S&P Global Market Intelligence, SSRN, Available online 2 February 2024
DOI:10.2139/ssrn.4696573

Shareholder Litigation and Private Benefits of Control: Evidence from Derivative Lawsuits

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Abstract

We examine the effects of derivative litigation risks on the value of private benefits of control. Quantifying the value of private benefits of control using the voting premiums from option prices, we find that the value of the voting premium significantly decreases after firms experience derivative lawsuits. To address endogeneity concerns, we exploit the staggered adoption of Universal Demand (UD) laws across 23 U.S. states from 1989 to 2005 to investigate whether and how the reduction in litigation risks affects the level of voting premium. The results show that the adoption of UD laws increases the value of voting premiums. Our DID results are robust to a battery of tests. We also find that the adoption of UD laws leads to a decrease in the value of cash holdings, an increase in CEO cash compensation and a decrease in investment efficiency and these effects are more pronounced for dual-class firms. Overall, our findings suggest that shareholder litigation can effectively curb the managerial extraction of private benefits. It has important implications for managers, shareholders, and policymakers.

Keywords: Private Benefits of Control, Shareholder Litigation, Derivative Lawsuits, UD Laws, Voting Premium

JEL Classification: G12, G34, K41

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The final published version (version of record) is available online at DOI:10.2139/ssrn.4696573. Please refer to any applicable publisher terms of use.
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1. Introduction

The expansion of capital markets is highly related to the protection of minority shareholders through the country-level legal framework (La Porta et al., 1997; La Porta et al., 2000; Dyck and Zingales, 2004). The legal mechanisms play an important role in fostering financial development through constraining expropriation by controlling parties. Existing empirical studies show the level of expropriation is affected by law enforcement (Zingales, 1994; Zingales, 1995; Nenova, 2003; Dyck and Zingales, 2004; Doidge, 2004), accounting standards (Hong, 2013), public policies (Gao and Zhang, 2019). These studies imply that the legal system serves as an important governance mechanism to protect outside shareholders' interests and rights by limiting controlling insiders' ability to extract value from the firm. However, these empirical studies might be subject to selection bias and measurement issues because it is challenging to observe and measure the private benefits of control by its nature. Since shareholder litigation is a vital part of the legal mechanism and is also an important legal approach to corporate governance, following the new estimation method of Kalay, Karakaş, and Pant (2014), our study aims to investigate the effects of shareholder litigation on the level of private benefits of control.

The curbed private benefits of control not only significantly affect the development of financial markets, but also have more important implications for corporate governance. Managers or controlling shareholders usually obtain disproportionate controlling power, which is not fairly allocated by corporate votes to all shareholders of the firm. As a result, they can enjoy some private benefits from the rights to control the firm at the cost of minority shareholders. The benefits of control over corporate resources aggravate agency conflicts between managers and shareholders, thereby causing agency problems at firms. Notably, the legal protection of shareholders is a solution to agency problems resulting from the separation of ownership and control (La Porta et al., 1998). In the legal system, shareholders are empowered to file a lawsuit against the wrongdoings of firm management, thereby fulfilling the function of deterrence to align the interests of managers and shareholders. Shareholders can exercise the governance power of lawsuits against the waste of corporate resources. As legal liability increases the costs of expropriating outside shareholders by controlling insiders, the extraction of private benefits will be limited effectively. Zingales (1995) indicates the ability of shareholders to sue management can be the governance mechanism to curb the extraction of private control benefits. Thus, a good legal system strengthens shareholder litigation rights, which are more likely to, in return, constrain corporate insiders' ability to extract value from the firm at the cost of minority shareholders. It is well documented that the level of private benefits of control is lower in the developed equity market with

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the strict legal environment (La Porta et al., 1997; Zingales, 1994; Zingales, 1995; Nenova, 2003; Dyck and Zingales, 2004; Doidge, 2004; Hong, 2013). Specifically, in addition to law enforcement and accounting standards, shareholder litigation rights are important proxies for the legal framework. However, these studies do not provide direct empirical evidence about the actual effects of shareholder litigation on the consumption of expropriation by controlling shareholders or management. Therefore, we built on these studies to further discuss whether and how shareholder litigation affects the amount of private benefits extracted by corporate insiders.

Derivate lawsuits are one of the important forms of shareholder litigation. A derivative lawsuit is initiated by shareholders on behalf of the corporation to sue alleged officers and directors for their breach of fiduciary duties. It is a key channel to improve corporate governance and deter managers from potential misconduct. First, the settlement of derivative lawsuits incurs substantial costs to firm management, including direct pecuniary loss and indirect reputational damage. Second, the primary purpose of derivative lawsuits is to reform corporate governance mechanisms. Ferris et al. (2007) argue that derivative lawsuits result in a remarkable improvement in the power of board structure. Appel (2019) documents that the reduction in the number of derivative lawsuits leads to an increase in management entrenchment. Derivative lawsuits enhance corporate governance structures, which reduces the agency cost created by unnecessary expropriation by entrenched managers or controlling shareholders. Simultaneously, the legal cost incurred by derivative lawsuits may exceed the private benefits. As a result, managers are less likely to expropriate wealth from the firm at the cost of minority shareholders in the legal protection of derivative lawsuits. Thus, we hypothesize that the derivative litigation risks will reduce the value of private benefits.

However, not all derivative lawsuits play an important role in creating firm value. Frivolous lawsuits caused by the abuse of shareholder litigation rights impose huge costs on the firm operation and managers are less motivated to pursue risky but value-creation investment policies in the long term because high litigation risks put management in an uncertain position in their career development. Accordingly, 23 states in the United States have adopted the Universal Demand (UD) laws during the periods between 1989 and 2005. Appendix A provides the list of the states that adopted UD laws. The adoption of UD laws reduces litigation risk by imposing procedural barriers to derivative lawsuits against wrongdoers. As such, following the passage of UD laws, the curbed litigation rights weakened the governance power of shareholder litigation, thereby exacerbating agency problems associated with private benefits of control by controlling shareholders and managers. Existing studies on UD laws have shown that the adoption of UD laws leads to an increase in management entrenchment

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(Appel, 2019), a rise in the external costs of financing (Houston, Lin, and Xie, 2018; Ni and Yin, 2018), a decrease in investment efficiency (Li, Monroe, and Coulton, 2023) and a deterioration in the corporate information environment (Le, Nguyen, and Sila, 2021; Boone, Fich, and Griffin, 2023). Although these studies document that insulating managers from the discipline of shareholder litigation increases potential expropriation risks and agency costs following the passage of UD laws, no studies have captured the casual economic effects of shareholder litigation on the value of private benefits of control. Thus, the U.S. provide us with an interesting case of UD law to analyze the effects of the decrease in litigation risk on the private benefits of control. The UD laws are adopted by different U.S. states at different times, which is exogenous to firms and litigation environments. This staggered adoption of UD laws takes place at the state of incorporation level, which greatly mitigates endogeneity concerns that occurred in the relation between shareholder litigation and corporate activities due to reverse causality or omitted variables. This identification approach helps us to identify the causal effects of litigation risks on the private benefits of control. In the United States, the legal environment is instituted to better buffer minority shareholders against the expropriation of managers and controlling shareholders. Doidge (2004) found that firms that are cross-listed in the U.S. usually experience a decrease in the level of private benefits of control. Gao and Zhang (2019) document that the enactment of the Sarbanes-Oxley Act effectively curbs the insiders' expropriation of corporate resources. Being different from the strict legal approach to corporate governance in the United States, the lax legal environment resulting from the UD laws enactment easily exposes shareholders to managers' expropriating activities. Therefore, we hypothesize that the adoption of UD laws leads to an increase in the value of private benefits of control.

We start our analysis by investigating the effects of the derivative lawsuit risks on the value of private benefits of control, estimated by the value of corporate voting rights using option prices (hereafter, *voting premium*), following the new method of Kalay, Karakaş, and Pant (2014). We obtain actual derivate lawsuit filing data from the Audit Analytics Corporate Legal Database. Using a sample of 18,878 firm-year observations of 3,299 U.S. public firms with 933 derivative lawsuits from 2000 to 2021, we find that the risk of derivative lawsuits negatively affects the value of private benefits. Specifically, the average value of the voting premium, which captures the level of private benefits of control, declines by 0.038 percentage points after the firm experiences a derivative lawsuit. This result holds when we control an extensive range of firm, and year fixed effects, state-level factors, as well as firm-specific and industry-specific variables motivated by Karakas¸ and Mohseni (2021), which include firm size, firm age, company leverage, book-to-market ratio, insider ownership, institutional ownership concentration, R&D expenses, capital expenses, and product market

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competition.

To further verify the causal inference about the relation between the value of private benefits and the derivative litigation risk, we exploit the staggered adoption of UD laws as an exogenous shock to shareholder litigation risk. The passage of UD laws made it difficult for shareholders to file derivative lawsuits against firm management for their wrongdoings, thereby weakening the governance power of shareholder litigation rights and significantly reducing litigation risks for firms incorporated in the states that have adopted the UD laws. In the validity test, we show that the adoption of UD laws indeed results in a reduction in the number of derivative lawsuits. Furthermore, using a difference-in-differences (DID) method, we compare the change in the value of voting premiums between treatment firms from states affected by UD laws and control firms from states unaffected by UD laws before and after the passage of UD laws during the sample period between 1996 and 2009. We find that the adoption of UD laws results in an increase in the level of voting premiums by 0.11%. Similarly, the result is insensitive to control for firm and year fixed effects, macro conditions, and firm and industry-specific characteristics. We also find the passage of UD laws is still positively related to dual-class voting premium, which is the alternative proxy for private benefits of control, but this result is insignificant.

We conduct a battery of tests to address endogeneity concerns and other robustness issues. First, the relation between the passage of UD laws and voting premiums might be spurious when the two just follow time trends. To check the validity of the pre-treatment trend, we employ a dynamic model to examine the relationship between the timing of the enactment of UD laws and the timing value of voting premiums. Our results show that the value of voting premiums only increases following the adoption of UD laws and not in the year preceding that, implying that there is no such spurious relation between the adoption of UD laws and voting premiums. Second, some omitted variables may drive the increase in the value of voting premiums following the adoption of UD laws. To explore the possibility, we use the propensity score matching (PSM) method to minimise the systematic differences between treated and control firms based on an array of firm characteristics. Our baseline results still hold after rerunning the DID regression using a PSM sample. Finally, we conduct additional robustness tests to validate our baseline results by examining whether our results are driven by confounding state-level laws and the self-selection bias of Delaware effects. Our findings remain qualitatively unchanged after controlling for Business Combination (BC) laws, Poison Pill (PP) legislation and excluding firms that are incorporated in Ninth Circuit states and the Delaware state.

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The voting premium findings might be driven by the measurement error issues given that the private benefits of control are inherently difficult to quantify by their particular nature (Dyck and Zingales, 2004; Hong, 2013). Hence, to corroborate our findings, the further purpose is to explore through which channels controlling parties can extract value from the firm at the cost of minority shareholders following the passage of UD laws. The literature on corporate governance discusses that managers are more likely to consume corporate resources for their private interests through the channel of corporate cash holdings, managerial compensation, and corporate investments (Dittmar and Mahrt-Smith, 2007; Masulis, Wang, and Xie, 2009; Hong, 2013; Gao and Zhang, 2019). The adoption of UD laws, which restrains shareholders from instituting a derivative lawsuit to challenge managerial malfeasance, can curb the governance power of shareholder litigation rights. The lax legal environment associated with the UD laws deteriorates corporate governance, which aggravates agency conflicts between managers and shareholders. Appel (2019) documents that the reduction in litigation risks following the passage of UD laws increases the use of governance provisions that entrench firm management. Because of the lack of effective constraints from derivative lawsuits, the studies on UD laws have shown that managers are inclined to misuse corporate cash reserves (Houston, Lin, and Xie, 2018), get more pay package (Appel, 2019), and make suboptimal investments (Li, Monroe, and Coulton, 2023) around the passage of UD laws. In addition, dual-class firms, which have more than one class of stock with different voting rights, lead to a remarkable separation between cash flow rights and voting rights. The divergence between cash flow rights and voting rights aggravates agency conflicts between shareholders and managers (Masulis, Wang, and Xie, 2009). Because the concentration of control insulates managers from shareholders' discipline power, managers with high-voting rights are prone to expropriate wealth from firms at the expense of shareholders, thereby decreasing firm value. Following the line of argument, our findings confirm that the adoption of UD laws decreases the value of cash, increases CEO cash compensation and decreases investment efficiency. In particular, these effects are more pronounced for dual-class firms relative to single-class firms.

Our study makes contributions to the literature in several ways. First, our findings extend a large body of studies on shareholder litigation that investigate the effects of the staggered adoption of UD laws on corporate governance provisions (Appel, 2019; Foroughi et al., 2022), the cost of external financing (Ni and Yin, 2018; Houston, Lin, and Xie, 2018; Nguyen, Phan, and Lee, 2020), corporate cash holdings (Nguyen, Phan, and Sun, 2018), corporate innovation (Lin, Liu, and Manso, 2021), corporate dividend policy (Do, 2021), corporate social responsibility (Freund, Nguyen, and Phan, 2023), corporate disclosure (Bourveau, Lou, and Wang, 2018), corporate mergers and

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acquisitions (Chu and Zhao, 2021; Huang, Ozkan, and Xu, 2023), corporate information environment (Le, Nguyen, and Sila, 2021; Boone, Fich, and Griffin, 2023) and corporate investment decisions (Li, Monroe, and Coulton, 2023). These studies answer the important question of whether shareholders benefit from the reduced threat of derivative lawsuits following the UD laws adoption. To the best of our knowledge, this is the first study to examine the effects of derivative litigation risk on the value of private benefits of control. We show that the managerial extraction of private benefits is negatively associated with the derivative litigation risks, captured by both actual derivative lawsuits and the UD laws setting. Our results reveal the bright side of shareholder litigation, especially for derivative lawsuits, to protect minority shareholders' interests from the expropriation of controlling insiders.

Second, our study adds to the literature on the private benefits of control. Prior studies commonly follow two methods to measure the value of private benefits of control via dual-class voting premium and the price premium of controlling block trades (Barclay and Holderness, 1989; Dyck and Zingales, 2004; Zingales, 1994; Zingales, 1995). However, both approaches face challenges with unusual events and small sample sizes in the empirical study. Divergent from prior research, we use the new method of Kalay, Karakaş, and Pant (2014) to derive the value of voting rights from option prices. This approach estimates voting premiums through the price difference between the company stock and the synthetic stock from the put-call parity relationship. As such, this new method allows us to observe and quantify the private benefits of control using a large sample of public companies on a more flexible timing basis, which is less susceptible to selection biases and unreliable measurement compared to previous estimations.

Moreover, our paper lends support to the positive effects of the legal suits on the curbed extraction of private benefits, which complements the studies on the determinants of the private benefit of control from the perspective of the legal approach to corporate governance. Our evidence empirically responds with the argument of Zingales (1995) regarding the legal rights to sue management as governance mechanisms to limit controlling insiders' expropriation. Thus, our research has significant implications for policymakers in formulating legal reform, and for shareholders and managers in assessing the value of corporate voting rights as agency costs.

The remainder of the paper proceeds as follows: Section 2 introduces the institutional background including derivative lawsuits and UD laws. Section 3 develops hypotheses. Section 4 introduces the methodology and sample description. Section 5 and Section 6 present empirical results with a battery of robustness tests. Section 7 presents channel analysis. Section 8 concludes the paper.

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2. Institutional Background

2.1 Derivative Lawsuits

In the U.S. corporate legal framework, the directors and officers hold fiduciary accountability for the corporation and ensure that they act in the best interests of shareholders. In general, fiduciary duties refer to the duties of care, loyalty, prudence, and good faith. The breach of fiduciary duties can trigger the starting procedure of judicial proceedings to protect the shareholder's legal rights and interests. Specifically, a derivative lawsuit is a special procedural mechanism to address the violation of fiduciary duties by enforcing state corporate laws. Different from direct class action lawsuits, which are filed by a subset of shareholders against firm management in case of the alleged violation of federal securities laws (e.g., securities fraud, stock mispricing) and the monetary recovery directly goes to shareholders in the securities class action lawsuit, derivative lawsuits are filed by shareholders on behalf of the entire corporation against self-interested directors and officers for the breach of fiduciary duties, including illegal activities, self-dealing or mishandling information. Because shareholders file legal proceedings derivatively on behalf of the firm, the actual plaintiff is the corporation instead of the shareholder and settlement fees of such suits belong to the company after paying the attorney fees.

The corrective remedy of derivative lawsuits for management wrongdoings is not limited to seeking monetary compensation but more importantly corporate governance reform. Although the pecuniary loss of derivative lawsuits can be covered by directors and officers (D&O) liability insurance, the condition is that the insurer cannot find any evidence of dishonesty and intentional wrongdoings by directors and officers. Thus, directors and officers cannot fully rely on such insurance coverage to bear the financial costs resulting from derivative suits. Even if managers successfully evade the payment of settlement fees in a derivative lawsuit, the involvement in the shareholders' lawsuit still can adversely affect their reputation, which will be detrimental to their career development in the labour market. Moreover, frequent suits brought by shareholders lead to higher risk premiums in the D&O insurance pricing, which increases hidden costs on the firm's legal liability. Furthermore, derivative suits are typically settled with favourable adjustments in corporate governance structure (Ferris et al., 2007). It is important to highlight that effective derivative suits can achieve their goal of promoting corporate governance reforms that may not be explicitly reflected in the legal process by publicizing the agency problems that have existed in companies. Such settlement strengthens oversight mechanisms and restrains directors and officers from committing potential misbehaviours. Consequently, derivative lawsuits serve as an important governance mechanism to mitigate agency problems.

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2.2 The Universal Demand (UD) Laws

In the United States, the filings of derivative suits have been processed through several stages. Before instituting a derivative lawsuit, the first step is that plaintiff shareholders are required to demand that their board of directors take legal action to address alleged wrongdoings. This process, known as "demand requirement", leaves the decision to the board about whether to reject or answer such demand within an appropriate duration of time. However, the board almost inevitably decide against bringing legal proceedings because their board members are often implicated as defendants in derivative lawsuits. Once the board disapproves the demand, the shareholder still can proceed with litigation for dealing with managerial misconduct. Nevertheless, in most cases, the count usually abides by the board's decision and dismisses the suit according to the business judgment rule, which naturally presumes that directors and managers serve the best interests of the company and all business decisions are made in good faith, with the standard of duty of care.

To lift the wrong blockade of the board on the shareholders' derivative suits, counts have developed the futility exception to the demand requirement. Specifically, this futility exception allows shareholders to bypass the demand requirement if shareholders can testify against the board for their unfair or biased evaluation in case of the involvement of the board in the wrongdoings. Because the count hardly proceeds with the derivative litigation after the board rejects the demand, shareholders are highly willing to plead that the demand is futile rather than required. However, since the demand futility makes it easier for shareholders to file a derivative lawsuit without the board's approval, the abusive use of futility exception causes more meritless and frivolous derivative suits which not only wastes the time and money for both firms and courts, but also stifle risk-taking but value-enhancing corporate activities (Lin, Liu, and Manso, 2021). To eliminate the adverse effects of the futility exception, 23 states in the United States adopted the UD laws during the period from 1989 to 2005, which require shareholders to make a demand on the board of directors in every derivative lawsuit. Following the passage of UD laws, the selectable option of demand futility is completely removed from legal proceedings and then replaced by mandatory demand requirement as a prerequisite to initial a derivative lawsuit. Since the board rarely approve the demand requirement to bring a suit against their members, the staggered adoption of UD laws places a significant procedural obstacle to derivative lawsuits. Few derivative lawsuits are initiated in the states that have passed the UD laws (Appel, 2019). Therefore, the adoption of UD laws significantly reduces shareholder litigation risk and weakens the governance power of shareholder litigation rights.

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3. Hypothesis Development

The private benefits of control have emerged as a central concept in the literature on corporate finance. Theoretically, some values are reaped solely by controlling parties and are not proportionally distributed to all shareholders by the shares they own, which is often referred to as the private benefits of control (Dyck and Zingales, 2004). In particular, these private values can be formed as controlling parties' expropriation of corporate resources, including visible corporate cash holdings, managerial compensations, as well as invisible information about investment opportunities and acquisition decisions (Masulis, Wang, and Xie, 2009). Since the private benefits of control are of such importance for the development of financial markets, investor protection, and corporate governance (La Porta et al., 1997; La Porta et al., 2000), the empirical studies on private benefits of control aim to answer two important questions. That is, how the private benefits of control are estimated and more importantly what factors affect the extent of private benefits of control. In practice, although the private benefits of control are difficult to observe and quantify by their nature, the magnitude of private benefits of control can be measured by dual-class voting premiums and the price premiums of controlling block trades (Barclay and Holderness, 1989; Dyck and Zingales, 2004; Zingales, 1994; Zingales, 1995).

Following these two estimation methods of private benefits of control, much research highlights the role of legal protection in curbing the amount of private benefits of control. Zingales (1994, 1995) documents that the average value of private benefits of control is much higher in Italy than in the United States and these differences are due to weak legal mechanisms in Italy, which cannot effectively protect minority property rights. Nenova (2003) compares the value of private benefits of control using a sample of dual-class firms among 18 countries and she found that the legal environment variables can explain 68% of the differences in the value of control rights across countries. Dyck and Zingales (2004) estimate the private benefits of control using the price premiums of controlling blocks trade in 39 countries and they show that both legal framework and extra-legal mechanisms are related to the lower private benefits of control. Doidge (2004) documents that foreign dual-class firms that are cross-listed in the U.S. experience a lower level of private benefits of control than those firms that are not listed in the U.S. and this is because the United States provide stronger legal protection and law enforcement mechanisms for minority investors relative to other countries' weak legal environments. Gao and Zhang (2019) found that the Sarbanes-Oxley Act enactment successfully reduces the average voting premium for the U.S. dual-class firms and their empirical evidence provides more support for the argument that the legal approach to corporate governance can curb the private benefits of control.

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Although extant studies use many proxies for legal framework to explore the determination of private benefits of control from a legal perspective, none of them capture the direct effects of shareholder litigation on the private benefits of control. Besides, these methods for estimating private benefits of control are likely to suffer from selection bias and small sample issues (Kalay, Karakaş, and Pant, 2014).

By its nature, private benefits of control are typically associated with agency problems. Managers or controlling shareholders reap the private benefits from holding concentrated rights to control the firm at the expense of minority shareholders, which creates large agency costs for their firms. Cronqvist and Nilsson (2003) examine whether and how controlling minority shareholder (CMS) structure is related to agency costs and they find that the corporation with CMS who have excessive voting rights over cash flow rights experience a significant decline in the firm value. Masulis, Wang, and Xie (2009) explore agency problems at dual-class firms and they find that managers are more likely to earn private benefits at the expense of outside shareholders as the separation between voting rights and cash flow rights increases. Lin et al. (2018) examine the effects of private benefits of control on the financing costs of the firm and they show that banks lend higher prices of loans to firms that enjoy higher private benefits of control because they view private benefits of control as large agency costs when banks assess the risk premium of a loan contract. The prior literature has proven the fact that agency costs caused by managerial extraction of private benefits indeed harm the firm. Based on this, it is obvious that agency costs can be significantly reduced by curbing private benefits of control by controlling shareholders or managers. As mentioned in the previous part, the country-level legal system effectively constrains the size of private benefits of control. Furthermore, from the perspective of the legal approach to corporate governance, the suing rights, which are one of the fundamental shareholder rights accompanied by equity ownership, also limit the managerial extraction of private benefits at the expense of outside shareholders (Zingales, 1995). In the United States, shareholders can file a derivative lawsuit against controlling insiders' expropriation of corporate resources. Derivative lawsuits are an important form of shareholder legal proceedings and their main purpose is to prevent management from the breach of their fiduciary duties, thereby aligning the managers' interests and those of shareholders. Such suits are very helpful in addressing agency problems between managers and shareholders, which directly change the corporate governance structure for the benefit of all shareholders. In addition, even if not every settlement of a derivative lawsuit strictly punishes firm management, its deterrence indirectly affects managers' behaviours. The controlling power not only brings managers benefits but also incurs litigation costs including monetary loss and reputation damage. When litigation costs exceed private benefits, managers are less likely to extract value from

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the firm. In this regard, the private benefits of control are reduced under the deterrence influence of derivative litigation. Thus, the preceding discussions lead to our first hypothesis as follows:

H1. The derivative lawsuit filings are related to the lower private benefits of control.

However, shareholder litigation has its own drawbacks. some critics point out that frivolous lawsuits resulting from the abuse of litigation rights impose substantial costs on the firm and the main beneficiaries of lawsuit settlement might be the attorneys rather than shareholder plaintiffs. Furthermore, potential litigation risks arouse managers' great concerns regarding their career prospects, thereby inducing managers to play it safe. In reality, shareholders could file a lawsuit against managers for the loss of project failure. To reduce legal exposure, managers are prone to engage in conservative corporate policies which avert the litigation costs, instead of pursuing risky but value-creation projects. Extant studies have documented that shareholder litigation restricts corporate innovation (Lin, Liu, and Manso, 2021), decreases corporate takeover efficiency (Chu and Zhao, 2021), and reduces the value of corporate cash (Nguyen, Phan, and Sun, 2018). The dark sides of shareholder litigation cast doubt on the net economic benefits of shareholder litigation rights as corporate governance mechanisms. To respond with meritless lawsuits, 23 states in the United States adopted the Universal Demand (UD) laws at different times spanning the periods from 1989 to 2005. The passage of UD laws places procedural barriers to derivative lawsuits against officers and directors for their alleged wrongdoings, which greatly decreases derivative litigation risks.

The adoption of UD laws greatly weakens the governance power of shareholder litigation rights. In the post-UD periods, The deterioration in corporate governance leads to an increase in management entrenchment, which exacerbates agency problems between managers and shareholders. Appel (2019) finds that the adoption of UD laws leads firms to adopt management-friendly governance provisions that entrench managers. The entrenched managers have more incentives to divert the company's resources for their private benefits. Karakaş, and Mohseni (2021) indicate that the stock's voting premiums are positively associated with the entrenchment effects of staggered boards. Some studies show that the passage of the adoption of UD laws exposes shareholders to managers' expropriation activities by insulating managers from shareholder litigation discipline. Ni and Yin (2018) point out that the curbed shareholder litigation rights increase the cost of debt through the channel of the deterioration in corporate governance, information asymmetry and enhanced managerial risk-taking. Houston, Lin, and Xie (2018) discuss that the expropriation costs and risks associated with the enactment of UD laws increase the firm's cost of

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capital. Li, Monroe, and Coulton (2023) document that the adoption of UD laws leads to a significant decrease in the firm's investment efficiency. In addition, since the curbed litigation rights restrict shareholders from disciplining firm management after the adoption of UD laws, entrenched managers are motivated to disclose less and low-quality information, which better helps them enjoy private benefits in the opaque information environment. Existing studies on UD laws document that the enactment of UD laws deteriorates the corporate information environment, which results in information asymmetry between corporate insiders and outside investors (Ni and Yin, 2018; Houston, Lin, and Xie, 2018; Le, Nguyen, and Sila, 2021; Boone, Fich, and Griffin, 2023). Nevertheless, all previous literature on UD laws does not provide direct empirical evidence for the effects of the reduced litigation risk on the value of private benefits. Notably, Dyck and Zingales (2004) find that the adoption of the Draghi reform in Italy, which makes it less difficult for minority shareholders to file a lawsuit against management, decreases the value of private benefits from 47% to 6%, implying that reduced litigation risks should increase the size of private benefits. Therefore, since our study captures the effects of derivative litigation risks by using not only the actual derivative lawsuit filings but also the UD laws setting, our second hypothesis is stated as follows:

H2. The adoption of UD laws leads to an increase in the value of private benefits of control.

4. Methodology and Data

4.1 The measure of Private Benefits of Control from Option Price

The previous literature provides us with two common methods for estimating the value of private benefits of control. That is, dual-class voting premium and the price premium of controlling block trades (Barclay and Holderness, 1989; Dyck and Zingales, 2004; Zingales, 1994; Zingales, 1995). The former estimation of private benefits of control is calculated by the percentage price difference between the high-voting class of share and the low-voting class of stock using a sample of dual-class firms. However, when companies go public in the stock market, few of them adopt dual-class structures which issue more than one class of stock with different voting rights. Gompers, Ishii, and Metrick (2010) show that dual-class firms only account for 6% of the number of listed firms in the United States. In addition, the liquidity of both classes of shares might be different even if they are traded in the stock market. Thus, the small sample size is the main limitation of the use of dual-class voting premiums. The second approach for estimating private benefits of control is based on the difference between the acquirer's purchase price per share and the market price on the day following the announcement

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of the block sale. Similarly, this method might be limited to a small sample size because it is not easy to frequently observe controlling block trading events for a substantial amount of stock. In addition, the measurement of private value is effective only if the controlling block is transferred. Thus, both methods for estimating the private benefits of control are subject to selection biases.

Unlike the common estimations of private benefits of control, we follow the new method of Kalay, Karakaş, and Pant (2014) to calculate the market value of voting premiums based on option prices. The private benefits of control are estimated by the value of voting premiums, which are calculated by subtracting the underlying stock price, which includes both voting rights and cash flow rights, from the synthesized non-voting stock price with only cash flow rights, and then adjusted by the underlying stock price. Thus, this new method allows us to estimate the private benefits of control based on a large sample size at any given time, which is not restricted to dual-class firms or controlling block sales events.

Specifically, the estimation of voting premiums from option prices starts with the put-call parity relationship, which is stated as follows:

$$S + P = C + PV(X)$$

Where S is the underlying stock price, C and P are the prices of call and put options respectively, X is the strike prices of both options, and $PV(X)$ is the present value of holding a bond with face value X that matures at time T.

This formula can provide us with a synthetic long position in the firm's stock by buying a call option and selling a put option with the same strike price X and time to maturity T, and investing a bond with face value X within time T.

$$\hat{S}(T) = C - P + PV(X)$$

The above formula is to calculate the synthetic long position for European-style options. For the exchange-traded American-style options, which can be exercised by option holders before maturity, the construction for the position of synthetic stock needs to be adjusted for the early exercise premium and dividends based on the basic put-call parity formula.

$$\hat{S}(T) = C - EEP_{call} - P + EEP_{put} + PV(X) + PV(DIV)$$

Where C and P represent the prices of call and put American-style options respectively, $PV(DIV)$ is the present value of dividend paid by the firm prior to the

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maturity, EEP proxy for the value of the rights to early exercise the American-style options before the option matures, which is calculated using the binomial option pricing model.

Since synthetic stock only reflects the cash flow rights of stock and does not offer voting rights, the present value of the market value of voting rights can be estimated by the price difference between the underlying stock and the synthetic stock:

$$PV\big(Vote(T)\big) = S - \hat{S}(T)$$

To simplify the comparisons over time and across firms, the value of voting premiums is normalized by dividing the present value of corporate votes by the stock. The actual value of private benefits of control based on option prices is calculated as follows:

$$Vote = \frac{S - \hat{S}(T)}{S}$$

4.2 Sample Selection

To measure the value of voting premiums, we collect daily data on options from the IvyDB OptionMetrics database starting from 1996. This database can provide detailed data for all American call and put options, which includes bid and ask quotes, trading volume, open interest, and option-specific data (e.g., implied volatility, maturity and strike prices). In addition, it gives us information regarding stock price, stock dividends and zero-coupon interest rates.

Following Kalay, Karakaş, and Pant (2014), we construct the synthetic stock in the form of option pairs, which are comprised of a call option on the underlying stock merged with a put option data with the same strike price and time to maturity. We discard option pairs in which case the quotes for either the call option or the put option are locked or crossed. The option price is calculated as the midpoint of the bid and ask quotes. The calculation of voting premiums is based on the most liquid option pairs with the highest volume, closest at the money and shortest maturity. In addition, we adopt the binomial pricing model to calculate the value of the early exercise premium for the put and call option since all the options are American style. We keep the option pairs with positive volume. To reduce potential downward biases arising from the early exercise of American-style options, we use the closest at-the-money options (see Kalay, Karakaş, and Pant (2014) for more details). After completing the construction of synthetic stock, we then match it with the actual stock price from CRSP to calculate the average value of voting premiums each year.

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The alternative measure of private benefits is dual-class voting premiums. We firstly identify dual-class firms based on the original dataset constructed by Gompers, Ishii, and Metrick (2010) during the periods between 1994 and 2002. We expand this sample size to the year 2009 by searching the CRSP database for dual-class firms with eight-digit CUSIP numbers consisting of the same six-digit CUSIP number and two different digital extensions. Next, we exclude dual-class firms which only have one PERMNO identifier from the CRSP database. With the candidate sample, we hand-collect voting rights of dual-class shares by checking the firm's proxy statement.

Since the adoption of UD laws is subject to the firm's state of incorporation, we use historical state of incorporation data provided by Bill Mcdonald to identify whether the firm is incorporated in the state that has adopted UD laws or not. If the historical value is missing, we replace it with the current state of incorporation from Compustat. In addition, we collect actual derivative lawsuit filings from the Audit Analytics Corporate Legal database. We use CRSP for stock market information and Compustat for firm-specific data.

Our primary sample consists of U.S. public firms from 2000 to 2021 since the data on derivative lawsuit filings is available from the year 2000. We exclude financial firms (SIC 6000-6999), and utility firms (SIC 4900-4999) from the candidate sample. We also winsorize the continuous variables at the 1st and 99th percentiles to mitigate the influence of outliers. Finally, our sample includes 18,878 firm-year observations of 3,299 U.S. public firms with 933 derivative lawsuits.

5. Voting Premium and Derivative Lawsuits

5.1 Distribution of Derivative Lawsuits

The Audit Analytics Corporate Legal database provides the data on derivative lawsuit filings. The sample of legal cases contains 933 derivative lawsuit filings from 2000 to 2021 since Audit Analytics only obtains derivative lawsuits starting from 2000. During the sample periods, Panel A of Table 1 reports the annual frequency of derivative lawsuits and the total number of firms. The last column of Table 1 shows the litigation rates of the sample, which are calculated by the number of derivative lawsuits divided by the total number of firms. On average, the derivative litigation rate is 4.94% in our sample. The litigation rate reached a peak in 2007 from the lowest (0.25%) in 2000. After that, the litigation rate started to decline in the range of 4% to 6% from 2008 to 2018. Notably, the litigation rate sharply reduced to 2.84% in 2016. Next, the litigation rate increased to a range of 6% to 7% from 2019 to 2021.

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Panel B of Table 1 presents the numbers of derivative lawsuits distributed in different industries based on two-digit SIC codes. The derivative litigation rate is very low in the construction industry (0%) and the transportation and public utilities industry (1.19%). For most industries, the derivative litigation rate changes from 3.47% in the retail trade industry to 6.48% in the wholesale trade industry.

[Insert Table 1 Here]

5.2 Summary Statistics and Correlation Matrix

We report the summary statistics of the sample in Panel A of Table 2, which includes 18,878 firm-year observations of 3,299 U.S. public firms from 2000 to 2021. The mean of voting premiums is 0.054%, which is close to the average value (0.055%) presented by Karakaş and Mohseni (2021). *Derivative* is an indicator variable that takes the value of one if the firm experiences a derivative lawsuit in a given year. The mean of *Derivative* is 0.042, which implies that 4.2% of firm-year observations are affected by derivative lawsuits. Panel B of Table 2 provides a correlation matrix for our variables. Most correlations are largely consistent with our prediction based on the previous literature. Specifically, the correlation coefficients between *Voting premium* and *Derivative (Derivative_number)* are negative but insignificant, which implies that the incidence of derivative lawsuits might be associated with lower voting premiums.

[Insert Table 2 Here]

5.3 Empirical Design

To test the first hypothesis, we examine the effects of derivative lawsuit filings on voting premiums by using the empirical model developed by Karakaş and Mohseni (2021), which has the following form:

$$Voting\ premium_{it} = \beta_0 + \beta_1 Derivative_{it} + \gamma X_{it} + Fixed\ effects + \varepsilon_{it}$$

The dependent variable $Voting\ premium_{it}$ capture the size of private benefits for firm i and year t, which takes the median value of daily voting premium each year. The independent variable, $Derivative_{it}$, is an indicator variable that is equal to one if shareholders file a derivative lawsuit and zero otherwise. Alternatively, it represents the number of derivative lawsuits that the firm experiences every year.

The X_{it} is a set of control variables, which capture the determination of private benefits of control based on the earlier literature. Nenova (2003) argues that large firm bears more costs of private benefits than small firms. Hence, we control for the firm size (*Firmsize*), which should be negatively related to the value of voting premiums.

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Gurun and Karakaş (2022) indicate that voting premiums increase in the case of unexpectedly negative earnings, which means that weak corporate performance causes an increase in the voting premiums. Following this study, we use *ROA* to represent corporate performance and it is expected to be negatively correlated with voting premium. Management entrenchment aggravates the expropriation of corporate resources (Megginson, 1990). Thus, we expect that insider ownership (*Insider*) is positively associated with voting premiums, which is consistent with the entrenchment effects of corporate insiders on voting premiums. We also control for book-to-market (*BM*) to represent the firm's growth since growing firms are susceptible to the control contest (Chemmanur, Paeglis, and Simonyan, 2011). Institutional investors value voting rights because it is an important channel for institutional investors to improve corporate governance (Aggarwal, Saffi, and Sturgess, 2015). Thus, more concentrated institutional ownership (*Instown_hhi*) will increase the value of voting rights. Debt plays a disciplinary role in corporate governance, so the debt may mitigate management entrenchment, thereby curbing private benefits of control (Lin et al., 2018). Thus, we expect that the firm's leverage is negatively related to the voting premium. Managers perform efficiently in the competitive market, so the product market competition may decrease firm entrenchment (Giroud and Mueller, 2010, 2011). Thus, we control for production market competition by using the Herfindahl-Hirschman index of market share (*HHI*), and it is expected to be positively associated with voting premiums given that a higher HHI reflects weaker competition. Furthermore, as firms mature and grow slowly, corporate insiders have more incentives to extract value from the firm rather than maximize firm value, thereby increasing agency costs (Kim and Michaely, 2019; Cremers, Lauterbach, and Pajuste, 2022). Thus, we also control for the firm age (*Firmage*) in the regression model. The firm investment decision is an important channel of private benefits consumption (Masulis, Wang, and Xie, 2009), so we control for both capital expenses (*Capitalexp*) and research expenses (*Researchexp*) to represent investment expenditure accompanied by management efficiency. Since voting premiums might be associated with time-invariant omitted firm characteristics and unobserved time-variant factors, we also control for firm and year-fixed effects in this model. We additionally control for some time-varying state-level factors to account for macroeconomic conditions affecting voting premiums, including the state GDP, GDP growth and GDP per capita. Lastly, we cluster our robust standard errors at the firm level.

Table 3 reports the results of the baseline regression regarding the effects of derivative lawsuits on the value of voting premiums. In column 1 of Table 3, the estimated coefficient on *Derivative*, which is a dummy variable that takes the value of one if shareholders file a derivative lawsuit in a given year and zero otherwise, is negatively

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significant at the significance level of 5% after we include the complete set of control variables, firm and year fixed effects. The economic effects of derivative lawsuits on voting premiums are very meaningful. A derivative case leads to a reduction in the value of the voting premium by 0.038%, which is equivalent to 70.37% of its sample mean. In column 2 of Table 3, we replace the main explanatory variable *Derivative* with *Derivative_number* which represents the number of derivative lawsuits that the firm experiences each year. Similarly, we found an additional of derivative lawsuits is related to a 0.021% decrease in the size of voting premiums after holding other variables unchanged. Both columns in this table show a negatively significant and economically important relationship between derivative lawsuits and voting premiums, suggesting that derivative lawsuits largely constrain corporate insiders' ability to extract the value of the firm at the expense of outside shareholders.

[Insert Table 3 Here]

6. Voting Premium and UD Laws

The above empirical results examining the effects of derivative lawsuits on voting premiums could be driven by omitted variables or reverse causality. For example, far-sighted managers use corporate resources to pursue risky projects maximising firm value rather than private benefits increasing agency costs, and they are also more likely to be the targets of derivative lawsuits because of project failure. Thus, we further exploit the staggered adoption of UD laws, which hinders shareholders from instituting derivative lawsuits against firm wrongdoings, across different U.S. states from 1989 to 2005 as a quasi-natural experiment to examine the causal effects of derivative litigation risk on the voting premiums. Table 4 reports the results of validity tests for our empirical setting. As Column 1 of Table 4 shows, The adoption of UD laws reduces the number of derivative lawsuits by 25.4%. The estimated coefficient is still negative and significant when economic factors enter the regressions of derivative lawsuits. This finding lends strong support to Appel (2019), indicating that UD laws impose a procedural obstacle to derivative lawsuits, which significantly reduces derivative litigation risks for firm management.

[Insert Table 4 Here]

6.1 Empirical Design

After validating our natural experiment, we employ the difference-in-differences (DID) model to investigate the effects of UD laws on the voting premium from 1996 to 2009. The treated (control) group refers to the firms incorporated in the states that have (have

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not) passed the UD laws. The baseline DID specification has the following form:

$$Voting\ premium_{ist} = \beta_0 + \beta_1 UDlaws_{ist} + \gamma X_{ist} + Fixed\ effects + \varepsilon_{ist}$$

Where $UDlaws_{ist}$ is an indicator variable which takes the value of one if the firm i was incorporated in the state s that have adopted the UD laws in the year t and zero otherwise. Similarly, we control for a full set of variables X_{it} reported in Table 3. Since the firm is subject to the passage of UD laws based on its state of incorporation, we cluster standard error at the level of state of incorporation to account for the effects of potential time-varying correlations in omitted variables on the firms within the same state (Ni and Yin, 2018).

We report the results of the effects of UD laws on voting premiums in Columns 1-3 of Table 5. Model specifications vary across columns in terms of the set of control variables provided. Column 1 shows the most parsimonious model with only firm and year-fixed effects. We further augment our model with a set of control variables including firm characteristics in Column 2, and economic state-level factors in Column 3. Across all columns in Table 5, the estimated coefficient on $UDlaws_{ist}$ is positive and significant at a 5% level. Even in the most stringent model reported in Column 3, the adoption of UD laws leads to an increase in voting premiums by 0.11%. This result suggests that managerial extraction of private benefits increases following the adoption of UD laws.

[Insert Table 5 Here]

6.2 Dynamic Models

Our baseline DID results show there is a positive relationship between UD laws and voting premiums, but we cannot exclude spurious relations among them, which is the case when the value of voting premiums and UD laws by states just follow time trends. According to the parallel trend assumption, our concern is possible if we observe the positive effects of UD laws on the voting premium before the adoption of UD laws. To address this concern, we estimate the following dynamic DID specification:

$$Voting\ premium_{ist} = \beta_0 + \beta_1 UDlaws^{-1} + \beta_2 UDlaws^{0} + \beta_3 UDlaws^{+1} + \beta_4 UDlaws^{\geq +2} + \gamma X_{ist} + Fixed\ effects + \varepsilon_{ist}$$

Where the dependent variable, control variable and even fixed effects remain the same as the baseline model. To construct the dynamic model, we decompose the enactment timing of UD laws into different time periods using four UD laws indicators. That is, $UDlaws^{-1}$, $\beta_2 UDlaws^{0}$, $UDlaws^{+1}$, and $UDlaws^{\geq +2}$ are equal to one if the firm is incorporated in a state that will pass the UD law in the next year, passes the UD law

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this year, passed the law one year ago, and passed the law two or more years ago, respectively, and zero otherwise.

The results of the dynamic voting premium model are reported in Columns 1-3 of Table 6. In all columns, we find that the coefficient of $UDlaws^{-1}$ is statistically insignificant while the coefficients of $UDlaws^{0}$, $UDlaws^{+1}$, and $UDlaws^{\geq+2}$ are positive and statistically significant. These results suggest that the voting premiums increase only after the passage of UD laws and not before and the increase in the voting premiums is caused by the UD laws enactment rather than time trends, which is consistent with the parallel trends assumption of DID models.

To visualize this dynamic timing test reported in Column 3 of Table 6, Figure 1 plots the estimated coefficients of the changing voting premiums around the timing of UD laws. Since the coefficient for the year dummy $t-1$ is insignificantly different from zero, the parallel trends assumption for our DID specification holds.

[Insert Table 6 Here]

6.3 Alternative Measure of Private Benefits of Control

Prior studies commonly use dual-class voting premiums to quantify the value of private benefits of control (Zingales, 1994, 1995; Doidge, 2004; Hong, 2013; Gao and Zhang, 2019). The private benefits of control reflect corporate insiders' extraction of value from the firm, so it represents the relatively high valuation of the right to control. In the dual-class structure, as the superior share with high voting power is more valuable for minority shareholders to gain control in future power distribution, the market price of a high-voting share is more likely to be traded at a premium than that of a low-voting share. Thus, we calculate the dual-class voting premium as the price difference between superior voting stock and inferior voting stock using the following equation:

$$Dual_voting_premium = \frac{P_H - P_L}{P_L - RV * P_H}$$

Where the P_H is the daily market price of a dual-class firm's high-voting share, P_L is the daily market price of a dual-class firm's low-voting share, and RV is the number of votes of a low-voting share relative to the number of votes of a high-voting share.

To compare voting premiums from option prices with dual-class voting premiums, we employ the following DID regression specification motivated by Gao and Zhang (2019) to examine whether the adoption of UD laws increases the value of voting premiums for dual-class firms:

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$$Dual_voting_premium_{ist} = \beta_0 + \beta_1 UDlaws_{ist} + \gamma\omega_{ist} + Fixed\ effects + \varepsilon_{ist}$$

Where dependent variable $Dual_voting_premium_{ist}$ is calculated by the median of all daily observations of dual-class voting premiums for the firm i incorporated in the state s in year t. The $UDlaws_{ist}$ is still an indicator variable for the adoption of UD laws. The state-level economic factor and fixed effects included in this model are similar to those reported in Table 5.

We follow the previous studies on the determinations of private benefits of control and include a set of control variables related to dual-class voting premium (Zingales, 1995; Doidge, 2004; Gao and Zhang, 2019). First, we control for voting power (*Votepower*), which is measured as the fraction of total votes attached to the high-voting stock relative to the fraction of total cash flow rights attached to high-voting stock. The high voting power represents a large divergence between cash flow rights and voting rights because the rights to control a firm depend on a small number of high-voting stocks rather than a large amount of low-voting shares. Thus, the voting power is high in the case of a high concentration of control rights, thereby increasing the voting premium. Second, the owner of low-voting stock usually receives a higher dividend for the compensation of curbed voting rights, which leads to a decrease in the voting premium. To control for the dividend premium, we use the dummy variable (*Dividend*), which is set to one if the inferior stock earns greater benefits of dividends than the superior stock and zero otherwise. The differences in the liquidity of dual-class stocks can affect the magnitude of voting premiums. Specifically, the voting premiums decrease when the high-voting share is less liquid than the low-voting share. We capture this effect using relative turnover (*Turnover*), which is measured as the log of the ratio of the average value of the low-voting share's daily turnover relative to the average value of the high-voting share's daily turnover, where turnover is defined as the number of shared traded divided by the number of shares outstanding. In addition, the conversion of different classes of shares may affect the voting premiums, so we capture this conversion right using the dummy variable *Conversion* that is equal to one if the superior share has been converted to the inferior share and zero otherwise. Furthermore, since block-holding costs increase the firm's market value, we control for market capitalization (*Marketcap*) measured as the logarithm of the sum of low voting share and high voting share and it is expected to be negatively associated with voting premium. Lastly, we control for the enactment timing of the Sarbanes-Oxley Act (*SOX*) since Gao and Zhang (2019) found that the average voting premium of U.S. dual-class firms is reduced following the Sarbanes-Oxley Act of 2003.

We find similar results reported in Table 7, which show that dual-class voting premiums

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are positively related to the adoption of UD laws. However, this result is not statistically significant. Prior studies document that the estimation method of dual-class voting premium is restricted to a small sample of dual-class firms. Therefore, since the adoption of UD laws involves 23 states of incorporation in the United States, the small sample size of dual-class firms may lower test power, thereby leading to statistical insignificance of the coefficient in this specification.

[Insert Table 7 Here]

6.4 Propensity Score Matching Analysis

Our results so far show that private benefits of control, measured by either voting premiums from option prices or voting premiums from dual-class structure, are positively associated with the adoption of UD laws. However, this positive relation could be driven by omitted variables that are affected by UD laws enactment. For instance, treated firms incorporated in states that have passed the UD laws are systematically different from other control firms unaffected by UD laws. Thus, to explore the possibility of omitted variables, we further validate our results by using a propensity score match (PSM) method to select a matched sample including similar treated and control firms.

In doing so, we first identify the treated (control) firm incorporated in the state that has (has not) passed the UD laws. Next, for each firm-year observation included in the treatment group, using a logit model, we match it with the observation in the control group which has the closest propensity score based on a full set of firm-specific control variables included in our baseline regression model, including firm size, leverage, research expense, capital expense, ROA, firm age, book-to-market ratio, institutional ownership concentration, insider ownership, and product market competition.

Panel A of Table 8 shows a comparison of each firm characteristics between treatment firms and control firms before and after the match. Specifically, treatment firms are significantly different from control firms in terms of the means of firm characteristics before the matching, but such means difference is statistically insignificant after the matching, suggesting that treatment firms are well matched with control firms in every observable aspect. Additionally, we rerun a DID analysis using the propensity-score matched sample. As shown in Panel B of Table 8, the coefficient on UD laws remains positive and statistically significant at the 5% level, which is consistent with our earlier findings. Overall, the PSM results suggest that the significant increase in voting premiums following the adoption of UD laws is not driven by observed differences in firm characteristics.

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[Insert Table 8 Here]

6.5 Robustness Checks

Our findings could be confounded by other state-level laws and regulations during the sample periods. Since the adoption of UD laws has spanned the same period as some anti-takeover laws, such as business combination laws (BC laws) or poison pill legislation (PP laws), it is possible that the positive effects of UD laws on voting premiums could be driven by these common anti-takeover laws. Thus, to control for the potential confounding effects of BC laws and PP laws, we define BC laws (PP laws) as a dummy variable that is set to one if the firm's state of incorporation is subject to BC laws (PP laws) in the year and zero otherwise. We include these confounding laws dummies in our baseline DID model. The results reported in Column 1 of Table 9 show that the voting premiums significantly increase following the adoption of UD laws when we control for the adoption of BC laws and PP laws, implying that our results are robust to control for confounding anti-takeover law changes. Furthermore, in addition to anti-takeover law changes, our results might be biased by other state-level law changes that affect class action lawsuits. Crane and Koch (2018) and Houston, Lin, and Xie (2018) indicate that the Ninth Circuit ruling in 1999 leads to a reduction in the incidence of class action lawsuits against firms. Like UD laws, the Ninth Circuit ruling in 1999 significantly reduces shareholder litigation risks by restricting shareholder rights to file class action litigation against firms. To highlight the effects of the UD laws rather than the Ninth Circuit ruling, we rerun the baseline regression using a subsample that excludes all firms incorporated in the Ninth Circuit states, including Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington. The estimated results reported in Column 2 of Table 9 reports show that the coefficient of UD laws is positive and statistically significant at the level of 5%, suggesting that our results are not driven by the effects of class action lawsuits. Lastly, our sample includes a large number of firms incorporated in Delaware state, which could bias our estimation results. To address this concern, we exclude firms incorporated in Delaware and rerun the voting premium regression. As shown in Column 3 of Table 9, the significance of the coefficient on UD laws is unchanged, suggesting that our results are not driven by Delaware effects.

[Insert Table 9 Here]

7. Channel Analysis

Our results so far show that the adoption of UD laws leads to a significant increase in the value of private benefits of control measured by voting premiums from option prices.

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To corroborate voting premium results, we examine changes in corporate policies on corporate cash holdings, CEO compensation and firm investment around the passage of UD laws. Prior studies document the relationships between them as potential channels through which corporate insiders extract value from the firm at the expense of outside shareholders (Dittmar and Mahrt-Smith, 2007; Masulis, Wang, and Xie, 2009; Hong, 2013; Gao and Zhang, 2019). Since the adoption of UD laws weakens the governance power of shareholder litigation rights and increases management entrenchment, we expect that the adoption of UD laws is associated with a lower value of corporate cash, higher CEO compensation and lower corporate investment efficiency. In addition, the dual-class structure increases the separation between cash flow rights and voting rights, thereby exacerbating the managerial extraction of private benefits. As corporate governance deteriorates following the adoption of UD laws, we argue that the expropriation of corporate resources for dual-class firms is more aggravated than for single-class firms in the lax litigation environment.

7.1 UD Laws and The Value of Corporate Cash

When agency problems exacerbate, managers are more likely to misuse corporate cash due to its strong liquidity. In that case, the market value of corporate cash is less valuable for shareholders because managers may utilize cash reserves to pursue their private benefits rather than value-enhancing projects. Dittmar and Mahrt-Smith (2007) indicate that good corporate governance can increase the value of cash. Since the adoption of UD laws deteriorates corporate governance by weakening the governance power of litigation rights, the UD laws may be negatively associated with the market value of corporate cash. To examine whether and how the adoption of UD laws affects the value of corporate cash reserves, we built on the research designs by Faulkender and Wang (2006) and Masulis, Wang, and Xie (2009), which explore how corporate financial policies affect the marginal value of cash. We augment their models with the interaction between the UD laws indicator with the dual indicator to investigate how the effects of UD laws on the value of cash for dual-class firms are different from those of single-class firms. Our model is specified as follows:

$$r_{i,t} - R^{B}_{i,t} = \beta_0 + \beta_1 \frac{\Delta Cash_{i,t}}{M_{i,t-1}} + \beta_2 UDlaws_{i,t} + \beta_3 Dual_{i,t} + \beta_4 UDlaws_{i,t} \times \frac{\Delta Cash_{i,t}}{M_{i,t-1}} + \beta_5 UDlaws_{i,t} \times \frac{\Delta Cash_{i,t}}{M_{i,t-1}} \times Dual_{i,t} + \Sigma \beta_n CONTROLS + FEs + \varepsilon_{i,t}$$

Where the dependent variable is the excess return of a firm i's stock from year $t-1$ to year t. We calculate the excess return as the difference between the firm's stock return ($r_{i,t}$) and the Fama-French size and book-to-market portfolio return ($R_{i,t}B$). For dual-class firms, the firm's stock return ($r_{i,t}$) is the return of the firm's inferior share.

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$\Delta Cash_{i,t}$ represents the change in cash reserve from year $t-1$ to year t. We divide it by the market of equity at the end of the previous year ($M_{i,t-1}$), which allows us to capture the effects of a one-dollar change in cash holdings on the dollar change in shareholder wealth by using the coefficient β_1.

Furthermore, $Dual_{i,t}$ is an indicator variable if the firm is a dual-class firm and zero otherwise. The β_4 coefficient measures the effects of UD laws on the marginal value of cash and we expect it to be negative since the adoption of UD laws deteriorates corporate governance and results in the decrease in the value of corporate cash. To explore whether the effects of UD laws on the value of corporate cash are more pronounced for dual-class firms than for single-class firms, we interact scaled $\Delta Cash_{i,t}$ with the two indicator variables including $Dual_{i,t}$ and $UDlaws_{i,t}$. In addition, following the baseline model of Faulkender and Wang (2006), we include a set of firm-specific variables to control for the sources of value regarding the firm's financing, profitability and investment policy. These firm-specific characteristics include changes in earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits, changes in net assets, changes in common dividends, changes in interest expense, changes in research and development expense, the firm's cash holding at the end of the previous year, the firm's net financing during the fiscal year and the market leverage at the end of the fiscal year. All these variables are scaled by the one-year lagged market value of equity to avoid the dominance of the largest firms in empirical results. Lastly, we also include two interaction terms (Lag_cash* Δ Cash and Leverage*ΔCash) to examine the negative relationship between the value of cash and both the firm's previous cash holdings and leverage.

Table 10 presents the regression results of the above value-of-cash model. Columns 1-3 show the estimation results for dual-class firms, single-class firms and all firms including dual-class and single-class firms, respectively. We control for firm and year-fixed effects across all regressions. As reported in column 1, the coefficient on the interaction between the change in cash and UD laws is negative and significant at the level of 5%, suggesting that the adoption of UD laws decreases the value of cash to the shareholders of dual-class firms. The effect of UD laws on the value of cash is economically meaningful. An additional one dollar of cash holdings is worth less by \$0.373 for a dual-class firm incorporated in the state that has adopted the UD laws relative to a dual-class firm that was unaffected by UD laws. In addition, as indicated by the negative and significant coefficient on the interaction term (UDlaws*ΔCash) in Column 2, the value of an incremental dollar of cash is \$0.054 lower for shareholders of single-class firms following the passage of UD laws. Similarly, the corresponding value for all firms in Column 3 indicates that the adoption of UD laws decreases the

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marginal value of cash by $0.053. These results imply that the adoption of UD laws motivates managers to divert corporate cash for their private benefits and thus corporate cash holdings are less valuable to shareholders, which is in line with the findings of Houston, Lin, and Xie (2018). In particular, the coefficient on the interaction term Dual*UDlaws*ΔCash is negative and statistically significant at the level of 5%, suggesting the value of cash is more significantly reduced around the passage of UD laws at dual-class firms relative to single-class firms. In other words, compared to single-class firms, firms with dual-class structures are more affected by the negative and incremental effects of UD laws on the value of cash. For the control variable, the signs and statistical significance generally remain the same as those results presented by Faulkender and Wang (2006). For instance, the coefficients on the two interaction terms, including the interaction between cash holdings amount and change in cash and the interaction between leverage and change in cash, are negatively associated with the value of cash.

[Insert Table 10 Here]

7.2 UD Laws and CEO Compensation

In addition to the misuse of corporate cash holdings, Managers may extract private benefits from CEO compensation. Excessive compensation is also a visible method of transferring wealth from shareholders to managers when weak corporate governance exacerbates agency problems. Appel (2019) documents that firms indirectly increase CEO cash compensation by adopting management-friendly governance policies following the passage of UD law. Thus, we examine whether and how the adoption of UD laws increases the managerial extraction of private benefits through CEO cash pay. The model is specified as follows:

$$Cashpay_{it} = \beta_0 + \beta_1 UDlaws_{it} + \beta_2 Dual_{it} + \beta_3 UDlaws_{it} \times Dual_{it} + \Sigma\beta_n CONTROLS + FEs + \varepsilon_{it}$$

Where the dependent variable ($Cashpay_{it}$) is defined as the logarithm of CEO cash compensation. The Execucomp provides data on CEO compensation. The key explanatory variable $UDlaws_{it}$ is an indicator variable for the adoption of UD laws. $Dual_{it}$ is an indicator variable if the firm is a dual-class firm and zero otherwise. We interact with these two indicator variables to capture the incremental change in CEO cash compensation for dual-class firms around the passage of UD laws. Following Masulis, Wang, and Xie, 2009, we also control for a set of variables determining the level of CEO cash compensation, including CEO tenure, firm size, Tobin's Q, leverage, research and development expenses, capital expenses, ROA, abnormal stock return and stock return volatility.

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Table 11 presents the estimation results from CEO compensation regression. Specifically, Columns 1-3 report the results for dual-class firms, single-class firms and all firms including dual-class and single-class firms, respectively. We control for firm and year-fixed effects across all regressions. In column 1, the coefficient on $UDlaws_{it}$ is positive and statistically significant at the level of 5%, indicating that the enactment of UD laws significantly increases the CEO cash compensation for dual-class firms, while this coefficient is positive but insignificant for single-class firm reported in Column 2. In addition, the coefficient β_3 on Dual*UDlaws is positive and statistically significant at the level of 10%, suggesting that the increase in CEO cash compensation following the passage of UD laws is more pronounced for dual-class firms. As the divergence between cash flow rights and voting rights increases management entrenchment at dual-class firms, entrenched managers have more incentives and opportunities to enjoy their private benefits from vast pay packages especially when the adoption of UD laws curb shareholder litigation rights as disciplinary mechanisms.

[Insert Table 11 Here]

7.3 UD Laws and Investment Efficiency

The firm investment decisions are another channel of the extraction of private benefits and they represent the efficient use of corporate resources. Manager may pursue their personal interests which are not aligned with those of shareholders by making suboptimal investment decisions, thereby destroying firm value. Thus, governance mechanisms play an important role in monitoring the firm's investment decisions. A good governance mechanism constrains managers from self-dealing and moral hazard problems and further mitigates agency conflicts between managers and shareholders, which ultimately improves the efficiency of investment projects. However, as the adoption of UD laws weakens the governance power of litigation rights by making it difficult for shareholders to enforce fiduciary duties via derivative lawsuits, UD laws create more incentives for managers to implement self-serving investment policies. To examine the impacts of UD laws on investment efficiency, we employ the following investment model to measure investment efficiency as the sensitivity of investment to investment opportunities (Tobin's Q):

$$\begin{aligned} Investment_{i,t} = {} & \beta_0 + \beta_1 UDlaws_{i,t} + \beta_2 Dual_{i,t} + \beta_3 TobinQ_{i,t-1} \\ & + \beta_4 UDlaws_{i,t} \times TobinQ_{i,t-1} \\ & + \beta_5 UDlaws_{i,t} \times Dual_{i,t} \times TobinQ_{i,t-1} + \Sigma\beta_n CONTROLS_{i,t-1} \\ & + FEs + \varepsilon_{it} \end{aligned}$$

Where the dependent variable $Investment_{i,t}$ represent the firm's investment

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expenditure in a year. It is defined as the sum of R&D expenditure, capital expenditure and acquisition expenditure, less cash receipts from sale of property, plant and equipment and scaled by beginning total assets. The key explanatory variable $UDlaws_{it}$ is an indicator variable, which equals to one if the UD laws is effective and zero otherwise. To examine the effects of UD laws on the investment efficiency, we exploit the coefficient of interaction between $UDlaws_{i,t}$ and $TobinQ_{i,t-1}$ and it is expected to be significantly negative if the adoption of UD laws reduce investment efficiency. $Dual_{it}$ is an indicator variable to distinguish sub-samples, which is set to one if the firm is a dual-class firm and zero otherwise. $TobinQ_{i,t-1}$ proxy for investment opportunities and it is defined as the market value of assets divided by book value of assets. The coefficient β_5 on the triple interaction ($UDlaws_{i,t} \times Dual_{i,t} \times TobinQ_{it-1}$) capture the incremental sensitivity of investment to investment opportunities for dual-class firms following the adoption of UD laws. In addition, following Badertscher, Shroff, and White (2013), we control for an array of factors potentially affecting investment efficiency, including firm size, cash holdings, leverage, and ROA. All the firm-specific variables are lagged by one year because the firm's beginning-of-year investment is determined by investment opportunities at the end of the prior year.

Table 12 presents the regression results of the impacts of UD laws on investment efficiency. Specifically, Columns 1-3 report the results for dual-class firms, single-class firms and all firms including dual-class and single-class firms, respectively. We control for firm and year-fixed effects across all regressions. The coefficients on the interaction between $UDlaws_{i,t}$ and $TobinQ_{i,t-1}$ are negative and statistically significant at the level of 1% across all specifications, suggesting that the adoption of UD laws significantly reduce investment efficiency, which is consistent with the findings of Li, Monroe, and Coulton (2023). In particular, as shown in Column 3, the coefficient β_5 on UDlaws*Tobin*Dual is significantly negative, implying that the decrease in investment efficiency around the passage of UD laws is more pronounced for dual-class firms relative to single-class firms. Because the separation of cash flow rights and voting rights insulate managers from shareholders' disciplinary tools, the dual-class structure can exacerbate the negative effects of UD Laws on investment efficiency. Taken together, the results lend support to the view that managers are more likely to make suboptimal investment decisions following the adoption of UD laws.

[Insert Table 12 Here]

8. Conclusion

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Most of research on the determination of private benefits of control focuses on the effects of the legal environment on the value of private benefits of control, but few studies in this line of research explore the effects of shareholder litigation on the level of private benefits of control even if shareholder litigation is an important proxy for the legal framework. Since the previous estimation of private benefits is restricted to a small sample size, we follow the new method of Kalay, Karakaş, and Pant (2014) to quantify the value of private benefits of control from the voting premium of option prices based on a large sample size at any point in time.

Specifically, this study examines whether and how derivative litigation risks affect the managerial extraction of private benefits. We find that the derivative litigation risk effectively can curb the private benefits of control. The voting premium from option prices, which capture the value of private benefits, significantly decreases after the firm experiences a derivative lawsuit and the result is also economically meaningful. Furthermore, to address the potential endogeneity concern, we exploit the staggered adoption of UD laws, which decrease the derivative litigation risks through imposing a procedural hurdle to derivative lawsuits, by 23 states in the United States between the periods from 1989 and 2005 as a quasi-natural experiment to validate the causal relationship between shareholder litigation and the value of voting premium. The empirical results show that the adoption of UD laws significantly increases the level of voting premium. Our DID findings are robust to a battery of tests, including the parallel trend assumption, propensity score matching, and other confounding state-level law changes. In the channel analysis, we explore whether managers may extract private benefits from corporate cash holdings, excessive pay packages and self-serving investments following the passage of UD laws. Our evidence indicates that the adoption of UD laws decreases the value of cash, increases CEO cash compensation and decreases investment efficiency. In particular, these effects are more pronounced for dual-class firms, implying that firms with dual-class structures have more severe agency problems in the lax litigation environment. Overall, our study suggests that reduced derivate lawsuit threat arising from the passage of UD laws deteriorates corporate governance, thereby leading to more insider expropriation, suggesting that shareholder litigation plays an important role in curbing private benefits of control.

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Table 1. Distribution of derivative lawsuits

This table presents annual distributions of derivative lawsuits and the total number of firms during the periods between 2000 and 2021. Panel B reports the distribution of derivative lawsuits across two-digit SIC industries.

Panel A: Derivative lawsuits by year

Year	The number of firms	Derivative lawsuits	
		No.	Rate (%)
2000	792	2	0.25
2001	734	5	0.68
2002	692	11	1.59
2003	614	9	1.47
2004	681	16	2.35
2005	690	33	4.79
2006	700	50	7.15
2007	730	59	8.09
2008	731	47	6.44
2009	714	33	4.63
2010	712	34	4.78
2011	740	38	5.14
2012	754	39	5.18
2013	826	56	6.79
2014	874	44	5.04
2015	856	35	4.09
2016	847	24	2.84
2017	858	39	4.55
2018	859	45	5.24
2019	1,291	89	6.90
2020	1,441	114	7.92
2021	1,742	111	6.38
Total	18,878	933	4.94

Panel B: Derivative lawsuits by industry

Sector	The number of firms	Derivative lawsuits	Rate (%)
Agriculture, forestry, and fishing	50	3	6.00
Construction	69	0	0.00
Manufacturing	14,411	753	5.22
Mining	384	14	3.65
Public administration	110	5	4.55
Retail trade	173	6	3.47
Services	3,067	139	4.53
Transportation and public utilities	506	6	1.19
Wholesale trade	108	7	6.48
Total	18,878	933	4.94

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Table 2. Descriptive statistics

This table presents the summary statistics for the main sample including 18,878 firm-year observations from 2000 to 2021. All variables are winsorized at the 1% and 99% levels. All variables are defined in Appendix B. Panel B reports the correlation matrix for Pearson (Spearman) correlations in the below (above) main diagonal.

Panel A. Summary statistics

Variable	Obs	Mean	Median	Min	Max	St.dev.
Vote premium (%)	18,878	0.054	0.015	-1.946	2.436	0.475
Derivative	18,878	0.042	0.000	0.000	1.000	0.202
Derivative_number	18,878	0.049	0.000	0.000	5.000	0.253
logat	18,878	7.454	7.376	3.205	12.374	2.048
Leverage	18,878	0.146	0.115	0.000	0.595	0.132
Researchexp	18,878	1.045	0.056	0.001	45.261	5.323
Capitalexp	18,878	0.112	0.039	0.001	2.613	0.317
ROA	18,878	0.041	0.102	-0.943	0.346	0.218
Firmage	18,878	21.695	15.000	0.000	89.000	21.177
BM	18,878	0.418	0.331	-0.777	2.327	0.428
Instown hhi	18,878	0.062	0.046	0.000	0.428	0.070
Insider	18,878	0.731	0.000	0.000	18.074	2.509
HHI	18,878	0.223	0.150	0.029	1.000	0.224
StateGDP_growth	18,878	0.028	0.025	-0.032	0.107	0.035
StateGDP_percapita	18,878	8.956	11.034	0.000	11.295	4.343
GDP	18,878	9.373	11.121	0.000	14.444	4.623

Panel B. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Vote premium (%)	1	-0.0071	-0.0071	-0.1452*	-0.0803*	0.0557*	0.1149*	-0.0538*	-0.1567*	0.0048	0.0038	-0.1032*	-0.0122	-0.0027	-0.1780*	-0.1427*
2. Derivative	-0.0054	1	0.9999*	0.0334*	0.0036	0.0675*	-0.0249*	-0.0188*	0.0314*	-0.0187*	-0.0182*	0.0450*	-0.0472*	0.0124	0.1157*	0.0841*
3. Derivative_number	-0.0036	0.9272*	1	0.0336*	0.0036	0.0674*	-0.0248*	-0.0187*	0.0317*	-0.0186*	-0.0180*	0.0448*	-0.0472*	0.0123	0.1157*	0.0840*
4. Firmsize	-0.0803*	0.0352*	0.0438*	1	0.3565*	-0.4506*	0.0425*	0.4664*	0.4154*	0.0913*	-0.2336*	0.0967*	0.2677*	-0.1338*	-0.1622*	-0.1342*
5. Leverage	-0.0027	0.0089	0.0087	0.2692*	1	-0.3968*	-0.0156*	0.0572*	0.1767*	0.2289*	-0.0124	0.0528*	0.1899*	-0.0789*	-0.0471*	-0.0244*
6. Researchexp	0.0400*	0.0084	0.0055	-0.2292*	-0.0993*	1	0.1375*	-0.5029*	-0.2920*	-0.2477*	0.1013*	-0.1825*	-0.5071*	0.0551*	0.1860*	-0.0025
7. Capitalexp	0.0896*	0.0013	0.0016	-0.1589*	-0.0523*	0.6866*	1	-0.0751*	-0.1535*	0.0272*	0.0059	-0.1725*	-0.1309*	-0.0174*	-0.1299*	-0.1798*
8. ROA	-0.0687*	-0.0281*	-0.0198*	0.5204*	0.0809*	-0.4699*	-0.3620*	1	0.3238*	-0.0877*	-0.2264*	0.2761*	0.2871*	-0.0237*	-0.1447*	0.0007
9. Firmage	-0.0664*	0.0155*	0.0297*	0.4493*	0.1031*	-0.1200*	-0.1440*	0.2707*	1	0.0662*	-0.1728*	0.2638*	0.3699*	0.0121	0.0134	0.2147*
10. BM	0.0003	-0.0237*	-0.0244*	0.0741*	0.2053*	-0.0606*	0.0102	0.0458*	-0.0266*	1	0.0557*	-0.0044	0.1466*	-0.0665*	-0.2115*	-0.1255*
11. Instown_hhi	0.0389*	-0.0246*	-0.0221*	-0.1888*	0.0505*	0.0711*	0.0688*	-0.1952*	-0.1550*	0.0912*	1	-0.1121*	-0.1347*	-0.0256*	0.0525*	-0.0067
12. Insider	-0.0099	0.0226*	0.0149*	-0.0324*	-0.0583*	-0.0500*	-0.0468*	0.0967*	-0.0400*	-0.0063	-0.0186*	1	0.1545*	0.0827*	0.2496*	0.2897*
13. HHI	-0.0003	-0.0362*	-0.0364*	0.1675*	0.1106*	-0.1201*	-0.1106*	0.2104*	0.2518*	0.0687*	-0.0814*	-0.0203*	1	0.0218*	-0.1060*	0.0963*
14. StateGDP_growth	-0.0093	0.0142	0.0098	-0.1350*	-0.0728*	0.0088	0.0123	-0.0419*	0.0251*	-0.0718*	-0.0458*	0.0413*	0.0203*	1	0.2679*	0.3039*
15. StateGDP_percapita	-0.0146*	0.0928*	0.0865*	-0.2805*	-0.0843*	0.0379*	-0.0113	-0.0776*	0.1095*	-0.1626*	-0.1583*	0.1165*	0.0468*	0.3868*	1	0.4827*
16. StateGDP	-0.0174*	0.0877*	0.0812*	-0.2652*	-0.0809*	0.0225*	-0.0261*	-0.0533*	0.1522*	-0.1521*	-0.1623*	0.1162*	0.0760*	0.3934*	0.9783*	1

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Table 3. Derivative lawsuits and voting premium

This table presents the results from investigating the effects of derivative lawsuits on the value of private control benefits measured by voting premium (%) during the period from 2000 to 2021. The dependent variable, *voting premium*, which captures the value of private benefits, is calculated as the difference between the market price of a stock and the market value of a matched synthetic stock, scaled by the stock market price and annualized by the average value of the whole year. In column 1, the independent variable, *Derivative*, is a dummy variable that takes the value of 1 if shareholders file a derivative lawsuit on behalf of the firm against management misconduct in a given year and zero otherwise. In Column 2, the independent variable, *Derivative_number*, is the number of derivative lawsuits that the firm experiences in the given year. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the firm level. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1) Voting premium (%)	(2) Voting premium (%)
Derivative	-0.038**	
	(-1.96)	
Derivative_number		-0.021*
		(-1.68)
Firmsize	-0.015	-0.016
	(-1.40)	(-1.43)
Leverage	0.079	0.077
	(1.01)	(0.99)
Researchexp	0.002	0.002
	(0.52)	(0.52)
Capitalexp	0.086*	0.086*
	(1.88)	(1.89)
ROA	0.010	0.010
	(0.14)	(0.15)
Firmage	-0.014***	-0.015***
	(-2.60)	(-2.62)
BM	-0.030	-0.030
	(-1.24)	(-1.25)
Instown_hhi	-0.077	-0.078
	(-0.49)	(-0.49)
Insider	-0.003	-0.003
	(-1.48)	(-1.48)
HHI	0.039	0.039
	(0.78)	(0.77)
State_GDP	-0.002	-0.002
	(-0.08)	(-0.08)
StateGDP_growth	0.216	0.217
	(1.17)	(1.17)
StateGDP_percapita	0.001	0.000
	(0.03)	(0.02)
Constant	0.402***	0.408***
	(2.95)	(3.00)
No. of observations	18,878	18,878
Adjusted R-squared	0.275	0.275
Firm FE	YES	YES
Year FE	YES	YES

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Table 4. Validity tests for litigation risk: derivative lawsuits

This table presents validity tests for estimating the change in litigation risk following the adoption of UD laws. The model is constructed by the state of incorporation and year level. The dependent variable, *ln(derivative)*, is measured by the natural log of one plus the number of derivative lawsuits. The independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. The regression model includes state-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance level for 1%, 5%, and 10% respectively.

	(1) ln(derivative)	(2) ln(derivative)
UDlaws	-0.254**	-0.213**
	(-2.30)	(-2.13)
State_GDP		0.170*
		(1.96)
StateGDP_growth		-0.461
		(-0.97)
StateGDP_percapita		-0.965*
		(-1.99)
Constant	0.111	8.015
	(1.58)	(1.64)
No. of observations	1,004	1,004
Adjusted R-squared	0.726	0.731
State FE	YES	YES
Year FE	YES	YES

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Table 5. UD laws and voting premium

This table presents the results from investigating the effects of the adoption of UD laws on the value of voting premiums based on option prices. The dependent variable, *voting premium*, which capture the value of private benefits, is calculated as the difference between the market price of a stock and the market value of a matched synthetic stock, scaled by the stock market price and annualized by the average value of the whole year. The key independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance level for 1%, 5%, and 10% respectively.

	(1) Voting premium (%)	(2) Voting premium (%)	(3) Voting premium (%)
UDlaws	0.106**	0.106**	0.111**
	(2.10)	(2.07)	(2.23)
Firmsize		-0.015	-0.015
		(-1.57)	(-1.56)
Leverage		-0.042	-0.043
		(-0.80)	(-0.79)
Researchexp		-0.003	-0.003
		(-1.33)	(-1.33)
Capitalexp		0.081**	0.082**
		(2.06)	(2.08)
ROA		-0.019	-0.019
		(-0.33)	(-0.33)
Firmage		-0.025***	-0.025***
		(-3.24)	(-3.23)
BM		0.004	0.004
		(0.28)	(0.24)
Instown_hhi		-0.951***	-0.954***
		(-5.85)	(-5.87)
Insider		-0.000	-0.000
		(-0.05)	(-0.04)
HHI		-0.048	-0.046
		(-1.39)	(-1.33)
State_GDP			-0.025*
			(-1.71)
StateGDP_growth			0.017
			(0.07)
StateGDP_percapita			-0.066
			(-0.40)
Constant	0.136***	0.605***	1.574
	(12.11)	(6.03)	(0.85)
No. of observations	9,882	9,882	9,882
Adjusted R-squared	0.238	0.243	0.242
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Table 6. UD laws and voting premium: dynamic model

This table presents the results of the dynamic voting premium model. The dependent variable, *voting premium*, which captures the value of private benefits, is calculated as the difference between the market price of a stock and the market value of a matched synthetic stock, scaled by the stock market price and annualized by the average value of the whole year. The four key independent variables, $UDlaws^{-1}$, $UDlaws^{0}$, $UDlaws^{+2}$, and $UDlaws^{+2}$, are indicator variables that take the value of 1 if the firm is incorporated in a state that has adopted UD laws next one year, passes the UD laws this year, adopted the UD laws one year ago, and adopted the UD laws two or more years ago. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1) Voting premium (%)	(2) Voting premium (%)	(3) Voting premium (%)
$UDlaws^{-1}$	-0.002	0.001	0.011
	(-0.03)	(0.01)	(0.13)
$UDlaws^{0}$	0.123***	0.128***	0.134***
	(3.25)	(3.37)	(3.68)
$UDlaws^{+1}$	0.129**	0.128**	0.134**
	(2.41)	(2.29)	(2.32)
$UDlaws^{+2}$	0.092*	0.094*	0.102*
	(1.81)	(1.76)	(1.87)
Firmsize		-0.015	-0.015
		(-1.58)	(-1.58)
Leverage		-0.042	-0.043
		(-0.80)	(-0.79)
Researchexp		-0.003	-0.003
		(-1.33)	(-1.34)
Capitalexp		0.081**	0.082**
		(2.06)	(2.08)
ROA		-0.019	-0.019
		(-0.34)	(-0.33)
Firmage		-0.025***	-0.025***
		(-3.25)	(-3.24)
BM		0.004	0.004
		(0.29)	(0.25)
Instown_hhi		-0.951***	-0.954***
		(-5.84)	(-5.86)
Insider		-0.000	-0.000
		(-0.06)	(-0.05)
HHI		-0.049	-0.047
		(-1.42)	(-1.36)
State_GDP			-0.025*
			(-1.71)
StateGDP_growth			0.031
			(0.12)
StateGDP_percapita			-0.067
			(-0.40)
Constant	0.136***	0.604***	1.592
	(13.03)	(6.06)	(0.86)
No. of observations	9,882	9,882	9,882
Adjusted R-squared	0.238	0.242	0.242
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Figure 1. The effect of UD laws on voting premiums

This figure plots the estimated coefficients of the year dummies for the year $t-1$ to $t+2$, where the year t denotes the year in which the firm is incorporated in a state that has passed the UD laws in the voting premium dynamic model. The dependent variable, *voting premium*, measures the value of private benefits of control. The dash lines represent the confidence intervals of the estimated coefficients at the level of 90%

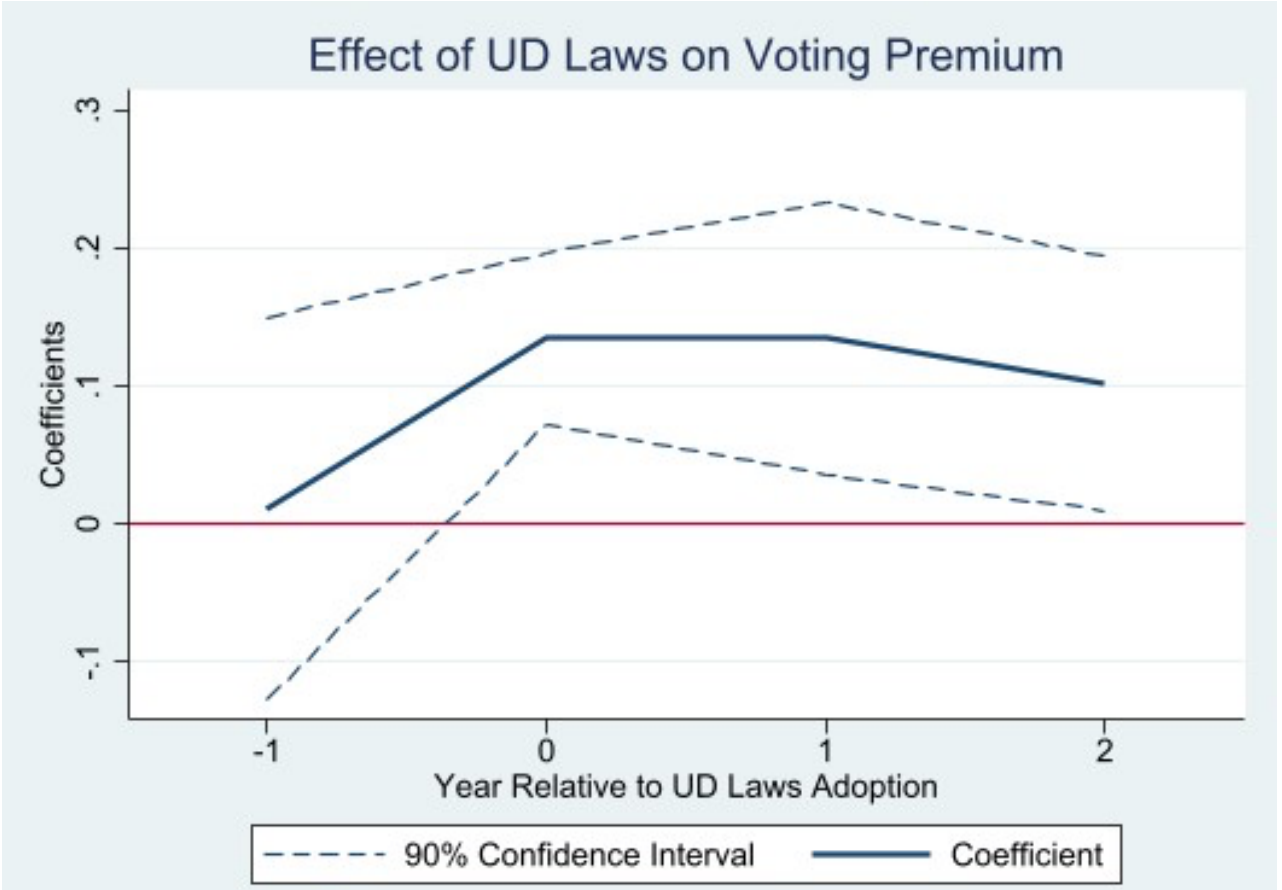

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Table 7. UD laws and dual-class voting premium

This table presents the results from investigating the effects of the adoption of UD laws on the value of dual-class voting premiums. The dependent variable, *dual-class voting premium*, which is the alternative measure of private benefits, is calculated as the market price difference between the high-voting class of share and the low-voting class of share. The key independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1) Dual-class voting premium
UDlaws	0.115
	(1.23)
Votepower	0.007**
	(2.25)
Conversion	-0.001
	(-0.09)
Turnover	0.010
	(1.57)
Marketcap	-0.052***
	(-3.53)
Dividend	-0.075***
	(-5.48)
Sox	-0.243**
	(-2.63)
State_GDP	0.202
	(1.27)
StateGDP_growth	-0.096
	(-0.41)
StateGDP_percapita	0.272
	(1.38)
Constant	-3.702*
	(-2.02)
No. of observations	846
Adjusted R-squared	0.050
Firm FE	YES
Year FE	YES

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Table 8. UD laws and voting premium: propensity score matching

This table reports the results from investigating the effects of voting premium on the UD laws using propensity score matching (PSM) methods. We identify treated firms with PSM-matched (control) firms based on a series of covariates, including firm size, book-to-market ratio, ROA, leverage, etc. Panel A shows the comparison of before and post-matching firm characteristics between treated firms and control firms. Panel B shows the regression results using a propensity score-matched sample. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

Panel A: Summary statistics for treated firms and control firms

Variable		Treated	Control	t-statistic	p-value
Firmsize	Before	6.859	6.716	1.480	0.139
	After	6.859	6.705	1.240	0.217
Leverage	Before	0.135	0.123	1.700	0.090*
	After	0.135	0.127	0.830	0.404
Researchexp	Before	0.124	0.696	-3.700	0.000***
	After	0.124	0.130	-0.210	0.837
Capitalexp	Before	0.061	0.124	-3.920	0.000***
	After	0.061	0.061	-0.010	0.988
ROA	Before	0.114	0.044	5.990	0.000***
	After	0.114	0.111	0.270	0.786
Firmage	Before	28.242	19.015	8.510	0.000***
	After	28.242	27.159	0.680	0.500
BM	Before	0.458	0.408	2.490	0.013**
	After	0.458	0.443	0.560	0.575
Instown_hhi	Before	0.041	0.053	-4.060	0.000***
	After	0.041	0.042	-0.210	0.836
Insider	Before	1.309	1.103	1.110	0.268
	After	1.309	1.125	0.800	0.425
HHI	Before	0.286	0.228	5.04	0.000***
	After	0.286	0.286	-0.04	0.972

Panel B: Multivariate results: propensity score matched sample

	(1) Vote premium (%)
UDlaws	0.166**
	(2.36)
Firmsize	-0.014
	(-0.12)
Leverage	-0.027
	(-0.11)
Researchexp	-0.033
	(-0.40)
Capitalexp	-0.824
	(-1.14)
ROA	-0.582***
	(-3.06)
Firmage	-0.038
	(-1.48)
BM	-0.030
	(-0.21)
Instown_hhi	1.470
	(0.85)
Insider	0.005
	(1.16)
HHI	-0.112
	(-0.66)
State_GDP	0.014
	(0.30)
StateGDP_growth	0.065
	(0.07)
StateGDP_percapita	-0.025
	(-0.05)
Constant	1.052
	(0.22)
No. of observations	1,044
Adjusted R-squared	0.346
Firm FE	YES
Year FE	YES

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Table 9. Robustness test

This table shows the results of the robustness test for the baseline regression model. Model (1) controls for the potential confounding legal events. *BC (PP)* is a dummy variable that takes the value of one if a firm is incorporated in a state that has adopted Business Combination laws (Poison Pill law), and zero otherwise. Model (2) exludes *Ninth Circuit states* including Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington. Model (3) excludes firms incorporated in *Delaware* from our sample. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1)	(2)	(3)
	Controlling BC and PP laws	Drop Ninth Circuit	Drop Delaware
	Vote premium (%)	Vote premium (%)	Vote premium (%)
UDlaws	0.113**	0.116**	0.106**
	(2.36)	(2.48)	(2.42)
PP	-0.137*		
	(-1.93)		
BC	0.055		
	(0.63)		
Firmsize	-0.015	-0.006	-0.020
	(-1.64)	(-0.69)	(-0.40)
Leverage	-0.045	-0.063	-0.180
	(-0.82)	(-0.92)	(-1.16)
Researchexp	-0.003	-0.003	-0.006
	(-1.35)	(-1.30)	(-0.24)
Capitalexp	0.082**	0.050***	0.271
	(2.11)	(4.47)	(1.45)
ROA	-0.019	-0.027	-0.080
	(-0.33)	(-0.62)	(-0.33)
Firmage	-0.025***	-0.028***	-0.038
	(-3.25)	(-3.05)	(-1.43)
BM	0.004	0.011	0.050
	(0.27)	(0.62)	(0.91)
Instown_hhi	-0.960***	-1.030***	-1.059
	(-5.93)	(-5.69)	(-1.68)
Insider	-0.000	-0.001	0.007
	(-0.04)	(-0.46)	(1.35)
HHI	-0.048	-0.062*	-0.019
	(-1.40)	(-1.95)	(-0.17)
State_GDP	-0.005	-0.033	-0.015
	(-0.18)	(-1.45)	(-0.40)
StateGDP_growth	0.066	0.167	0.687
	(0.26)	(0.54)	(1.13)
StateGDP_percapita	-0.094	-0.171	-0.329
	(-0.58)	(-1.11)	(-1.09)
Constant	1.619	2.770	4.518
	(0.88)	(1.54)	(1.54)
No. of observations	9,882	9,110	2,765
Adjusted R-squared	0.243	0.233	0.252
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Table 10. Channel analysis: UD laws and the value of cash

This table presents the results from investigating the effects of the adoption of UD laws on the value of cash for dual-class firms, single-class firms, and all firms, respectively. The dependent variable, *excess return*, is measured as the difference between the stock return of a firm in a given year and the matched twenty-five Fama and French value-weighted portfolio return based on size and book-to-market. The key independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. Δ represents a change in value from year $t-1$ to t. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. Note that the standalone *Dual* variable is not included in the regression output because it is already absorbed by firm fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1)	(2)	(3)
	Dual-class sample	Single class sample	Overall sample
	Excess return	Excess return	Excess return
UDlaws	0.194***	-0.001	0.006
	(3.33)	(-0.03)	(0.30)
UDlaws*ΔCash	-0.373**	-0.054**	-0.053*
	(-2.11)	(-2.02)	(-1.96)
Dual*UDlaws*ΔCash			-0.411**
			(-2.02)
ΔCash	1.455***	1.645***	1.640***
	(9.62)	(35.13)	(33.83)
ΔEarnings	0.463***	0.306***	0.315***
	(8.81)	(14.48)	(15.45)
ΔNetAssets	-0.002	0.143***	0.134***
	(-0.05)	(17.38)	(18.83)
ΔR&D	1.502***	0.326***	0.383***
	(2.90)	(3.73)	(4.44)
ΔInterest	-0.998***	-0.610***	-0.611***
	(-2.92)	(-5.87)	(-5.89)
ΔDividend	-3.133	4.296	3.689
	(-0.87)	(1.55)	(1.47)
Lag_cash	0.802***	0.669***	0.678***
	(8.25)	(31.34)	(34.31)
Leverage	-0.986***	-1.108***	-1.100***
	(-11.18)	(-48.89)	(-53.78)
NetFinancing	0.159**	0.051***	0.056***
	(2.18)	(3.31)	(3.98)
Lag_cash*ΔCash	-0.812***	-0.667***	-0.676***
	(-6.70)	(-15.46)	(-16.51)
Leverage*ΔCash	-1.235***	-1.554***	-1.546***
	(-2.94)	(-20.97)	(-18.44)
Constant	0.335***	0.052**	0.061***
	(6.52)	(2.54)	(2.88)
No. of observations	3,271	56,587	59,858
Adjusted R-squared	0.195	0.183	0.183
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Table 11. Channel analysis: UD laws and CEO compensation

This table presents the results from investigating the effects of the adoption of UD laws on CEO compensation for dual-class firms, single-class firms, and all firms, respectively. The dependent variable, *CEO compensation*, is measured as the annual total cash compensation received by the CEO, including both salary and bonus. The key independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. Other variables are explained in Appendix B. The regression model includes firm-fixed effects and year-fixed effects. Note that the standalone *Dual* variable is not included in the regression output because it is already absorbed by firm fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1)	(2)	(3)
	Dua-class sample	Single-class sample	Overall sample
	CEO compensation	CEO compensation	CEO compensation
Udlaws	0.182**	0.014	0.018
	(2.45)	(0.42)	(0.53)
Dual*UDlaws			0.119*
			(1.77)
Tenure	0.037***	0.043***	0.042***
	(22.39)	(31.34)	(34.06)
Firm size	0.230***	0.186***	0.189***
	(13.26)	(34.98)	(46.04)
Tobin	-0.009	0.005***	0.004**
	(-1.09)	(3.16)	(2.45)
Leverage	-0.192***	-0.248***	-0.243***
	(-3.28)	(-20.08)	(-17.77)
R&Dsale	-0.164	0.055***	0.062***
	(-0.35)	(3.66)	(4.37)
Captialsale	-0.189	-0.106***	-0.114***
	(-1.41)	(-8.94)	(-10.42)
ROA	1.303***	0.651***	0.698***
	(8.26)	(23.25)	(19.41)
Stockreturn	0.070***	0.064***	0.064***
	(10.76)	(14.14)	(15.81)
Returnstd	-0.417*	0.092	0.050
	(-1.81)	(1.18)	(0.62)
Constant	4.228***	4.404***	4.398***
	(31.37)	(108.46)	(119.75)
No. of observations	12,210	119,319	131,529
Adjusted R-squared	0.550	0.532	0.536
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Table 12. Channel analysis: UD laws and investment efficiency

This table presents the results from investigating the effects of the adoption of UD laws on investment expenditures for dual-class firms, single-class firms, and all firms, respectively. The dependent variable, *investment*, is measured as the sum of R&D expenditure, capital expenditure, and acquisition expenditure, less cash receipts from the sale of property, plant, and equipment, scaled by total assets at the beginning of the year. The key independent variable, *UDlaws*, is a dummy variable that takes the value of 1 if the firm is incorporated in a state that has adopted UD laws and zero otherwise. *Tobin* represents investment opportunities. All the firm-specific variables are lagged by one year because the firm's beginning-of-year investment is determined by investment opportunities at the end of the last year. Other variables are explained in the Appendix B. The regression model includes firm-fixed effects and year-fixed effects. Note that the standalone *Dual* variable is not included in the regression output because it is already absorbed by firm fixed effects. t-statistics are reported in parentheses, with heteroscedasticity-robust standard errors clustered by the state of incorporation. The symbols ***, **, and * denotes statistical significance levels for 1%, 5%, and 10% respectively.

	(1)	(2)	(3)
	Dual-class sample	Single-class sample	Overall sample
	Investment	Investment	Investment
UDlaws	0.043***	0.016*	0.018**
	(3.66)	(1.88)	(2.21)
UDlaws*Tobin	-0.022***	-0.010***	-0.010***
	(-3.35)	(-3.64)	(-3.68)
UDlaws*Tobin*Dual			-0.006***
			(-3.78)
Tobin	0.022***	0.016***	0.016***
	(3.27)	(7.31)	(7.09)
Leverage	-0.081***	-0.040***	-0.044***
	(-2.73)	(-4.42)	(-4.61)
ROA	-0.160***	-0.034***	-0.038***
	(-5.27)	(-2.99)	(-3.33)
Cash	0.044***	0.097***	0.094***
	(4.19)	(9.24)	(9.04)
Size	-0.017***	-0.013***	-0.014***
	(-4.88)	(-3.32)	(-3.67)
Constant	0.217***	0.167***	0.171***
	(6.74)	(8.54)	(9.00)
No. of observations	6,994	71,773	78,767
Adjusted R-squared	0.411	0.351	0.353
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

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Appendix A.

Adoption of Universal Demand (UD) Laws

Year	State	Citation
1989	Georgia	Georgia Code Ann. § 14-2-742
1989	Michigan	Michigan Comp. Laws Ann. § 450.1493a
1990	Florida	Florida Stat. Ann. § 607.07401
1991	Wisconsin	Wisconsin Stat. Ann. § 180.742
1992	Montana	Montana Code Ann. § 35-1-543
1992	Virginia	Virginia Code Ann. § 13.1-672.1B
1992	Utah	Utah Code Ann. § 16-10a-740(3)
1993	New Hampshire	New Hampshire Rev. Stat. Ann. § 293-A:7.42
1993	Mississippi	Mississippi Code Ann. § 79-4-7.42
1995	North Carolina	North Carolina Gen. Stat. § 55-7-42
1996	Arizona	Arizona Rev. Stat. Ann. § 10-742
1996	Nebraska	Nebraska Rev. Stat. § 21-2072
1997	Connecticut	Connecticut Gen. Stat. Ann. § 33-722
1997	Maine	Maine Rev. Stat. Ann. 13-C, § 753
1997	Pennsylvania	Cuker v. Mikalauskas (547 Pennsylvania. 600, 692 A.2d 1042)
1997	Texas	Texas Bus. Corp. Act. § 5.14c
1997	Wyoming	Wyoming Stat. § 17-16-742
1998	Idaho	Idaho Code § 30-1-742
2001	Hawaii	Hawaii Rev. Stat. § 414-173
2003	Iowa	Iowa Code Ann. § 490.742
2004	Massachusetts	Massachusetts Gen. Laws Ann. Ch. 156D, § 7.42
2005	Rhode Island	Rhode Island Gen. Laws § 7-1.2-710(C)
2005	South Dakota	South Dakota Codified Laws 47-1A-742

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Appendix B.

Definitions of variables

Variable	Definition
Private benefits of control	
Voting premium	the difference between the market price of a stock and the market value of a matched synthetic stock from put-call parity, scaled by the stock market price and annualized by the average value of the fiscal year
Dual-class voting premium	the average value of daily voting premium over the year, defined as $\frac{P_H - P_L}{P_L - rv \times P_H}$, where P_H and P_L are the daily prices of high-voting stock and low-voting class and rv is relative number of votes of the low-voting stock compared to high-voting stock
Key independent variables	
UDlaws	The indicator variable takes the value of 1 if the firm was incorporated in a state that has adopted the UD laws in the year and zero otherwise
Baseline regression analysis: the adoption of UD laws and private benefits of control	
ln(derivative)	The natural log of one plus the number of derivative lawsuits
Votepower	The ratio of the fraction of total votes attached to the high-voting stock to the portion of total cash flow rights attached to the high-voting stock. It is defined as $\frac{Shrout_H + Shrout_L}{Shrout_H + rv \times Shrout_L}$ where $Shrout$ is the total number of the share outstanding
Conversion	a dummy variable that takes the value of one if the high-voting class of share is convertible to the low-voting class of share
Turnover	the natural log of the daily turnover of the low-voting stock relative to that of the high-voting stock. Turnover is defined as the number of shares traded divided by the number of shares outstanding
Marketcap	The natural log of the firm's market capitalization including high-voting stock and low-voting stock
Dividend	a dummy variable that takes the value of one if the low-voting class of share receives a higher dividend per share that the high-voting class of share and zero otherwise
Sox	a dummy variable that takes the value of one if the firm-year ending or after 2003 and zero otherwise
State_GDP	the natural log of the state GDP over the fiscal year
StateGDP_growth	The state-level GDP growth over the fiscal year
StateGDP_percapita	The natural log of a state GDP per capita
Firmsize	The natural log of total assets (*AT*)
Leverage	The ratio of total debts (*DLC+DLTT*) to the market value of total assets (*AT-CEQ+CSHO*PRCC_F*)
Researchexp	The research and development expenses (*XRD*) scaled by sales (*SALE*)
Capitalexp	The capital expenditure (*CAPX*) scaled by sales (*SALE*)

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ROA	Net income (*OIBDP*) over total assets (*AT*)
Firmage	The number of year the firm has been first listed in CRSP
BM	The book value of equity (*CEQ*) divided by the market value of equity (*PRCC_F*CSHO*)
Instown_hhi	The Herfindahl-Hirschman index of institutional shareholdings of the firm
Insider	The percentage of share outstanding owned by the firm's top managers
HHI	The Herfindahl-Hirschman index of market share, calculated by the firm's sales (*SALE*)

Channel analysis: the adoption of UD laws and the value of cash

Excess return	Buy and hold excess stock return over a year defined as $\prod(1+R_{i,m})-\prod(1+R_{p,m})$ where $R_{i,m}$ is stock $i's$ monthly return and $R_{p,m}$ is twenty-five Fama-French value weighted portfolio monthly return based on size and book-to-market
ΔCash	Change in cash holdings (*CHE*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
ΔEarnings	Change in earnings (*IB+XINT+TXDI+ITCI*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
ΔNetAssets	Change in net assets (*AT-CHE*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
ΔR&D	Change in research and development expenses (*XRD*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
ΔInterest	Change in interest expenses (*XINT*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
ΔDividend	Change in dividends (*DVC*) in year t, scaled by market value of equity (*PRCC_F*CSHO*) in year $t-1$
Lag_cash	Lagged cash holdings, scaled by market value of equity in year $t-1$
Leverage	Market leverage in a year t is calculated as the ratio of total debt (*DLC+DLTT*) to market value of the firm (*DLC+DLTT+PRCC_F*CSHO*).
NetFinancing	Net financing in a year t is calculated as total equity issuance (*SSTK*) minus repurchases (*PRSTKC*) plus debt issuance (*DLTIS*) minus debt redemption (*DLTR*)

Channel analysis: the adoption of UD laws and CEO compensation

CEO compensation	Annual total cash compensation received by the CEO, including both salary and bonus (*TOTAL_CURR*)
Tenure	The number of years the CEO has been in an office
Firm size	The natural log of total assets (*AT*)
Tobin	The market value of assets (*AT-CEQ+CSHO*PRCC_F*) over the book value of assets (*AT*)
Leverage	The ratio of total debts (*DLC+DLTT*) to the market value of total assets (*AT-CEQ+CSHO*PRCC_F*)

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R&Dsale	The ratio of Research and Development expenses (*XRD*) to the sales (*SALE*)
Captialsale	Capital expenditures (*CAPX*) divided by sales (*SALE*)
ROA	Net income (*OIBDP*) over total assets (*AT*)
Stockreturn	Buy-and-hold stock return (*RET*) minus buy-and-hold CRSP value-weighted market return (*VWRETD*)
Returnstd	The standard deviation of monthly stock return (*RET*) during the past 5 years
Channel analysis: the adoption of UD laws and investment efficiency	
Investment	The sum of R&D expenditure (*XRD*), capital expenditure (*CAPX*), and acquisition expenditure (*AQC*), less cash receipts from the sale of property, plant, and equipment (*SPPE*), scaled by total assets (*AT*) at the beginning of the year
Tobin	The market value of assets (*AT-CEQ+CSHO*PRCC_F*) over the book value of assets (*AT*) for the firm in the year $t-1$
Leverage	The ratio of total debts (*DLC+DLTT*) to the market value of total assets (*AT-CEQ+CSHO*PRCC_F*) for the firm in the year $t-1$
ROA	Net income (*OIBDP*) over total assets (*AT*) for the firm in the year $t-1$
Cash	Cash and cash equivalents (*CHE*), divided by total assets (*AT*) at the beginning of the year for the firm in the year $t-1$
Size	The natural log of the total assets (*AT*) for the firm in the year $t-1$

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