Shareholder Protection and the Cost of Capital

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Abstract

Do shareholder protection laws affect the corporate cost of capital? To identify the causal impact of shareholder protection laws on firms' implied cost of capital, we exploit the staggered adoption across 23 US states of universal-demand laws, which place significant obstacles to derivative lawsuits and thus undermine shareholders' litigation rights. Using a sample of public US firms between 1985 and 2013, we find that weakened litigation rights for shareholders materially increase firms' implied cost of capital. We further show that the curtailing of shareholders' rights leads to a deterioration in information quality, increased risk-taking, and more severe insider expropriation, all of which contribute to heightened financing costs. Overall, our findings indicate that weakened litigation rights for shareholders lead them to face greater agency conflicts and higher market risk, which ultimately translates into higher required returns.

1. Introduction

A pivotal implication from the law and finance literature is that laws protecting shareholders' interests help resolve the agency problems arising from the separation of ownership and control. These protections increase investors' willingness to finance firms and ultimately boost financial market development and corporation valuations (La Porta et al. 1997, 1998, 2000, 2002; Acemoglu and Johnson 2005). Prior research highlights that the legal protection of outside investors

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helps boost corporate valuation, either because investors are better protected from being expropriated by insiders and/or because the accessibility to external finance enables firms to fully exploit their growth opportunities (Shleifer and Wolfenzon 2002).

In this paper, we consider an alternative channel by which shareholder protection laws may influence corporate valuations. We focus on how changes in shareholders' rights affect their required risk premium, which generates important influences on both corporate valuations and the overall depth of financial markets. Intuitively, when outside shareholders invest in jurisdictions with stronger investor protections, they recognize that insiders are less likely to divert firms' resources for their own private benefits. Shareholders factoring this lower risk of expropriation into their valuation model are therefore willing to pay more for firms' equity, which in turn enables firms to obtain external financing with better terms.

We focus on shareholders' litigation rights, which entitle them to make legal claims against corporate management and are suggested to be the most important among shareholders' various rights (La Porta et al. 1997, p. 1136). As argued in La Porta, Lopez-de-Silanes, and Shleifer (2006, p. 28), "[T]he benefit of common law in this area comes from its emphasis on market discipline and private litigation." In particular, the authors find that the procedural ease by which securities laws facilitate the recovery of investors' damages plays a particularly effective role in promoting financial market development. Given these particular emphases on the important role of private litigation, we assess how changes in shareholders' ability to make legal claims against corporate management affect their required rate of return, as measured by the firms' implied cost of capital (ICOC). Although researchers document an association between shareholders' litigation rights and firms' cost of capital (for example, Hail and Leuz 2009), few have identified the causal economic impact of shareholders' litigation rights on firms' cost of external finance.

To isolate the effects of shareholders' litigation rights, we employ a quasi-natural experiment in which we examine the impact of staggered state-level changes in universal-demand (UD) laws on firms' cost of capital. Since the late 1980s, 23 US states have adopted UD laws. The adoption of UD laws has significantly weakened shareholders' litigation rights by raising procedural hurdles to pursue derivative lawsuits (Davis 2008; Erickson 2010). In particular, when a firm's management breaches its fiduciary duties by causing injuries to the firm, individual shareholders are entitled to bring a derivative suit against the manager to remedy wrongdoing on behalf of the corporation. The UD laws, however, impose a UD requirement for every derivative lawsuit, meaning that the plaintiff-shareholder must first make a demand on the board of directors to take corrective actions before proceeding with litigation. This requirement places a significant obstacle to derivative suits because directors are usually the defen-

dants in these suits and hence almost always refuse to proceed with litigation.[1] Moreover, the shareholder can no longer circumvent the demand procedure by arguing demand futility on the ground that directors have a conflict of interest. Using information on companies' derivative lawsuits collected from their Securities and Exchange Commission (SEC) form 10-K filings, we confirm that the occurrence of derivative litigation dropped materially following the passage of UD laws. In this regard, UD laws weaken shareholders' litigation rights by making it more difficult for shareholders to seek remedies and enforce fiduciary duties through derivative suits.

States that have become UD jurisdictions followed the lead of the Revised Model Business Corporation Act (MBCA), section 7.42 (see Committee on Corporate Laws 1990, p. 1241), which is a model law proposed by the American Bar Association (ABA). Section 7.42—and thereby UD—was the centerpiece of a package of amendments that were generally hostile to derivative litigation. These amendments were advocated by the ABA in response to the earlier path taken by the Delaware Supreme Court. In Delaware, procedural hurdles for derivative litigation "include both a motion to dismiss for failure to make demand that is put to the *Aronson* test, and later a special litigation committee's motion to dismiss that is put to the *Zapata* test" (Kinney 1994, p. 182). A primary motivation for eliminating the futility defense is that fighting for the futility exception, which was not supposed to be the focus of dispute, always takes a disproportionate amount of time in derivative suits. Thus, the UD requirement recommended by the MBCA serves as a streamlined approach to the derivative suits. Table 1 lists the states that adopted this model.

It is important to highlight that there are several reasons why directors' and officers' liability insurance (D&O insurance) does not completely shield the company from the effects of derivative lawsuits. First, D&O insurance does not provide indemnification in cases of dishonesty and intentional wrongdoing, such as deliberate fraud and illegal profit (Ferris et al. 2007). Even with a rich D&O insurance policy, the coverage is by no means automatic: the insurer always looks carefully into the events and tries to find a claim against the policy in an attempt to deny coverage. Thus, in practice, there are frequent disputes between the claimant and the insurer (Cox 1999). Second, prior increased litigation by shareholders is often priced into higher insurance premiums, which translates into a larger financial burden on the company. Finally, even in those instances in which the insurance fully protects officers and directors from bearing the direct financial costs of the lawsuits, there are often nontrivial indirect costs because shareholders' lawsuits also harm the reputations of the managers in the labor market and of the involved corporations, with negative repercussions in the financial markets (Alexander 1999; Graham, Li, and Qiu 2008). Taken together, even in the presence of D&O insurance, UD laws are expected to have a material impact on

[1] In a comprehensive examination of derivative lawsuits, Erickson (2010) finds that plaintiff-shareholders targeted a median of nine directors per suit in her sample, which indicates that most derivative suits name the entire board of directors.

Table 1
States' Adoption of Universal-Demand Legislation

State	Year of Adoption	*N*		Reference
Georgia	1989	388	(1.41)	Ga. Code Ann., sec. 14-2-742
Michigan	1989	325	(1.18)	Mich. Comp. Laws Ann., sec. 450.1493a
Florida	1990	471	(1.72)	Fla. Stat. Ann., sec. 607.07401
Wisconsin	1991	444	(1.62)	Wis. Stat. Ann., sec. 180.742
Montana	1992	9	(.03)	Mont. Code Ann., sec. 35-1-543
Utah	1992	99	(.36)	Utah Code Ann., sec. 16-10a-740(3)
Virginia	1992	381	(1.39)	Va. Code Ann., sec. 13.1-672.1B
Mississippi	1993	17	(.06)	Miss. Code Ann., sec. 79-4-7.42
New Hampshire	1993	9	(.03)	N.H. Rev. Stat. Ann., sec. 293-A:7.42
North Carolina	1995	262	(.95)	N.C. Gen. Stat., sec. 55-7-42
Arizona	1996	38	(.14)	Ariz. Rev. Stat. Ann., sec. 10-742
Nebraska	1996	28	(.1)	Neb. Rev. Stat., sec. 21-2072
Connecticut	1997	115	(.42)	Conn. Gen. Stat. Ann., sec. 33-722
Maine	1997	24	(.09)	Me. Rev. Stat. Ann., tit. 13-C, sec. 753
Pennsylvania	1997	707	(2.58)	*Cuker v. Mikalauskas* (547 Pa. 600, 692 A.2d 1042)
Texas	1997	394	(1.44)	Tex. Bus. Orgs. Code Ann., sec 607.07401
Wyoming	1997	9	(.03)	Wyo. Stat., sec. 17-16-742
Idaho	1998	12	(.04)	Idaho Code, sec. 30-1-742
Hawaii	2001	4	(.01)	Haw. Rev. Stat., sec. 414-173
Iowa	2003	92	(.34)	Iowa Code Ann., sec. 490.742
Massachusetts	2004	628	(2.29)	Mass. Gen. Laws. Ann., ch. 156D, sec. 7.42
Rhode Island	2005	34	(.12)	R.I. Gen. Laws., sec. 7-1.2-710(C)
South Dakota	2005	19	(.07)	S.D. Codified Laws, sec. 47-1A-742
Total		4,509	(16.43)	
All other states		22,935	(83.57)	

Note. The Model Business Corporation Act provides the following universal-demand requirement: "No shareholder may commence a derivative proceeding until: (1) A written demand has been made upon the corporation to take suitable action; and (2) 90 days have expired from the date the demand was made unless, prior to the expiration of the 90 days, the shareholder was notified that the corporation rejected the demand, or unless irreparable injury to the corporation would result by waiting for the expiration of the 90 day period." Percentages are in parentheses.

managerial incentives and corporate policies, which ultimately is reflected in the firms' cost of capital.

Prior theoretical work provides at least three mechanisms through which shareholders' litigation rights may affect the cost of capital. First, as formalized in the model in Lombardo and Pagano (2002), outside shareholders have to pay an out-of-pocket monitoring cost to shield themselves from expropriations by a firm's insiders. In this scenario, they would demand a higher rate of return to compensate for this incurred cost. The required compensation is expected to be higher for firms with greater monitoring needs (those with higher agency costs and greater expropriation risks). In our context, the enactment of UD laws imposes greater barriers to shareholders' litigation, which might, in turn, increase shareholders' monitoring needs, which translates into higher rates of returns.

Second, as shown in Albuquerue and Wang (2008), weak investor protection

creates strong incentives for corporate insiders to pursue private benefits at the cost of other shareholders via self-dealing investments, which increase the variance of investment outputs and hence the equilibrium equity premium. Related to this concern, Giannetti and Simonov (2006) find that investors are reluctant to hold stocks of companies for which the outside investors feel less protected from the extraction of private benefits by the corporate insiders. In other words, the potential expropriation risk narrows the investor base, which in turn increases the cost of capital. Consequently, if the adoption of a UD law aggravates potential expropriation risk by insulating managers from shareholders' discipline, its passage is expected to generate a corresponding increase in firms' cost of capital.

Third, shareholders' litigation incentivizes corporate insiders to improve the quality of financial disclosures, which, in turn, reduces the cost of capital. Studies of the association between corporate disclosure and the cost of capital provide supportive evidence using both US firms only and data across countries (Leuz and Wysocki 2008). Corporate insiders have incentives to obfuscate information disclosures to mask and conceal their expropriation and other rent-extraction activities (Leuz, Nanda, and Wysocki 2003). By mitigating the rent-extraction incentives and holding corporate insiders accountable for inadequate, misleading, and untimely disclosures, an active litigation environment has a positive impact on improving the quality of disclosure. Consistent with a capital asset pricing model (CAPM) framework, Lambert, Leuz, and Verrecchia (2007) examine how the disclosure of accounting information affects a firm's cost of capital. Similar to the key insights of the CAPM, the cost of capital in their model increases with the estimated covariance between the firm's cash flow and the cash flows of all other firms in the market. Lambert, Leuz, and Verrecchia (2007) show that higher financial reporting quality in a firm reduces the assessed covariance between its and other firms' cash flows because information about one firm's cash flow also implicitly provides information about other firms' cash flows. This improved information disclosure removes a source of common variation among firms so that the covariance of the cash flows declines. Given that this effect is not diversifiable, better information disclosure leads to a lower cost of capital. In our context, weak litigation discipline can generate obfuscation and a deterioration in the corporate information environment, which subsequently translates into a higher cost of capital.

Studies of derivative suits also lend practical support to the agency and information channels described above. For example, Erickson (2010) finds that more than 80 percent of complaints in derivative suits allege that public firms misreported their financial statements, and 60 percent of the suits include claims of insider trading, a particular form of self-dealing activities. Similarly, Ferris et al. (2007) summarize that the most common allegations pertain to information and disclosure, the duty of care, the duty of loyalty, and issues with mergers and acquisitions. Thus, derivative suits are highly relevant to the issues of agency problems and information disclosure.

Methodologically, the staggered adoption of UD laws on a state level over time

allows us to employ a difference-in-differences approach. Compared with conventional cross-country analyses, this empirical design has at least two advantages to further alleviate concerns related to omitted factors. First, the difference-in-differences approach allows us to control for firm and year fixed effects throughout our analyses. In subsequent robustness tests, we conduct the analyses in a more rigorous way by adding industry-year and operating-state–year fixed effects. Industry-year fixed effects control for unobserved, time-varying heterogeneity across industries, and operating-state–year fixed effects control for time-varying differences across states of operation (such as local economic conditions). Second, reverse causality is less of a concern in our setting, since the passage of the laws occurs at the state-of-incorporation level, and hence they are less likely to be driven by individual firms' characteristics. We conduct a validity test in which we show that the state-level average cost of capital does not predict the enactment of the UD laws, which suggests that neither the probability nor the timing of passing a UD law is driven by the firms' cost of capital.

Our primary sample consists of about 5,000 public firms in the United States from 1985 through 2013. For each firm, we apply an accounting-based discounted dividend valuation model to estimate its annual cost of capital. Following Hail and Leuz (2006, 2009), we employ four models and back out the cost-of-capital estimate as the implied rate of return that equates the stock price and the present value of future earnings.[2] Compared with realized stock returns, the ICOC measures estimated from the accounting-based models capture the ex ante rate of return and attempt to explicitly separate the cost-of-capital effects from the cash-flow effects (Hail and Leuz 2009).[3] On the basis of these estimates, our baseline analyses suggest that following the passage of UD laws, the ICOC for firms incorporated in the state rises on average by 26 basis points, approximately 5 percent above the sample median. Importantly, we demonstrate that the findings are not confounded by preexisting trends between the treated and control firms.

We conduct a series of formal tests to alleviate endogeneity concerns related to reverse causality and omitted factors. First, as highlighted above, we find no evidence that increases in individual firms' cost of capital trigger the adoption of UD laws at the state level. Second, we address the concern that certain types of firms might incorporate in states with UD laws by showing that the number of firms incorporated in a state does not change significantly following the adoption of the UD law, and our primary findings stay robust to excluding newly incorporated firms after states adopt UD laws. These tests suggest that our findings are unlikely to be driven by firms' incorporation-state shopping. Third, we condition our analyses on an array of economic state-specific characteristics, namely, real gross state product (GSP) per capita, real GSP, GSP growth, and unemployment,

[2] The four models are described in detail in the Online Appendix. Also see Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Easton (2004), and Ohlson and Juettner-Nauroth (2005).

[3] The implied-cost-of-capital measure is accepted and widely used in both accounting studies (for example, Francis, Nanda, and Olsson 2008) and the finance literature (for example, Hail and Leuz 2009; Li, Ng, and Swaminathan 2013).

and our results hold, which suggests that the impact of UD laws on the cost of capital is not a simple manifestation of some common, macro factors. Furthermore, our results remain robust when we account for time-invariant firm factors, time-varying heterogeneity across industries and operating states, and a battery of firm-specific controls. Our results also hold when using the earnings-to-price ratio (E/P) as an alternative measure of the cost of capital.

Building on our basic findings, we further explore three potential channels through which UD laws influence firms' cost of capital: information disclosure, risk-taking, and insider trading. First, as argued above, changes in the legal environment may influence the cost of capital through its effects on information quality. We assess whether the UD laws shape the overall stock price informativeness and the information content of corporate disclosures. Following the passage of the UD laws, managers are better insulated from shareholders' litigation for expropriating activities and financial misreporting, which in turn discourages them from disclosing information in an accurate and timely fashion. We find evidence supporting this channel. The UD laws are shown to result in a dramatic decline in stock price informativeness (measured by price nonsynchronicity) and the information quality of voluntary filings of form 8-K (measured by instantaneous market reaction to 8-K announcements), which indicates a lower quality of corporate disclosure and an overall less informative environment.

Second, we show that firms become riskier following the enactment of UD laws, which also contributes to a higher cost of capital. In particular, we find that a firm's stock return volatility, exposure to market risks (as measured by the stock's beta from the CAPM), implied asset volatility, and expected default probability (derived from the Merton [1974] distance-to-default [DD] model) all increase significantly with the UD laws in place. This is consistent with the notion that with fewer threats of being sued for the potential bad outcomes of their business decisions, managers are encouraged to invest in riskier projects that otherwise would be passed up, which results in higher risks for firms and greater exposure to systematic market risk. These higher risks, however, are not accompanied by higher cash flows, as we find that UD laws do not raise subsequent cash flows.

Regarding the third channel, we find that informed insiders trade more aggressively when the litigation risks are lowered with the adoption of the UD laws. In particular, we show that UD laws lead to increased insider-trading volumes and larger transaction values, which suggests that corporate insiders adopt more active trading strategies when they face a lower disciplinary litigation threat due to changes in the legal environment (Del Guercio, Odders-White, and Ready 2017). To the extent that these shifts increase investors' expectation of being expropriated by corporate insiders with private information, outside disadvantaged investors will demand a higher rate of return for holding stocks with increased insider-trading activities and private information, which contributes to a higher cost of capital.

We build our paper on an extensive strand of studies that highlight the role of investor protection in a variety of economic outcomes (La Porta et al. 1997, 1998,

1999, 2000, 2002; Morck, Yeung, and Yu 2000; Berkowitz, Moenius, and Pistor 2006; Brockman and Chung 2003; Djankov et al. 2008) and the importance of judicial efficiency and independence on economic growth (Djankov et al. 2003; La Porta et al. 2004; Berkowitz and Clay 2006, 2012; Lu, Pan, and Zhang 2015). This study also relates broadly to research on corporate governance (Morck, Wolfenzon, and Yeung 2005). Many researchers stress that investor protection laws boost firms' equity value because they increase firms' accessibility to external finance for value-enhancing projects and thus enable firms to better exploit growth opportunities (La Porta et al. 2002). Our study complements this line of research by documenting the risk-premium mechanism through which shareholders' litigation rights affect corporate equity valuations.

We distinguish our work from two related studies, Hail and Leuz (2009) and Chen, Li, and Zou (2016), in several ways. First, our study takes significantly more steps to establish the causal impact of shareholder protection laws on the cost of capital. Exploiting cross-country variations in the legal institutions determining shareholder protection, Hail and Leuz (2009) find that strong shareholder protection is positively associated with the cost of capital. Likewise, using cross-firm variations in the coverage of D&O insurance, Chen, Li, and Zou (2016) focus on how this mechanism that enhances protections for corporate directors and officers influences the cost of capital. While enlightening, the cross-sectional nature of these studies makes it difficult to establish causal inferences. This paper addresses these concerns by exploiting the staggered adoption of UD laws, which generates cross-state, cross-time variations in shareholders' litigation rights and allows us to identify the causal impact of shareholders' rights in a much more rigorous empirical setting.

It is worth noting that Chen, Li, and Zou (2016) use the passage of the Nevada law, which reduces the directors' and officers' personal legal liabilities in the event of shareholders' lawsuits, to mitigate the endogeneity concerns. However, the Nevada law setting is less powerful in terms of identification, as it is a one-time shock to one state, whereas the UD law setting contains multiple shocks that occurred to multiple states at different times. Thus, the nature of the UD law setting allows us to better isolate the impact of UD laws from a battery of effects, namely, the firm, industry-year, and operating-state–year fixed effects, by conditioning out any time-invariant differences across firms and time-varying differences across industries and operating states. More broadly, the Nevada law applies to the securities class action, a form of shareholder litigation that is different from our focus on derivative lawsuits.

Furthermore, we investigate the specific underlying mechanisms through which shareholders' litigation rights shift companies' cost of capital. Chen, Li, and Zou (2016) exploit the Nevada law as a robustness test to confirm their main results. But they do not explore the underlying channels through which the Nevada law raises the cost of capital. We provide empirical evidence suggesting that weakened shareholder protection results in more aggressive insider-trading strategies, intensified managerial risk-taking, and deteriorated quality of corporate

disclosure, all contributing to a higher cost of capital. These concrete channels help further differentiate our work from existing research.

The remainder of the paper is organized as follows. Section 2 describes the data, variables, and empirical design. Section 3 presents and discusses our empirical results. Section 4 concludes.

2. Data and Methodology

2.1. Primary Sample

We obtain financial data from Compustat, analysts' forecast information from the Institutional Brokers' Estimate System (I/B/E/S), and stock price information from the Center for Research in Security Prices (CRSP). We start with all US publicly listed firms in Compustat over the time period 1985–2013. We then match those firms with data in CRSP and I/B/E/S to retrieve share price and analyst forecasts, respectively. The I/B/E/S provides the consensus of individual analysts' forecasts as of the Thursday before the third Friday of each month. We follow Gebhardt, Lee, and Swaminathan (2001) and collect the median values of analysts' forecasts as of June each year. In this way, we ensure that the financial information from the previous fiscal year is already publicly available and reflected in the market price at the time we estimate the cost of capital. Accordingly, we use the stock price measured at the end of June.

To compute the proxies for the ICOC, we require each firm-year observation to have available information on book value of equity, shares outstanding, earnings, and dividends. We also require analysts' forecasts on 1-year-ahead and 2-year-ahead earnings per share (EPS), a long-term growth forecast, and a contemporaneous share price. We consider negative earnings forecasts to be invalid and thus remove them from the sample. Moreover, we exclude firms classified as utilities (Standard Industrial Classification [SIC] 4000–4999), financials (SIC 6000–6999), and public administration or nonclassifiable (SIC 9000–9999). Our primary sample consists of 5,037 firms over 1985–2013, with 27,444 firm-year observations.

2.2. Universal-Demand Laws

Corporate officers and directors have a fiduciary responsibility to take actions that are consistent with maximizing long-run shareholder value. However, it is well recognized that the separation of ownership and control often induces managers to take actions that serve their own private benefits at the expense of shareholders. When such wrongdoing is detected, shareholders may take legal actions as a means of protecting their rights and interests. A derivative lawsuit is when shareholders to sue the manager on behalf of the corporation if directors and officers transgress their fiduciary duties by engaging in conduct that harms the corporate entity. The lawsuit is called derivative because the corporate entity suffers direct damage due to management's misbehavior in the first place. For instance,

when the manager in an acquiring firm overpays for a target in a takeover deal, the entire corporation directly bears the incurred costs. The damage to the firm's value might in turn cause a decline in stock price and thus injure shareholders indirectly. In response to this breach of fiduciary duty, shareholders can sue the manager derivatively on the corporation's behalf. The most common allegations pertain to information disclosure and agency problems including insider trading and issues with mergers and acquisitions (Erickson 2010; Ferris et al. 2007).

One significant procedural barrier to derivative suits is known as the demand requirement. Before a derivative suit can be brought, the plaintiff-shareholder must first demand that the corporation's board of directors take corrective actions to address the alleged wrongdoing. The board's response to the claim determines whether shareholders can proceed with litigation. Such a demand, however, involves an inherent conflict of interest, since some board members are often named as defendants. In practice, the directors almost always reject the demand to proceed with litigation (Swanson 1993). The law makes an exception to the demand requirement: the shareholder is entitled to argue demand futility if he or she demonstrates that the board of directors cannot evaluate the demand impartially. After the demand requirement is ruled futile, the plaintiff-shareholder may circumvent the board and initiate a demand-excused suit. Intuitively, shareholders prefer to argue demand futility rather than make a demand because of the potential conflicts of interest of boards and the courts' unwillingness to overturn demand refusal.

Since the late 1980s, various states have followed the lead of section 7.42 of the MBCA and adopted UD requirements, whereby a shareholder must make a demand on the board of directors prior to every suit. The UD requirement was put in place primarily in the hope of eliminating the amount of time spent litigating the demand issue if futility is pleaded. Critics of the futility exception make three key connected arguments. First, boards can evaluate the demand objectively by appointing only independent and disinterested directors. Second, the demand requirement enables boards to correct for the alleged wrongdoing before seeking legal actions. Third, the futility exception moves the focus of litigation from the breach of fiduciary duty to the issues of demand futility, thereby reducing the efficiency of judicial economy.

As discussed in Section 3, we show that the passage of the UD requirement significantly reduces the occurrence of individual firms' derivative lawsuits. Our key explanatory variable in this study is a dummy variable that indicates whether a firm is incorporated in a state with effective UD laws. Table 1 indicates that, from 1989 to 2005, 23 of 50 states adopted UD laws with varying effective years.

Whether a firm is subject to a UD law depends on its state of incorporation (which may differ from the state where the firm's operations are located). It is therefore important to correctly identify the state where each firm is incorporated. Compustat provides information only on the most recent state of incorporation. To obtain public firms' historical states of incorporation and operation,

we rely on information provided by Bill McDonald,[4] who compiles relevant data based on firms' SEC electronic filings since 1994. For the years before 1994, we assume that the firm was located in the state in which we have the earliest reported information. For firms that are completely missing from McDonald's data set (for instance, firms that stopped filing before 1994), we use the geographic information provided by Compustat. Unless otherwise indicated, we use historical incorporated states reported in $t - 1$. Our results obtain when using alternative assignment to incorporated states.

2.3. *Estimating the Implied Cost of Capital*

We utilize a series of accounting-based valuation models to estimate the firms' ex ante cost of capital. This approach has two main benefits relative to alternative techniques that rely on realized stock returns as proxies for the cost of capital. First, the accounting-based valuation models separately incorporate cash-flow estimates, which make them particularly suited for isolating changes in the cost of capital. Second, since they do not rely on realized stock returns, the models are able to produce cost-of-capital estimates without having to utilize a long time series of past returns (Hail and Leuz 2009).

Following Hail and Leuz (2006, 2009), we adopt four models; two are based on the residual income valuation model in Claus and Thomas (2001) and Gebhardt, Lee, and Swaminathan (2001), and two are based on the abnormal earnings growth valuation model (modified price-earnings growth) in Easton (2004) and Ohlson and Juettner-Nauroth (2005). The ICOC estimates that are derived from these valuation equations are essentially the "internal rate of return that equates current stock price and the sequence of expected future residual incomes or abnormal earnings" (Hail and Leuz 2009, p. 432). The four models differ from each other in the use of analyst-forecasted earnings, the forecast horizon, and the assumptions regarding short-term and long-term growth rates. We use the median values of analysts' forecasts throughout the estimation. In Online Appendix Table OA1, we provide detailed descriptions of the four models.

Each estimate of ICOC is constrained to be positive, so if a negative value is obtained, we treat the observation as missing. From each of the resulting estimates, we subtract the risk-free rate (measured as the yield to maturity on 10-year treasury securities) to obtain an estimate of the risk premium. Finally, to reduce the potential measurement error introduced by individual models, we follow prior studies and take either the average ($R_{\text{AVG}}\_R_{\text{f}}$) or the first principal component ($R_{\text{FPC}}\_R_{\text{f}}$) of the four risk-premium estimates for each firm-year observation, conditional on having available values for the four ICOC measures. To prevent our results from being driven by outliers, we winsorize all firm-level variables at the 1 percent and 99 percent levels. Summary statistics reported in Table 2 indicate

[4] We retrieve information on the historical state of incorporation and location from Bill McDonald, Mendoza College of Business, University of Notre Dame, Software Repository for Accounting and Finance, Augmented 10-X Header Data (https://sraf.nd.edu/data/augmented-10-x-header-data/).

Table 2
Summary Statistics

Variable	*N*	Mean	SD	25th Percentile	50th Percentile	75th Percentile
$R_{AVG\_}R_f$	27,444	.060	.030	.038	.055	.075
$R_{FPC\_}R_f$	27,444	.121	.062	.077	.110	.152
UD Law	1,095	.279	.449	0	0	1
BC Law	1,095	.608	.488	0	1	1
FP Law	1,095	.516	.500	0	1	1
CSA Law	1,095	.489	.500	0	0	1
Real GSP per Capita	1,095	10.455	.330	10.164	10.501	10.726
Real GSP	1,095	12.298	1.127	11.493	12.238	13.145
GSP Growth	1,095	.028	.028	.011	.027	.047
Unemployment	1,095	6.119	1.973	4.8	5.8	7.3
Derivative Lawsuits	20,044	.025	.157	0	0	0
Class Actions	18,065	.034	.182	0	0	0
Size	26,745	6.523	1.731	5.250	6.419	7.646
Leverage	26,745	.267	.457	.006	.108	.321
BM	26,745	−.934	.666	−1.329	−.881	−.480
Beta	26,745	.995	.529	.611	.949	1.319
IdioRisk	26,745	.026	.012	.017	.023	.032
LnRet12	26,745	.104	.394	−.118	.121	.335
FDiff	26,745	−.010	.035	−.011	−.001	.003
E/P	58,641	.025	.308	−.004	.057	.116
E/P (Positive)	43,438	.123	.150	.046	.083	.143
Stock Return Synchronicity 1	57,911	−2.022	1.383	−2.919	−1.969	−1.020
Stock Return Synchronicity 2	57,911	−2.173	1.749	−3.320	−2.025	−.888
AbsCAR_MM	103,541	.0459	.0539	.0118	.0276	.0578
AbsCAR_FF3	103,541	.0457	.0537	.0118	.0275	.0575
AbsCAR_Carhart4	103,541	.0458	.0537	.0118	.0276	.0578
Stock Return Volatility	58,235	.139	.078	.084	.121	.172
Implied Asset Volatility	56,836	.725	.413	.430	.620	.902
Expected Default Probability	56,836	.110	.218	.000	.003	.093
Insider-Trading Frequency	36,303	2.787	1.420	1.792	2.833	3.689
Insider-Trading Size	36,303	11.769	2.072	10.463	11.887	13.168
Insider-Trading Value	36,291	14.548	2.421	12.876	14.694	16.310

that there is a fair degree of variation in the aggregate ICOC estimates. The average of the four ICOC measures net of the risk-free rate, $R_{AVG\_}R_f$, has a mean of 6 percent and a median of 5.5 percent. Our summary statistics exhibit magnitudes similar to those reported in Hail and Leuz (2006) using the same estimation method. The average ICOC is reported to equal 10.24 percent (see Hail and Leuz 2006, table 1). With a risk-free rate of 6 percent, it implies an average risk premium of 4.24 percent.

2.4. Other Firm-Level Attributes

To isolate the impact of UD laws on firms' cost of capital, we consider several firm-level controls that are documented to be correlated with the cost of capital.

The variable Size equals the natural logarithm of market value, Leverage is measured as the ratio of long-term debt to the market value of equity, and BM is the book-to-market ratio and equals the natural logarithm of the book value of equity to the market value of equity. All three variables are measured at the beginning of a fiscal year relative to the dependent variable. We also take into account two proxies for risk, systematic risk (Beta) and idiosyncratic risk (IdioRisk), which are estimated by the market model using daily returns over the 12 months prior to the time of ICOC estimation.

We also consider two additional controls, LnRet12 and FDiff, to account for the potential sluggishness and bias of analysts' forecasts (Chen, Li, and Zou 2016). Analysts may not always incorporate new information as quickly as the stock market. The untimely update might generate some noise in the estimation of a firm's future expected cash flow, which in turn generates noise in the cost-of-capital measure. In light of this issue, we calculate the price run-up (LnRet12) using the previous 12-month daily returns to capture analysts' sluggishness in processing information. From a different perspective, analysts' forecasts are known to be optimistic. If market participants recognize this bias and systematically adjust stock price accordingly, then the ICOC estimated from the accounting-based valuation models will be consistently upward biased. To control for this bias, we construct FDiff, which is defined as the 1-year-ahead actual realized earnings minus the 1-year-ahead analysts' forecasted earnings, scaled by the stock price 1 month before the forecast's announcement date. Note that FDiff is constructed such that a lower value indicates a more optimistic forecast. We provide detailed definitions of the variables in the Appendix and report summary statistics in Table 2.

2.5. Empirical Methodology

We use the staggered adoption of UD laws across states to assess the impact of derivative lawsuits on the cost of capital. The baseline difference-in-differences specification is as follows:

$$\text{ICOC}_{i,s,t} = \alpha_0 + \beta \text{UD Law}_{s,t} + \boldsymbol{\theta}' \text{Firm}_{i,s,t-1} + \boldsymbol{\rho}' \text{OpState}_{O,t} + \alpha_i + \alpha_t + \varepsilon_{i,s,t}, \quad (1)$$

where the dependent variable, $\text{ICOC}_{i,s,t}$, represents the proxy for the ICOC in firm i incorporated in state s at year t. The key explanatory variable, UD $\text{Law}_{s,t}$, is an indicator that equals one if state s has adopted a UD law by year t and zero otherwise. The coefficient β corresponds to the difference-in-differences estimator. This approach essentially compares changes in ICOC among firms incorporated in states that adopt UD laws (the treatment group) with changes in ICOC among firms incorporated in states that do not (the control group). As states passed UD laws at different times, it enables us to make use of a variety of treatment and control groups in our analyses. For example, when Pennsylvania adopted a UD law (and thus firms incorporated in Pennsylvania were treated) in 1997, not only firms in states that never passed UD laws but also firms in states that had not ad-

opted laws by 1997, such as Massachusetts (treated eventually in 2004), serve as the control group. This helps to reduce the biases and noise associated with relying on a single treatment group (Angrist and Pischke 2009).

We control for a number of time-variant characteristics of firms using the variables Size, Leverage, BM, Beta, IdioRisk, LnRet12, and FDiff. We account for a set of operating-state economic traits, $\text{OpState}_{O,t}$, using the variables Real GSP per Capita, Real GSP, GSP Growth, and Unemployment. In addition, we include firm and year fixed effects, α_i and α_t. In robustness tests, we further include operating-state–year and industry-year fixed effects to control for any time-varying differences across states and industries. The standard errors are clustered at the state-of-incorporation level to account for potential correlations among firms incorporated in the same state.

3. Empirical Results

3.1. Validity Tests of Adopting Universal-Demand Laws

The nature of our empirical design limits the usual concerns related to reverse causality. First, as highlighted above, the UD requirement is adopted primarily to eliminate the time spent arguing for demand futility rather than the supposed purpose of focusing on the alleged wrongdoing. Second, if managers find derivative suits to be a costly nuisance, and they effectively use their political connections to encourage legislators to pass the UD laws, either shareholders should be indifferent or they may "mistakenly" buy into tort-reform arguments. Moreover, even if firms lobby for the adoption of UD laws so that they can enjoy lower-cost financing, these actions would work against us finding that the passage of UD laws leads to an increase in the firm's cost of capital. Nevertheless, we conduct validity tests to formally address the possibility of reverse causality.

Table 3 suggests that the preexisting ICOC does not affect the probability or the timing of states enacting UD laws. In particular, column 1 employs a probit model in which the dependent variable is an indicator that equals one for state-year observations that include adoption of a UD law and zero otherwise, and the explanatory variable is the prior year's cost of capital aggregated at the state level (that is, the average of firm-level ICOC). To assess whether the average cost of capital in a state affects the timing of passing the law in the state, we apply a Weibull hazard model (Beck, Levine, and Levkov 2010) in column 3, where the dependent variable is the log of expected time to passing a UD law. To account for the possibility that it may take a long time for a state's cost of capital to affect the adoption of a UD law, columns 2 and 4 use the lagged 2-year state-level cost of capital. We also control for a set of time-varying state-level economic and demographic characteristics, including Real GSP per Capita, Real GSP, GSP Growth, Unemployment, Percentage Female-Headed Households, Percentage Black, and Percentage High-School Dropouts. As shown in Table 3, the state-level cost-of-capital measures, $R_{\text{AVG}}\_R_{\text{f}}$ (1- or 2-year lagged), enter insignificantly

Table 3
Timing of Passing Universal-Demand Laws and Preexisting Implied Cost of Capital

	Probit Model		Duration Model	
	(1)	(2)	(3)	(4)
$R_{AVG\_}R_f$ (1-year lag)	1.767		4.834	
	(.339)		(1.318)	
$R_{AVG\_}R_f$ (2-year lag)		−.299		2.717
		(−.052)		(.499)
States	51[a]	51[a]	50	50
N	1,069	1,030	893	854

Note. Results are from validity tests of whether the preexisting level of implied cost of capital (ICOC) predicts the probability and timing of passing a universal-demand (UD) law in a state. The dependent variable in columns 1 and 2 is UD Law; the dependent variable in columns 3 and 4 is the log of expected time to passing a UD law. States drop from the sample once they pass the law. All regressions include state controls lagged 1 year. Robust *z*-statistics (or *t*-statistics) calculated using state-level standard errors are in parentheses.

[a] Includes the District of Columbia.

across columns, which indicates that neither the probability nor the timing of passing a UD law is affected by firms' cost of capital.

A second key presumption underlying our empirical design is that the adoption of a UD requirement materially undermines shareholders' litigation rights, which translates into two testable hypotheses: following the passage of UD laws, the incidence of derivative suits should decrease and the incidence of securities class actions, considered to be a complementary form of litigation to derivative lawsuits, should remain unchanged. To execute the tests, we hand collect the date when a derivative lawsuit was initiated from each firm's SEC form 10-K filings. We read and record each SEC form 10-K document filed by the sample firms over the period from 1994, the first year of SEC electronic filings, to 2013. In this way, we compile a detailed firm-year panel of shareholders' litigation. We define Derivative Lawsuits as equal to one if a firm was sued via derivative suits in a year and zero otherwise. We assemble data on securities class actions from Audit Analytics, which covers relevant legal cases since 1996, and we define Class Actions in a similar way. We use a model specification similar to equation (1), except that the dependent variable is one of the litigation indicators.

The results reported in Table 4 are fully consistent with the hypotheses that validate our empirical setting. As shown, UD Law enters the regressions of Derivative Lawsuits negatively and significantly. The economic magnitude is large. The adoption of UD laws reduces the incidence of derivative litigation by 1.1–1.6 percentage points, equivalent to about 56 percent of the sample mean of Derivative Lawsuits. The results hold when we include firm-specific characteristics, industry-year fixed effects, and operating-state–year fixed effects. By contrast, we see that UD Law enters the regressions of Class Actions insignificantly. This evidence confirms that the incidence of derivative lawsuits decreases significantly

Table 4
Universal-Demand Laws and the Occurrence of Derivative Lawsuits and Class Actions

	Derivative Lawsuits			Class Actions		
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	−.014**	−.016*	−.011*	−.001	−.004	−.005
	(−4.096)	(−2.577)	(−2.088)	(−.161)	(−.577)	(−.555)
Size	.018**	.018**	.018**	.025**	.027**	.026**
	(5.081)	(7.937)	(8.722)	(8.424)	(8.296)	(8.781)
Leverage	.016**	.018**	.016*	.011**	.012**	.011*
	(3.895)	(3.331)	(2.615)	(2.951)	(2.868)	(2.557)
BM	.006	.005	.006+	.001	.005	.004
	(1.412)	(1.581)	(1.897)	(.106)	(.773)	(.717)
LnRet12	−.025**	−.025**	−.024**	−.044**	−.043**	−.044**
	(−7.196)	(−5.870)	(−5.812)	(−11.523)	(−10.482)	(−10.786)
Year fixed effects	Yes	No	No	Yes	No	No
Industry-year fixed effects	No	Yes	Yes	No	Yes	Yes
Operating-state–year fixed effects	No	No	Yes	No	No	Yes
N	20,044	20,044	20,044	18,065	18,065	18,065
Adjusted R^2	.039	.039	.0518	.0859	.0826	.0867

Note. Results are at the firm-year level. Robust t-statistics calculated using state-level standard errors are in parentheses. All regressions include firm fixed effects. $N = 50$ states.

+ $p < .10$.
* $p < .05$.
** $p < .01$.

Table 5
Universal-Demand Laws and Incorporation-State Shopping

	(1)	(2)
UD Law	−.078	−.108
	(−.606)	(−.778)
State controls	No	Yes
Adjusted R^2	.969	.969

Note. The dependent variable is the total number of publicly listed firms incorporated (in hundreds) at the state-year level. Robust *t*-statistics calculated using state-level standard errors are in parentheses. All regressions include year and state fixed effects. $N = 51$ states and 1,479 observations.

following the UD requirement and the decrease in derivative litigation does not lead to a complementary increase in class-action suits.

There might be concerns that firms could choose to incorporate in states that adopt corporate-friendly laws. To mitigate this concern, we examine whether the number of firms in a state changes following the adoption of a UD law. As reported in Table 5, UD Law enters the regressions insignificantly, which suggests that the enactment of UD laws does not induce firms to shift their states of incorporation in any statistically meaningful manner.

3.2. Universal-Demand Laws and the Cost of Capital

3.2.1. Baseline Analyses

We start our main analyses by examining how UD laws affect firms' ICOC. The results in Table 6 are consistent with the view that a decline in shareholders' litigation resulting from the passage of UD laws induces investors to require a higher rate of return. The UD Law dummy enters positively and significantly across all columns in Table 6, which suggests that passing a UD law leads to an increase in the ICOC. In particular, in column 1 we take the average of four individual measures of ICOC net of the risk-free rate, $R_{AVG}\_R_f$, as the dependent variable, and we take the UD Law indicator together with an array of state-specific economic characteristics and firm and year fixed effects as the explanatory variables. The cost-increasing effects remain qualitatively robust to the other ICOC measure, $R_{FPC}\_R_f$, in column 2. Columns 3 and 4 present analyses with additional firm-level controls. Conditional on these additional factors, we continue to find UD Law to be positive and statistically significant.

The economic magnitude of these findings is meaningful. The difference-in-differences coefficient in column 3 implies that following the adoption of a UD law, the cost of capital for firms incorporated in the state will increase on average

Table 6
Universal-Demand Laws and the Implied Cost of Capital: Baseline

	$R_{AVG}\_R_f$ (1)	$R_{FPC}\_R_f$ (2)	$R_{AVG}\_R_f$ (3)	$R_{FPC}\_R_f$ (4)	Accuracy-Weighted Model (5)
UD Law	.003*	.006*	.003**	.005**	.002*
	(2.378)	(2.369)	(2.825)	(2.861)	(2.369)
Size			−.006**	−.013**	−.006**
			(−10.856)	(−11.137)	(−11.936)
Leverage			.004**	.007**	.004**
			(4.955)	(4.354)	(5.336)
BM			−.000	−.001	.000
			(−.543)	(−.781)	(.014)
Beta			.000	.001	.000
			(1.456)	(1.663)	(.965)
IdioRisk			.272**	.587**	.269**
			(11.469)	(12.338)	(12.158)
LnRet12			−.019**	−.038**	−.018**
			(−27.985)	(−26.591)	(−29.949)
FDiff			−.137**	−.298**	−.147**
			(−28.122)	(−28.881)	(−29.383)
Real GSP per Capita	.000	−.001	−.002	−.004	−.001
	(.038)	(−.144)	(−.627)	(−.779)	(−.475)
Real GSP	.001	.002	.001	.002	.000
	(1.165)	(1.279)	(1.267)	(1.469)	(.749)
GSP Growth	−.048**	−.097**	−.004	−.007	−.003
	(−4.387)	(−4.587)	(−.431)	(−.415)	(−.433)
Unemployment	−.000	−.000	.000	.000	.000
	(−.888)	(−.928)	(.068)	(.042)	(.071)
N	27,444	27,444	26,745	26,745	26,701
Adjusted R^2	.550	.543	.663	.657	.660

Note. Columns 1–4 use ordinary least squares (OLS) estimation; column 5 uses a weighted OLS regression with 1 plus the log of analysts' forecast accuracy as the weight. All specifications include firm and year fixed effects. Robust t-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states.

* $p < .05$.

** $p < .01$.

by 26 basis points, which is equivalent to about 5 percent of the median value of $R_{AVG}\_R_f$ (5.5 percentage points as reported in Table 2).

We report the weighted ordinary least squares (OLS) regression results in column 5 using analysts' forecast accuracy as the weight. As our ICOC measures are calculated from analysts' earnings forecasts, the weighted OLS regression model gives higher weights to more accurate forecasts. Following Hail and Leuz (2009), we construct analysts' forecast accuracy as the inverse of the absolute 1-year-ahead forecast error scaled by the stock price 1 month before the forecast date. Column 5 shows that the effects of UD Law on our primary ICOC measure are insensitive to this alternative specification. The coefficient on UD Law indicates

an average effect of 24 basis points and remains statistically significant at the 5 percent level. In sum, the baseline results in Table 6 are consistent with our conjecture that UD laws reducing the threat of litigation by shareholders result in increases in the affected firms' cost of capital.

Taking a closer look at the results, we also see that the control variables exhibit the expected effects. The cost of capital is negatively associated with firm size, while firms with higher leverage ratios and return volatility bear higher financing costs. The negative coefficient on LnRet12 is also consistent with our expectations. In particular, these results imply that following a large stock price run-up (decline), if analysts fail to revise their earnings forecasts quickly enough to incorporate the new information, then our ICOC estimates will be biased downward (upward). Recall that a lower value of the difference between actual earnings and analysts' forecasts, FDiff, implies a more optimistic forecast. Thus, the negative coefficients on FDiff suggest that greater optimism leads to higher estimates of the cost of capital. Coefficients on these control variables are consistent with the results found in previous studies.

3.2.2. Robustness Tests

We conduct several robustness checks by adding more controls and testing for preexisting trends. The corresponding results are reported in Table 7. In particular, columns 1–2 employ more stringent specifications that include two-digit SIC industry-year or/and operating-state–year controls to account for unobservable time-varying heterogeneity across industries and operating states, respectively. We are able to add operating-state–year fixed effects because more than 65 percent of the sample firms operate in states different from their states of incorporation. As reported, the coefficients on the UD Law indicator remain statistically significant after including these additional fixed effects, which suggests that our main findings are not driven by the potential macrochanges in the operation states or trends in certain industries.[5]

Next we consider potential confounding events, the staggered adoption of antitakeover laws since the 1980s, when 36 states started to adopt at least one of three antitakeover laws: business combination (BC) laws, fair-price (FP) laws, and control share acquisition (CSA) laws. These laws arguably dampen the governance role provided by the market for corporate control by insulating managers from

[5] Although not reported, our main findings are highly robust to other tests in which we also control for stock return volatility or measures of corporate governance (Gompers, Ishii, and Metrick 2003). To the extent that stock return volatility is considered a good predictor of the propensity to be sued through class actions, this analysis further mitigates concerns that our findings are driven by the other form of litigation by shareholders. Our main findings are also robust to shifts in sample compositions, namely, excluding Delaware, which remains the most popular state for incorporation; removing the Internet bubble period of 2000 and 2001 and the recent financial crisis period of 2008 and 2009; focusing on the case of Pennsylvania, where the universal-demand (UD) law, as implemented by the Supreme Court of Pennsylvania, is arguably less likely to be affected by corporate lobbying; and restricting our analyses to a sample of treated firms that have both pre- and post-UD law observations, thus excluding firms incorporated in a state only after it enacts a UD law.

Table 7
Universal-Demand Laws and the Implied Cost of Capital: Robustness

	Industry-Year Fixed Effects (1)	Industry-Year and Operating-State–Year Fixed Effects (2)	BC Law (3)	FP Law (4)	CSA Law (5)	Preexisting Trends (6)
UD Law	.003**	.001*	.003**	.003**	.003*	.002**
	(2.793)	(2.099)	(2.799)	(2.730)	(2.625)	(2.896)
UD Law (−2)						.001
						(.443)
UD Law (−1)						.001
						(.457)
Operating-state controls	Yes	No	Yes	Yes	Yes	No
Year fixed effects	No	No	Yes	Yes	Yes	No
Adjusted R^2	.689	.692	.663	.663	.663	.692

Note. The dependent variable is $R_{AVG\_}R_f$. All regressions include firm fixed effects and firm-level controls (Size, Leverage, BM, Beta, IdioRisk, LnRet12, and FDiff). Robust t-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states and 26,745 observations.

* $p < .05$.

** $p < .01$.

the threat of hostile takeovers (Bertrand and Mullainathan 2003). Likewise, these antitakeover laws might affect our results if governance plays a role in determining a firm's cost of capital. We explicitly control for antitakeover laws in our specification. The resulting horse-race tests between the UD laws and antitakeover laws in columns 3–5 suggest that the positive effects of UD Law on the cost of capital are not affected by changes in antitakeover laws.

Table 7 further shows that the impact of UD laws on the cost of capital is not driven by preexisting trends (column 6). To test this, we add into the regression a series of dynamic indicators: UD Law (−1) equals one for states in the year before the UD law passes and zero otherwise, UD Law (−2) equals one for states in the second year before the UD law passes and zero otherwise, and UD Law equals one for states during and after the adoption years and zero otherwise. As can be seen, UD Law (−1) and UD Law (−2) enter insignificantly, whereas UD Law enters positively and significantly, which suggests that the ICOC for the treated firms and control firms diverges only after the passage of UD laws.

3.2.3. Universal-Demand Laws and Earnings-to-Price Ratios

We redo our analyses using E/P (that is, the inverse of price-to-earnings ratios) as an alternative measure of the cost of capital (see Basu 1977). The E/P equals EPS divided by stock price. Intuitively, in a typical valuation model with constant growth rate, the E/P is equivalent to the discounted factor and thereby the cost of capital. The test results using E/P as the dependent variable are reported in Table 8. As can be seen from columns 1–3, the coefficient estimates on UD Law are positive and statistically significant. The results remain highly robust across the model specifications. The results also hold when we focus on a group of observations with positive (and thus economically meaningful) E/Ps.

3.3. Channels

We next explore several channels through which the UD laws affect a firm's cost of capital. We show that the enactment of a UD law leads to deteriorated information environment and corporate disclosure quality, intensified corporate risk-taking, and increased insider trading.

3.3.1. Quality of Information

Increases in the cost of capital imposed by the UD laws may stem from a deterioration in the corporate information environment. To shed light on this channel, we explore whether the passage of UD laws directly influences the quality of firms' disclosures. Previous studies demonstrate that the legal environment in general—and shareholders' litigation in particular—is often related to financial reporting and disclosure quality (Leuz, Nanda, and Wysocki 2003; DuCharme, Malatesta, and Sefcik 2004; Barzuza and Smith 2014). In the context of UD laws, a lower likelihood of bearing legal consequences can create incentives for cor-

Table 8

Universal-Demand Laws and the Cost of Capital: Earnings-to-Price Ratio

	E/P			E/P (Positive)		
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	.0175**	.0152*	.0156*	.0103*	.0112**	.0139**
	(3.592)	(2.630)	(2.139)	(2.318)	(2.787)	(3.915)
Operating-state controls	Yes	Yes	No	Yes	Yes	No
Year fixed effects	Yes	No	No	Yes	No	No
Industry-year fixed effects	No	Yes	Yes	No	Yes	Yes
Operating-state–year fixed effects	No	No	Yes	No	No	Yes
N	58,641	58,641	58,641	43,438	43,438	43,438
Adjusted R^2	.449	.455	.453	.472	.490	.495

Note. All regressions include firm fixed effects and firm-level controls (Size, Leverage, BM, and LnRet12). Operating-state controls include Real GSP per Capita, Real GSP, GSP Growth, and Unemployment. Columns 1–3 include an indicator that equals one if the earnings are nonpositive and zero otherwise (unreported). Robust t-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states.

* $p < .05$.

** $p < .01$.

porate managers to pursue their private agendas, which leads them to obfuscate the information environment to mask their expropriation activities. This argument suggests an information channel in which the passage of UD laws leads to a higher cost of capital.

To examine the information channel, we adopt two market-based measures that are widely used in the literature to capture the market's information: stock price informativeness and instantaneous market reaction to corporate disclosure. First, we use price synchronicity, the extent to which individual stock returns comove with the market-wide returns, to capture the extent to which firm-specific information is incorporated into stock prices (see, for example, Roll 1988; Morck, Yeung, and Yu 2000; Wurgler 2000; Durnev, Morck, and Yeung 2004). For each firm in a year, we estimate the R^2-value from regressing an individual stock's daily return on the corresponding market return and industry return using the following regression: $\text{Ret}_{i,t} = \beta_0 + \beta_1\text{MktRet}_t + \beta_2\text{IndRet}_{j,t} + \varepsilon_{i,t}$, where $\text{Ret}_{i,t}$ represents the daily stock return for firm i at time t, MktRet_t is the market return at time t, and $\text{IndRet}_{j,t}$ is the return of industry j to which firm i belongs at time t. We then use a logistic transformation of the R^2-value and define Stock Return Synchronicity as $\ln[R^2/(1 - R^2)]$. Thus, a higher value of Stock Return Synchronicity indicates that a firm's stock return is highly correlated with the market and industry returns, and a lower degree of firm-specific information is incorporated in the firm's stock price.

Second, we measure the information content of corporate disclosure using the instantaneous market reaction to voluntary filing of 8-K forms, an approach predominantly employed in the literature (Carter and Soo 1999; Healy and Palepu 2001; Holthausen and Watts 2001). We focus on the voluntary form 8-K filings reported under items "regulation fair disclosure" or "other events." We calculate the absolute value of the 3-day cumulative abnormal return (CAR) at announcement using a standard market model, Fama-French three-factor model, and Carhart four-factor model. A higher level of the CARs (in absolute terms) indicates greater information conveyed to investors at announcements. We assess the information channel using a specification similar to equation (1), except that we use the measures of price informative as the dependent variables.[6] Table 9 reports the results of how UD laws affect these two market-based measures of information content.

Table 9 provides evidence that stock price becomes more synchronous and reflects less firm-specific information and voluntary form 8-K disclosure conveys less information following the adoption of UD laws. As shown in columns 1 and 2, UD Law enters positively and significantly, which suggests that the stock price informativeness deteriorates when managers are exposed to a lower threat of shareholder litigation resulting from the adoption of UD laws. Coefficient estimates from column 1 suggest that passing a UD law results in roughly a 9 percent increase in stock return synchronicity. Likewise, UD Law enters negatively and

[6] The unit of analysis for form 8-K information content is at the level of the firm by form 8-K announcement date.

Table 9
Universal-Demand Laws, Stock Price Informativeness, and the Information Content of Voluntary 8-K Forms

	Stock Return Synchronicity		Instantaneous Market Reaction		
	Equal Weighted (1)	Value Weighted (2)	Market (3)	Fama-French Three Factor (4)	Carhart Four Factor (5)
UD Law	.093**	.122*	−.008**	−.008**	−.007**
	(3.400)	(2.109)	(−3.256)	(−3.273)	(−3.000)
N	57,911	57,911	103,541	103,541	103,541
Adjusted R^2	.726	.767	.161	.162	.163

Note. The unit of analysis for the absolute cumulative abnormal returns in columns 3–5 is the 8-K announcement date. All regressions include firm, industry-year, and operating-state–year fixed effects and firm-level controls (Size, Leverage, BM, and LnRet12) to account for unobservable firm heterogeneity and time-varying differences across industries and operating states. Robust *t*-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states.

* $p < .05$.

** $p < .01$.

significantly in columns 3–5, which suggests that voluntary form 8-K disclosure becomes less informative after the adoption of UD laws. The economic magnitude is not small. Coefficients in column 3 indicate that announcement CARs (in absolute terms) would on average drop by about .8 of a percentage point following the passage of UD laws. This is equivalent to about 15 percent of the standard deviation of AbsCAR_MM.

3.3.2. Corporate Risk-Taking

Next we evaluate whether managerial risk-taking behavior shifts following the enactment of a UD law. To the extent that the law better insulates managers from the threat of shareholders' litigation against the bad outcomes related to their business decisions, the enactment is expected to encourage managerial risk-taking ex ante, thereby leading to increased corporate risk and in turn a higher cost of capital.

We consider four risk-taking measures. First, Stock Return Volatility equals the standard deviation of stock returns over the past 12 months, which is a market-based measure of individual firms' risk commonly used in existing research. Second, we use the variable Beta to measure firms' exposure to market risk. As implied by the CAPM, holding the risk premium constant, a higher market beta indicates a greater rate of returns and thereby a higher cost of equity capital. Thus, Beta captures the extent to which shareholders are exposed to systematic market risk that is not diversifiable. Moreover, we estimate two more variables, Implied Asset Volatility and Expected Default Probability, by implementing the Merton DD model, in which a firm's equity is viewed as a call option on the underlying value of the firm with a strike price equal to the face value of the firm's debt. The Merton DD model infers the unobservable variables—that is, the value

Table 10
Universal-Demand Laws and Corporate Risk-Taking

	Stock Return Volatility	Beta	Implied Asset Volatility	Expected Default Probability
UD Law	.006**	.057*	.027*	.020**
	(4.283)	(2.485)	(2.557)	(6.021)
N	58,235	58,709	56,836	56,836
Adjusted R^2	.618	.551	.682	.514

Note. All regressions include firm, industry-year, and operating-state–year fixed effects and firm-level controls (Size, Leverage, BM, and LnRet12). Robust *t*-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states.

* $p < .05$.

** $p < .01$.

of the firm and its volatility (which is Implied Asset Volatility in this study)—from a set of observables including the value of equity, the volatility of equity, the face value of debt, the risk-free rate, and the forecasting period. Accordingly, we infer the values of Implied Asset Volatility and Expected Default Probability by solving a system of nonlinear equations. Compared with Stock Return Volatility and Beta, which measure realized firm risk, the two variables estimated from the Merton DD model capture the firm's expected risk and default probability. The Merton DD model is widely applied in the literature to estimate the risk of distress (Campbell, Hilscher, and Szilagyi 2008; Drucker and Puri 2009).

Table 10 reports the results of the effects of UD laws on firms' risks, which suggest that the passage of UD laws increases managerial risk-taking. As shown, the coefficient estimates on UD Law consistently demonstrate that the passage of UD laws generates a significant and positive increase in the firms' risk measures. The economic magnitude is large. For instance, the coefficient estimates suggest that stock return volatility and the probability of default increase by about 8 percent (=.006/.078), and 9 percent (=.02/.218) of their corresponding standard deviations. In sum, the results in Table 10 are consistent with the notion that shareholders' weakened litigation rights caused by the UD laws encourage managers to make riskier investments, which leads to higher risks for firms and greater exposure to systematic market risk, which ultimately translates into a higher cost of equity capital.

In the Online Appendix, we also examine the cash-flow effect. Although it is not the key theme of this paper, we want to explore whether the UD laws affect both the discount factor (the cost of capital) and the cash flows. Table OA2 presents estimated results from a series of tests examining whether the passage of UD laws leads to higher future cash flows. The variable Cash Flow is defined as net income before extraordinary items plus depreciations and amortization divided by beginning-period total assets. Table OA2 reports the effects of UD laws on contemporaneous cash flows and future cash flows in 1 or 2 years. As shown, the

coefficient estimates on UD Law are statistically insignificant and economically small across columns, which suggests that subsequent cash flows do not change significantly following the passage of UD laws.

3.3.3. Insider Trading

We now assess the third channel through which the UD laws affect firms' cost of capital: intensified insider-trading activities, a particular form of self-dealing activities. As mentioned, a large proportion of derivative suits involve allegations of insider trading. Corporate insiders have an informational advantage over outside investors and can potentially benefit from trading on their private information at the expense of information-disadvantaged market participants. To the extent that insiders are concerned about litigation risks, their willingness to trade on private information should vary with changes in the legal environment (Cheng, Huang, and Li 2016). Del Guercio, Odders-White, and Ready (2017), for instance, show that the SEC enforcement intensity mitigates illegal insider trading. In our context, insiders are expected to be more aggressive in their trading when the litigation risks are perceived to be lower following the adoption of the UD laws.

We consider three proxies to measure the extent to which insiders exploit their informational advantage and expropriate the outside investors. First, Insider-Trading Frequency equals the number of stock transactions conducted by corporate insiders in a year. Second, Insider-Trading Size equals the number of shares purchased or sold by corporate insiders. Third, Insider-Trading Value equals the dollar value of shares purchased or sold by corporate insiders, where the dollar value is the product of trading volume and transaction price. We collect corporate insiders' trading data from the Thomson Reuters Insider Filing database, where corporate insiders are defined broadly to include those that have "access to non-public, material, insider information" (Thomson Reuters 2008, p. 26). The database contains trade information from officers, directors, and beneficial owners of more than 10 percent of a firm's equity securities. We focus on valid transactions by corporate insiders on common stocks, filed via SEC form 4.

Table 11 presents the estimation results of the effects of UD laws on insider trading. The UD Law indicator enters all the regressions positively and significantly, which suggests that insiders (or informed traders) become more aggressive in trading on their private information following the passage of UD laws. The economic size is large. The coefficient estimate for value indicates that the transaction value of insider trading increases by about one-third after the state where the firm is incorporated adopts a UD law.

Finally, we consider the changing value of cash as an additional channel by which the passage of UD laws may affect the ICOC. Without adequate discipline from shareholders' litigation, managers tend to waste corporate resources such as cash, which leads to a decrease in firms' value of cash. We employ the standard approach to measure the value of cash by assessing how a change in a firm's value

Table 11
Universal-Demand Laws and Insider Expropriation

	Insider-Trading Frequency	Insider-Trading Size	Insider-Trading Value
UD Law	.223*	.220*	.386**
	(2.029)	(2.101)	(3.699)
N	36,303	36,303	36,291
Adjusted R^2	.384	.381	.513

Note. All regressions include firm-level controls (Size, Leverage, BM, and LnRet12) and firm, industry-year, and operating-state–year fixed effects. Robust *t*-statistics calculated using state-level standard errors are in parentheses. $N = 50$ states.

* $p < .05$.

** $p < .01$.

varies with a change in corporate cash holdings (see, for example, Faulkender and Wang 2006; Dittmar and Mahrt-Smith 2007) and how this relation changes before and after the enactment of UD laws. Online Appendix Table OA3 reports the estimated effects of UD laws on the value of cash and suggests that the passage of UD laws materially reduces the value of cash. Coefficients from column 1 imply that the value of a dollar of cash to a firm decreases by $.2 after the adoption of UD laws.

4. Conclusion

Do the legal environment and the level of shareholder protection meaningfully influence the cost of capital? To shed some light on this broader issue, we exploit the staggered adoption of UD laws in 23 states to examine the causal impact of shareholders' litigation rights on the ICOC. Employing a difference-in-differences approach on a primary sample of US public firms from 1985 through 2013, we find that reduced litigation rights induced by UD laws increase firms' cost of capital. Proxies for the ICOC are estimated from four accounting-based valuation models commonly used in the literature. Our baseline results are robust to the inclusion of firm, year, industry-year, and operating-state–year fixed effects and a variety of firm-specific controls. They are also not sensitive to alternative dependent variables or changes in the composition of the sample.

Further analyses suggest that shareholders' litigation rights influence corporate financing through the aggravation of agency problems. Consistent with this conjecture, we show that the passage of UD laws results in deteriorated quality of information, increased risk-taking, and more intensive insider-trading activities. Overall, our findings support the notion that UD laws place significant obstacles to lawsuits by shareholders, which leads shareholders to face intensified agency conflicts and greater expropriation risks, which in turn lead them to require a higher rate of return.

Appendix

Definitions and Sources of Variables

A1. Cost-of-Capital Measures

$R_{AVG}\_R_f$. The variable $R_{AVG}\_R_f$ equals R_{AVG} minus R_f, where R_{AVG} is the mean value of four implied cost of capital (ICOC) estimates based on Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), and Ohlson and Juettner-Nauroth (2005) and the modified price-earnings growth model in Easton (2004); R_f is the risk-free rate. The term is calculated using data from Compustat, the Center for Research in Security Prices (CRSP), the Institutional Brokers' Estimate System (I/B/E/S), and the Federal Reserve System.

$R_{FPC}\_R_f$. The variable $R_{FPC}\_R_f$ is the first principal component of the four individual ICOC estimates.

A2. State-Level Laws

UD Law. The term UD Law is a dummy variable equal to one if a state in a year has passed a universal-demand law and zero otherwise (Appel 2015).

BC Law. The term BC Law is a dummy variable equal to one if a state in a year has passed a business combination law and zero otherwise (Bertrand and Mullainathan 2003).

FP Law. The term FP Law is a dummy variable equal to one if a state in a year has passed a fair price law and zero otherwise.

CSA Law. The term CSA Law is a dummy variable equal to one if a state in a year has passed a control share statute and zero otherwise.

A3. Litigation Variables

Derivative Lawsuits. The term Derivative Lawsuits is a dummy variable equal to one if a firm has a derivative lawsuit filed in a year and zero otherwise (from EDGAR).

Class Actions. The term Class Actions is a dummy variable equal to one if a firm has a class-action lawsuit filed in a year and zero otherwise (from Audit Analytics).

A4. Other Firm- and Industry-Level Variables

E/P. The earnings-to-price ratio is calculated as earnings per share over a fiscal period divided by the stock price at the end of the period. The data are from Compustat, CRSP, and I/B/E/S.

Size. The term Size is the natural logarithm of the market value of equity.

Leverage. The term Leverage is the ratio of long-term debt to the market value of equity

BM. The term BM is the natural logarithm of the book value of equity to the market value of equity.

Beta. The term Beta is a proxy for a firm's systematic risk estimated by the market model using daily returns from the previous 12 months.

IdioRisk. The term IdioRisk, the idiosyncratic risk, equals the standard deviation of the residual daily returns in the market model.

LnRet12. The term LnRet12 is calculated as the natural logarithm of 1 plus the compounded stock returns during the previous 12 months.

FDiff. The term FDiff equals actual realized earnings per share (EPS) minus the 1-year-ahead analyst-forecasted EPS, scaled by the stock price 30 days before the forecast's announcement date.

Stock Return Volatility. The term Stock Return Volatility equals the standard deviation of monthly stock returns over the past 12 months.

Stock Return Synchronicity 1. The term Stock Return Synchronicity 1 is calculated using CRSP data. For each firm in a year, the R^2-value is estimated by regressing the stock's daily return on equal-weighted market and industry return, using the following model: $\text{Ret}_{i,t} = \beta_0 + \beta_1\text{MktRet}_t + \beta_2\text{IndRet}_{j,t} + \varepsilon_{i,t}$, where *i*, *j*, and *t* denote stock, industry, and time, respectively. The variable $\text{Ret}_{i,t}$ is the daily stock return for firm *i*'s stock at time *t*, MktRet_t is the equal-weighted market return at time *t*, and $\text{IndRet}_{j,t}$ is the equal-weighted return for industry *j* at time *t*. We use a logistic transformation of R^2 and define Stock Return Synchronicity as $\ln[R^2/(1 - R^2)]$.

Stock Return Synchronicity 2. The term Stock Return Synchronicity 2 is calculated using CRSP data. For each firm in a year, the R^2-value is estimated by regressing individual stock daily return on value-weighted market and industry return, using the following model: $\text{Ret}_{i,t} = \beta_0 + \beta_1\text{MktRet}_t + \beta_2\text{IndRet}_{j,t} + \varepsilon_{i,t}$, where *i, j,* and *t* denote stock, industry, and time, respectively. The variable $\text{Ret}_{i,t}$ is the daily stock return for firm *i*'s stock at time *t*, MktRet_t is the value-weighted market return at time *t*, and $\text{IndRet}_{j,t}$ is the value-weighted return for industry *j* at time *t*. We use a logistic transformation of R^2 and define Stock Return Synchronicity as $\ln[R^2/(1 - R^2)]$.

AbsCAR_MM. The term AbsCAR_MM is calculated from EDGAR and CRSP data as the absolute value of 3-day cumulative abnormal return (CAR) around the 8-K announcement date using a standard market model. The model's parameters are estimated over the 200-trading-day window [−210, −11] relative to the announcement date (day 0).

AbsCAR_FF3. The term AbsCAR_FF3 is calculated as the absolute value of the 3-day CAR around the 8-K announcement date, using the Fama-French three-factor model. The model's parameters are estimated over the 200-trading-day window [−210, −11].

AbsCAR_Carhart4. The term AbsCAR_Carhart4 is calculated as the absolute value of the 3-day CAR around the 8-K announcement date using the Carhart four-factor model. The model's parameters are estimated over the 200-trading-day window [−210, −11].

Implied Asset Volatility. The implied volatility of a firm's value is calculated

using CRSP and Compustat data and the nonlinear equations (A1) and (A2) under the Merton distance-to-default model:

$$E = V\mathcal{N}(d1) - d^{-rT}F\mathcal{N}(d2), \tag{A1}$$

where

$$d1 = [\ln(V/F) + (r + .5\sigma_V^2)T/(\sigma_V\sqrt{T})]$$

and

$$d2 = [\ln(V/F) + (r - .5\sigma_V^2)T/(\sigma_V\sqrt{T})],$$

where $\mathcal{N}(\cdot)$ represents a cumulative standard normal distribution function, E is the market value of the firm's equity, F is the face value of debt, V is the market value of the firm's asset, σ_V is the volatility of V, and r is the risk-free rate; and

$$\sigma_E = (V/E)\mathcal{N}(d1)\sigma_V, \tag{A2}$$

where σ_E is the volatility of the firm's equity. We use the readily observed variables (E, σ_E, F, r, T [which equals 1, assuming a forecasting horizon of 1 year]) as the inputs to simultaneously solve for V and σ_V in equations (A1) and (A2). The term σ_V is Implied Asset Volatility.

Expected Default Probability. The term Expected Default Probability indicates the probability that the value of a firm will fall below the face value of its debt at the forecasting horizon. Expected default probability can be expressed as follows:

$$\mathcal{N} = \{-[\ln(V/F) + (\mu - .5\sigma_V^2)T/(\sigma_V\sqrt{T})]\},$$

where $\mathcal{N}(\cdot)$ represents a cumulative standard normal distribution function; F is the face value of debt; V and σ_V are the value and volatility of a firm's asset, which are inferred from the Merton model as described above; μ is the expected return on V; and T denotes the forecasting horizon and is assumed to equal 1 year.

Insider-Trading Frequency. The term Insider-Trading Frequency is the logarithm of the number of stock transactions by corporate insiders over a period and is calculated using data from the Thomson Reuters Insider Filing database.

Insider-Trading Size. The term Insider-Trading Size is calculated as the logarithm of the number of shares purchased or sold by corporate insiders over a period.

Insider-Trading Value. The term Insider-Trading Value is calculated as the logarithm of the dollar value of total shares purchased or sold by corporate insiders over a period.

A5. Operating-State Characteristics

Real GSP per Capita. The term Real GSP per Capita is calculated as the logarithm of the real gross state product per capita using data from the Bureau of Economic Analysis.

Real GSP. The term Real GSP equals the logarithm of the real gross state product.

GSP Growth. The term GSP Growth is the annual growth rate of the real gross state product.

Unemployment. The term Unemployment is the state's rate of unemployment in a state and uses data from the Bureau of Labor Statistics.

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