Disloyal managers and shareholders' wealth

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Abstract

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JEL classification: G34; K22

Keywords: Corporate opportunities waiver; Innovation; Marginal value of cash; Acquisitions; Firm value

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1. Introduction

Agency conflicts arise when managers' interests depart from those of shareholders. Shareholders expect managers to have a fiduciary duty to subordinate their personal interests to those of shareholders, and in particular, not to take new business opportunities for themselves rather than the corporation. For the vast majority of the history of corporate law, shareholders would have been correct in this presumption. But in 2000, states, starting with Delaware, changed the law to allow companies to waive this so-called duty of loyalty. These corporate opportunity waivers explicitly allow managers to ignore the duty of loyalty when in the course of their employment, they discover new business opportunities. Despite this substantive shift in the law underpinning corporate governance, these statutory changes have received very little attention in the academic literature, with the notable exception of a law review article (Rauterburg and Talley, 2017). In this study, we present the first investigation of the consequences of this shift for corporate innovation and growth strategies.

Specifically, we use the staggered state-level adoption of corporate opportunity waivers to identify their causal effect on corporate innovation activity, the value shareholders put on internal slack, and the value implications of acquisitions. Because the waivers allow managers to expropriate new opportunities for themselves without first offering them to their employer, we predict that corporate capture of innovation, through patents assigned to the company, will decrease. Further, shareholders will place a lower value on internal slack. Finally, facing slower internal growth due to expropriated innovation, boards will pursue growth through acquisition, but as this is a second-best solution, the value consequences of the acquisitions will be negative. This last result can obtain either due to worse acquisitions, or due to the revelation bias documented in Wang (2018), which in this case is the revelation that the effect of the waiver is strong enough to affect the firm's organic growth prospects, forcing it to conclude that it is better off acquiring.

We test these hypotheses using a large panel of publicly traded U.S. firms, exploiting the staggered adoption of the corporate opportunity waiver laws by nine states between 2000 and 2016 (see Table 1). We first show that there is a sharp discontinuity in innovation after the adoption of the waivers, with R&D spending, patent value and patent counts all dropping in the year after the waiver adoption and remaining at the new lower level. We then investigate the value of the remaining innovation and find that the contribution of marginal spending on R&D to market value is lower, as is the incremental patent value. We view this stark impact of the waivers on corporate innovation activity as the primary channel through which they affect the value of internal slack and the company's acquisition activity.

We investigate these implications next, starting with the market valuation of internal cash. The results show that, subsequent to waiver law adoption, the market valuation of a marginal dollar of internal cash is 7 to 12 cents lower than it was prior to the waiver law adoption. Finally, we test the hypothesis that, with greater expropriation of internal growth opportunities, the board turns to acquisitions for growth, and that after a waiver law adoption, an acquisition announcement reveals more negative information to the stock market. We find that acquisition announcement returns are significantly lower after a waiver law adoption, and that acquirers are less likely to withdraw from acquisitions met with negative returns as well. This last result is consistent with the interpretation that the announcement reaction is due to the revelation of the waiver's effect on the acquirer's internal growth prospects rather than the value implication of the deal itself.

With difference-in-differences (DiD) methods, we study changes in innovation activity, the marginal value of cash, and acquisition decisions for firms once their state of incorporation passes a corporate opportunities waiver law (the treatment group) against changes in the same characteristics for firms not subject to the law (the control group). As noted by Bertrand, Duflo, and Mullainathan, (2004), two econometric issues threaten the validity of DiD models: lack of

parallel trends, and serial correlation. While testing for parallel trends is inheritably infeasible, we run multivariate falsification tests showing that, in the absence of the treatment (i.e., the passing of a waiver law), the difference between the treatment and control groups stays constant over time. These findings suggest that our analyses comply with parallel trends. In addition, results from non-parametric permutation tests (Chetty, Looney, and Kroft, 2009) suggest that serial correlation and artificially inflated *t*-statistics do not bias our results.

Our paper contributes to the growing literature on the real implications of changes in corporate law. This work includes the vast literature on the effects of antitakeover legislation (see, e.g., Karpoff and Wittry (2017) and Cain, McKeon and Solomon (2017)), and the growing literature on the effects of Universal Demand Laws (see, for example, Appel (2019)). We join Rauterburg and Talley (2017) in exploring corporate opportunity waivers and our study is also related to Barzuza and Smith (2014) study of Nevada in particular, and more generally on the race to the bottom in creating manager friendly corporate legal environments.

Overall, our study fits into the broad literature on corporate governance (see Yermack (2010), Edmans (2014), and Hilt (2014) for reviews) and how certain legal principles, such as the duty of loyalty, are critical determinants of the ability of shareholders to capture the value created by their investment. Changes in these duties impact the incentive to invest in innovation activities, which ultimately alters the growth path of innovating firms and hence, the allocation of assets in the economy.

The paper continues as follows. Section 2 provides a brief background on the corporate opportunities doctrine and the state legislated waivers to this doctrine. Section 3 evaluates the effect of a waiver on innovation activities as well as their contribution to firm value. Section 4 examines the impact of the waivers on the marginal value of cash. Section 5 considers whether and how the waivers affect acquisition decisions and outcomes. Section 6 addresses

methodological issues related to our use of difference-in-differences estimation methods. Our conclusions appear in Section 7. The variables we use in this study are defined in the appendix.

2. Corporate opportunity waivers

A foundational part of the duty of loyalty owed by corporate managers to shareholders is the corporate opportunities doctrine.[1] The corporate opportunity doctrine is the legal principle requiring that directors and officers of a corporation, in their role as fiduciaries, must not take for themselves any business opportunity that could benefit the firm. The purpose of the doctrine is to recognize an inevitable conflict of interest and decide it firmly in the shareholders' favor. Specifically, a self-interested fiduciary that discovers a business opportunity might be tempted to appropriate the opportunity for him or herself. However, a direct conflict of interest will arise if (1) the corporation is financially able to undertake the opportunity; (2) the opportunity is within the firm's line of business; (3) the corporation has an interest or expectancy in the opportunity; and (4) by personally appropriating the opportunity, the corporate fiduciary will thereby be placed in a position that conflicts with his duties to the corporation.[2] The doctrine resolves this conflict by unequivocally requiring the company to decline the opportunity before the fiduciary can pursue it.

This doctrine has been an immutable part of common law legal system's corporate law since the 1800s, which made it all the more surprising when the Delaware legislature amended Delaware corporate law to explicitly allow companies incorporated in that state to waive this part of the duty of loyalty. Delaware was soon followed by eight more states, thereby freeing

[1] We draw from the law review article by Rauterburg and Talley (2017) in generating this summary of the corporate opportunities doctrine and waivers.

[2] These four parameters, which are outlined in the Broz v. Cellular Info. Sys 673 A.2d 148 (Del. 1996) decision, were first mentioned in the Delaware Chancery Court 1939 decision of Guth v. Loft. In that case, Charles Guth, president of Loft, Inc., a firm that served cola drinks in its fountain stores, relied on cola syrup supplied from Coca-Cola Ltd. Guth personally bought the Pepsi company and its syrup recipe after Pepsi filed for bankruptcy. Afterwards, using Loft's chemists, Guth reformulated Pepsi's syrup recipe and intended to sell it to Loft. As a result, Guth was sued by Loft's shareholders, who alleged that he breached his fiduciary duty of loyalty to the company by failing to offer the Pepsi business opportunity to Loft, instead appropriating it for himself. The court ruled in favor of Loft's shareholders.

thousands of US corporations to waive the opportunities requirement. Rauterburg and Talley (2017) estimate that over one thousand public companies have subsequently executed a corporate opportunities waiver.

The motivation for Delaware's action was sound; the existing doctrine was inflexible and demanded "undivided" loyalty of a fiduciary. However, many growing organization forms (venture capital, private equity, partial spin-offs, joint ventures, etc.) involve managers and board members with concerns in businesses with potentially overlapping interests. The existing doctrine did not permit a corporation the flexibility to contract on specific boundaries of loyalty. The rationale for the legislative action was to create that flexibility. Nonetheless, Rauterburg and Talley (2017) find that companies waiving the opportunities doctrine are typically large and profitable, not the situations that motivated the law change. In the rest of this study, we investigate the effects of these waivers.

3. The effects of corporate opportunity waivers on innovation

We hypothesize that waiving the corporate opportunities doctrine—a fundamental aspect of the duty of loyalty—will adversely affect corporate innovation because the firm's fiduciaries will no longer be required to subordinate their own interests to their corporation's shareholders. As such, managers covered by a corporate opportunity waiver (COW) could legally pursue and develop new business projects for their personal benefit without the obligation of offering them to their firms. This will decrease the expected return on innovation activities, as some opportunities discovered in the course of research and development will be appropriated by fiduciaries, and will have a quick and lasting impact on the quality of current innovation retained by the company. To test this hypothesis, we study firms' innovation activity around the passing of COW laws by considering research and development (R&D) spending, the quality (value) of the innovation, and the number of patents generated.

We draw patent information from the Kogan, Papanikolaou, Seru, and Stoffman (2017) dataset which covers all patent applications filed with (and ultimately granted by) the US Patent and Trademark Office (USPTO) from 1926 to 2010. We focus on the patent filing year because Griliches, Pakes, and Hall (1987) argue that, unlike the grant year, the filing year truly identifies the actual time of innovation. In addition, focusing on the filing date mitigates the concern of potential anomalies arising from lags between the application and granting dates (two years, on average). With the identifiers provided for each patent filing firm by Kogan et al., we merge their dataset with CRSP and Compustat to create a sample of 57,672 firm-years for 8,559 unique U.S. firms from 1996 to 2010.[3]

For our first proxy of innovation activity we estimate R&D intensity by scaling R&D expenditures by the firm's assets. For the second proxy, we follow Kogan et al. (2017) and measure the quality of innovation (or patent's dollar value based on the stock market reaction upon the patent's approval) by adding all the values of patents that are granted to the firm in the year, and then scaling this total by the firm's assets.[4] For the third proxy, we use patent output (the number of patents granted scaled by the firm's assets) as it is a widely accepted measure of innovation (Hall, Jaffe, and Trajtenberg 2001). Nevertheless, comparing patent counts is not straight forward since counts vary over time and across technological classes. Moreover, counts are susceptible to a truncation bias because patents are recorded (in the Kogan et al. dataset) only after they are granted. We alleviate these issues by weighting each patent by the mean number of patents granted in the same year and technology class (Hall, Jaffe, and Trajtenberg, 2001, 2005). Thus, patents granted in fields with more patent activity receive less weight.

[3] The sample excludes financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999).

[4] Specifically, for each patent, Kogan et al. use standard event study methods to estimate the firm's market-adjusted stock return running from the day of the patent approval announcement date until two days after (t, t+2).

Table 2 provides summary statistics for our innovation sample. On average, firms spend 5.6% of their assets in R&D. This proportion is close to 7.3%, the value reported by Koh and Reeb (2015) for the same variable. We note that for the average firm, the value of their patents represents 2.6% of its assets. This figure compares favorably to the 3.1% reported by Kogan et al. (2017).

We begin with a simple test that considers changes in our innovation proxies around the adoption of COW. As treatment (i.e., passing of a COW law) occurs at different times for different states, we use the method in Gormley and Matsa (2014) and construct cohorts of treated and control firms for the three years before and the three years after each COW event. We then pool the data across cohorts and regress our innovation variables on a COW indicator for years (-3) through (+3), firm-cohort, headquarter state-year-cohort, and industry-year-cohort fixed effects. The COW indicator is set to one once the firm's state of incorporation adopts a COW law. Otherwise, the indicator is set to zero. For each innovation proxy, we plot the OLS point estimates excluding the indicator for the year in which a state passes the law—COW Year (0)—in order to trace its effect relative to this year.[5] The objective of these plots, which we report in Figure 1, is to determine whether there is a clear change in the trend of the innovation variables around the promulgation of COW laws. Visual inspection of Figure 1 reveals that the change in treatment group behavior describes a sharp decrease in innovation for all our innovation proxies *after* COW laws pass. According to Figure 1, after COW adoptions, R&D spending drops by 0.015, which represents a cut of 27% based on the sample mean of 0.056. Likewise, once COW laws are in effect, innovation value falls by 0.0055 (equivalent to a 21% reduction from the sample mean of 0.026) and patent counts decline by 0.0012 (a 9% decrease from the sample mean of 0.014).

[5] We winsorize the variables in these tests at the 1% tails to reduce noise in each period point estimate.

The plots in Figure 1 indicate that innovation activity, proxied by R&D spending, innovation value, and patent generation declines after COW laws pass. We complement the graphical analyses with hedonic regressions like those in Hall et. al. (2005). Specifically, Table 3 presents three regressions in which we respectively evaluate the relative contribution of our three innovation variables to the market value of the firm. Equation (1) describes the baseline hedonic regression we estimate:

$$ln(\text{Tobin's q})_{i,t} = \alpha_{i,t} + \beta_1 \text{innovation}_{i,t} + \beta_2 COW_{s,t} + \beta_3 \text{innovation}_{i,t} \text{ X } COW_{s,t} + f_i + \omega_{l,t} + \lambda_{j,t} \quad (1)$$

where i indexes firms, s indexes the firm's state of incorporation, l indexes a firm's headquarters (HQ) location, j indexes industries, and t indexes time.

In the baseline hedonic model, the dependent variable is the natural logarithm of Tobin's q and $COW_{s,t}$ is a (0,1) indicator variable denoting that a corporate opportunities waiver law is effective in state of incorporation s at time t at the end of the fiscal year. Equation (1) controls for unobserved firm heterogeneity, time-varying differences across states, and time-varying differences across industries by including firm (f_i), HQ state-by-year ($\omega_{l,t}$), and 3-digit SIC industry-by-year ($\lambda_{j,t}$) fixed effects for a firm i, headquartered in state l, operating in industry j, at time t. Angrist and Pischke (2009) and Gormley and Matsa (2014) argue that including additional controls in the presence of fixed effects may lead to biased parameter estimates if they are contemporaneously affected by the identifying construct (in our case, the passage of COW laws). Therefore, our estimations of equation (1) suppress all control variables.[6] In all tests, we follow Petersen's (2009) advice to control for serial correlation with robust Rogers (1993) standard errors clustered at the state of incorporation level s.

Looking at the regressions in Table 3, we focus on the β_3 coefficient (for the $\text{innovation}_{i,t}$ X $COW_{s,t}$ interaction term) as it provides the contribution of our innovation proxies to the

[6] Our baseline results are unaltered when we repeat all our empirical tests in regressions that simultaneously use all control variables and all fixed effects. These analyses are available upon request.

market value of the firm *after* COW laws pass. The results associated with β_3 indicate that the market value of the firm relies significantly less on innovation activity after COW laws pass. According to model (1), for example, a one percentage point increase in R&D intensity is associated with an increase of 0.51% in the firm's market value but it is reduced by 0.17% once a COW is in effect. Likewise, the estimates in model (2) imply that increasing the value of patents per dollar of assets by one percentage point is related to an increase of 0.80% in Tobin's q which is lowered by 0.32% when a waiver releases the firm's managers from their duty of loyalty. Model (3) paints a similar picture: a single percentage point increase in the number of patents per dollar of assets contributes 0.43% to the average firm's market value, but once COW laws pass, the contribution drops by 0.18%.

Overall, the results in Table 3 suggest that once corporate fiduciaries can lawfully appropriate new business opportunities for themselves without first presenting them to the company, the relative contribution of innovation to their firm's market value declines sharply. In this regard, our results suggest that by diluting the fiduciary duty of loyalty, COW laws limit a firm's ability to grow organically.

4. Corporate opportunity waivers and the marginal value of cash

Dittmar and Mahrt-Smith (2007) show that that the value of an extra dollar of cash is lower in firms with poor corporate governance. If our setting, we would expect a similar finding if corporate opportunities waivers worsen the governance of firms incorporated in states that approve such waivers. We evaluate this possibility in this Section.

We expand the empirical framework in Faulkender and Wang (2006),[7] in a specification, given by equation (2), as follows:

[7] Other recent papers that adapt the Faulkender and Wang specification include: Dittmar and Mahrt-Smith (2007); Masulis, Wang, and Xie. (2009); Fresard and Salva (2010); Denis and Sibilkov (2009); Harford, Klasa, and Maxwell (2014); Duchin, Gilbert, Harford and Hrdlicka (2017); and Dessaint and Matray (2017).

$$r_{i,t} - R_{i,t}^{B} = \gamma_0 + \gamma_1 COW_{s,t} + \gamma_2 \frac{\Delta C_{i,t}}{M_{i,t-1}} \times COW_{s,t} + \gamma_3 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \quad (2)$$

$$\gamma_5 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_6 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \gamma_7 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \gamma_8 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \gamma_9 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_{10} L_{i,t} + \gamma_{11} \frac{NF_{i,t}}{M_{i,t-1}} +$$

$$\gamma_{12} \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_{13} L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}}$$

where ΔX reflects the change in the variable X. $COW_{s,t}$ is a (0,1) dummy variable that, when set equal to 1, indicates that a corporate opportunities waiver law is effective in state of incorporation s at time t at the end of the fiscal year. $C_{i,t}$ and $C_{i,t-1}$ are cash and marketable securities at the end and beginning of the period (respectively), $E_{i,t}$ is earnings before interest and extraordinary items, $NA_{i,t}$ is total assets net of cash, $RD_{i,t}$ is research and development expenditures, $I_{i,t}$ is interest expense, $D_{i,t}$ is total dividends, $L_{i,t}$ is market leverage, and $NF_{i,t}$ is the net amount of external financing. All firm level control variables are normalized by the beginning of period market capitalization ($M_{i,t-1}$). In equation (2), the coefficient of interest, γ_2, measures the dollar change in equity value resulting from a dollar change in the firm's cash holdings *after* COW laws pass.

As in Masulis, Wang, and Xie (2009), we estimate the benchmark return in two different ways. The first is the value-weighted return based on market capitalization within each of the 25 Fama-French portfolios formed based on size and book-to-market ratio. The second is the value-weighted Fama-French (1997) 48-industry returns.

Table 4 presents descriptive statistics for the sample we use to estimate equation (2). It consists of 48,764 firm-years for 7,734 unique U.S. firms from 1996 to 2018 drawn from the merged CRSP-COMPUSTAT database. In many important respects, our sample looks like the samples used to estimate the marginal value of cash in other work. For instance, the median value for our size and market-to-book adjusted return and our industry-adjusted excess return are -11.2% and -7.7%, respectively. These values are similar in magnitude to the medians of -10.1% and 7.4% reported by Chen, Harford, and Lin (2015) for the same variables. In our

sample, the median level of cash (0.088) and the median level of leverage (0.138) are comparable to the medians reported for those variables (0.116 and 0.179) in Masulis et al. (2009).

Table 5 presents the regression results for equation (2). In models (1) and (2), the dependent variable is the size and market-to-book adjusted excess return during fiscal year *t* whereas in models (3) and (4), it is the industry-adjusted excess return during fiscal year *t*.

We notice that some control variables generate findings that match those in other studies. For instance, we find negative and significant coefficients for the interaction term between the change in cash and lagged cash, and for the interaction between leverage and change in cash. These results are consistent with those in Chen et al. (2015), Faulkender and Wang (2006), and Masulis et al. (2009).[8] More importantly, across the four models, we consistently estimate a statistically significant negative coefficient for γ_2, indicating that the value of an extra dollar of cash declines after COW laws are enacted. According to the estimates in Table 5, on average, the value of an additional dollar falls by 9 cents to 12 cents in firms incorporated in states that pass corporate opportunities waiver legislation. This decrease is economically large and roughly equivalent to one standard deviation of the marginal value of cash (10.4 cents) before COW laws pass. In general, the results in Table 5 are congruent with those in Dittmar and Mahrt-Smith (2007) and support our conjecture that, on average, COW laws weaken the corporate governance of firms incorporated in states that approve these waivers.

5. The impact of COW on firms' acquisitions

So far, our results (Table 3) indicate that innovation activity contributes less to the market value of firms incorporated in states where their fiduciaries are covered by a corporate opportunities waiver. This evidence suggests that these waivers lessen the ability of firms to

[8] Furthermore, in models (2) and (4), the respective estimates on Δ Cash, 1.542 and 1.647, are close to the values of 1.801 reported by Chen et al (2015) and 1.466 reported by Faulkender and Wang (2006) for the same variable.

grow organically. When organic growth is muted, firms are likely to pursue growth through acquisitions. If this happens, a negative revelation effect occurs upon an M&A announcement if the market perceives that a negative shock to the firm's growth prospects compelled its managers to acquire (Wang, 2018). In this section, we evaluate these conjectures by examining whether firm's covered by COW laws (i) are more likely to make acquisition bids, (ii) are more likely to make acquisition bids that are met with negative market announcement reactions, and (iii) are less likely to withdraw from M&A deals that trigger negative announcement returns.

5.1. Sample

We begin with 81,134 firm-years for 9,752 unique U.S. firms excluding financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999) in the merged CRSP-COMPUSTAT database. We match these observations with information from the Securities Data Corporation's (SDC) US Mergers and Acquisitions (M&A) database to identify firms that issue acquisition bids during the sample period. Panel A in Table 6 presents descriptive statistics for this sample. We note that the unconditional probability of making an acquisition bid for our sample firms is 5.6%, a value that is within the 4.5% and 8.2% reported by Akbulut (2013) and Cai and Vijh (2005), respectively. We use the sample described in Panel A to evaluate the effect of COW laws on the likelihood of issuing a merger bid.

We refine the sample in Panel A by requiring that (i) the acquisition is completed, (ii) the transaction value reported in SDC is more than $1 million and is at least 1% of the acquirer's market value of total assets, measured at the fiscal year-end before the M&A announcement, (iii) the acquirer owns less than 50% of the target's equity before the M&A announcement but more than 50% after the deal is completed, (iv) the acquirer has 272 trading days of stock return data before the M&A announcement available from CRSP and accounting data available from Compustat, and (v) the deal is not classified as a spinoff, recapitalization, exchange offer, repurchase, self-tender, or privatization. These requirements yield a sample of 4,716 completed

U.S. domestic M&A deals made by 2,376 unique U.S. acquirers during 1996-2018. We use this sample, which is described in Panel B of Table 6, to study the effect of COW legislation on acquisition quality.

As can be seen in Panel B of Table 6, our summary statistics resemble those reported in other studies. For instance, at 0.346%, our median acquirer announcement return is comparable to the 0.473% reported by Masulis et al. (2009) for the same variable. Likewise, in our sample, the proportion of negative CAR deals is 0.466 which is close to the 0.517 reported in Chen et al. (2015). Moreover, the magnitude for the mean values we report for the acquirer's size, Tobin's q, and ROA (8,258, 2.930, 0.16), are similar to those in Chen et al. (8,460, 3.052, and 0.131).

5.2. Acquisition decisions

We examine firms' acquisition decisions (in the sample described in Panel A of Table 6) using differences-in-differences estimation in which we expand the linear regression model in Comment and Schwert (1995) and Palepu (1986) with our COW indicator as the key independent variable. Specifically, in the six models reported in Panel A of Table 7, the dependent variables are as follows: a dummy variable set to 1 if the firm makes a merger bid during the year and set to 0 otherwise (in models (1) and (2)), the natural logarithm of 1 plus the number of bids (in models (3) and (4)), and the natural logarithm of 1 plus the total M&A deal value of all bids made by the firm during the year (in models (5) and (6)). The odd-numbered models include headquarter state × year and industry × year fixed effects while the even-numbered tests include a vector of firm characteristics in addition to the fixed effects.

The COW indicator, our main independent variable, attains a positive and significant coefficient in all tests. The magnitude of the regression coefficients indicates that the effect of a COW is economically important. For example, looking at model (1) in Panel A of Table 7, we find that firms incorporated in COW states are 0.8% more likely to make a merger bid. This

estimate represents an increase of 14 percentage points based on the 5.7% unconditional probability of issuing a bid for the sample firms. According to model (3), the annual number of M&A bids increases by 0.7% once COW laws are in effect. In terms of the money spent by the acquirers, the estimates in model (5) indicate an increase of 4.7% in total M&A deal value after COW laws are enacted. Consistent with our conjectures, the results in Panel A of Table 7 suggest that firms covered by COW laws are more likely to grow through acquisitions and to commit more resources to achieve such growth.

5.3. Acquisition quality

We now use the sample described in Panel B of Table 6 in regressions that examine acquisition quality of firms incorporated in states that enact COW laws. These tests are reported in Panel B of Table 7. In model (1) of Panel B, the dependent variable is the acquirer's three-day cumulative abnormal return (CAR) during the window centered around the M&A announcement (-1,+1). We estimate abnormal returns as the acquirer's stock return minus the CRSP value weighted market return (Dodd and Warner, 1983).[9] The independent variable of interest in model (1), COW (0,1), is a dummy variable that equals 1 if a corporate opportunities waiver law is effective in the firm's state of incorporation when the M&A deal is announced. Otherwise, the dummy variable equals 0. Model (1) also includes a wide array of acquirer- and deal-specific control variables like those in other studies (e.g. Masulis et al., 2009) as well as state × year and industry × year fixed effects.

The results in model (1) of Panel B (Table 7) indicate that that the three-day M&A CAR accruing to the acquirers in our sample is 77 basis points lower once COW laws pass. This drop implies a reduction of about US$64 million in the market capitalization for the average sample

[9] Fuller, Netter, and Stegemoller (2002) note that, in calculating abnormal returns, the estimation period often includes previous takeover bid announcements, particularly for frequent acquirers, making market model parameter estimation less meaningful. They also note that for short-window event studies, adjusting the market return by the firm's beta does not significantly improve the abnormal return estimation. Our analysis is robust to using the market model estimated during a one-year window ending one month before the deal announcement.

acquirer during the announcement period. To assess whether firms covered by COW are more likely to engage in inferior acquisitions, we set the dependent variable in model (2) of Panel B to 1 if the acquirer's CAR is negative and set it to 0 otherwise. All the right-hand side variables in model (2) are the same as those used in model (1). The results show that acquirers are 3 percentage points more likely to engage in acquisitions that generate negative stock market returns upon their announcement. This effect is economically large when benchmarked against the 47% incidence of M&A deals that generate negative M&A announcement CARs in our sample and also against an extensive body of research showing that market reactions to M&A announcements are, on average, neutral or mildly negative for acquirer firms (e.g., Andrade, Mitchell, and Stafford, 2001; Betton, Eckbo, and Thorburn, 2008).

Next, we examine whether COW coverage affects the acquirer firm's response to the investor's reaction to an M&A announcement. Earlier work shows that acquirers are more likely to rescind acquisitions bids that are met with unfavorable investor reactions. The same work also shows that the propensity to pull out from a seemingly bad acquisition is lower for acquirer firms subject to agency problems (e.g., Chen, Harford, and Li, 2007). In model (3) of Panel B, we follow Masulis et al. (2009) and modify the specification of model (1) in two ways. First, in model (3), the dependent variable equals 1 if an acquisition is withdrawn and 0 otherwise. Second, as additional control variables, model (3) includes the acquirer's three-day M&A CAR (-1,+1) and the interaction between this CAR and the COW (0,1) indicator (i.e., COW × CAR(-1,+1)).

The results in model (3) are consistent with those in the earlier literature. We also find an inverse association between the market's reaction to the M&A upon its announcement and the probability that the deal is withdrawn. The estimates indicate that a 1% decrease in CAR is related to a 6.9% increase in the probability that the deal is withdrawn. More importantly, the COW × CAR(-1,+1) interaction term earns a positive and significant coefficient. This is

consistent with our prediction that after a COW law passes, an acquisition announcement reveals the extent of the reduction in internal growth opportunities and the market's reaction is updating the value of the acquirer more than it is valuing the deal per se (consistent with the general evidence in Wang (2018)).

To add perspective to this finding and understand its economic importance, we consider the 508 M&A bids whose M&A announcement CARs are in the bottom decile. Among these acquisitions which were disliked by investors, the withdrawal probability for the 199 acquirers subject to a COW is 9.55% whereas the withdrawal probability for the 309 acquirers not subject to a waiver is 15.48%. The *p*-value for the difference in proportions between the two groups is 0.05. Unless managers in states enacting a COW statute are systematically less likely to learn from and react to the acquisition announcement return, the difference in withdrawal probabilities suggests that managers in COW states are focused on the acquisition as replacement for lost internal growth, rather than on the market's perception of the transaction. Such managerial behavior is consistent with our initial premise that a corporate opportunities waiver lowers the firm's value by reducing its avenues for internal growth. The extent of this is revealed when the acquisition is announced.

The empirical findings in Panel B of Table 7 support the view that, once their state approves a COW law, firms face lower return on internal growth and turn to second-best (less profitable) growth through acquisitions. Our results show that these firms are more likely to make M&A bids, and that the market reaction and subsequent managerial actions are consistent with the revelation of the negative effects of a corporate opportunities waiver on firm value.

6. Methodological concerns

With difference-in-differences (DiD) estimation, we compare changes in innovation, in the marginal value of cash, and in acquisition decisions and performance among firms incorporated in states that pass a COW law with changes in the same variables among firms incorporated

elsewhere. There are two econometric issues that are known to threaten the reliability of DiD estimates which we address in this Section: lack of parallel trends, and serial correlation.

6.1. Parallel trends

A potential concern with our experimental design is whether events other than a COW law might be driving our results. A related problem is whether the state's adoption of corporate opportunities waiver legislation is anticipated. These issues illustrate violations of the parallel trends assumption which needs to be satisfied to ensure the internal validity of DiD models. This assumption requires that in the absence of the treatment (e.g. the enactment of a COW law), the difference between the 'treatment' and 'control' group is constant over time. Although the parallel trends assumption is not really testable, we use the falsification method recommended by Roberts and Whited (2013) to check whether the change in the outcome variables we document in the preceding analyses occur only *after* COW laws are enacted, but not *before*.

We perform falsification regression analyses of the pre- and post-trends in our outcome variables. For this purpose, we construct indicator variables that assign each COW law event a placebo date one year (y - 1) and two years (y - 2) *before* the year of their actual promulgation (i.e., y + 0). We define analogous variables *after* COW laws pass (i.e., (y + 1), (y + 2), ($y + 3^{+}$)). We use these indicator variables to re-estimate regressions that are specified as those in Tables 3, 5, and 7. The falsification tests appear in Table 8.

Panel A in Table 8 presents three Tobin's q regressions that augment the specification in Table 3 with the placebo indicators as independent variables. The results of these tests indicate that innovation activity, proxied by R&D spending (model 1), patent output (model 2) and patent value (model 3) contribute less to the market value of the firm *once* COW laws pass, but not earlier. In Panel B, we use the placebo indicators to expand the marginal value of cash models we estimate in Table 5. These expanded regressions show that the value of an extra

dollar declines only *after* COW laws are effective, regardless of whether the dependent variable is estimated as the size and market-to-book adjusted annual excess stock return (model 1) or as the industry adjusted annual excess stock return (model 2). In analyses similar to those in Panel A of Table 7, the tests in Panel C of Table 8 use the placebo indicators to show that firms are both more likely to become acquirers and to undertake more expensive takeovers after their state of incorporation enacts a COW law, but not before. Lastly, we use the placebo variables to rerun the acquisition performance regressions reported in Panel D of Table 8. These tests show that investors' reactions to M&A announcements accruing to bidding firms are lower after COW laws pass (model 1), that once states ratify a COW law, firms are more likely to make bids that generate negative stock market reactions (model 2), and that the same firms are less likely to withdraw such bids (model 3).

Altogether, the pre- and post-trend findings in Table 8 generate inferences congruent with those from our main empirical analyses: COW laws lower corporate innovation thereby cutting organic growth, depressing the value of the firm's internal slack, and forcing second-best growth through acquisitions. Importantly, the results in Table 8 suggest that our analyses satisfy the parallel trends assumption.

6.2. Serial correlation and inflated t-statistics

Another non-trivial problem that often undermines the reliability of DiD estimates is that inflated *t*-statistics could arise because serial correlation generates standard errors that understate the standard deviation of the treatment effect (Bertrand, Duflo, and Mullainathan, 2004). We address this issue with the nonparametric permutation test method endorsed by Chetty, Looney, and Kroft (2009). Those authors argue that, since these tests make no parametric assumptions about the error structure, they are not vulnerable to the over-rejection bias of the *t*-test when serial correlation occurs.

Following Chetty et al. (2009), we randomly assign a firm in our sample to a state that has passed a corporate opportunities waiver law to create our placebo test group. Afterwards, we re-estimate all the baseline tests, treating the placebo group as the actual treatment group. For every outcome variable, we repeat this process 2,000 times using a different random number generator seed for every iteration. We record each estimate to plot the cumulative distribution function (cdf) plots in Figure 2 for every outcome variable. The plots in Figure 2 are organized as follows. Panels A, B, C, and D present the cdf plots that correspond to the outcome variables we use in Table 3, Table 5, Table 7-Panel A, and Table 7-Panel B, respectively. To provide a benchmark, we overlay a vertical line in each cdf figure to show the original regression coefficient from the corresponding baseline model.

Contrasting the cdf plots in Figure 2 to their corresponding regression coefficients suggests that our analyses are not susceptible to serial correlation and inflated *t*-statistics. For example, looking at the R&D spending plot in Panel A of Figure 2, 38 out of the 2,000 (1.9%) placebo coefficients are smaller than the reported estimated effect (-0.166) from Table 3, Model 1. In Panel B, for the industry-adjusted marginal value of cash plot, 18 out of 2000 (0.9%) of the placebo coefficients are smaller than the estimated effect in Table 5, Model 4 (-0.120). According to the bid (0,1) plot in Panel C of Figure 2, 94 of the placebo estimates (4.7%) are larger than the 0.008 estimate from Table 7-Panel A, Model 1. Likewise, in the probability that a "COW bidder" earns a negative M&A announcement CAR in Panel D, 66 of the 2000 placebo coefficients (3.3%) are larger than the actual parameter estimate in Table 7-Panel B, Model 2 (0.03). Chetty et al. (2009) note that the identified percentage of the placebo coefficients that is contrasted with the treatment is like a *p*-value, which should yield statistical inferences like those from the actual regression *p*-values. Since this is the case in all the plots in Figure 2, the permutation tests lessen concerns about serial correlation and understated standard errors driving our baseline results.

7. Conclusions

In 2000, a quiet revolution in the standards of corporate governance started. States, beginning with standard-setter Delaware, began allowing boards to waive the long-standing duty of loyalty barring managers from appropriating business opportunities for themselves. While the reasonable goal of contracting-flexibility for start-ups seeking financing was the driver of this change, research by Rauterberg and Talley (2017) finds that many large, unconstrained public firms enacted the waivers.

We study the impact of these waivers where they would be most expected to matter: innovation. The possibility that managers could appropriate new discoveries for their own benefit decreases the return on investment in innovation. Exploiting the staggered introduction of the waiver laws, we find that firms invest less in R&D, produce fewer patents, and less valuable patents after COW adoption. The contribution of innovation activities to firm value decreases, and with a reduction in internal growth opportunities, firms turn toward acquisitions instead. The (lower) market reaction to the acquisition announcements is consistent with the revelation of the value implications of the waiver. While contracting flexibility is generally value-increasing, our study provides policy-relevant evidence that in the case of weakening fiduciary duty, the effect for many firms has been negative.

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Figure 1: Innovation around COW adoption

This figure plots OLS point estimates of the effect of corporate opportunity waiver (COW) law on R&D spending, value of patents, and number of patents. To cleanly identify the timing of the effect, we construct cohorts of treated and control firms for six years around each COW adoption event. We then pool the data across cohorts and regress the outcome variable on COW indicators, firm-cohort, headquarters state-year-cohort, and industry-year-cohort fixed effects. The gray shading represents 90% confidence intervals using heteroskedasticity-consistent standard errors clustered by state of incorporation.

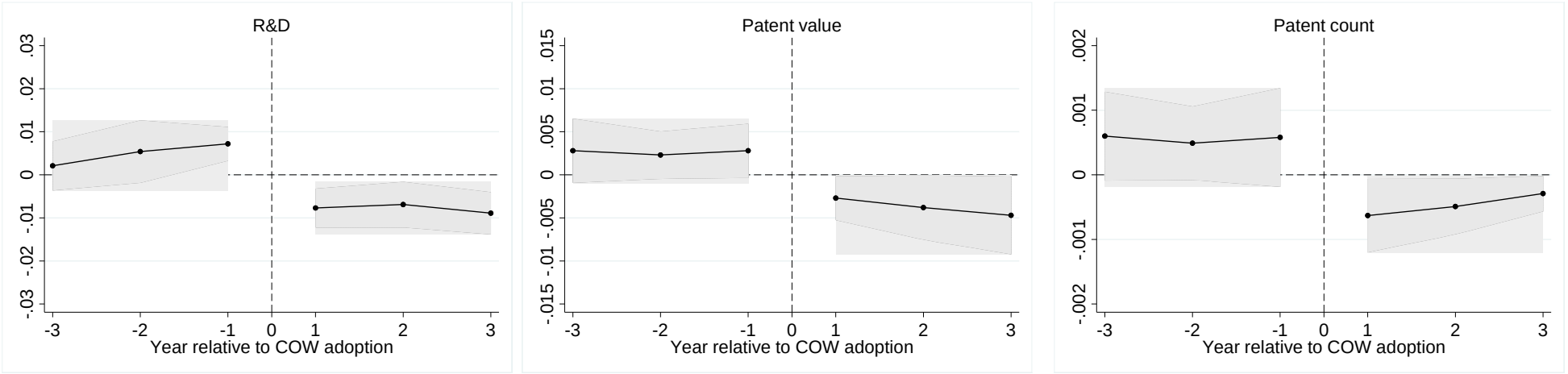
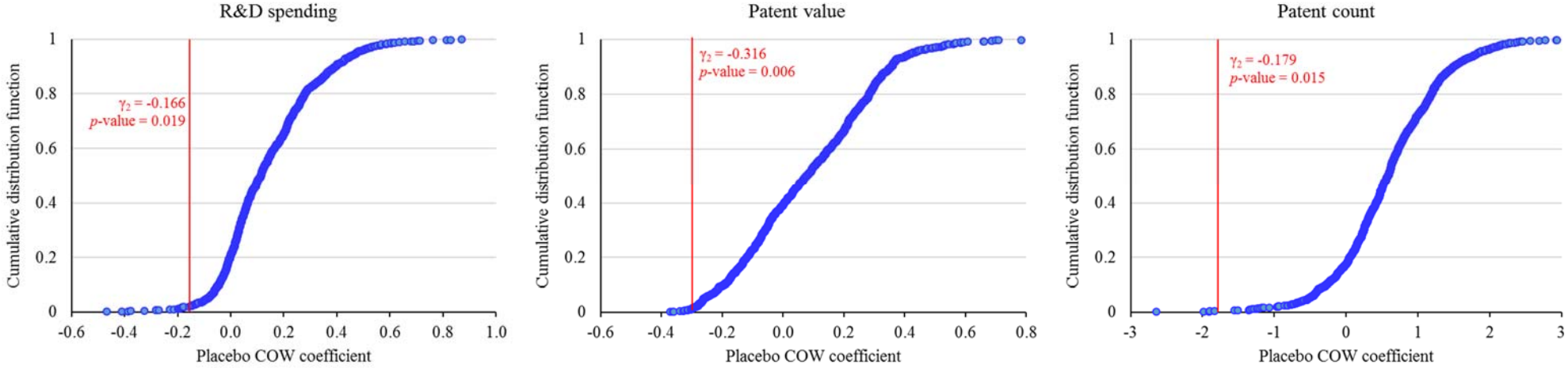


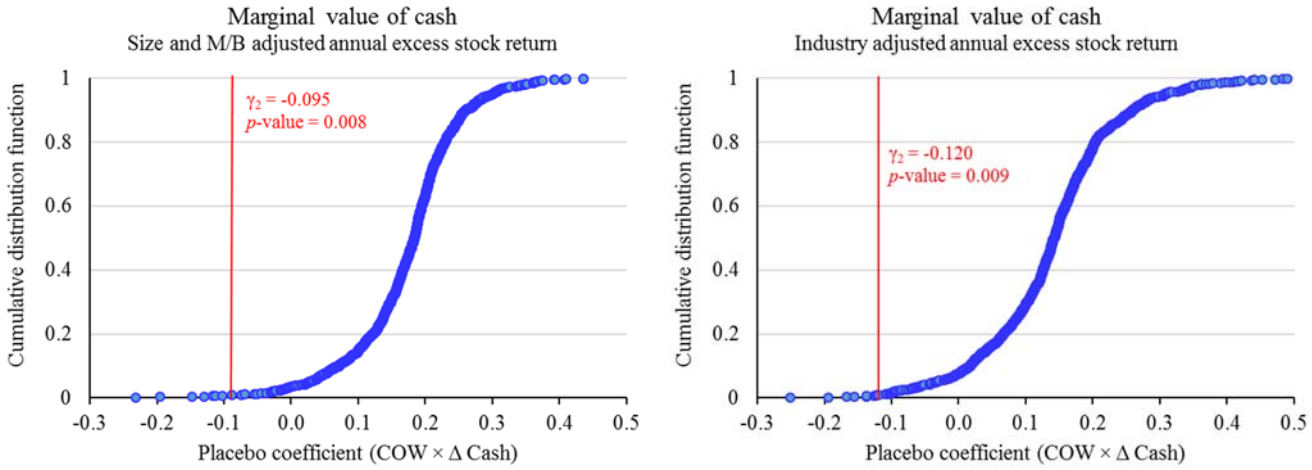
Figure 2: Block permutation tests

This figure presents the outcome of the block permutation procedure following the method in Chetty, Looney, and Kroft (2009). In each iteration, the COW law treatment variable is randomly re-assigned by state and year without replacement as a placebo through the sample period. Our main regressions of the outcome variables are then estimated on the falsified data. The plots report the empirical cumulative distribution function (cdf) generated from running each of the regression models in 2,000 random iterations of this procedure and capturing the placebo coefficient estimate (γ_2, p) of the falsified COW law dummy (or its interaction) and the outcome variables (market's valuation of innovation in Panel A, marginal value of cash holdings in Panel B, acquisition decisions in Panel C, and acquisition quality in Panel D) using regressions from Table 3 Models 1 and 2 (Panel A), Table 5 Models 2 and 4 (Panel B), Table 7 Panel A Models 1, 3, and 5 (Panel C), and Table 7 Panel B Models 1, 2, and 3 (Panel D). The vertical line indicates the position of the actual coefficient estimate for the impact that COW law has on the outcome variables and implied p-value when placed in the context of cdf. The implied p-value reported in each plot shows the proportion of the placebo coefficients that are contrasted with the actual regression coefficient.

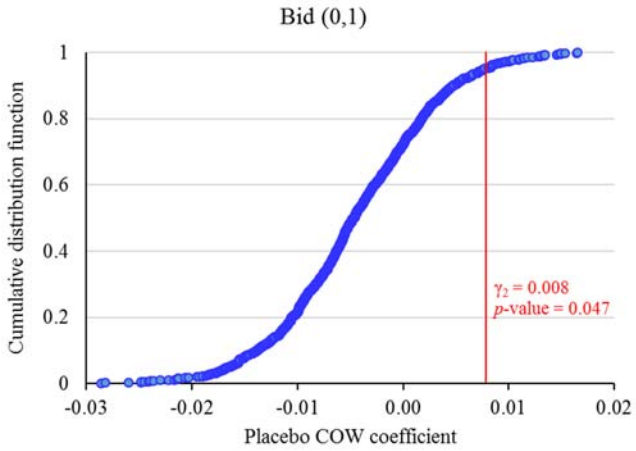
Panel A: Market's valuation of innovation

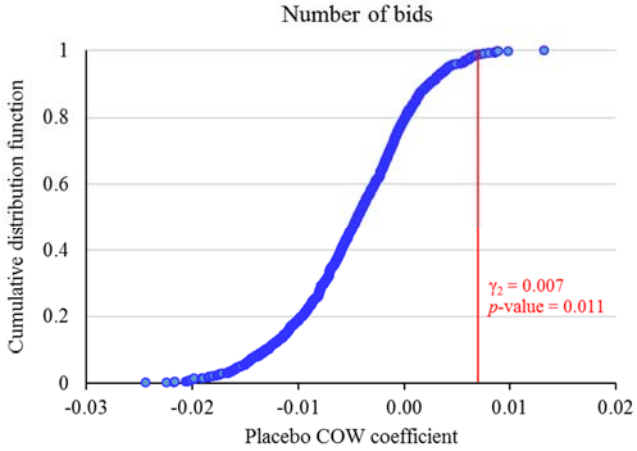


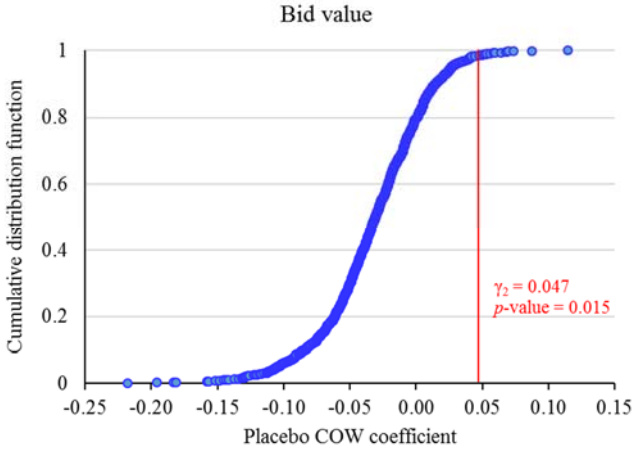
Panel B: Marginal value of cash



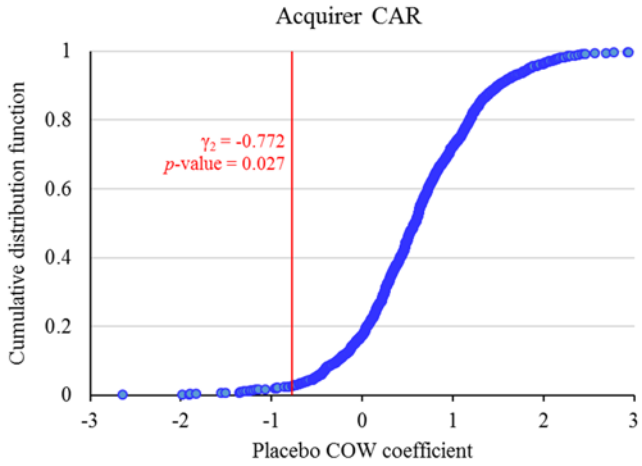
Panel C: Acquisition decisions

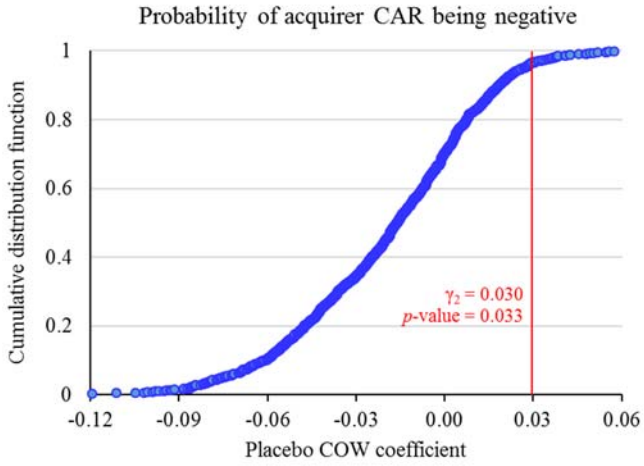






Panel D: Acquisition quality





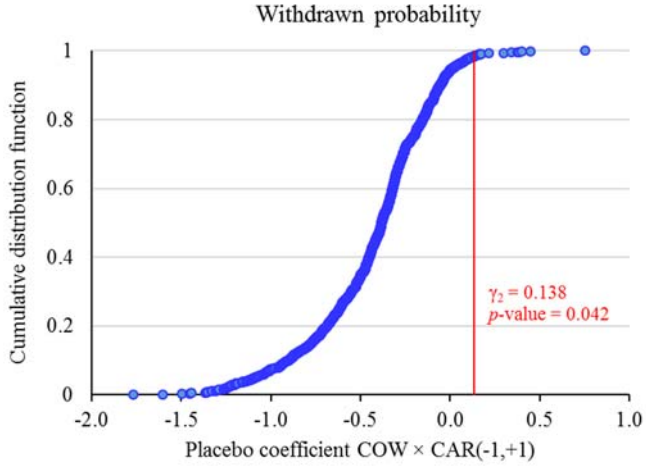


Table 1: State adoption of Corporate Opportunity Waivers law

This table presents the dates that Corporate Opportunity Waivers (COW) law was adopted. Data on the adoption of the law are obtained from Rauterberg and Talley (2017).

State	Implementing Statute	Effective date
Delaware	Del. Code Ann. tit. 8, § 122(17)	July 1, 2000
Oklahoma	Okla. Stat. Ann. tit. 18, § 1016(17)	November 1, 2001
Missouri	Mo. Ann. Stat. § 351.385(16)	October 1, 2003
Kansas	Kan. Stat. Ann. § 17-6102 (17)	January 1, 2005
Texas	Tex. Bus. Orgs. Code Ann. § 2.101(21)	January 1, 2006
Nevada	Nev. Rev. Stat. Ann. § 78.070(8)	October 1, 2007
New Jersey	NJ Stat. Ann. 14A:3-1(q)	March 11, 2011
Maryland	Md. Code Ann., Corps. & Ass'ns § 2-103(15)	October 1, 2014
Washington	Wash. Rev. Code Ann. § 23B.02.020(5)(k)	January 1, 2016

Table 2: Summary statistics – Analysis of the market's valuation of innovation

The sample consists of 57,672 firm-years for 8,559 unique U.S. firms excluding financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999) in the merged CRSP-COMPUSTAT database with complete data to analyze the market's valuation of innovation from 1996 to 2010. COW is one if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. Innovation characteristics variables are scaled by the firm's book value of assets. All other variables are defined in Appendix A. All continuous variables are winsorized at the 1% and 99% level.

	Mean	Std	Q1	Median	Q3
COW	0.442	0.497	0	0	1
Market valuation					
ln(Tobin's q)	0.545	0.635	0.102	0.423	0.875
Innovation					
R&D spending	0.056	0.102	0	0.002	0.073
Dollar value of patents	0.026	0.115	0	0	0.005
Number of patents	0.014	0.065	0	0	0.002

Table 3: Regression analyses of the market's valuation of innovation

The sample consists of 57,672 firm-years for 8,559 unique U.S. firms described in Table 2. The dependent variable is the natural logarithm of the firm's Tobin's q. COW is one if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. The coefficient for this variable is the difference-in-differences estimate. In each model we control for whether the respective innovation measure is zero. All coefficients are estimated by OLS. Industry fixed effects use 3-digit SIC and state fixed effects are based on headquarters location. Robust standard errors are clustered at the state of incorporation level. All other variables are defined in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Innovation measure =	Dependent variable: *ln*(Tobin's q)					
	R&D spending Model 1		Value of patents Model 2		Number of patents Model 3	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
Innovation	0.508***	0.000	0.802***	0.000	0.425***	0.000
COW	-0.046**	0.035	-0.044**	0.014	-0.052**	0.014
COW × Innovation	-0.166**	0.016	-0.316***	0.000	-0.179***	0.003
Intercept	0.516***	0.000	0.483***	0.000	0.507***	0.000
Firm FEs	Yes		Yes		Yes	
State × year FEs	Yes		Yes		Yes	
Industry × year FEs	Yes		Yes		Yes	
N	57,672		57,672		57,672	
Adjusted R^2	0.591		0.602		0.595	
Regression's *p*-value	0.000		0.000		0.000	

Table 4: Summary statistics – Analyses of the marginal value of cash holdings

The sample consists of 48,764 firm-years for 7,734 unique U.S. firms excluding financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999) in the merged CRSP-COMPUSTAT database with complete data to analyze the marginal value of cash holdings from 1996 to 2018. COW is one if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. All other variables are defined in Appendix A. * denotes that the variable is scaled by the market value of equity of the firm of fiscal year *t-1*. All dollar values are inflation adjusted to 2001 using the Consumer Price Index (CPI). All continuous variables are winsorized at the 1% and 99% level.

	Mean	Std	Q1	Median	Q3
COW	0.529	0.499	0	1	1
Excess stock returns during the fiscal year					
Size and M/B adjusted annual excess return	-0.059	0.517	-0.378	-0.112	0.172
Industry adjusted annual excess return	-0.034	0.526	-0.340	-0.077	0.189
Firm characteristics					
Market value of equity (in $ million)	2,833	12,631	63	312	1,313
Leverage	0.201	0.210	0.015	0.138	0.318
Δ Cash $_t$ *	0.001	0.104	-0.029	0	0.029
Cash $_{t-1}$	0.151	0.184	0.032	0.088	0.200
Δ Earnings $_t$ *	0.006	0.174	-0.030	0.004	0.033
Δ Net assets $_t$ *	0.034	0.310	-0.048	0.015	0.101
Δ R&D $_t$ *	0	0.019	0	0	0.001
Δ Interest $_t$ *	0.001	0.016	-0.002	0	0.002
Δ Dividends $_t$ *	0	0.006	0	0	0
Net financing $_t$ *	0.033	0.173	-0.032	0	0.049

Table 5: Regression analyses of the market value of cash holdings

The sample consists of 48,764 firm-years for 7,734 unique U.S. firms from 1996 to 2018 described in Table 4. The dependent variable is the size and market-to-book adjusted annual excess stock returns during fiscal year *t* in Models 1 and 2 and the industry adjusted annual excess stock returns in Models 3 and 4. COW is one if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. The coefficient for this variable is the difference-in-differences estimate. All coefficients are estimated by OLS. Industry fixed effects use 3-digit SIC and state fixed effects are based on headquarters location. Robust standard errors are clustered at the state of incorporation level. All other variables are defined in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Dependent variable							
	Size and market-to-book adjusted annual excess stock return				Industry adjusted annual excess stock return			
	Model 1		Model 2		Model 3		Model 4	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
Δ Cash	0.857***	0.000	1.542***	0.000	0.942***	0.000	1.647***	0.000
COW × Δ Cash	-0.087*	0.064	-0.095***	0.000	-0.092**	0.049	-0.120***	0.001
COW	-0.024	0.357	0.002	0.918	0.012	0.352	0.014	0.209
Cash $_{t-1}$ × Δ Cash			-0.440***	0.001			-0.468***	0.000
Leverage × Δ Cash			-0.165***	0.000			-0.175***	0.000
Δ Earnings			0.379***	0.000			0.420***	0.000
Δ Net assets			0.191***	0.000			0.211***	0.000
Δ R&D			0.390***	0.003			0.432***	0.007
Δ Interest			-0.555***	0.003			-0.974***	0.000
Δ Dividends			0.677***	0.003			1.053***	0.000
Cash $_{t-1}$			0.938***	0.000			1.007***	0.000
Leverage			-1.035***	0.000			-1.022***	0.000
Net financing			0.041***	0.001			0.045***	0.000
Intercept	-0.042***	0.003	-0.003	0.786	-0.034***	0.000	-0.010	0.205
Firm FEs	Yes		Yes		Yes		Yes	
State × year FEs	Yes		Yes		Yes		Yes	
Industry × year FEs	Yes		Yes		Yes		Yes	
N	48,764		48,764		48,764		48,764	
Adjusted R^2	0.138		0.274		0.139		0.287	
Reg's *p*-value	0.000		0.000		0.000		0.000	

Table 6: Summary statistics – Analyses of acquisition deals

In Panel A, the sample consists of 81,134 firm-years for 9,752 unique U.S. firms excluding financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999) in the merged CRSP-COMPUSTAT database with complete data to analyze acquisition decisions from 1996 to 2018. COW is one if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. In Panel B, the sample consists of 4,716 completed U.S. domestic mergers and acquisitions (M&A) from the SDC M&A database made by 2,376 unique U.S. acquirers excluding financials (SIC 4900-4999), utilities (SIC 6000-6999), and public administration firms (SIC 9000-9999) in the merged CRSP-COMPUSTAT database with complete data to analyze acquisition quality during the fiscal year end 1996-2018 before the merger public announcement date. We exclude observations involving spinoffs, recapitalizations, exchange offers, repurchases, self-tenders, privatizations, acquisitions of remaining interest, and partial interests or assets, and those with deal value less than $1 million. COW is one if the acquirer is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. Acquirer characteristics are measured at the fiscal year end before deal announcement. All other variables are defined in Appendix A. All dollar values are inflation adjusted to 2001 using the Consumer Price Index (CPI). All continuous variables are winsorized at the 1% and 99% level.

Panel A: Summary statistics – Acquisition decisions at the firm-year level					
	Mean	Std	Q1	Median	Q3
COW	0.535	0.499	0	1	1
Acquisition decision					
Bid (0,1)	0.056	0.230	0	0	0
ln(1 + number of bids)	0.042	0.176	0	0	0
ln(1 + deal value)	0.266	1.196	0	0	0
Firm characteristics					
Market value of equity (in $ million)	1,688	4,900	53	238	1,011
Leverage	0.199	0.225	0.005	0.119	0.321
Tobin's q	2.131	1.638	1.146	1.571	2.439
Liquidity	-1.898	6.563	-0.470	-0.030	-0.003
ROA	0.119	0.113	0	0.106	0.182

Panel B: Summary statistics – Completed acquisitions					
	Mean	Std	Q1	Median	Q3
COW	0.476	0.499	0	0	1
Acquirer announcement returns					
CAR(-1,+1) %	0.866	7.622	-2.703	0.346	4.203
1 if CAR(-1,+1) < 0, 0 otherwise	0.466	0.499	0	0	1
Acquirer characteristics					
Market value of equity (in $ million)	8,258	22,935	248	864	3,790
Leverage	0.188	0.189	0.009	0.150	0.229
Tobin's q	2.930	2.955	1.420	1.977	3.123
Liquidity	-0.408	1.828	-0.045	-0.004	-0.001
ROA	0.164	0.132	0.071	0.150	0.229
Deal characteristics					
Deal value (in $ million)	465	1,167	23	90	365
Relative size	0.261	0.432	0.031	0.096	0.287
Private target	0.497	0.500	0	0	1
Subsidiary target	0.123	0.328	0	0	0
All cash payment	0.378	0.485	0	0	1
Tender offer	0.085	0.280	0	0	0
Hostile deal	0.002	0.048	0	0	0
Competed deal	0.017	0.129	0	0	0
Toehold	0.031	0.173	0	0	0
Lock up	0.005	0.070	0	0	0
Merger of equals	0.004	0.062	0	0	0
Diversifying deal	0.394	0.511	0	0	1

Table 7: Regression analyses of acquisition deals

In Panel A, the sample consists of 81,134 firm-years for 9,752 unique U.S. firms described in Table 6. The dependent variable is one if the firm makes an M&A bid in a given year and zero otherwise in Panel A model 1 and 2, the number of M&A bids made by the firm in a given year in Panel A model 3 and 4, and the total value of all M&A bids made by the firm in a given year in Panel A model 5 and 6. COW is one if the acquirer is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. The coefficient for this variable is the difference-in-differences estimate. All coefficients are estimated by OLS due to the use of high dimensional fixed effects. In Panel B models 1 and 2, the sample consists of 4,716 completed domestic M&A from the SDC M&A database made by 2,376 unique U.S. acquirers described in Table 6. In Panel B model 3, to study the probability of deal withdrawal, we add 366 withdrawn deals during the same period to the above sample. In Panel B model 1, the dependent variable is the acquirer's cumulative abnormal return (CAR) in percentage points during the three-day window period around the deal announcement date. In Panel B model 2, the dependent variable equals one if the acquirer's CAR is negative and zero otherwise. In Panel B model 3, the dependent variable equals one if the acquisition is withdrawn and zero otherwise. COW is one if the acquirer is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. The coefficient for this variable is the difference-in-differences estimate. Industry fixed effects use 3-digit SIC and state fixed effects are based on headquarters location. Robust standard errors are clustered at the state of incorporation level. All other variables are defined in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Acquisition decisions

Dependent variable =	Bid (0,1)				*ln*(1 + number of bids)				*ln*(1 + bid value)			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
COW	0.008**	0.040	0.008**	0.041	0.007***	0.004	0.007***	0.006	0.047**	0.013	0.046**	0.017
Firm characteristics												
Size			0.021***	0.000			0.016***	0.000			0.117***	0.000
Leverage			0.041***	0.000			0.029***	0.000			0.268***	0.000
Tobin's q			-0.000	0.496			-0.000	0.868			0.000	0.980
Liquidity			-0.000***	0.000			-0.000***	0.000			-0.000***	0.000
ROA			0.000**	0.016			0.000**	0.013			0.000**	0.048
Intercept	0.052***	0.000	-0.070***	0.000	0.038***	0.000	-0.056***	0.000	0.245***	0.000	-0.455***	0.000
State × year FEs	Yes		Yes		Yes		Yes		Yes		Yes	
Industry × year FEs	Yes		Yes		Yes		Yes		Yes		Yes	
N	81,134		81,134		81,134		81,134		81,134		81,134	
Adjusted R^2	0.079		0.083		0.099		0.103		0.094		0.099	
Regression's *p*-value	0.040		0.000		0.004		0.000		0.013		0.000	

Panel B: Acquisition quality						
Dependent variable =	CAR(-1,+1) %		1 if CAR(-1,+1) < 0, 0 otherwise		1 for withdrawn deals, 0 otherwise	
	Model 1		Model 2		Model 3	
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
COW	-0.772**	0.025	0.030**	0.040	-0.011	0.303
CAR(-1,+1)					-0.069**	0.019
COW × CAR(-1,+1)					0.138***	0.000
Acquirer characteristics						
Size	-0.353***	0.000	0.012***	0.000	-0.013***	0.000
Leverage	0.456	0.356	0.022	0.220	0.026**	0.016
Tobin's q	-0.041**	0.026	-0.002***	0.003	0.000	0.687
Liquidity	-0.010	0.262	-0.000***	0.000	-0.000***	0.000
ROA	0.006***	0.000	-0.000***	0.000	0.000	0.732
Deal characteristics						
Relative size	-0.011***	0.000	0.000***	0.000	0.000	0.605
Private target	2.275***	0.000	-0.125***	0.000	-0.074***	0.000
Subsidiary target	2.506***	0.000	-0.106***	0.000	-0.068***	0.000
All cash payment	0.272	0.184	-0.068***	0.000	-0.003	0.697
Tender offer	0.511	0.227	-0.006	0.788	-0.066***	0.003
Hostile deal	3.455*	0.055	0.006	0.961	0.565***	0.000
Competed deal	0.846	0.548	-0.009	0.777	0.342***	0.000
Toehold	0.194	0.415	-0.027	0.331	0.021	0.453
Lock up	-4.130***	0.000	0.065	0.254	0.024	0.428
Merger of equals	2.182	0.198	-0.226***	0.000	0.114***	0.003
Diversifying deal	-0.102	0.664	0.010	0.350	0.003	0.644
Intercept	1.647**	0.012	0.495***	0.000	0.181***	0.000
State × year FEs	Yes		Yes		Yes	
Industry × year FEs	Yes		Yes		Yes	
N	4,716		4,716		5,082	
Adjusted R^2	0.024		0.035		0.213	
Regression's *p*-value	0.000		0.000		0.000	

Table 8: Dynamic coefficient trends – Falsification tests

This table presents the dynamic coefficient trends of the effect of COW law on the market's valuation of innovation in Panel A, marginal value of cash holdings in Panel B, acquisition decisions in Panel C, and acquisition quality in Panel D. COW is one if the acquirer is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise. $COW^{(y-(+)i)}$ is a dummy equal to one if the fiscal year end of the observation is the i^{th} year before (after) the date the COW law is passed and zero otherwise (y^{3+} denotes year +3 and beyond). Industry fixed effects use 3-digit SIC and state fixed effects are based on headquarters location. Robust standard errors are clustered at the state of incorporation level. All other variables are defined in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Market's valuation of innovation

Innovation measure =	Dependent variable: *ln*(Tobin's *q*)					
	R&D spending Model 1		Value of patents Model 2		Number of patents Model 3	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
Innovation	0.375***	0.000	0.762***	0.000	0.457***	0.000
$COW^{(y-2)}$	-0.008	0.641	-0.024	0.182	-0.014	0.409
$COW^{(y-1)}$	0.063	0.405	0.101	0.606	0.112	0.302
$COW^{(y+0)}$	-0.011	0.642	0.012	0.540	0.000	0.991
$COW^{(y+1)}$	0.005	0.862	0.002	0.934	0.004	0.887
$COW^{(y+2)}$	-0.050*	0.071	-0.071***	0.009	-0.061**	0.023
$COW^{(y3+)}$	-0.030*	0.079	-0.028*	0.067	-0.019	0.228
$COW^{(y-2)}$ × Innovation	-0.115	0.202	0.288	0.170	0.012	0.907
$COW^{(y-1)}$ × Innovation	-0.083	0.201	0.109	0.408	0.030	0.764
$COW^{(y+0)}$ × Innovation	-0.124**	0.032	-0.356***	0.005	-0.181***	0.000
$COW^{(y+1)}$ × Innovation	-0.131**	0.019	-0.334***	0.003	-0.201***	0.000
$COW^{(y+2)}$ × Innovation	-0.195***	0.000	-0.301***	0.005	-0.188***	0.000
$COW^{(y3+)}$ × Innovation	-0.127**	0.032	-0.319***	0.003	-0.184**	0.014
Controls and FEs as in	Table 3 Model 1		Table 3 Model 2		Table 3 Model 3	
N	57,672		57,672		57,672	
Adjusted R^2	0.593		0.604		0.596	
Regression's *p*-value	0.000		0.000		0.000	

Panel B: Market value of cash holdings

	Dependent variable			
	Size and M/B adjusted annual excess stock return Model 1		Industry adjusted annual excess stock return Model 2	
	Coefficient	*p*-value	Coefficient	*p*-value
Δ Cash	1.524***	0.000	1.627***	0.000
COW $^{(y-2)}$	0.003	0.433	0.021	0.521
COW $^{(y-1)}$	0.008	0.277	0.026	0.475
COW $^{(y+0)}$	0.002	0.835	0.026	0.429
COW $^{(y+1)}$	0.005	0.343	0.023	0.643
COW $^{(y+2)}$	0.004	0.473	0.025	0.553
COW $^{(y3+)}$	0.004	0.456	0.029	0.356
COW $^{(y-2)}$ × Δ Cash	-0.007	0.775	-0.007	0.886
COW $^{(y-1)}$ × Δ Cash	-0.025	0.299	-0.008	0.633
COW $^{(y+0)}$ × Δ Cash	-0.090***	0.000	-0.152***	0.000
COW $^{(y+1)}$ × Δ Cash	-0.105***	0.000	-0.178***	0.000
COW $^{(y+2)}$ × Δ Cash	-0.073***	0.001	-0.131**	0.034
COW $^{(y3+)}$ × Δ Cash	-0.096***	0.006	-0.121**	0.045
Controls and FEs as in	Table 5 Model 2		Table 5 Model 4	
N	48,764		48,764	
Adjusted R^2	0.275		0.287	
Regression's *p*-value	0.000		0.000	

Panel C: Acquisition decisions

	Dependent variable:					
	Bid (0,1) Model 1		*ln*(1 + number of bids) Model 2		*ln*(1 + bid value) Model 3	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
COW $^{(y-2)}$	0.002	0.326	0.001	0.363	0.010	0.599
COW $^{(y-1)}$	0.005	0.210	0.001	0.302	0.021	0.204
COW $^{(y+0)}$	0.011***	0.005	0.007***	0.004	0.043**	0.040
COW $^{(y+1)}$	0.008**	0.026	0.006***	0.003	0.041**	0.016
COW $^{(y+2)}$	0.007**	0.030	0.005***	0.007	0.049***	0.001
COW $^{(y3+)}$	0.008**	0.017	0.006***	0.005	0.046**	0.020
Controls and FEs as in	Table 7 Panel A Model 1		Table 7 Panel A Model 3		Table 7 Panel A Model 5	
N	81,134		81,134		81,134	
Adjusted R^2	0.079		0.053		0.057	
Regression's *p*-value	0.003		0.001		0.001	

Panel D: Acquisition quality

	Dependent variable:					
	CAR(-1,+1) %		1 if CAR(-1,+1) < 0, 0 otherwise		1 for withdrawn deals, 0 otherwise	
	Model 1		Model 2		Model 3	
	Coef	*p*-value	Coef	*p*-value	Coef	*p*-value
COW $^{(y-2)}$	0.161	0.639	-0.009	0.921	0.004	0.824
COW $^{(y-1)}$	0.204	0.737	0.008	0.593	0.006	0.529
COW $^{(y+0)}$	-0.691**	0.029	0.029**	0.040	-0.028	0.365
COW $^{(y+1)}$	-0.848***	0.009	0.031**	0.035	-0.032	0.311
COW $^{(y+2)}$	-0.689**	0.021	0.037**	0.020	-0.029	0.394
COW $^{(y3+)}$	-0.690**	0.035	0.034**	0.036	-0.010	0.342
CAR(-1,+1)					-0.078**	0.036
COW $^{(y-2)}$ × CAR(-1,+1)					0.020	0.784
COW $^{(y-1)}$ × CAR(-1,+1)					-0.048	0.598
COW $^{(y+0)}$ × CAR(-1,+1)					0.118**	0.011
COW $^{(y+1)}$ × CAR(-1,+1)					0.144***	0.001
COW $^{(y+2)}$ × CAR(-1,+1)					0.134***	0.003
COW $^{(y3+)}$ × CAR(-1,+1)					0.107**	0.020
Controls and FEs as in	Table 7 Panel B Model 1		Table 7 Panel B Model 2		Table 7 Panel B Model 3	
N	4,716		4,716		5,082	
Adjusted R^2	0.024		0.035		0.335	
Regression's *p*-value	0.000		0.000		0.000	

Appendix A: Variable definitions

Variable	Definition	Source
	Main independent variable	
COW	One if the firm is incorporated in a state which has passed a Corporate Opportunity Waivers law by the fiscal year end date, and zero otherwise.	Rauterberg and Talley (2017)
	Analysis of the market's valuation of innovation	
Tobin's q	Market value of assets over book value of assets: (*at* − *ceq* + *csho* × *prcc_f*)/*at*	Compustat
R&D spending	R&D/assets (*xrd/at*, set to 0 if missing)	Compustat
Value of patents	total dollar value of patents granted in the year scaled by assets	Kogan et al (2017)
Number of patents	total number of patents granted in the year scaled by assets	Kogan et al (2017)
	Analysis of the marginal value of cash holdings	
Size and M/B adjusted annual excess stock return	Firm-level stock returns minus Fama-French size and book-to-market (5 x 5) matched portfolio returns	CRSP and Ken French's web site
Industry-adjusted annual excess stock return	Firm-level stock returns minus Fama-French (1997) 48 industry value weighted returns	CRSP and Ken French's web site
Leverage	Total debt (dltt + dlc)/Market value of total assets (*at* − *ceq* + *csho* × *prcc_f*)	Compustat
Δ Cash	Change in cash (*che*)	Compustat
Δ Earnings	Change in earnings before extraordinary items (*ib* + *xint* + *txdi* + *itci*)	Compustat
Δ Net assets	Change in net assets (*at* − *che*)	Compustat
Δ R&D	Change in R&D (*xrd*, set to 0 if missing)	Compustat
Δ Interest	Change in interest (*xint*)/	Compustat
Δ Dividends	Change in common dividends (*dvc*)	Compustat
Net financing	New equity issues (*sstk* − *prstkc*) + Net new debt issues (*dltis* − *dltr*)	Compustat
	Analysis of acquisitions	
Bid (0,1)	One if the firm makes an M&A bid in a given year	SDC, Compustat
Number of bids	The total number of M&A bids made by the firm in a given year	SDC, Compustat
Bid value	The total value of all M&A bids made by the firm in a given year	SDC, Compustat
CAR(-1,+1)	Three-day cumulative abnormal return calculated using excess stock return over CRSP value weighted return relative to the announcement date (day 0)	CRSP

Size	Natural logarithm of market value of equity (*csho* × *prcc_f*)	Compustat
Leverage	Total debt/Market value of total assets: (dltt + dlc)/(*at* − *ceq* + *csho* × *prcc_f*)	Compustat
Tobin's q	Market value of assets over book value of assets: (*at* − *ceq* + *csho* × *prcc_f*)/*at*	Compustat
Liquidity	Natural logarithm of one plus the average of the daily Amihud (2002) illiquidity measure over the fiscal year, multiplied by minus one	CRSP
ROA	Return on assets (*oibdp*/*at*)	Compustat
Relative size	Deal value/Acquirer's market value of equity two days before the deal announcement	SDC, Compustat
Private target	One for private targets, zero otherwise	SDC
Subsidiary target	One for subsidiary targets, zero otherwise	SDC
All cash payment	One for purely cash financed deals, zero otherwise	SDC
Tender offer	One for tender offers, zero otherwise	SDC
Hostile deal	One for hostile deals, zero otherwise	SDC
Competed deal	One for competed deals, zero otherwise	SDC
Toehold	One if the acquirer owns shares in the target before the deal announcement, zero otherwise	SDC
Lock up	One if the deal includes a lockup of target shares, zero otherwise	SDC
Merger of equals	One if the deal is a merger of equals, zero otherwise	SDC
Diversifying deal	One if the acquirer and the target do not belong to the same 2-digit SIC	SDC, Compustat