

Shareholder Litigation Risk and the Information Environment: Revisiting Evidence from Two Natural Experiments*

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Abstract

A court case that reduced the threat of securities class action litigation led to less frequent voluntary disclosure, but did not significantly affect the level of information asymmetry. Conversely, state laws that reduced the threat of derivative litigation led to more frequent voluntary disclosure, but increased the level of information asymmetry. We reconcile these differences by highlighting that securities class action lawsuits address disclosure decisions while derivative lawsuits address both disclosure and operating decisions, and show that changes in firms' real operations is the economic mechanism driving the association between derivative litigation risk and corporate information environments.

Keywords: Information Environment, Disclosure, Shareholder Litigation, Silicon Graphics Inc. Ruling, Universal Demand Laws

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1. Introduction

A large accounting and finance literature dating back to Skinner (1994) examines how shareholder litigation risk affects corporate disclosure. Studies in this area deliver mixed results due to the endogenous nature of the relationship. Recent papers seek to overcome the identification problem by studying court cases and state laws that provide exogenous variation in the threat of shareholder litigation. Despite these econometric improvements, there is still a lack of consensus. Indeed, Houston, Lin, Liu, and Wei (HLLW 2019) and Bourveau, Lou, and Wang (BLW 2018) both examine natural experiments that exogenously lower the threat of shareholder litigation but reach opposite conclusions. HLLW show that the frequency of voluntary disclosure *decreases* after the threat of a 10b-5 securities class action lawsuit was lowered by the Ninth Circuit Court's Silicon Graphics Inc. ruling (SGI Ruling) on July 2, 1999. Conversely, BLW show that the frequency of voluntary disclosure *increases* after the threat of a derivative lawsuit was lowered by universal demand laws (UD Laws) adopted by twenty-three states between 1989 and 2005.

In this paper, we revisit these natural experiments with three specific goals. First, we probe the robustness of HLLW and BLW's inferences by replicating their main findings on voluntary disclosure quantity and extending their analyses with commonly used measures of voluntary and mandatory disclosure quality. Second, we examine whether the documented changes in corporate disclosure coincide with changes in the level of information asymmetry, and therefore, have implications for investors. Finally, we shed light on the economic mechanism driving the main results in BLW by examining the role of UD Law-induced changes in firms' real operations. Together, these tests aim to reconcile contradictory findings in the literature and offer new insights about the dynamics between different litigation types (10b-5 class actions or derivative lawsuits), corporate disclosure, and firms' fundamental performance.

We begin by investigating the effect of shareholder litigation risk on voluntary disclosure behavior. In theory, disclosure can either deter or trigger litigation. Because plaintiffs do not know when managers receive bad news, the *deterrence hypothesis* of Skinner (1994, 1997) and Kasznik and Lev (1995) posits that disclosure lowers potential litigation costs by weakening the claim that managers improperly withheld information. In contrast, the *liability hypothesis* of Johnson, Kasznik, and Nelson (2001) argues that disclosure escalates potential litigation costs because inaccurate information can later be used to sue the firm.

HLLW and BLW test these hypotheses by examining changes in voluntary disclosure quantity around the SGI Ruling and the adoption of UD Laws, respectively, and arrive at opposite inferences. We successfully replicate each paper's main findings on the frequency of management earnings per share (EPS) forecasts and voluntary 8-Ks, both in terms of economic magnitude and statistical significance. For example, our estimates imply that firms located in the Ninth Circuit are 4.7 to 7.8 percentage points less likely to issue an earnings forecast after the ruling, while firms incorporated in UD states are 4.4 to 5.9 percentage points more likely to issue a forecast after the law change.

Notably, HLLW (p. 257) describe their results as "... consistent with the "litigation-detering" motives of earnings forecasts. Since the treated firms would expect a lower probability of being sued by the shareholders after the ruling, they become less incentivized to provide disclosures that are used to prevent large stock price movements and corresponding litigation." This interpretation implies that a decline in the threat of securities class actions after the SGI Ruling *deteriorated* corporate information environments. In contrast, BLW (p. 800) conclude that "[o]verall, UD laws seem to incentivize managers to share more and better quality information with shareholders rather than exercise more opportunistic disclosure behavior." This interpretation implies that a decline in

the threat of derivative lawsuits after the passage of UD Laws *improved* corporate information environments. Given these contrasting results on disclosure quantity, we next examine changes in disclosure quality to provide a more complete view of firms' disclosure behavior.

Waymire (1985) highlights that firms are more likely to be sued for underperformance of expectations than for overperformance due to institutional features of U.S. securities law. We investigate how this asymmetry influences voluntary disclosure quality by studying the bias and accuracy of management earnings forecasts, and find conflicting outcomes depending on the empirical setting. Our tests reveal no significant changes in forecast bias or accuracy around the SGI Ruling. Conversely, we find a significant increase in the frequency of both optimistic and pessimistic forecasts after the adoption of UD Laws.

At first glance, the symmetric increase in optimistic/pessimistic forecasts post-UD seems to corroborate BLW's conclusion that the laws incentivize managers to share better quality information rather than to exercise more opportunistic behavior. We note, however, that the increase in *both* optimistic and pessimistic forecasts (defined as forecasts with actual earnings surprises greater than 10% and smaller than -10% respectively) suggests that managers issue forecasts with large errors more frequently. To evaluate this conjecture, we extend BLW's analyses with a test of management forecast accuracy. This test reveals that the absolute difference between management forecasts and actual earnings increases by more than one-third of the sample mean post-UD. This deterioration in forecast accuracy contrasts with BLW's conclusions and instead supports the notion that an increase in voluntary disclosure quantity does not necessarily improve the information environment (e.g., Loughran and McDonald 2014; Lo, Ramos, and Rogo 2017).

Because voluntary disclosure represents just one means for managers to shape their firm's information environment, we also consider how shareholder litigation risk affects the quality of

mandatory disclosure. Using the disclosure quality measure (DQ) of Chen, Miao, and Shevlin (2015) and the financial statement value relevance measure (RSQ) of Francis and Schipper (1999) as proxies for mandatory disclosure quality, we again find disparate outcomes across natural experiments. Specifically, we fail to reject the null hypothesis of no change in mandatory disclosure quality around the SGI Ruling. In contrast, we find a significant post-UD decrease in both DQ and RSQ. The latter findings suggest that firms provide less detailed and less informative financial reports when facing lower derivative litigation risk.

So far, our replications corroborate the main findings of HLLW and BLW, but our extensions challenge their conclusions. The SGI Ruling led to a decline in voluntary disclosure frequency, but did not affect the bias or accuracy of earnings forecasts as would be predicted by the litigation deterrence hypothesis. Meanwhile, UD Laws led to an increase in the *quantity* of voluntary disclosure but a decline in the *quality* of both voluntary and mandatory disclosure, suggesting that corporate information environments do not improve post-UD. Therefore, to shed additional light on these interpretations and assess the implications for outside investors, we examine the net effect of the SGI Ruling and UD Laws on the information environment by testing for changes in information asymmetry.

We form proxies for information asymmetry among analysts using the dispersion and accuracy of analyst EPS forecasts, and in the trading environment using bid-ask spreads and trading volume, based on evidence showing that these features improve with the informativeness of firm disclosure policies (Lang and Lundholm 1996; Leuz and Verrecchia 2000). Consistent with our disclosure quality results, we find no significant changes in information asymmetry around the SGI Ruling, but a significant increase around the adoption of UD Laws. Our estimates imply that analyst forecast dispersion and error increase by roughly 8% to 9% of a standard deviation, bid-ask spreads

widen by 4.4%, and daily trading volume declines by US\$4.5 million relative to firms operating in the same state and industry but not incorporated in a UD state. Collectively, our analyses provide no evidence that the SGI Ruling led to a significant deterioration of corporate information environments beyond a decline in voluntary disclosure quantity. By contrast, after the adoption of UD Laws, overall disclosure quality falls and information asymmetry worsens.

Our findings raise an important question: what economic mechanism is driving these starkly different results across natural experiments? The direct mechanism through which a reduction in litigation risk influences the information environment is by shifting managers' incentive to disclose. We argue, however, that some *types* of litigation risk potentially influence the information environment through an indirect mechanism. Dechow, Ge, and Schrand (2010) note that variables intended to measure the quality of the information environment could reflect benign changes in fundamental performance. We argue that this issue is particularly salient for interpreting changes in the information environment around the adoption of UD Laws because derivative suits address breaches of duty that harm the entire firm. Consequently, derivative litigation covers a wide range of offenses including illegal activities, self-dealing, and other poor business practices (e.g., announcing an acquisition without adequate due diligence). This broad scope differs from the 10b-5 securities class action suits studied by HLLW, which pertain to managers' duty under securities law to provide shareholders with accurate value-relevant information about firm activity.

Motivated by prior research showing that UD Laws influence firm fundamentals, we construct an operational change indicator variable that measures material upticks in risk-taking by capturing increases in average R&D expense, acquisition expenditure, or cash flow volatility (Lin, Liu, and Manso 2020; Ni and Yin 2018) from the three years before to the three years after a UD adoption

event. We use this operational change indicator and the triple-difference methodology of Gormley and Matsa (2011) to investigate the underlying mechanism driving changes in the information environment. Our results show that the effect of UD Laws is concentrated among firms that experience a material change in operations, suggesting that the post-UD changes in voluntary disclosure frequency documented by BLW stem from changes in firm fundamentals and not necessarily from a direct change in managerial incentives to disclose. This interpretation is in line with Brown and Tucker (2011), who show that firms are more likely to modify their disclosure behavior after large economic changes, and He and Plumlee (2020), who show that voluntary 8-K frequency is positively associated with R&D expense and volatility.

Our main contributions are as follows. First, we provide a parsimonious rationale for conflicting results in prior studies of litigation risk by highlighting important differences between 10b-5 securities class action lawsuits (affected by the SGI Ruling) and derivative suits (affected by UD Laws). According to our results, disparate findings in the literature emerge because securities class actions affect liability risk for disclosure choices while derivative litigation affects liability risk for both disclosure and operational choices.¹

Second, we answer the call by journal editors across several disciplines urging partial or full replications of previous papers. Indeed, despite the many benefits of reproducing existing work (Clemens 2017; Höffler 2017), a low number of articles in economics, finance, and accounting involve replications (Hubbard and Vetter 1996; Mueller-Langer et al. 2019). Moreover, an even lower number of authors attempt replications because “reproductions have the potential to be

¹ Our findings suggest that papers studying litigation types that cover broad corporate malfeasance (e.g., Donelson and Yust 2014; Barzuza and Smith 2015; Levy, Shalev, and Zur 2018; Bourveau et al. 2018; Houston et al. 2018; Ni and Yin 2018; Basu and Liang 2019) may differ from papers studying litigation types with a more narrow focus on improper disclosure (e.g., Johnson, Kasznik, and Nelson 2001; Sikochi 2016; Hopkins 2018; Licht, Poliquin, Siegel, and Li 2018; Dong and Zhang 2018; Houston et al. 2019; Naughton, Rusticus, Wang, and Yeung 2019) because their results may be driven by fundamental changes in firm activities, and may not reflect deliberate decisions of management to alter firm disclosure.

viewed as confrontational” (Hail, Lang, Leuz 2020, p. 533). We successfully reproduce the findings of HLLW and BLW, who provide an important first look at how an exogenous reduction in litigation risk affects voluntary disclosure quantity. Together with their evidence, our extensions provide a more nuanced view of how shareholder litigation influences corporate information environments.

Finally, our work helps unify BLW’s findings with Houston, Lin, and Xie (2018), Ni and Yin (2018), and Huang, Li, Yu, and Zhou (2020), and casts doubt on BLW’s conclusion that UD Laws incentivize managers to improve disclosure. Instead, our results support an augmented view of Johnson et al.’s (2001) liability hypothesis: a lower risk of derivative litigation appears to incentivize managers to increase real activity like R&D and M&A, leading to more frequent but less accurate disclosure and higher information asymmetry. Finally, our results indicate that firms affected by the SGI Ruling exhibit no significant changes in their disclosure quality or information asymmetry. As a result of this new evidence, it is unclear the extent to which the post-SGI Ruling drop in disclosure frequency documented by HLLW materially affects investors.

2. Academic and Institutional Background

2.1. Literature on litigation and disclosure

Prior work suggests that there are two potentially opposing effects of disclosure on shareholder litigation. By offering information earlier than revealed in financials, voluntary disclosure curtails the argument that managers did not reveal information in a timely manner, thus curbing the grounds for a lawsuit. Further, conditional on a lawsuit, voluntary disclosure about potential adverse events reduces the duration of trading at higher prices and mitigates large one-time price declines that can trigger litigation alleging material damages (Skinner 1997). Rather than reducing litigation, however, voluntary disclosure could instead exacerbate the risk

of facing a lawsuit. Specifically, disclosed information could be used by litigants as evidence of misleading behavior (Johnson, Kasznik, and Nelson 2001; Rogers and Van Burskik 2009) and increase the likelihood that a suit would be allowed to proceed (Cutler, Davis, and Peterson 2019).

The endogenous nature of disclosure and litigation inhibits the ability to make causal inferences from simple correlations (Field, Lowry, and Shu 2005). Thus, to explore the relationship, we study two settings—the SGI Ruling and UD Laws—that both exogenously altered the threat of litigation. Below, we highlight that these settings affect different *types* of shareholder litigation, which we argue causes conflicting inferences in the literature. Specifically, HLLW find that the SGI Ruling (reducing securities class action litigation risk) decreased voluntary disclosure while BLW find that the passage of UD Laws (reducing derivative litigation risk) increased voluntary disclosure.

2.2. 10b-5 securities class action lawsuits and the SGI Ruling

Rule 10b-5, formally known as the Employment of Manipulative and Deceptive Practice, is a regulation created under the Securities Exchange Act of 1934 that requires firms to provide shareholders with material information about firm activity in a timely manner. Starting with Skinner (1994), most papers examining litigation risk and the information environment focus on Rule 10b-5 because it directly links the threat of a suit with management’s disclosure incentives. Specifically, the SEC states that, under Rule 10b-5, a manager “has an obligation to make full and prompt announcements of material facts regarding the company's financial condition” and “[n]ot only must material facts affecting the company’s operations be reported; they must also be reported promptly” (Sec. Exch. Act Rel. 8995 (1970)). Moreover, “there is a duty to correct statements made in any filing ... if the statements either have become inaccurate by virtue of subsequent events, or are later discovered to have been false and misleading from the outset ...” (Sec. Act Rel.

6084, 17 SEC Dock. 1048, 1054 (1979)). If managers fail to uphold these standards, a group of shareholders can jointly file a lawsuit to recover damages (i.e., a securities class action).

The Silicon Graphics Inc. ruling on July 2, 1999 reduced the threat of this type of litigation for firms located within the jurisdiction of the U.S. Ninth Circuit Court of Appeals. Shareholders in the case alleged that management issued misleading statements to inflate Silicon Graphics' stock price while profitably selling their own shares. The Ninth Circuit Court dismissed the suit and raised pleading standards for future cases, concluding that "general allegations regarding negative internal reports and stock sales do not give rise to a strong inference of fraudulent intent..." Instead, plaintiffs must establish that alleged improper disclosure was made with "... deliberate recklessness" (183 F.3d 970). HLLW show that this procedural hurdle created by the SGI Ruling led to roughly a fifty percent decline in class action lawsuits against firms located in the Ninth Circuit relative to firms in other circuits.

2.3. Derivative lawsuits and Universal Demand Laws

In contrast to 10b-5 securities class actions, which focus narrowly on financial reporting and voluntary disclosure, derivative lawsuits address broad breaches of management's fiduciary duty, including the duty of loyalty (i.e., managers furthering their own interests at the expense of the corporation) and the duty of care (i.e., incompetence/negligence running the corporation). These allegations cover a wide range of offenses and are typically triggered by value-destroying investment decisions, mishandling of information, and other bad business practices (Ferris, Jandik, Lawless, and Makhija 2007; Lin et al. 2020).

Shareholders initiate derivative suits on behalf of the entire corporation because "officers and directors, who normally decide whether corporations should file lawsuits, are often implicated in the alleged wrongdoing and cannot be trusted to make unbiased decisions regarding the merits of

these suits” (Erickson 2009). The suits, however, cannot proceed without board approval (i.e., the demand requirement). Unsurprisingly, boards (either directly or through a special litigation committee) often deny the request and halt litigation (Swanson 1992). The futility exception shifts power back to shareholders by waiving the demand requirement if there exists reasonable doubt that the board can make an independent good faith decision on the suit. Plaintiffs frequently name directors as defendants, so the futility exception enables shareholders to circumvent the demand requirement and file a derivative lawsuit without needing board approval.

Between 1989 and 2005, 23 states eliminated the futility exception with a Universal Demand Law. As noted by the American Bar Association, the universal demand requirement imposes a significant hurdle on derivative litigation by always requiring board approval, barring irreparable harm (Jost 1994). Houston, Lin, and Xie (2018) and Appel (2019) show that this hurdle led to a roughly forty percent decline in derivative lawsuits against firms incorporated in UD states.²

We note that some similarities between derivative and class action lawsuits (for example as a means to redress improper disclosure) can render derivative lawsuits as duplicative. In 2016, for example, Twitter faced both a derivative and securities class action lawsuit alleging that its executives provided misleading disclosures to hide poor performance while selling millions of dollars of personally held stock. Underscoring the redundancy of the two types of lawsuits, attorneys for Twitter’s Board of Directors argued that “without a stay, the company would be in

² The extent to which UD laws reduce derivative litigation is subject to debate. While Houston et al. (2018) and Appel (2019) show that derivative litigation rates fall after the adoption of UD laws using litigation data collected directly from firm 10-K’s, Donelson et al. (2021) find no relation between UD laws and derivative suits using data from a third-party provider, Advisen, and a later sample period. Our analysis merely requires that managers *perceive* a reduction in litigation risk and change their behavior accordingly, regardless of realized suit frequency. A host of recent papers show that firm behavior indeed changes around the passage of UD laws, including Manchiraju, Pandey, and Subramanyam (2020) and Chen, Li, and Xu (2019) on conditional conservatism; Adhikari, Agrawal, and Sharma (2019) and Jung, Nam, Shu (2018) on insider trading; Houston, Lin, Xie (2018) on the implied cost of capital; Ni and Yin (2018) on the cost of debt; Lin, Liu, and Manso (2020) on corporate innovation; Le, Nguyen, and Sila (2020) on idiosyncratic volatility; Chu and Zhao (2021) on mergers and acquisitions; Nguyen, Phan, and Sun (2018) on cash holdings; and Nguyen, Phan, and Lee (2020) on capital structure.

the "precarious position" of having to accuse its directors of violating federal securities laws in Delaware, while at the same time defending itself against those same allegations in California.”³ Indeed, Donelson, Kettell, McInnis, and Toyne (2021) find that over 90% of financial reporting-related derivative suits involve parallel litigation from security class actions or SEC enforcement actions, and that stand-alone derivative suits primarily address non-financial reporting breaches of fiduciary duties such as improper M&A. We argue that legal differences between securities class action and derivative lawsuits, along with the fact that UD Laws do not inhibit the filing of class actions, renders prior evidence showing that UD Laws directly affect disclosure/financial reporting practices somewhat surprising. Throughout our paper, we explore an indirect mechanism behind the observed changes in the information environment based on post-UD changes in real activities.

3. Sample characteristics

3.1. Sample construction

We begin with the full set of U.S. firm-year observations with data available in the CRSP-COMPUSTAT merged database and I/B/E/S between 1987 and 2007. We exclude utilities (SIC 4900-4999), financials (SIC 6000-6999), and public administration (SIC 9000-9999) because these firms are subject to additional regulation and financial reporting requirements. These steps yield a panel of 61,857 firm-year observations from which we form our final sample for each analysis depending on data availability and empirical specification.

We construct our SGI Ruling sample following HLLW. Specifically, we restrict the sample period to fiscal years 1994-1998 and 2000-2003 and exclude firms with more than two years of missing data pre- or post-ruling. We then assign firms to “treatment” or “control” groups based on

³ See <https://fortune.com/2016/10/26/twitter-shares-lawsuit/> and <https://finance.yahoo.com/news/twitter-derivative-suit-del-stayed-080527016.html>

whether the firm is headquartered in the Ninth Circuit in 1999 and estimate the probability of treatment using pre-ruling average size, leverage, market-to-book, return on assets, stock volatility, analyst coverage, institutional ownership, and management forecast frequency.⁴ Finally, we match treated and control firms on a one-to-one basis using the nearest propensity score and allowing for replacement. This process yields a sample of 5,346 firm-year observations from 642 firms.

We construct our UD Law sample following BLW. The full sample consists of 46,369 firm-year observations from 6,215 firms with non-missing data between 1987 and 2007 – two years pre/post the adoption of the first/last UD Law. This sample period creates a symmetric panel and avoids confounding effects in the information environment prior to SFAS 95 and during the great recession.⁵ However, since voluntary disclosure data are not widely available before electronic filing became prevalent in the mid-1990s, our voluntary 8-K sample is restricted to 33,260 firm-year observations from 5,286 firms between 1995-2007 that can be linked to EDGAR using WRDS SEC Analytics Suite, and our management forecast sample is restricted to 29,599 firm-year observations from 5,017 firms between 1998-2007.

3.2. Sample description

Panel A of Table 1 displays the distribution of observations by headquarter and incorporation state for our full sample of firm-years. Twenty-three percent of observations are headquartered within the jurisdiction of the Ninth Circuit Court of Appeals (Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington) and fifteen percent are incorporated in a state that passed a UD Law.⁶ Notably, 73 percent of our sample firm-year observations are

⁴ As in HLLW, we use historical headquarter data from 10-K filings compiled by Bill McDonald (<https://sraf.nd.edu>).

⁵ Statement of Financial Accounting Standards No. 95 (SFAS 95) established a new standard for cash flow reporting that requires firms to classify receipts and payments according to operating, investing, and financing activities.

⁶ For consistency with BLW, we code Utah as a UD state starting in 1992 and Pennsylvania as a UD state starting in 1997. However, we note that PA adopted ALI Principles Sec. 7.03 (see *Cuker v. Mikalauskas*, 692 A.2d 1042), which is a less stringent provision than other states, and Utah did not fully enact a UD law until 2000 (see 1992 Ut. HB 50

headquartered and incorporated in different states and only three states in the Ninth Circuit adopted a UD Law during our sample period (Hawaii, Idaho, and Montana). This feature of the data enables us to separately estimate the effect of the SGI Ruling and UD Laws on the information environment.

Panel B reports summary statistics for our outcome variables and Appendix 1 provides variable definitions. Because First Call merged with I/B/E/S, we retrieve management forecasts from the I/B/E/S Guidance database rather than from First Call's Company Issued Guidance database as in HLLW and BLW. Nevertheless, summary statistics displayed in Panels B and C of Table 1 resemble those reported in prior studies. For example, 20 percent of firms in our SGI Ruling sample issue a management earnings per share (EPS) forecast during a given fiscal year, close to the 22 percent pre-ruling average reported by HLLW. Similarly, our UD sample's 1.08 mean value for *FreqVol8k* closely matches the 1.10 reported by BLW.

As there is no single measure that fully encapsulates the corporate information environment, we analyze a variety of proxies beyond voluntary disclosure frequency that contribute to its various aspects. Specifically, we study measures of voluntary disclosure quality, mandatory disclosure quality, and information asymmetry among analysts and in the trading environment. Collectively, these proxies capture variation in the information environment between managers and shareholders and among outside investors (Frankel and Li 2004; Beyer, Cohen, Lys, and Walther 2010).

3.3. Empirical design

To better understand how litigation risk affects corporate information environments, we study two natural experiments that produce exogenous variation in the threat of shareholder litigation.

and 2000 Ut. HB 86). In untabulated analyses, we find that our results are robust to dropping PA and UT from the sample.

First, we test for changes in the information environment around the Ninth Circuit Court of Appeals' Silicon Graphics ruling on July 2, 1999 using the matching-based difference-in-differences (DiD) specification of HLLW, which compares within-firm changes in the information environment over time between firms headquartered in the Ninth Circuit (the treatment group) and firms headquartered outside of the circuit (the control group). Specifically, we estimate the following model using ordinary least squares (OLS) regression analysis,

$$y_{ijlt} = \beta_1 \cdot SGI\ Ruling_{lt} + \alpha_i + \delta_{jt} + \varepsilon_{ijlt} \quad (1)$$

In equation (1), y_{ijlt} is the outcome of interest for firm i , operating in industry j , headquartered in state l , in year t . $SGI\ Ruling_{lt}$ is an indicator that equals one if the firm's headquarter state l is under the jurisdiction of the Ninth Circuit Court of Appeals and the time t is after the Silicon Graphics Inc. ruling of 1999. α_i denotes firm fixed effects that control for unobserved, time-invariant differences across firms and δ_{jt} denote either year fixed effects or industry-by-year fixed effects that control for unobserved, time-varying changes at the macro or two-digit SIC industry level depending on the specification. Considering the date of the SGI Ruling, the inclusion of industry-by-year fixed effects is important as they absorb time-varying factors (such as the tech bubble and Reg FD) that differentially impact certain industries and might otherwise produce spurious correlations. Thus, our most stringent specification compares within-firm changes around the SGI Ruling for a propensity-matched set of firms operating in the same industry, where some firms are headquartered in the Ninth Circuit and others are not.

Second, we test for changes in the information environment around the staggered adoption of Universal Demand Laws by twenty-three states between 1989 and 2005 using the staggered difference-in-differences specification of BLW. Specifically, we estimate the following model using OLS regression analysis,

$$y_{ijl_{st}} = \beta_1 \cdot UD_{Law_{st}} + \alpha_i + \theta_{lt} + \delta_{jt} + \varepsilon_{ijl_{st}} \quad (2)$$

In equation (2), $y_{ijl_{st}}$ is the outcome of interest for firm i , operating in industry j , headquartered in state l , incorporated in state s , in year t . $UD_{Law_{st}}$ is an indicator set to one if a Universal Demand Law is effective in incorporation state s at time t . Firm fixed effects, α_i , control for unobserved, time-invariant differences across firms; state-by-year fixed effects, $\theta_{l,t}$, account for unobserved, time-varying differences across headquarter states; and industry-by-year fixed effects, δ_{jt} , control for unobserved, time-varying differences across two-digit SIC industries. Thus, our most rigorous specification compares within-firm changes around the adoption of a UD Law for firms headquartered in the same state and operating in the same industry, where some firms are incorporated in a state that adopts UD and others are not.

We cluster standard errors in all specifications based on the treatment's unit of variation. Thus, estimations of equation (1) cluster standard errors at the headquarter state level and estimations of equation (2) cluster standard errors at the incorporation state level to account for potential cross-firm correlation within states, serial correlation, and heteroscedasticity (Petersen 2009). This technique lessens the likelihood of bias in the estimation of DiD standard errors, a concern noted by Bertrand, Duflo, and Mullainathan (2004).

4. Main results

4.1. Voluntary disclosure quantity

We begin our empirical analysis by replicating the main results of HLLW that show voluntary disclosure quantity decreases when the threat of a security class action lawsuit falls. Our OLS estimates in columns (1)-(2) of Table 2, Panel A imply that firms located in the Ninth Circuit are 4.7 to 7.8 percentage points less likely to issue a management EPS forecast after SGI Ruling,

confirming the 6.8 percentage point decline reported by HLLW. Columns (3)-(6) corroborate the decline in voluntary disclosure quantity on the intensive margin. We find that the frequency of management forecasts and voluntary 8-Ks decrease by 32.9% and 12.2% relative to their respective sample means.⁷ Together, these results affirm HLLW's finding that voluntary disclosure frequency is positively related to shareholder litigation risk and support Skinner's (1994, 1997) litigation deterrence hypothesis arguing that firms preemptively increase disclosure to deter securities class action lawsuits targeting the omission of material information. This interpretation of our empirical evidence is similar to how HLLW (p. 266-267) explain their own results as they state "...we find that the frequency and information content of voluntary 8-K filings decrease after the SGI Ruling among the treated firms compared to the control firms, which is consistent with the "litigation-detering" motives of voluntary disclosure."

The evidence in Panel B of Table 2, however, suggests that the opposite dynamic is true after UD Laws lower the threat of derivative litigation. Columns (1)-(2) imply that firms are 4.4 to 5.9 percentage points more likely to issue a management EPS forecast after a Universal Demand Law lowers the threat of derivative litigation. Moreover, columns (4) and (6) show that the frequency of management forecasts and voluntary 8-Ks increase by 33.3% and 7.6% relative to their respective sample means. These findings are similar to the increases of 23.9% and 7.2% for the same variables reported by BLW.⁸ Therefore, our results confirm BLW's finding that voluntary disclosure frequency is negatively related to shareholder litigation risk and support the liability hypothesis of Johnson et al. (2001) and Baginski, Hassell, and Kimbrough (2002) arguing that

⁷ Based on model (4) $(-0.091 / 0.277) * 100 = 7.6\%$ and model (6) $(-0.083 / 0.680) * 100 = 33.3\%$ from Table 2 Panel A in our paper.

⁸ Based on model (4) $(0.126 / 0.378) * 100 = 33.3\%$ and model (6) $(0.143 / 1.076) * 100 = 13.3\%$ from Table 2 Panel B in our paper and model (2) $(0.1433 / 0.5997) * 100 = 23.9\%$ and model (8) $(0.0792 / 1.1018) * 100 = 7.2\%$ from Table 3 in Bourveau et al. (2018).

litigation risk suppresses voluntary disclosure because inaccurate forecasts can later be used against managers in court.

4.2. Voluntary disclosure quality

Based on the post-UD increase in voluntary disclosure frequency, BLW (p.800) conclude that “[o]verall, UD laws seem to incentivize managers to share more and better quality information with shareholders rather than exercise more opportunistic disclosure behavior.” In contrast, HLW (p.259) do not weigh in on the matter and instead “focus on the intensity of earnings forecasts, which reflects the first-order decision in a firm’s disclosure policy.” Therefore, to provide a more nuanced perspective of firms’ voluntary disclosure behavior after a reduction in shareholder litigation risk, we examine changes in the accuracy of management forecasts around the SGI Ruling and adoption of UD Laws.

Table 3 reports regressions in which the dependent variable is the frequency of optimistic forecasts in columns (1)-(2), the frequency of pessimistic forecasts in (3)-(4), and management forecast error in (5)-(6). Although firms affected by the SGI Ruling reduce voluntary disclosure quantity on average, estimates in Panel A provide no evidence that the ruling altered the relative frequency of pessimistic/optimistic forecasts or the average forecast accuracy. These insignificant findings are consistent with HLLW, who comment in footnote 20 (p. 259) that they do not find any significant effect regarding the directional bias or absolute accuracy of earnings forecasts.⁹ Notably, that lack of statistical significance contrasts with the “litigation deterrence” hypothesis of Skinner (1994, 1997), which predicts that a reduction in shareholder litigation risk would lead to less frequent and less accurate disclosure, particularly for pessimistic forecasts.

⁹ HLLW do provide some evidence that forecast accuracy declines relative to control firms using a discrete measure that sorts forecasts into accuracy quintiles, but state that “these results are not robust” (pg. 259).

Columns (1)-(4) in Panel B validate BLW's finding that both optimistic and pessimistic forecast frequency increases after the adoption of a UD Law. We note, however, that given their definition of optimistic/pessimistic forecasts (those with actual earnings surprises higher than 10% and lower than -10%, respectively) the findings suggest that firms covered by UD laws issue inaccurate forecasts more frequently. We formally test this conjecture in Columns (5) and (6) of Panel B by examining the absolute difference between management forecasts and actual earnings. The tests reveal that management forecast errors increase by more than one third, on average, following the passage of UD laws. This evidence casts doubt on BLW's interpretation that the reduction in shareholder litigation risk incentivized managers to share better quality information. Rather, our results conform with the view that longer and more frequent disclosure might obfuscate, rather than improve, the information supplied to investors (e.g., Li 2008; Bloomfield 2008; Loughran and McDonald 2014).

4.3. Mandatory disclosure quality

Given the conflicting results regarding the effect of shareholder litigation risk on voluntary disclosure behavior, we next examine mandatory disclosure quality as an alternative avenue through which managers can influence the information environment (Bertomeu, Vaysman, and Xue 2021). Table 4 reports regressions in which the dependent variable is the disclosure quality measure (DQ) of Chen, Miao, and Shevlin (2015) in columns (1)-(2) and the financial statement value relevance measure (RSQ) of Francis and Schipper (1999) in columns (3)-(4).

DQ is based on the notion that more detailed information is of higher quality and is constructed by counting the number of non-missing items in annual financial statements, as captured by Compustat, and comparing this to the total number of items that the firm could have reported given

its operations.¹⁰ Thus, DQ reflects discretionary choices managers make within mandatory filings, such as shifting expenses between core accounts and special items or whether and how corporate R&D is disclosed. In our sample, the mean value of DQ is 0.62, close to the 0.58 reported by Chen et al. (2015).

RSQ is the adjusted R-squared from a firm-specific time-series regression of price on earnings and book value of equity. We follow Armstrong, Balakrishnan, and Cohen (2012) and estimate the following equation as a rolling regression from time $t-10$ to t , requiring that firms have a minimum of five annual observations.

$$P_{it} = \beta_{0i} + \beta_{1i} \cdot E_{it} + \beta_{2i} \cdot BV_{it} + \varepsilon_{it} \quad (3)$$

In equation (3), P_{it} is the price per share of firm i three months after fiscal year end t , E_{it} is the earnings per share of firm i during year t , and BV_{it} is the book value per share of firm i at the end of year t . Hence, RSQ provides a comprehensive proxy for financial statement informativeness based on the explanatory power of accounting information (Frankel and Li 2004). The mean value of RSQ in our sample is 0.42, in line with the 0.35 in Armstrong, Balakrishnan, and Cohen (2012).

Results reported in Table 4 show that the SGI Ruling and UD Laws once again produce starkly different inferences. Coefficients for the SGI Ruling indicator in Panel A have confidence intervals tightly bound around zero, failing to reject the null of no change in mandatory disclosure quality. Importantly, this null result does not support the litigation deterrence hypothesis, which predicts that a decrease in shareholder litigation risk leads to lower quality disclosure.

¹⁰ Because Compustat might code an item as missing either because the firm fails to report it or because the firm does not have operations that would produce such an item, we carefully screen the data applying the fact that balance sheet line items sum to larger accounts (see Chen et al. 2015 for details). Alternatively, an item could be missing in Compustat as a result of a coding error. However, Chen et al. (2015) argue that Compustat data are of very high quality and unlikely to be systematically biased.

Meanwhile, coefficients in Panel B suggest that UD Laws lead to a decline in both the granularity and value relevance of mandatory disclosure. According to these estimates, the average treated firm in our UD sample suppresses between 0.6% and 1.1% of their data items and the informativeness of their financial statements falls between 9.7% and 10.3% of their sample mean. Given the limited flexibility afforded by Regulation S-X, this post-UD decline in mandatory disclosure quality may heighten uncertainty and information risk borne by investors, a consequence we examine below.¹¹

4.4. Information asymmetry among market participants

So far, we have replicated and extended the analyses of HLLW and BLW on the relation between shareholder litigation risk and voluntary disclosure. Our extensions challenge their initial interpretations. The SGI Ruling led to a decline in voluntary disclosure frequency but did not affect the bias or accuracy of earnings forecasts, as would be predicted by the litigation deterrence hypothesis. Meanwhile, UD Laws led to an increase in the frequency of voluntary disclosure but a decline in the quality of both voluntary and mandatory disclosure, suggesting that managers do not share better quality information post-UD. To gain additional insight on these interpretations, and assess the implications for outside investors, we next examine whether the SGI Ruling and Universal Demand Laws altered the level of information asymmetry among analysts and in the trading environment.

Information produced by sell-side analysts both reflects and influences the corporate information environment. Notably, the precision of analysts' forecasts relies on information firms

¹¹ Other research on mandatory disclosure shows that i) the nominal value of discretionary accruals decreases post-UD (Bourveau et al. 2018) but the absolute value increases (Ni and Yin 2018), ii) conditional conservatism increases (Manchiraju, Pandey, and Subramanyam 2020) or decreases (Chen, Li, and Xu 2019) post-UD, iii) real earnings management increases after UD Laws and the SGI Ruling (Huang, Roychowdhury, and Sletten 2019), iv) restatements increase post-SGI Ruling (Hopkins 2018), and (v) non-GAAP reporting increases post-SGI Ruling (Cazier, Christensen, Merkley, and Treu 2019).

provide through voluntary and mandatory disclosures. Therefore, if disclosure quality decreases after a reduction in shareholder litigation risk, we would expect more disagreement among analysts and a decline in the accuracy of their reports. We study analyst information production with one-year-ahead annual EPS estimates in the most recent I/B/E/S forecast summary before the fiscal year end. As in Armstrong, Balakrishnan, and Cohen (2012), we define forecast dispersion as the standard deviation of these estimates, and define forecast error as the absolute difference between the mean estimate and the actual EPS reported in I/B/E/S. Like Cheong and Thomas (2011), we do not deflate dispersion or forecast error by a scale variable to ensure that our results are driven by changes in analyst disagreement and accuracy and not by changes in the scale variable.¹²

Estimates in columns (1)-(4) of Table 5, Panel A indicate that neither the dispersion nor the accuracy of analyst forecasts changes after the SGI Ruling. These non-results comport with our inability to reject the null of no change in the quality of voluntary or mandatory disclosure around the ruling, and suggest that the post-SGI Ruling drop in voluntary disclosure frequency did not meaningfully impact the overall information environment. In contrast, Panel B displays a significant negative relation between the enactment of UD legislation and proxies of information asymmetry. The increase in forecast dispersion and error reported in columns (1)-(4) are not only statistically significant but also economically important. After the adoption of a UD Law, analyst forecast dispersion and error increase by roughly 9% and 8% of a standard deviation, respectively.¹³ This evidence is consistent with the notion that curtailing derivative litigation rights leads to the deterioration of corporate information environments.

¹² The magnitudes of our analyst proxies are comparable to those reported elsewhere. For example, the median (mean) analyst forecast error in our UD sample, 0.04 (0.22), is similar to the magnitude reported at the analyst-level in Harford, Jiang, Wang, and Xie (2019) of 0.07 (0.25).

¹³ Based on model (6), $(0.031 / 0.3398) * 100 = 9.12\%$, and based on model (9), $(0.062 / 0.7433) * 100 = 8.34\%$.

Prior research finds that market liquidity improves in the presence of more corporate disclosure (Leuz and Verrecchia 2000) and lower analyst forecast dispersion (Sadka and Scherbina 2007). Thus, to the extent that altering litigation risk affects corporate disclosure quality by managers and information production by analysts, we expect changes in the trading environment (Diamond and Verrecchia 1991). Likewise, increases in information asymmetry between managers and shareholders likely exacerbate the adverse selection problem between these parties, which should manifest in a decline in market liquidity (Easley and O'Hara 2004; Beyer et al. 2010).

We evaluate our conjectures in Table 5 using bid-ask spreads in columns (5)-(6) and average daily (dollar) trading volume in columns (7)-(8) as dependent variables to track market liquidity. Once again, we find no empirical support for the conjecture that the post-SGI Ruling drop in voluntary disclosure frequency coincides with an increase in information asymmetry. Point estimates in columns (5)-(8) of Panel A are negative and have large standard errors. In contrast, the regressions in Panel B suggest that the trading environment deteriorates once UD Laws are in effect. The average treated firm exhibits a bid-ask spread increase of 4.4% based on column (6) $[(EXP(0.043) - 1) * 100 = 4.39\%]$ and a decline in its daily trading volume of US\$4.5 million according to column (8). These findings, combined with our analyst forecast results, suggest that the passage of UD Laws leads to an increase in overall levels of information asymmetry and a decrease in market liquidity.

While the post-UD increase in information asymmetry is an expected repercussion of more frequent but lower quality disclosure, the absence of a change in information asymmetry after the SGI Ruling is somewhat surprising. Intuitively, information asymmetry should increase if managers provide less disclosure, particularly if the foregone disclosures were intended to preempt litigation by keeping investors apprised of all material information. We note, however, that the

economic magnitude of the SGI Ruling-induced drop in disclosure is relatively small. According to estimates in Figure 1 of HLLW (p.260), firms headquartered in the Ninth Circuit provided roughly 2.1 forecasts per year following the ruling, compared to 2.7 forecasts provided by control firms. Our analyses suggest that the relative decline of 0.6 forecasts per year, unaccompanied by a change in disclosure quality, did not generate a meaningful enough change in the information environment to worsen information asymmetry.

5. Economic channel

Stark disparities in results across natural experiments raise important questions regarding the economic mechanism driving these outcomes. We test the hypothesis that disparities are driven by institutional differences in the *type* of litigation risk affected by the SGI Ruling and UD Laws. Specifically, we note that UD Laws inhibit derivative lawsuits, which cover a wide range of transactions that damage the corporation. Conversely, the SGI Ruling inhibits 10b-5 securities class actions, which pertain only to managers' requirement to provide shareholders with value-relevant information about firm activity. Thus, the post-UD change in the information environment may reflect benign changes in fundamental performance that were caused by the UD-induced drop in derivative litigation risk rather than by changes in managerial incentives to disclose.

5.1. The role of changing operations

In this section, we ask whether a change in real activities is the channel through which a drop in derivative litigation risk affects the information environment. This question helps ascertain the validity of UD Laws as a shock that *directly* affects corporate information environments, as questioned by Donelson, Kettell, McInnis, and Toynbee 2021. For example, Ni and Yin (2018) and Nguyen, Phan, and Lee (2020) show that firms increase risk-taking activities, such as

acquisition expenditure and R&D expense, after the passage of a UD law and it is plausible that these fundamental changes could lead to both greater disclosure quantity and information asymmetry. Indeed, Brown and Tucker (2011) show that firms are more likely to modify their disclosure behavior after large economic changes and He and Plumlee (2020) show that voluntary 8-K frequency is positively associated with R&D expense and volatility.

Based on these findings, we create an Operational Change indicator variable that is set to one if the firm exhibits an above-median increase in average R&D expense, acquisition expenditure, or cash flow volatility from the three years before to the three years after the UD adoption event. Due to the staggered nature of UD Law enactment across states, there is no clean “pre” and “post” period for treated firms. Therefore, we follow the triple-difference methodology of Gormley and Matsa (2011) and construct cohorts of treated and control firms for six years around each UD adoption event, requiring control firms to not have been previously treated by another state. We then pool the data across cohorts, and regress outcome variables on the UD Law indicator, UD Law indicator * Operational Change, firm-cohort, headquarter state-year-cohort, and industry-year-cohort fixed effects.

Table 6 displays cross-sectional variation in the effect of UD Laws on our outcome variables depending on whether a firm exhibits operational changes post-UD. Because the Operational Change indicator classifies firms as a “non-changer” or a “changer” based on the difference in their behavior pre vs. post UD adoption, the variable takes a value of zero or one for all six years within the cohort and is therefore subsumed by the firm-cohort fixed effects. Consequently, the table displays coefficients for UD Law, which switches from zero to one after a firm’s state of incorporation adopts a UD Law and captures the (stand-alone) effect of UD Laws on firms that have a below-median change in operations after the UD adoption year. Further, the interaction

term, UD Law * Operational Change, captures the incremental effect of UD Laws for firms that have an above-median change in operations after the UD adoption year. Therefore, summing up the coefficients on UD Law and UD Law * Operational Change gives the total effect of UD Laws on firms that have an above-median change in operations following the UD adoption year.

The results in Table 6 show that the post-UD increase in voluntary disclosure documented by BLW is driven by firms that experience an underlying change in operations. That is, we find that the likelihood a firm provides a management earnings forecast, the frequency of these forecasts, and the frequency of voluntary 8-Ks are all significantly higher for firms with an above-median increase in activities. According to the estimates, the frequency of management forecasts increases by approximately 29% relative to the sample mean for firms with a post-UD operational change but no significant change for firms that do not experience an operational change post-UD.¹⁴ Moreover, comparing coefficients in the bottom row of Table 6 with coefficients on UD Law, we see that the post-UD change in disclosure and information asymmetry are concentrated among firms with an above-median change in operations. Taken together, these results suggest that post-UD changes in the information environment stem from shifts in firm fundamentals and not necessarily from a direct change in managerial disclosure incentives. This economic mechanism helps reconcile conflicting findings across natural experiments as UD Laws reduce liability risk for *both* disclosure and operational choices whereas 10b-5 class action suits *only* affect the liability risk for disclosure choices.

5.2. Controlling for endogenous firm characteristics

Dechow, Ge, and Schrand (2010, p. 350) note that “disentangling the role of fundamental

¹⁴ Based on model (2), $(0.108 / 0.378) * 100 = 28.571\%$.

performance from the role of the measurement system is a challenge ... and we encourage further research to clarify the role each plays in the documented findings.” Our results suggest that the post-UD increase in voluntary disclosure frequency documented by BLW is largely driven by changes in firm operations rather than by disclosure incentives. Prior research attempts to partial out the effect of fundamental performance on disclosure outcomes by including a wide range of firm characteristics as control variables. However, Angrist and Pischke (2009) note that controlling for firm-level characteristics is undesirable in a DiD estimation strategy because these variables might be affected by the policy under study and bias the estimated coefficients. This “bad control” bias is of particular concern in the UD setting because Ni and Yin (2018) and Nguyen, Phan, and Lee (2020), among others, show that UD laws lead to changes in firm fundamentals. Therefore, as advised by Gormley and Matsa (2014), we estimate our baseline models using different combinations of firm, year, state-year, and industry-year fixed effects.

To assess whether controlling for potentially endogenous firm characteristics is a viable strategy to partial out the effect of fundamental performance, we repeat all baseline regression analyses including the control variables used in HLLW and BLW. If controlling for firm characteristics eliminates the influence of changing firm operations, we expect to see no differences between our baseline estimates and these new coefficients for the SGI Ruling indicator, but attenuation of the coefficients for the UD Law indicator. The results in Table 7 show that the inclusion of control variables does not alter any coefficients in the Ninth Circuit analyses and only affects inferences for two of our twelve UD analyses, as the *p*-values for management forecast error and bid-ask spread rise above the 10 percent threshold. Moreover, the magnitude of the post-UD increase in voluntary disclosure frequency appears to be larger when including controls, though not enough to be considered significantly different. Collectively, these results highlight

that controlling for firm characteristics does not sufficiently disentangle the role of fundamental performance from the role of disclosure incentives.

6. Conclusion

We confirm that voluntary disclosure frequency *decreases* after the Silicon Graphics Inc. ruling exogenously lowered the threat of shareholder litigation through securities class actions. Although the decline in disclosure quantity supports the “litigation deterrence” hypothesis of Skinner (1994), we find no evidence of changes in disclosure quality or of distortions in the level of information asymmetry among investors. Consequently, it is uncertain the degree to which the post-SGI decline in voluntary disclosure frequency impacts investor welfare.

Conversely, while we verify that voluntary disclosure frequency *increases* after UD Laws exogenously lowered the threat of shareholder litigation through derivative lawsuits, our additional analyses indicate that the increase in disclosure frequency is accompanied by a *decrease* in the quality of both voluntary and mandatory disclosure. Further, treated firms experience an increase in information asymmetry. As a result, the totality of our findings does not support the notion that UD Laws incentivize managers to provide more and better-quality information.

To reconcile the differential impacts that the SGI Ruling and UD Laws have on firm disclosure, we note that these events alter different types of shareholder litigation risk. In 10b-5 securities class action lawsuits (affected by the SGI Ruling), shareholders sue the firm on behalf of themselves, alleging harm from misleading or omitted material information. Conversely, in derivative lawsuits (affected by UD Laws), shareholders sue managers on behalf of the firm, alleging that managers engaged in a bad business practice that harmed the entire corporation. Considering that firms’ real operations affect disclosure, the UD Law setting creates an endogeneity challenge of its own.

In light of these differences, we study the channel through which UD Laws affect corporate information environments and find that observed changes in voluntary disclosure frequency are driven by UD-induced changes in firm operations. This new evidence contributes to the literature that uses UD Laws as a shock to shareholder litigation risk by identifying an indirect mechanism through which the laws affect the information environment. This evidence also helps reconcile contrasting results across different dimensions of the information environment (e.g., the quantity and quality of disclosure) affected by UD Laws as well as contrasting results across papers that use different natural experiments to study the relation between litigation risk and disclosure.

In addition, our results highlighting the indirect channel through which UD Laws affect the information environment have important implications for the interpretation of other research that studies exogenous shocks and uncovers changes in the information environment in the presence of various monitors/provisions (e.g., institutional owners, analysts, independent boards, antitakeover defenses, etc.). Our findings warn that observed changes in the information environment may indirectly be driven by the effect of these various items on firm fundamentals rather than by a direct change in managerial disclosure incentives.

Finally, our contributions to the literature on disclosure and shareholder litigation would not have been possible without reproducing key results in prior articles. Therefore, we hope that our work motivates others to pursue worthwhile replications that might be necessary to advance our knowledge in topics of great importance to finance and accounting researchers as well as policymakers.

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Table 1: Sample description. This table describes the samples used to analyze changes in the information environment around the Silicon Graphics Inc. (SGI) ruling (183 F.3d 970) by the Ninth Circuit Court of Appeals in 1999, which lowered the threat of a securities class action lawsuit for firms located in the circuit, and the staggered adoption of universal demand (UD) laws by twenty-three states between 1989 and 2005, which lowered the threat of a derivative lawsuit for firms incorporated in the states. Panel A displays the distribution of observations by headquarter and incorporation state for the full sample of 46,369 firm-year observations from 6,215 firms between 1987 and 2007 with data available in the CRSP-COMPUSTAT merged database and I/B/E/S. We exclude utilities (SIC 4900-4999), financials (SIC 6000-6999) and public administration firms (SIC 9000-9999). Grey bars highlight the nine states located in the Ninth Circuit. Panels B and C report summary statistics for our SGI Ruling and UD Law analyses, respectively. Sample sizes vary across outcome variables depending on data availability and empirical specification. Variables are winsorized at the 1/99 percent tails. Appendix 1 provides variable definitions.

Panel A: Distribution

State	UD Law Adopted	HQ State Firm-years	Incorp. State Firm-years	State	UD Law Adopted	HQ State Firm-years	Incorp. State Firm-years
AK		12	6	MT	1992	27	11
AL		262	53	NC	1995	1,016	409
AR		285	34	ND		6	2
AZ	1996	716	62	NE	1996	167	56
CA		8,000	1,047	NH	1993	204	2
CO		1,073	155	NJ		1,671	509
CT	1997	1,033	141	NM		25	5
DC		77	13	NV		359	739
DE		144	30,145	NY		2,789	1,143
FL	1990	1,577	749	OH		1,861	1,170
GA	1989	1,482	691	OK		290	72
HI	2001	24	12	OR		534	395
IA	2003	250	127	PA	1997	2,019	956
ID	1998	123	3	RI	2005	141	38
IL		2,396	108	SC		234	93
IN		501	506	SD	2005	55	20
KS		236	78	TN		905	415
KY		282	94	TX	1997	4,857	720
LA		299	137	UT	1992	301	154
MA	2004	2,654	987	VA	1992	1,370	657
MD		677	461	VT		18	13
ME	1997	22	21	WA		901	611
MI	1989	1,058	476	WI	1991	830	571
MN		1,535	1,148	WV		19	0
MO		929	296	WY	1997	0	19
MS	1993	123	39	Total		46,369	46,369

Panel B: Summary statistics for analysis of SGI Ruling

	Mean	S.D.	P25	Median	P75	Obs
Voluntary Disclosure Quantity						
<i>Disclosure</i>	0.1951	0.3963	0.0000	0.0000	0.0000	5,346
<i>FreqMF</i>	0.2769	0.6317	0.0000	0.0000	0.0000	5,346
<i>FreqVol8k</i>	0.6804	0.8367	0.0000	0.0000	1.3863	5,346
Voluntary Disclosure Quality						
<i>FreqMF Optimistic</i>	0.0880	0.3247	0.0000	0.0000	0.0000	5,346
<i>FreqMF Pessimistic</i>	0.1040	0.3498	0.0000	0.0000	0.0000	5,346
<i>MF Error</i>	0.1118	0.2224	0.0102	0.0325	0.1000	904
Mandatory Disclosure Quality						
<i>DQ</i>	0.6192	0.0742	0.5740	0.6202	0.6726	4,382
<i>RSQ</i>	0.4211	0.3905	0.1236	0.4749	0.7639	4,382
Information Asymmetry						
<i>AF Dispersion</i>	0.0747	0.2392	0.0100	0.0200	0.0500	4,658
<i>AF Error</i>	0.1352	0.4564	0.0100	0.0300	0.0800	4,658
<i>Bid-Ask Spread</i>	0.0169	0.0145	0.0064	0.0133	0.0231	4,658
<i>Dollar Volume (US\$M)</i>	28.9594	83.0000	1.1602	4.4121	17.2900	4,658

Panel C: Summary statistics for analysis of UD Laws

	Mean	S.D.	P25	Median	P75	Obs
Voluntary Disclosure Quantity						
<i>Disclosure</i>	0.2612	0.4393	0.0000	0.0000	1.0000	29,599
<i>FreqMF</i>	0.3782	0.7107	0.0000	0.0000	0.6931	29,599
<i>FreqVol8k</i>	1.0758	0.8929	0.0000	1.0986	1.7918	33,260
Voluntary Disclosure Quality						
<i>FreqMF Optimistic</i>	0.1224	0.3739	0.0000	0.0000	0.0000	29,599
<i>FreqMF Pessimistic</i>	0.1306	0.3845	0.0000	0.0000	0.0000	29,599
<i>MF Error</i>	0.1512	0.3960	0.0150	0.0369	0.1050	6,727
Mandatory Disclosure Quality						
<i>DQ</i>	0.6228	0.0993	0.5609	0.6090	0.6847	41,773
<i>RSQ</i>	0.4261	0.3883	0.1353	0.4845	0.7624	41,773
Information Asymmetry						
<i>AF Dispersion</i>	0.1077	0.3513	0.0100	0.0200	0.0700	46,369
<i>AF Error</i>	0.2255	0.7943	0.0100	0.0400	0.1200	46,369
<i>Bid-Ask Spread</i>	0.0198	0.0176	0.0058	0.0163	0.0279	46,369
<i>Dollar Volume (US\$M)</i>	13.2461	34.7317	0.5599	2.1172	8.6237	46,369

Table 2: Voluntary disclosure quantity. This table displays ordinary least squares (OLS) estimates of the change in voluntary disclosure frequency around two natural experiments that lowered the threat of shareholder litigation. Panel A reports the estimated impact of the SGI Ruling using the matching-based difference-in-differences specification of Houston, Lin, Liu, and Wei (2019). Panel B reports the estimated impact of UD laws using the staggered difference-in-differences specification of Bourveau, Lou, and Wang (2018). Heteroskedasticity-consistent standard errors, reported in parentheses, are clustered by headquarter state in Panel A and incorporation state in Panel B. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Lower threat of securities class action lawsuit

	<i>Disclosure</i>		<i>FreqMF</i>		<i>FreqVol8k</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
SGI Ruling	-0.047** (0.023)	-0.078*** (0.024)	-0.069* (0.041)	-0.091** (0.043)	-0.077* (0.046)	-0.083* (0.049)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes
Observations	5,346	5,346	5,346	5,346	5,346	5,346
Adjusted R-squared	0.407	0.414	0.428	0.453	0.556	0.560

Panel B: Lower threat of derivative lawsuit

	<i>Disclosure</i>		<i>FreqMF</i>		<i>FreqVol8k</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	0.059*** (0.008)	0.044*** (0.010)	0.149*** (0.016)	0.126*** (0.015)	0.118*** (0.042)	0.143*** (0.036)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes
Observations	29,599	29,599	29,599	29,599	33,260	33,260
Adjusted R-squared	0.523	0.530	0.564	0.576	0.491	0.505

Table 3: Voluntary disclosure quality. This table displays OLS estimates of the change in voluntary disclosure accuracy around two natural experiments that lowered the threat of shareholder litigation. Panel A reports the estimated impact of the SGI Ruling using the matching-based difference-in-differences specification of Houston, Lin, Liu, and Wei (2019). Panel B reports the estimated impact of UD laws using the staggered difference-in-differences specification of Bourveau, Lou, and Wang (2018). Heteroskedasticity-consistent standard errors, reported in parentheses, are clustered by headquarter state in Panel A and incorporation state in Panel B. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Lower threat of securities class action lawsuit

	<i>FreqMF Optimistic</i>		<i>FreqMF Pessimistic</i>		<i>MF Error</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
SGI Ruling	-0.017 (0.019)	-0.017 (0.022)	0.017 (0.023)	-0.005 (0.021)	0.002 (0.048)	0.009 (0.051)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes
Observations	5,346	5,346	5,346	5,346	904	904
Adjusted R-squared	0.189	0.202	0.274	0.298	0.143	0.190

Panel B: Lower threat of derivative lawsuit

	<i>FreqMF Optimistic</i>		<i>FreqMF Pessimistic</i>		<i>MF Error</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	0.036*** (0.010)	0.023* (0.013)	0.059*** (0.007)	0.055*** (0.008)	0.046*** (0.002)	0.062*** (0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes
Observations	29,599	29,599	29,599	29,599	6,727	6,727
Adjusted R-squared	0.220	0.230	0.324	0.331	0.347	0.388

Table 4: Mandatory disclosure quality. This table displays OLS estimates of the change in mandatory disclosure quality around two natural experiments that lowered the threat of shareholder litigation. Panel A reports the estimated impact of the SGI Ruling using the matching-based difference-in-differences specification of Houston, Lin, Liu, and Wei (2019). Panel B reports the estimated impact of UD laws using the staggered difference-in-differences specification of Bourveau, Lou, and Wang (2018). Heteroskedasticity-consistent standard errors, reported in parentheses, are clustered by headquarter state in Panel A and incorporation state in Panel B. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Lower threat of securities class action lawsuit

	<i>DQ</i>		<i>RSQ</i>	
	(1)	(2)	(3)	(4)
SGI Ruling	-0.003 (0.006)	-0.003 (0.006)	0.006 (0.033)	-0.011 (0.034)
Firm FE	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes
Observations	4,382	4,382	4,382	4,382
Adjusted R-squared	0.825	0.833	0.540	0.545

Panel B: Lower threat of derivative lawsuit

	<i>DQ</i>		<i>RSQ</i>	
	(1)	(2)	(3)	(4)
UD Law	-0.011** (0.005)	-0.006* (0.004)	-0.044*** (0.013)	-0.041*** (0.014)
Firm FE	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes
Observations	41,773	41,773	41,773	41,773
Adjusted R-squared	0.771	0.786	0.478	0.498

Table 5: Information asymmetry. This table displays OLS estimates of the change in information asymmetry around two natural experiments that lowered the threat of shareholder litigation. Panel A reports the estimated impact of the SGI Ruling using the matching-based difference-in-differences specification of Houston, Lin, Liu, and Wei (2019). Panel B reports the estimated impact of UD laws using the staggered difference-in-differences specification of Bourveau, Lou, and Wang (2018). Heteroskedasticity-consistent standard errors, reported in parentheses, are clustered by headquarter state in Panel A and incorporation state in Panel B. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Lower threat of securities class action lawsuit

	<i>AF Dispersion</i>		<i>AF Error</i>		<i>Bid-Ask Spread</i>		<i>Dollar Volume</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SGI Ruling	0.005 (0.007)	-0.000 (0.006)	0.018 (0.016)	-0.002 (0.018)	-0.001 (0.002)	-0.000 (0.001)	13.503 (9.520)	10.981 (6.654)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4,658	4,658	4,658	4,658	4,658	4,658	4,658	4,658
Adjusted R-squared	0.695	0.686	0.629	0.629	0.499	0.549	0.623	0.625

Panel B: Lower threat of derivative lawsuit

	<i>AF Dispersion</i>		<i>AF Error</i>		<i>Bid-Ask Spread</i>		<i>Dollar Volume</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
UD Law	0.033*** (0.007)	0.032*** (0.006)	0.060*** (0.013)	0.060*** (0.015)	0.055*** (0.018)	0.043** (0.017)	-5.636** (2.719)	-4.507** (2.234)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	46,369	46,369	46,369	46,369	46,369	46,369	46,369	46,369
Adjusted R-squared	0.699	0.704	0.592	0.603	0.845	0.854	0.583	0.619

Table 6: The role of changing operations. This table displays cross-sectional variation in the effect of UD laws on the information environment depending on whether the firm made operational changes post-UD. Following the triple-difference methodology of Gormley and Matsa (2011), we construct cohorts of treated and control firms for six years around each UD adoption event, requiring control firms to not have been previously treated by another state. We then construct proxies for operational changes, pool the data across cohorts, and regress outcome variables on the UD indicator, operational change interaction term, firm-cohort, headquarter state-year-cohort, and industry-year-cohort fixed effects. Operational Change equals one if the firm had an above-median increase in average R&D Expense, Acquisition Expenditure, or Cash Flow Volatility from the three years before to the three years after the UD adoption event. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

	<i>Disclosure</i>	<i>FreqMF</i>	<i>FreqVol8k</i>	<i>FreqMF</i> <i>Optimistic</i>	<i>FreqMF</i> <i>Pessimistic</i>	<i>MF</i> <i>Error</i>
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law x Operational Change	0.033*** (0.008)	0.096*** (0.014)	0.239*** (0.083)	-0.023 (0.018)	0.126*** (0.013)	0.086*** (0.025)
UD Law	-0.013 (0.008)	0.012 (0.016)	0.032 (0.077)	0.065*** (0.007)	-0.049*** (0.009)	-0.016 (0.018)
Firm-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100,720	100,720	116,423	100,720	100,720	20,751
Adjusted R-squared	0.561	0.635	0.556	0.249	0.374	0.373
Total Effect on Op. Changers	0.021** (0.009)	0.108*** (0.016)	0.271*** (0.056)	0.042** (0.019)	0.077*** (0.010)	0.070*** (0.014)

	<i>DQ</i>	<i>RSQ</i>	<i>AF</i> <i>Dispersion</i>	<i>AF</i> <i>Error</i>	<i>Bid-Ask</i> <i>Spread</i>	<i>Dollar</i> <i>Volume</i>
	(7)	(8)	(9)	(10)	(11)	(12)
UD Law x Operational Change	0.016 (0.012)	-0.046* (0.024)	0.006 (0.008)	-0.014 (0.018)	0.046** (0.017)	-2.593* (1.421)
UD Law	-0.021** (0.009)	0.020 (0.021)	0.016 (0.010)	0.050** (0.020)	-0.027 (0.024)	0.131 (0.375)
Firm-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	164,858	164,858	184,983	184,983	184,983	184,983
Adjusted R-squared	0.818	0.665	0.727	0.634	0.886	0.790
Total Effect on Op. Changers	-0.006 (0.006)	-0.026** (0.013)	0.022*** (0.007)	0.036* (0.018)	0.018 (0.017)	-2.462* (1.491)

Table 7: Controlling for endogenous firm characteristics. This table displays OLS estimates of the change in the information environment around two natural experiments that lowered the threat of shareholder litigation. Panel A reports the estimated impact of the SGI Ruling using the matching-based difference-in-differences specification and control variables in Table 4, Column (2) of Houston, Lin, Liu, and Wei (2019). Panel B reports the estimated impact of UD laws using the staggered difference-in-differences specification and control variables in Table 3, Column (3) of Bourveau, Lou, and Wang (2018). Heteroskedasticity-consistent standard errors, reported in parentheses, are clustered by headquarter state in Panel A and incorporation state in Panel B. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Lower threat of securities class action lawsuit

	<i>Disclosure</i>	<i>FreqMF</i>	<i>FreqVol8k</i>	<i>FreqMF</i> <i>Optimistic</i>	<i>FreqMF</i> <i>Pessimistic</i>	<i>MF</i> <i>Error</i>
	(1)	(2)	(3)	(4)	(5)	(6)
SGI Ruling	-0.078*** (0.024)	-0.093** (0.043)	-0.108** (0.047)	-0.016 (0.022)	-0.004 (0.021)	-0.017 (0.051)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,346	5,346	5,346	5,346	5,346	904
Adjusted R-squared	0.420	0.460	0.575	0.209	0.301	0.215

	<i>DQ</i>	<i>RSQ</i>	<i>AF</i> <i>Dispersion</i>	<i>AF</i> <i>Error</i>	<i>Bid-Ask</i> <i>Spread</i>	<i>Dollar</i> <i>Volume</i>
	(7)	(8)	(9)	(10)	(11)	(12)
SGI Ruling	-0.004 (0.006)	-0.018 (0.032)	-0.005 (0.006)	-0.010 (0.016)	0.000 (0.001)	3.424 (4.155)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,382	4,382	4,658	4,658	4,658	4,658
Adjusted R-squared	0.835	0.557	0.695	0.643	0.670	0.703

Table 7: Controlling for endogenous firm characteristics (Cont.)

Panel B: Lower threat of derivative lawsuit

	<i>Disclosure</i>	<i>FreqMF</i>	<i>FreqVol8k</i>	<i>FreqMF</i> <i>Optimistic</i>	<i>FreqMF</i> <i>Pessimistic</i>	<i>MF</i> <i>Error</i>
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	0.055*** (0.013)	0.155*** (0.022)	0.201*** (0.043)	0.044*** (0.015)	0.069*** (0.007)	0.011 (0.022)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,937	24,937	27,870	24,937	24,937	5,828
Adjusted R-squared	0.582	0.629	0.514	0.270	0.369	0.390

	<i>DQ</i>	<i>RSQ</i>	<i>AF</i> <i>Dispersion</i>	<i>AF</i> <i>Error</i>	<i>Bid-Ask</i> <i>Spread</i>	<i>Dollar</i> <i>Volume</i>
	(7)	(8)	(9)	(10)	(11)	(12)
UD Law	-0.006* (0.004)	-0.035** (0.014)	0.032*** (0.004)	0.049*** (0.017)	0.021 (0.016)	-5.620** (2.665)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter state-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,427	41,427	36,473	36,473	36,473	36,473
Adjusted R-squared	0.786	0.508	0.716	0.628	0.899	0.688

Appendix 1: Variable definitions. The following table lists variable definitions and data sources. Compustat denotes Compustat’s North America Fundamentals Annual File. CRSP denotes CRSP’s Daily Stock File. TFN denotes Thomson Reuters’ Institutional Managers (13f) Holdings S34 File. I/B/E/S denotes I/B/E/S’ Summary History with Actuals File and Guidance – Detail File. ISS denotes ISS’ (formerly RiskMetrics) Directors Legacy Data and Governance Legacy Data.

<i>Variable</i>	<i>Source</i>	<i>Description</i>
SGI Ruling	Houston, Lin, Liu, and Wei (2019)	Indicator that equals one if the firm is headquartered within the jurisdiction of the Ninth Circuit Court of Appeals and the year is after the Silicon Graphics Inc. (SGI) ruling (183 F.3d 970) of 1999. The SGI Ruling increased pleading standards for securities class action lawsuits by requiring plaintiffs to establish that the alleged misleading statements were “deliberately recklessness”
UD Law	Bourveau, Lou, and Wang (2018)	Indicator that equals one if the firm is incorporated in a state that passed a universal demand (UD) law. UD laws establish a procedure hurdle that requires shareholders to obtain board approval before initiating a derivative lawsuit
Disclosure	I/B/E/S	Indicator that equals one if the firm issues a management earnings per share (EPS) forecast during the fiscal year
FreqMF	I/B/E/S	Natural logarithm of one plus the number of management EPS forecasts issued during the fiscal year
FreqVol8k	WRDS SEC Analytics	Natural logarithm of one plus the number of voluntary 8-Ks filed during the fiscal year
FreqMF Optimistic (Pessimistic)	I/B/E/S	Natural logarithm of one plus the number of optimistic (pessimistic) management EPS forecasts issued during the fiscal year. Following Bourveau, Lou, and Wang (2018), we define an optimistic (pessimistic) forecast as a forecast with actual earnings surprise greater than 10% (lower than -10%). Actual earnings surprise is the difference between the management forecast and the actual earnings, scaled by the absolute value of actual earnings
MF Error	I/B/E/S	The absolute difference between the last management EPS forecast before the forecast period end and the actual EPS reported in I/B/E/S, averaged over the fiscal year. We use the midpoint of the upper and lower estimates if a guidance range is given
DQ	Compustat	The value-weighted ratio of non-missing to total Compustat line items, calculated following Chen, Miao, and Shevlin (2015)
RSQ	Compustat + CRSP	The adjusted R-squared from a firm-specific time-series regression of price on earnings and book value of equity. We estimate $P_{i,t} = \beta_{0i} + \beta_{1i}E_{i,t} + \beta_{2i}BV_{i,t} + \varepsilon_{i,t}$ as a rolling regression from time $t-10$ to t , requiring firms to have at least five observations. $P_{i,t}$ is the price per share of firm i three months after fiscal year end t , $E_{i,t}$ is the earnings per share of firm i during year t , and $BV_{i,t}$ is the book value per share of firm i at the end of year t .
AF Dispersion	I/B/E/S	The standard deviation of annual EPS estimates in the last I/B/E/S analyst forecast summary before the fiscal year end
AF Error	I/B/E/S	The absolute difference between the mean annual EPS estimate in the last analyst forecast summary before the fiscal year end and the actual EPS reported in I/B/E/S
Bid-Ask Spread	CRSP	The daily closing ask price minus the closing bid price divided by the midpoint of the closing ask and bid prices in CRSP, averaged over the fiscal year
Dollar Volume (US\$M)	CRSP	Daily trading volume multiplied by the closing price, averaged over the fiscal year, reported in millions of U.S. dollars

Appendix 1: Variable definitions (Cont.)

<i>Variable</i>	<i>Source</i>	<i>Description</i>
Operational Change	Compustat + CRSP	Indicator that equals one if the firm had an above-median increase in average R&D Expense (xrd/at), Acquisition Expenditure (aqc/at), or Cash Flow Volatility (standard deviation of the ratio of operating income before depreciation to assets (oibdp/at) from year t to t-4) from the three years before to the three years after the UD adoption event