663 |
| R-squared | 0.59 | 0.58 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

## Appendix Table VII. Robustness—Subsamples

| | Enventually treated states | | Matched control group | | Excluding Delaware | | Pre-1995 period | |
|---|---|---|---|---|---|---|---|---|
| Dependent variable | Patents | Citations | Δ Patents | Δ Citations | Patents | Citations | Patents | Citations |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Constituency Statute | 0.086** | 0.097*** | 0.061*** | 0.056*** | 0.058** | 0.076*** | 0.071** | 0.054** |
| | (0.044) | (0.032) | (0.016) | (0.020) | (0.028) | (0.025) | (0.029) | (0.021) |
| Control variables | Yes | Yes | – | – | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | – | – | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | – | – | Yes | Yes | Yes | Yes |
| State × year fixed effects | Yes | Yes | – | – | Yes | Yes | Yes | Yes |
| Observations | 59,898 | 59,898 | 3,388 | 3,388 | 77,403 | 77,403 | 86,177 | 86,177 |
| R-squared | 0.73 | 0.59 | 0.01 | 0.02 | 0.73 | 0.58 | 0.84 | 0.68 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006 (except in columns (7) and (8) where it is from 1976 to 1995). *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

## Appendix Table VIII. Robustness—Confounding Effects

| | Industry trends | | Excluding states that have passed antitakeover laws or bank deregulation laws | | Controlling for G-index | |
|---|---|---|---|---|---|---|
| Dependent variable | Patents | Citations | Patents | Citations | Patents | Citations |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Constituency Statute | 0.065*** | 0.053*** | 0.105*** | 0.102*** | 0.035*** | 0.038*** |
| | (0.020) | (0.014) | (0.023) | (0.027) | (0.012) | (0.010) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| State × year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry × year fixed effects | Yes | Yes | No | No | No | No |
| Observations | 159,558 | 159,558 | 36,129 | 36,129 | 16,048 | 16,048 |
| R-squared | 0.79 | 0.62 | 0.90 | 0.72 | 0.78 | 0.71 |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006 (except in columns (5) and (6) where it is from 1990 to 2006). *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

**Appendix Table IX. Robustness—Citation-Weighted Patents and Count Data Models**

| Dependent variable | Citation-weighted patents | Number of patents | Number of patents |
|---|---|---|---|
| | (1) | (2) | (3) |
| Constituency Statute | 0.078*** | 0.389** | 0.328*** |
| | (0.015) | (0.153) | (0.121) |
| Control variables | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes |
| Firm fixed effects | Yes | No | No |
| State × year fixed effects | Yes | No | No |
| Regression type | OLS | Poisson | NegBin |
| Observations | 159,558 | 159,558 | 159,558 |
| R-squared | 0.59 | – | – |

*Notes.* Standard errors (reported in parentheses) are clustered at the state of incorporation level. The sample period is from 1976 to 2006. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

**Appendix Table X. Robustness—Serial Correlation**

| | AR(1)-GLS | | Block bootstrapping | | Residual collapsing | |
|---|---|---|---|---|---|---|
| Dependent variable | Patents | Citations | Patents | Citations | Patents | Citations |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Constituency Statute | 0.066*** | 0.070*** | 0.068*** | 0.069*** | 0.041** | 0.053*** |
| | (0.024) | (0.019) | (0.023) | (0.018) | (0.019) | (0.016) |
| Control variables | Yes | Yes | Yes | Yes | – | – |
| Year fixed effects | Yes | Yes | Yes | Yes | – | – |
| Firm fixed effects | Yes | Yes | Yes | Yes | – | – |
| State × year fixed effects | Yes | Yes | Yes | Yes | – | – |
| Observations | 143,192 | 143,192 | 159,558 | 159,558 | 3,958 | 3,958 |
| R-squared | 0.76 | 0.59 | 0.78 | 0.60 | 0.00 | 0.00 |

*Notes.* Standard errors are reported in parentheses. The sample period is from 1976 to 2006. *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.