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Does Shareholder Litigation Affect the Corporate Information Environment?

By *Nhan Le, Duc Duy Nguyen, Vathunyoo Sila*

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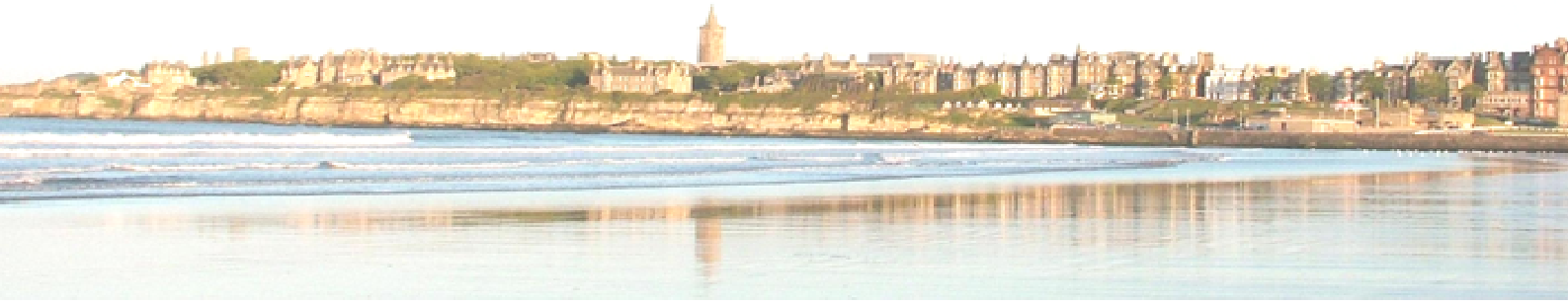

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ABSTRACT

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JEL classifications: D82, G30, K22

Keywords: shareholder litigation, universal demand laws, information environment, agency theory, managerial discretion

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1. Introduction

Shareholder litigation is an important governance mechanism to discipline managers and mitigate agency problems in corporations (La Porta et al., 1998; Becht et al., 2003; Cheng et al,, 2010). However, threats of litigation may deter firms from experimenting with new ideas and investing in value-maximizing projects (Romano, 1991; Johnson et al., 2000). Given this trade-off, the net economic effects of shareholder litigation remain an open empirical question. In this paper, we uncover new evidence of the effect of the removal of shareholder litigation rights on firms' information environments and evaluate the economic implications of such an effect.

To examine the causal effect of litigation risk on the information environment, we examine how the staggered adoption of universal demand (UD) laws affects firms' stock price informativeness. Enacted across 23 U.S. states between 1989 and 2005, the main goal of UD laws is to raise the procedural hurdle faced by shareholders in initiating lawsuits against managers or directors. Following the passage of UD laws, shareholders are required to seek approval from the board of directors, who in most cases are among the defendants in the lawsuit, before they can initiate such actions. Consequently, the passage of UD laws results in an up to 40% reduction in derivative litigation among affected firms (Appel, 2019).

We find that firms' information environments deteriorate after UD laws are passed. Specifically, the enactment of UD laws is associated with a 7.5% reduction in idiosyncratic volatility, a commonly employed proxy for the information asymmetry between a firm and outsiders (e.g., Bennett et al., 2020). Since our regression specifications include firm, industry-year, and headquarter-state-year fixed effects, we can compare the average change in the same treatment firms before and after the passage of UD laws while controlling for the time-varying

conditions in the state and industry.[1] The effect is economically substantial. As a comparison, a twofold increase in the market-to-book ratio is associated with only a 1.4% increase in idiosyncratic volatility.

An important debate in the literature is whether idiosyncratic volatility captures a firm's information contents or in fact reflects a firm's liquidity risk (e.g., Morck et al., 2000; Ang et al., 2009; Han and Lesmond, 2011). In particular, Han and Lesmond (2011) argue that stock liquidity could bias the estimates of idiosyncratic volatility because bid–ask bounce can bias daily returns and zero returns can affect return and systematic risk estimations (e.g., Blume and Stambaugh, 1983; Lesmond et al., 1999). To alleviate the concern that our results could be due to the effect of liquidity, we include three different proxies for liquidity in all our idiosyncratic volatility regressions: stock turnover, bid–ask spread, and the percentage of zero return. We find that our results are robust to an alternative measure of idiosyncratic volatility, which is estimated using quote-midpoint-price returns instead of CRSP closing returns. This directly accounts for the bid–ask bounce effect on the variance of returns and thus, minimizes liquidity biases. Finally, following Han and Lesmond (2011) and Han et al. (2015), we purge the effect of liquidity from our estimated idiosyncratic volatility by including higher order terms that capture the non-linear effects of the zero-return and the bid–ask spread. Our results remain robust in all specifications.

We then explore three non-mutually exclusive channels through which corporate information environments can deteriorate: (1) an increase in earnings opacity; (2) a reduction in voluntary disclosures; and (3) changes in corporate investment. Overall, our results point away

[1] Our tests show that that impact of UD laws on idiosyncratic volatility occurs only after the regulation takes effect, ruling out the possibility that our results are due to any pre-existing trend differences between the treatment and control states (Bertrand and Mullainathan, 2003; Roberts and Whited, 2012).

from the first two channels and suggest that the deterioration in the information environment is largely due to changes in corporate investment after states enact UD laws.

In the first channel—an increase in earnings opacity—the deterioration in corporate information environments after the enactment of UD laws is posited to be a result of managers becoming more entrenched (Appel, 2019), and consequently, they become more likely to obfuscate high-quality earnings information from investors (Bertrand and Mullainathan, 2003; Ferreira and Laux, 2007).[2] This could make a firm's earnings less informative and its stock prices less comprehensible to investors.

Our evidence collectively points away from this channel. First, we do not find any evidence that firms manage their accruals or real earnings after the passage of UD laws. Second, we find that the effect of UD laws on idiosyncratic volatility is stronger among firms with better governance quality (i.e., those with a higher proportion of independent directors) and fewer governance provisions considered to be hostile to minority shareholders. Furthermore, we do not find UD laws to be associated with an increase in stock price crashes, which is an eventual manifestation of bad news accumulation (Jin and Myers, 2006). Overall, there is little evidence to suggest that the deteriorating corporate information environment following the passage of UD laws is driven by heightened agency costs.

Similarly, we do not find support for the second channel—reduction in voluntary disclosures—where it is conjectured that a reduced threat of litigation lowers a firm's incentive to voluntarily disclose its private information.[3] On the contrary, we find that firms affected by UD

[2] Managers could, for instance, manage earnings upwards to hide the company's declining performance from investors for private gain (e.g., Burgstahler and Dichev, 1997; Healy and Whalen, 1999; Graham et al., 2005). Consistent with this, Gul et al. (2011) and Sila et al. (2017) show that the agency conflicts within the firm could contribute to making it more opaque.

[3] Consistent with this, studies find that disclosures of firm-specific information can deter certain types of litigation (Skinner, 1997) and, conditional on being litigated, are associated with smaller settlement amounts.

laws increase the frequency of voluntary disclosures by 11.2% and improve the readability of these disclosures by 17%. Firms can be more willing to disclose post UD as they are less concerned that the disclosed information will be used for litigation (Johnson et al., 2000). In summary, we find little evidence that firms become more opaque after the passage of UD laws because they obfuscate or withhold firm-specific information.

Our results provide support for the third channel: changes in corporate investment. According to this channel, the reduced threat of litigation may lead firms to change their investment behavior such that the firm becomes more opaque to outside investors. Corresponding to this view, the passage of UD laws relieves managers of litigation pressure and thereby allows them to invest in long-term projects that are potentially more difficult to value (Manso, 2011; Tian and Wang, 2014).[4] While these investments are potentially value maximizing, they may not be easily comprehended by outsiders and consequently widen the information gaps between firms and investors (Myers and Majluf, 1984; Edmans, 2009).

Consistent with this explanation, we find that UD laws result in a 10.6% increase in research and development (R&D) expenditures.[5] As R&D expenditures are often unique to each firm, it is difficult to evaluate them and they can contribute to increasing the information asymmetry between firms and investors (Aboody and Lev, 2002). In line with this interpretation, we also find that firms experiencing the sharpest reduction in idiosyncratic volatility after the passage of UD laws are smaller firms, firms with high R&D expenditures, low asset tangibility,

[4] Although the business judgment rule protects managers from litigation pertaining to ordinary business decisions, shareholders may claim that managers did not properly disclose all the risks associated with the projects. Additionally, project failures may upset shareholders and give rise to unrelated litigation. Importantly, even when the litigation suit is frivolous, managers can still suffer from reputation costs as well as the opportunity cost of managerial time (e.g., Katz, 1990; Ferris et al., 2007; Brochet and Srinivasan, 2014; Donelson and Yust, 2014).

[5] Interestingly, UD laws are not associated with changes in other investment categories, such as acquisition or sales of property, plant, and equipment. The increase in R&D expenditures alone explains the aggregate increase in total investment expenditures by affected firms post UD.

high market-to-book ratio, low capital expenditures, or firms belonging to industries with high cash flow volatility.[6] These firms are likely to benefit the most from the passage of UD laws as a lower litigation risk would allow them to pursue more intangible investments that are likely to bear fruit in the long run. Finally, we find that UD laws are associated with a significant increase in firms' investment sensitivity to stock prices (Chen et al., 2007; Foucault and Gehrig, 2008), suggesting that firms can better invest in response to the market's evaluation of their growth opportunities. In summary, our results indicate that the reduction in firm opacity is unlikely to be driven by heightened agency costs; rather, it is due to firms making value-maximizing investments that are more difficult for outsiders to evaluate.

This paper joins a recent and growing body of work documenting the causal effect of litigation risk on the firm's information environment. By exploiting the staggered adoption of UD laws, we are able to rule out several endogenous explanations pertaining to our results and estimate a causal effect of litigation risk on the firm's information environment. Our results are consistent with those of Akyol et al. (2016), who show that a lack of monitoring by shareholders does not necessarily lead to value-destroying investment decisions. In another study, Bourveau et al. (2018) find that corporate disclosures significantly increase in states that adopt UD laws. Our findings imply that such enhanced disclosures are not sufficient to offset the opacity created from the increase in R&D investments post UD, resulting in a *net* deteriorating effect on corporate information environments after the implementation of UD laws.

Consistent with our paper, Boone et al. (2019) find that firms become more opaque after the passage of UD laws. They conclude that the removal of shareholder litigation rights aggravates agency problems and destroys firm value. While we find similar evidence that UD law adoptions

[6] Firms in industries with higher levels of cash flow volatility are more likely to experience performance fluctuations (Lin et al., 2020) and are thus more exposed to litigation risk.

cause firms to become more opaque, our analyses of the economic channels suggest that this deterioration in the information environment is not driven by heightened agency costs and does not appear to harm shareholder wealth. In contrast, we find that the effect is largely driven by changes in the way firms make long-term investments, consistent with the results reported in Lin et al. (2020). Our results thus offer novel insights into the net economic benefits of shareholder litigation and make an important general contribution to this literature (e.g., Arena and Julio, 2015; Appel, 2019; Houston et al., 2019; Lin et al., 2020).

We also contribute to work on the information content of stock prices. Studies find that idiosyncratic volatility is linked to the quality of board monitoring (Armstrong et al., 2014), stock ownership (Ben-Nasr and Cosset, 2014), press freedom (Kim et al., 2014), corporate disclosures (Bushman et al., 2004; Rajgopal and Venkatachalam, 2011; Grewal et al., 2017), cross-listings (Fernandes and Ferreira, 2009), and analyst coverage (Chan and Hameed, 2006). Our paper offers novel evidence that an exogenous reduction in outside monitoring reduces the information content of stock prices. Importantly, our findings do not suggest that this leads to value-destroying firm outcomes.

Finally, our findings are distinct from a strand of literature that studies managers' ability to extract information from their firm's stock price to make investment decisions (e.g., Chen et al., 2007; Foucault and Gehrig, 2008). For instance, Foucault and Gehrig (2008) develop a model where higher stock price informativeness, achieved via cross-listing, can enhance managers' ability to identify positive net present value (NPV) projects. Our paper complements this body of work by focusing on the benefits of reduced litigation risk and managers' incentives to invest. While the lower litigation threat allows managers to invest in longer-term and unconventional projects, which leads to the deterioration in stock price informativeness, the lower litigation threat

also allows managers to be more responsive to stock price information, consequently leading to the firm's investment being more sensitive to stock prices.

2. Institutional background: Derivative lawsuits and universal demand laws

This section presents the institutional details on derivative litigation and UD laws, which provides the basis for our evaluation of the potential effects of the reduction in litigation risk on the corporate information environment. While managers and directors have a fiduciary duty to act in a manner that is consistent with long-term shareholder value maximization, empirical evidence shows that these agents do not always behave in the shareholders' best interests. When such cases are detected, shareholders may take legal action to protect their rights and interests (La Porta et al., 1997). A derivative lawsuit is a special subset of shareholder litigation that allows shareholders to sue the managers and the directors on behalf of the firm if the managers or the directors engage in behavior that harms it.[7]

Prior to initiating a derivative lawsuit, the plaintiff shareholders must first satisfy the "demand requirement." That is, they must first make a written demand that the firm's board of directors addresses the alleged breach of fiduciary duty. Only when the demand is refused or unanswered within a reasonable amount of time can shareholders proceed with the lawsuit. Because the directors are usually among the defendants in a derivative lawsuit, they almost always decide against pursuing it (Swanson, 1992).

Due to this conflict of interest, the plaintiff shareholders are allowed to circumvent the demand requirement on the basis of the "futility exception." That is, shareholders may argue that

[7] This type of lawsuit is considered "derivative" because it is the entire firm (instead of specific investors) that suffers damage from the behavior of the managers and the directors. The shareholders file a lawsuit derivatively on behalf of the entire firm. For example, in 2002, AIG's shareholders took a derivative litigation action against the firm's former CEO and the chairman of its board of directors for misleading the shareholders regarding the firm's performance.

the directors are not able to be impartial due to their conflict of interest and initiate the lawsuit without complying with the demand requirement. However, the availability of the futility exception has led to the abuse of derivative lawsuits, wasting the time and money of both courts and companies (Ni and Yin, 2018; Chen et al., 2019).[8] As a response to this abuse, the American Bar Association proposes a universal demand requirement with the intent of raising the procedural bar to prevent frivolous lawsuits (Swanson, 1992).

Between 1989 and 2005, 23 U.S. states enacted UD laws that stipulate that plaintiff shareholders can no longer argue for the futility exception and must meet the demand requirements in all derivative lawsuits. This acts as a significant deterrent to derivative litigation. Following the passage of UD laws, the probability of a firm in the affected states facing a derivative lawsuit dropped by approximately 40%, and, importantly, the drop in derivative lawsuits is not offset by other forms of litigation such as shareholder class action or accounting-related lawsuits (Appel, 2019). Therefore, UD laws significantly reduce the risk of litigation for firms incorporated in the affected states (Davis, 2008; Erickson, 2010). Table 1 reports the 23 states that enacted UD laws and years when UD laws were enacted in each state.

The enactment of UD laws is plausibly exogenous to local firms' information environments for several reasons. First, as UD laws are enacted with the aim to promote efficiency in the juridical system, the adoption of UD laws is unlikely to be politically motivated by individual firms. Second, since UD laws are based on the state of incorporation rather than headquarter location, the treatment status is likely to be exogenous to firm-level conditions as many firms are incorporated

[8] Shareholders prefer arguing for the futility exception rather than making a demand that the firm files a lawsuit. This is because the court would generally adhere to the business judgment rule and dismiss the suit if the demand were refused by the firm. The firm usually responds to the shareholders' futility exception argument by asking for the suit to be dropped. As such, court time is often spent on arguing the merit of the futility exception rather than on the actual lawsuit (e.g., Block et al., 1993; Kinney, 1994).

and headquartered in different states. Finally, the timing of the enactment of UD laws is staggered across different states (see Figure 1). Thus, the passage of these laws is unlikely to be confounded with any other events that occur in any specific year (Roberts and Whited, 2012). In Figure 2, we present the states that have passed UD laws and do not find any obvious clustering of states in which UD laws have been enacted. In Table A2 in the Appendix, we show that firms' pre-existing information environments do not affect the timing of a state's adoption of UD laws. Column (1) presents the results using a Weibull hazard model and column (2) presents the probit results. Both specifications include, in log forms, the level of GDP, GDP per capita, and the number of listed firms incorporated in the state to control for the economic activities at the state level. In both specifications, the coefficients on lagged idiosyncratic volatility are statistically and economically insignificant. The overall results suggest that pre-existing information environments are unlikely to affect the timing of a state's adoption of UD laws.

3. Sample, variables, and model

Our primary sample consists of 92,460 firm-year observations, representing 8,987 firms within our 1982–2012 sample period. We obtain financial information from Compustat and stock price information from the Center for Research in Security Prices (CRSP). We exclude financial (SIC 4900–4999), utility (SIC 6000–6999), and unclassified firms (SIC 9900–9999) from our sample.

According to the internal affairs doctrine, a company is subject to the corporate laws of the state in which it was incorporated rather than the state in which its headquarters is located (Daines, 2001). Since Compustat only contains information on a firm's current state of incorporation, we use historical state of incorporation data from firms' 10-K reports on EDGAR.[9] As the data are

[9] Available on Bill McDonald's website: https://sraf.nd.edu/data/augmented-10-x-header-data/.

available from 1994, we assume that each firm was incorporated in the state for which we have the earliest available data. Following Appel (2019), we exclude firms that change their state of incorporation at least once during our sample period.[10]

3.1 Main explanatory variable: Idiosyncratic volatility

We employ idiosyncratic volatility as our key proxy for the information asymmetry between the firm and outsiders. Developed by Roll (1988), this measure reflects firm-specific stock return variation, or the variation in the return on a stock that cannot be explained by market returns as the proportion of overall stock return variation. Specifically, for each firm *i* in year *t*, we estimate the following Fama-French three-factor model:

$$r_{i,t}^{d} - r_{f,t}^{d} = \alpha_{it} + \beta_{mkt,i,t}\left(r_{mkt,t}^{d} - r_{f,t}^{d}\right) + \beta_{smb,i,t} r_{smb,t}^{d} + \beta_{hml,i,t} r_{hml,t}^{d} + \varepsilon_{i,t}^{d}, \qquad (1)$$

where $r_{i,t}^{d}$ is the daily return for firm *i* on day *d* of year *t*, and $r_{f,t}^{d}$ is the daily risk-free rate.

The variables $r_{mkt,t}^{d}$, $r_{smb,t}^{d}$, and $r_{hml,t}^{d}$ are daily returns on the market, the small-minus-big factor, and the high-minus-low factors respectively.[11] We then compute each stock's relative idiosyncratic volatility, as the ratio of the volatility of the residuals ($\sigma_{e,i,t}^{2}$) to total excess stock return volatility ($\sigma_{i,t}^{2}$). This ratio is precisely $1 - R_{i,t}^{2}$ of equation (1). Given the bounded nature of $R_{i,t}^{2}$, we follow the literature (e.g., Morck et al., 2000; Ferreira and Laux, 2007; Bennett et al., 2020) and use the logistic transformation of $1 - R_{i,t}^{2}$. Specifically, our measure of idiosyncratic volatility ($\psi_{i,t}$) for a generic firm *i* in year *t* is defined as:

[10] Our results remain unchanged if we include these firms in the sample.

[11] We obtain returns on the market, small-minus-big factor, high-minus-low factor, and the risk-free rates from Kenneth French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/.

$$\psi_{i,t} = \ln\left(\frac{1-R_{i,t}^2}{R_{i,t}^2}\right) = \ln(\frac{\sigma_{e,i,t}^2}{\sigma_{i,t}^2-\sigma_{e,i,t}^2}). \quad (2)$$

According to studies that use idiosyncratic volatility as a measure of firm-specific information (e.g., Morck et al., 2000; Ferreira and Laux, 2007; Bennett et al., 2020), a high level of relative idiosyncratic volatility (low $R_{i,t}^2$) means that the market return explains a smaller component of the overall stock return volatility, which implies that a firm's stock price movements carry a greater level of firm-specific information contents. We note that there is a debate in the literature as to whether idiosyncratic volatility could also capture stock liquidity risk. Therefore, we perform additional analyses to rule out this alternative interpretation (see Subsection 4.2).

3.2 Model

Our main purpose is to evaluate how the enactment of UD laws, which significantly reduces shareholder litigation risk, affects the corporate information environment. Specifically, we employ the following difference-in-differences estimation model:

$$y_{ijrst} = \beta \times UD_{rt} + \mathbf{c}'_{ijrst}\boldsymbol{\theta} + \boldsymbol{\delta}_{jt} + \boldsymbol{\gamma}_{st} + \eta_i + \varepsilon_{ijrst}. \quad (2)$$

The dependent variable y_{ijrst} is idiosyncratic volatility. UD_{rt} is an indicator variable equal to one when a firm's state of incorporation r has enacted UD laws in year t, and zero otherwise.[12]

[12] The inclusion of our set of fixed effects essentially replaces the "treatment" and "post" indicator variables employed in traditional difference-in-differences settings. The *UD* indicator is the equivalent to the *treatment*post* indicator variable.

The main coefficient of interest is β, which is a difference-in-differences coefficient. The first difference is between firms incorporated in the states that have enacted UD laws and firms incorporated in states that have not enacted UD laws, while the second difference is between the years before and the years after UD law enactment.

Our tightest specification includes firm fixed effects (η_i), headquarter-state-year fixed effects ($\boldsymbol{\gamma}_{st}$), and industry-year fixed effects ($\boldsymbol{\delta}_{jt}$). While firm fixed effects take into account any unobserved time-invariant firm-level factors that may influence a firm's information environment, headquarter-state-year fixed effects and industry-year fixed effects absorb all variables that do not vary within a given industry and year and a given state and year, such as industry-wide investment opportunities, the state of the business cycle, or local economic conditions. Thus, our difference-in-differences estimator compares the average change in the same treatment firms before and after the passage of UD laws, while controlling for any unobserved heterogeneity that varies across industries and states over time.

We also include several control variables that are known to affect idiosyncratic volatility. Most importantly, to take into account the influence of liquidity risk on idiosyncratic volatility estimation (e.g., Ang et al., 2005, 2009; Spiegel and Wang, 2005), we include three control variables that capture stock liquidity: *Stock turnover*, *Bid–ask spread*, and *%Zero return days* (Lesmond et al., 1999; Chordia et al., 2008; Han et al., 2015).[13] We also control for *ROE* and *SD ROE*, *Leverage*, *Market/Book*, *Firm Size*, *Dividend*, *Firm Age*, and a *Diversification* indicator variable (Roll, 1988; Chan and Hameed, 2006; Ferreira and Laux, 2007; Rajgopal and Venkatachalam, 2011).

[13] We include the *Bid–ask spread* and *%Zero return days* in the model because Han and Lesmond (2011) have shown theoretically that the bid–ask bounce and zero returns bias the estimation of idiosyncratic volatility.

4. Universal demand laws and firms' information environments

4.1 Main results

We begin by examining how the staggered enactment of UD laws affects corporate information environments. Model specifications in Table 2 vary across columns in terms of the set of fixed effects included. We start with a basic model where only firm and year fixed effects are included (column (1)). We then progressively include additional fixed effects (columns (2) to (4)). Our tightest specification (column (4)) includes firm, industry-year, and headquarter-state-year fixed effects. These fixed effects allow us to rule out the possibility that our results are merely due to firms becoming more opaque over time in some industries or states. All *t*-statistics are computed based on robust standard errors that are clustered at the state-of-incorporation level (Bertrand and Mullainathan, 2003).

Across all specifications in Table 2, the difference-in-differences coefficients on *UD* are negative and statistically significant and well below the 1% level. Thus, a reduction in the shareholders' ability to initiate a lawsuit against managers causes the stock prices of affected firms to become less informative to outsiders. We later show that this effect is driven by changes in firm investment policies following the passage of UD laws. The effect is economically substantial. For example, in column (4), which includes the full set of fixed effects, the enactment of UD laws is associated with an approximately 7.5% reduction in idiosyncratic volatility. This effect is larger than most of the included covariates. By comparison, a 100% increase in return on equity is associated with a 1.5% increase in idiosyncratic volatility, and a 100% increase in the market-to-book ratio is associated with a 1.4% increase in idiosyncratic volatility. Notably, across all results in Table 2, the magnitude of the coefficient estimates on *UD* remains highly stable as we

progressively include more fixed effects into the model, implying that our results are orthogonal to unobserved heterogeneity across industries and states that varies over time.[14]

4.2 Ruling out a liquidity-based explanation

While several studies use relative idiosyncratic volatility as a proxy for corporate information environments (e.g., Morck et al., 2000; Ferreira and Laux, 2007; Bennett et al., 2020), a strong contender to this view is that idiosyncratic volatility is related to liquidity risk (e.g., Spiegel and Wang, 2005; Ang et al., 2009; Han and Lesmond, 2011).

In particular, Han and Lesmond (2011) develop a market microstructure model and show that stock liquidity can bias the estimate of idiosyncratic volatility in two ways. The first influence is due to the bid–ask bounce or the microstructure noise, which increases the variance of returns and, consequently, inflates the idiosyncratic volatility estimate. The second influence is through the incidence of zero returns. Zero returns reduce the total return volatility and bias the loadings on systematic risk factors, which also bias the idiosyncratic volatility estimate. Han and Lesmond (2011) show that removing the effect of liquidity from idiosyncratic volatility significantly reduces the measure's ability to price stock returns. Han et al. (2015) also find that after purging the effect of liquidity, idiosyncratic volatility has little pricing ability across 45 international markets. While we already control for the bid–ask spread and the percentage of zero returns in all our baseline results, we also perform several robustness analyses to further isolate the liquidity-based explanation from the information-based explanation.

[14] In Section 7, we present additional robustness tests for this finding, including validating the parallel trend assumption and showing that our results are robust to controlling for potentially confounding events (Karpoff and Wittry, 2017) and several alterations in model specifications and variable definitions.

Panel A of Table 3 presents estimation results using an alternative measure of idiosyncratic volatility based on quote-midpoint-price returns instead of CRSP closing returns (Han and Lesmond, 2011; Han et al., 2015). Using midpoint prices could account for the bid–ask bounce effect on the variance of returns and therefore, minimize liquidity biases. Following Han and Lesmond (2011), we calculate midpoint-price returns based on closing bid–ask (quote) midpoints. As shown in Panel A, the re-estimated coefficient on *UD* is negative and remains highly statistically significant. This indicates that our results are unlikely to be driven by changes in firms' liquidity risk.

Panel B reports the results of additional tests that evaluate the sensitivity of our main findings to the liquidity effects. The dependent variables in all specifications in Panel B are closing returns idiosyncratic volatility because this estimate is hypothesized to contain a liquidity component. We control for the non-linear influence of the bid–ask bounce bias by including both the bid–ask spread and the squared spread along with the percentage of zero returns in the regressions (column (1)). Next, we include the interaction term between zero-return and the bid–ask spread to account for the fact that the percentage of zero returns is also a proxy for the spread (column (2)) (Lesmond et al., 1999). Finally, we include both the interaction term between zero-return and the bid-ask spread and the squared bid–ask spread (column (3)). Our results are robust across all specifications.

Having shown that our results are unlikely to reflect changes in firms' liquidity, we further validate our baseline findings by showing in Table 4 that the decline in idiosyncratic volatility indeed corresponds to an increased information asymmetry between the firm and agents outside of the firm. First, we examine the effect of UD laws on equity analyst forecasts. Equity analysts play an important role in facilitating the distribution of financial information to the market

(Grossman and Stiglitz, 1980; Loh and Stulz, 2001). If UD laws cause firms to become more opaque, we would expect a decline in analysts' ability to produce accurate information about firms. This is exactly what we find in Table 4.[15] Specifically, *UD* is associated with a 9% increase in the standard deviation of analyst earnings forecasts (column (1)) and a 6% increase in mean absolute forecast errors (column (2)). Overall, the results in Table 4 validate our core results by showing that the decline in idiosyncratic volatility post UD corresponds to a wider information gap between firms and outside agents.

5. Economic mechanisms

In this section, we investigate how the reduction in shareholder litigation risk exacerbates the information asymmetry between firms and outsiders. We propose and test three non-mutually exclusive channels through: (1) a reduction in the quality of earnings information that firms release to the market; (2) a reduction in voluntary disclosures made by firms; and (3) changes in corporate investment policy.

5.1 Increase in earnings opacity

In the first potential mechanism, a deteriorating information environment is posited to be a result of managers becoming more entrenched (Appel, 2019) and consequently more likely to obfuscate earnings information from investors (Bertrand and Mullainathan, 2003; Ferreira and Laux, 2007). Managers could, for instance, conceal the company's declining performance from investors by managing earnings upwards (e.g., Burgstahler and Dichev, 1997; Healy and Whalen, 1999; Graham et al., 2005). While this allows managers to extract private benefits, it makes the firm's

[15] All regression specifications include the same set of fixed effects (firm, headquarter-state-year, and industry-year) as in equation (1). Control variables follow the literature.

earnings less informative and its stock prices less comprehensible to outsiders (e.g., Bhattacharya et al., 2013; Cazier et al., 2017; Hopkins, 2018; Houston et al., 2019).

To test this hypothesis, we examine changes in a firm's accruals and real earnings management activities after the enactment of UD laws. We obtain proxies for accruals management using the absolute values of four discretionary accruals models that have been widely used in the literature: Jones (1991), modified-Jones model (Dechow et al., 1995), Dechow and Dichev (2002), and McNichols (2002).[16] For real earnings management, we use three proxies from Roychowdhury (2006): abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs.[17]

Panels A and B of Table 5 show the results for accruals and real earnings management, respectively. In both sets of results, we do not find any evidence that firms manage their earnings upwards to conceal declining earnings information from investors following the passage of UD laws. All but one of the coefficient estimates on *UD* is statistically insignificant, and the magnitudes of all the coefficients are close to zero.[18] The only significant coefficient is for *abnormal discretionary expenses* (column (2) of Panel B). While Roychowdhury (2006) predicts that firms manage their real earnings by decreasing discretionary expenses (implying a negative coefficient), we find that the sign of the coefficient is positive. Thus, after UD law enactment,

[16] See Table A1 for how these measures are calculated.

[17] *Abnormal cash flows from operations* reflect situations where firms attempt to boost their earnings through increased price discounts or more lenient credit terms. While both strategies boost earnings in the current period, they also result in abnormally low operating cash flows. *Abnormal discretionary expenses* reflect situations where firms try to inflate their earnings by cutting discretionary expenses, such as advertising, R&D, and selling, general and administrative (SG&A) expenses, causing their discretionary expenses to be significantly lower. *Abnormal production costs* manifest in firms' attempts to increase production in order to decrease their cost of goods sold and report higher operating margins. Therefore, if a firm manages its earnings through accelerating production, we would observe a significant increase in production costs.

[18] In untabulated results, we estimate the same model on subsamples of "suspect firm years," i.e., those with net income scaled by total assets greater than or equal to zero but less than .005, .010, and .015, and we obtain similar results.

affected firms in fact increase their abnormal discretionary expenses (such as R&D expenses), which would decrease their immediate real earnings. We show in Subsection 5.3 that this increase in discretionary expenses reflects changes in firms' investment strategies toward novel, long-term projects post UD enactment. Overall, our evidence is at odds with the view that a reduced litigation risk causes managers to manipulate firms' earnings upwards to conceal valuable earnings information from investors for private gain.

5.2 Reduction in voluntary disclosures

The second possible mechanism contends that the passage of UD laws alleviates the pressure on firms to voluntarily disclose private information, which, as a result, widens the information gaps between firms and investors. Firms have an incentive to voluntarily disclose private information in a timely manner to reduce the probability of being litigated, as well as the potential cost of a lawsuit (Skinner, 1994; Graham et al., 2005; Kothari et al., 2009). Therefore, a reduction in litigation risk brought by UD laws could reduce the quantity and quality of voluntary disclosures.

To test this hypothesis, we examine the impact of UD laws on the frequency, quantity, and quality of firms' voluntary disclosures. Following the literature (e.g., Gul et al., 2011; Bourveau et al., 2018), we capture a firm's voluntary disclosures based on Item 8.01 ("Other Events") in its Form 8-K current report.

The SEC requires public firms to file Form 8-K to disclose material events on an ongoing basis. The SEC provides a list of events that it deems sufficiently material to require disclosure. These events are classified by "items." For example, financial information items include "Completion of Acquisition or Disposition of Assets," "Material Impairments," "Results of Operations and Financial Condition," etc. We focus on items that are filed under Item 8.01

because, unlike the other sections in Form 8-K filings, Item 8.01 allows the firm "to report events that are not specifically called for by Form 8-K, that the registrant considers to be of importance to security holders." As there is no clear definition of what constitutes materiality (Debreceny and Rahman, 2005), firms can exercise substantial discretion with regard to what they disclose under this category.

We define the frequency of voluntary disclosures as the natural log of one plus the number of Form 8-K filings that contain Item 8.01.[19] For the quantity of voluntary disclosure, we use one plus the length (in words) of disclosures under Item 8.01. Finally, for the quality of voluntary disclosure, we rely on the computational linguistics literature and use the Fog index to measure the readability of Item 8.01 in Form 8-K filings (Guay et al., 2016; Ertugrul et al., 2017).

Results in Table 6 indicate that after the UD laws are passed, affected firms increase both the frequency and quality of their voluntary disclosures. Specifically, the frequency with which Form 8-K filings contain Item 8.01 increases by 11.2% after the laws are implemented (column (1)), and conditional on firms providing Item 8.01 disclosures, the readability of these disclosures improves by 17% after the laws (column (4)). Importantly, the results in column (2) indicate that UD laws are not associated with any change in other non-voluntary items in Form 8-K filings. Therefore, only voluntary disclosures are affected by the implementation of UD laws.[20]

In summary, we do not find evidence that firms reduce their voluntary disclosures after UD laws are passed. On the contrary, we find that a lower litigation threat promotes more voluntary

[19] In 2004, the SEC changed the classification of items in Form 8-K filings, resulting in a relabeling of "other disclosures" from Item 5 to Item 8.01. Therefore, for Form 8-K filings in the pre-2004 format, we use a logarithm of one plus the number of filings that contain Item 5 as the frequency of voluntary disclosures.

[20] We also find that there is a positive association between stock turnover and the frequency, the average length, and the readability of voluntary disclosures. This is consistent with Schoenfeld (2017), who finds that the inclusion of a firm's stock on the S&P 500 Index increases its voluntary disclosures, which, in turn, increase its stock liquidity.

disclosures as firms appear to be less concerned that the disclosed information will be used for litigation purposes (Johnson et al., 2000).

5.3 Change in corporate investment

The third explanation states that the reduction in litigation risk may lead firms to change their investment behavior such that the firm becomes more opaque to outside investors. Risk of litigation may limit managerial discretion and deter managers from taking on risky investment projects with positive net present values (e.g., Romano, 1991; Johnson et al., 2000; Arena and Julio, 2015). While the business judgment rule protects managers from litigation pertaining to ordinary business decisions, shareholders may claim that managers did not properly disclose all the risks associated with the projects, or project failures may upset shareholders and give rise to unrelated litigation. Importantly, even when the litigation suit is frivolous, managers can still suffer from reputation costs, as well as the opportunity cost of managerial time (e.g., Katz, 1990; Ferris et al., 2007; Brochet and Srinivasan, 2014; Donelson and Yust, 2014).

As UD laws significantly reduce litigation threats, managers could be more willing to invest in longer term and unconventional projects that potentially yield high value (Manso, 2011; Tian and Wang, 2014).[21] However, while these investments are potentially value maximizing, they may not be easily comprehended by outsiders (Myers and Majluf, 1984; Edmans, 2009), causing the firm's stock prices to become less informative.

[21] Consider, for instance, a pharmaceutical firm. The manager can invest either in R&D activities in pursuit of the invention of a new drug or in marketing drugs that are currently in the market. The R&D project can lead to litigation if it results in a clinical trial failure, and thus the manager may decide to forgo this project if the risk of being litigated is high. Therefore, following the passage of UD laws, this manager could be more willing to invest new drug development.

A case in point is Square, Inc., a California-based company that had traditionally specialized in producing software and hardware payment-processing services. In recent years, the company has increasingly expanded its R&D activities to transform into a financial services provider. The move has created confusion among Square's investors, with many finding it difficult to evaluate the potential value creation from the heavy investments in the financial services segment.[22] Therefore, shifts in corporate investment policies could be an important, albeit less obvious, channel through which the passage of UD laws affect a firm's information environment.

To test for this channel, we examine changes in firm investment policies following the passage of UD laws and report the results in Table 7. While we consider different categories of investment expenditures, we find that the passage of UD laws has the most noticeable effect on R&D expenditures. Specifically, UD laws result in a 10.6% (= 0.005/0.047) increase in R&D expenditures (column (1)). However, we do not find UD laws to be associated with any change in capital expenditures (column (2)), acquisition expenditures (column (3)), or the sales of property, plant, and equipment (column (4)). The increase in R&D expenditures itself explains the increase in total investment expenditures (column (5)) and abnormal discretionary expenses (Panel B, Table 5) following the passage of UD laws.

Importantly, the increase in R&D expenditures as a result of UD laws is consistent with our conjecture that firms change their investment behavior and become more opaque. While other types of capital investment expenditures can share common characteristics across firms within the same industry, R&D expenditures are often unique to each firm. As a result, it is difficult to evaluate and thus can exacerbate the information asymmetry between a firm and its shareholders (Aboody and Lev, 2002). This is consistent with Veldkamp (2006), who argues that asset prices

[22] "Why Square, like Roku and Box, was misunderstood by investors?" *The Street*, November 21, 2017.

are less likely to incorporate firm-specific information when the cost of producing information on individual firms is high.[23]

Overall, out of the three potential mechanisms, our evidence suggests that changes in investment policies as a result of lower litigation pressure are a key contributing factor that explains heightened firm opacity after UD laws are passed.

6. Extensions

Our evidence is consistent with the view that the reduction in litigation risk allows firms to invest in projects that are difficult to comprehend by outside investors, which therefore causes the corporate information environment to deteriorate. In contrast, we do not find evidence that UD laws incentivize managers to conceal firm-specific information from investors for private gain. In Subsection 6.1, we perform additional analyses and show that the documented effect of UD laws on the corporate information environment is not likely to come from managers obfuscating or withholding firm-specific information; rather, it comes from firms pursuing longer-term, less tangible investment decisions. Further, we show in Subsections 6.2 and 6.3 that while the information environment deteriorates, this deterioration is not likely to be harmful to either the firms or their investors.

[23] There are several reasons why information acquisition by investors still falls short even when firms increase their voluntary disclosures. First, processing R&D-related information requires investors to have specific scientific knowledge (e.g., understanding genome research in biochemistry) and invest a considerable amount of time (Veldkamp, 2006). Second, the high uncertainty on the future benefits of R&D could impede managers from delivering reliable information about these benefits to investors. Consistent with this, Kothari et al. (2002) show that the contribution of current R&D expenditures to the variability of future earnings is three times greater than that of investment in property, plants, and equipment.

6.1 Cross-sectional evidence

Table 8 presents the results of cross-sectional tests that measure the effects of UD laws on firms' information environments, conditional on several firm and industry characteristics. We sort the sample across various firm-level and industry-level characteristics, and for each specification we construct three dummy variables: *top tercile*, *middle tercile*, and *bottom tercile*, representing the observations with characteristic values in the highest 33%, middle 34%, and bottom 33%, respectively. The interaction between these variables and the *UD* dummy measures the effect of UD laws on idiosyncratic volatility for these three groups.

As shown in Panel A of Table 8, firms that experience the sharpest reduction in idiosyncratic volatility after the passage of UD laws are smaller firms (column (1)), firms with high R&D expenditures (column (2)), low asset tangibility (column (3)), high market-to-book ratio (column (4)), and low capital expenditures (column (5)). These firms are likely to benefit the most from the passage of UD laws as a reduced litigation risk would allow them to pursue less tangible investments that are likely to bear fruit in the long run. While potentially value maximizing, these changes cause the firm to become more opaque to outside investors.

In Panel B of Table 8, we show that the effect of UD laws on idiosyncratic volatility is stronger among firms with stronger internal monitoring mechanisms, such as firms with a greater proportion of outside directors on the board (column (1)) and firms with fewer governance provisions that are considered hostile to shareholders (column (2)). This implies that the deterioration of corporate information environments following the passage of UD laws is unlikely to be driven by heightened agency costs (e.g., Appel, 2019) and is in line with our findings that firms neither obfuscate nor withhold firm-specific information post UD. In column (3), we also find that the effect is more salient among firms with the highest holdings by "dedicated"

institutional investors, defined as institutional investors with a high portfolio concentration and low portfolio turnover (Bushee, 1998, 2001).[24] This provides evidence that suggests the effect of UD laws is concentrated on firms with an overall focus on long-term investments.

6.2 Investment sensitivity to price

So far, our results indicate that the reduction in litigation risk post UD laws allows managers more flexibility to invest in longer-term, R&D-intensive projects that potentially benefit shareholders. If this is true, we should find that UD laws increase a firm's ability to adjust their investment to be more responsive to growth opportunities as embedded in its stock prices. To test for this, we follow Chen et al. (2007) and Foucault and Fresard (2012) and estimate the following investment sensitivity to price equation:

$$\mathrm{I}_{it} = \alpha_1 UD_{rt-1} \times \left(\mathrm{Q}_{it-1} - \mu\right) + \alpha_2\left(\mathrm{Q}_{it-1} - \mu\right) + \alpha_3 UD_{it-1} + \boldsymbol{x}'_{it-1}\boldsymbol{\pi} + \boldsymbol{\delta}_{jt} + \boldsymbol{\gamma}_{st} + \varepsilon_{ijrst}.$$

The dependent variables I_{it} are (1) *Total investment*$_{it}$, which is the sum of R&D expenditures, capital expenditures, and acquisition expenditures less sales of property, plant, and equipment scaled by total assets; and (2) *R&D expenditures*, which is R&D expenditures scaled by total assets. UD_{rt-1} is an indicator variable equal to one when a firm's state of incorporation r

[24] Studies find that the presence of dedicated institutional investors is associated with a firm's tendency to focus on long-term value rather than engaging in myopic behavior. For instance, Bushee (1998) finds that firms with overall large holdings by dedicated investors are less likely to cut long-term R&D projects to meet short-term earnings targets. Connelly et al. (2010) find that firms with dedicated institutional investors are more likely to engage in long-term strategic actions rather than short-term tactical competitive actions. Overall, large shareholding by dedicated institutional investors is associated with long-term investment horizons. We thank Brian Bushee for making institutional investor classification data available on his website: http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html.

has enacted UD laws in year $t-1$ and zero otherwise. We use *demeaned* Tobin's q in our specifications to allow the coefficient on *UD* (α_3) to capture the effect of UD laws on the average firm in our sample. Following Foucault and Fresard (2012), we include the natural logarithm of assets and cash flow as additional control variables to account for the impact of firm size and cash flow on firm investment decisions. As studies also document the effect of stock price information on investment-price sensitivity (e.g., Chen et al., 2007; Foucault and Fresard, 2012), we include idiosyncratic volatility and the interaction between idiosyncratic volatility and demeaned Tobin's q as additional control variables in columns (3)-(4). The main coefficient of interest is α_1, which captures the effect of UD laws on the sensitivity of investment to stock prices.

Table 9 shows that both total and R&D investments are more sensitive to stock prices post UD laws. These results support our interpretation that a lower litigation risk allows managers to better respond to price information about the firm's growth opportunities. As we find that investment-price sensitivity increases despite the deterioration in stock price information, our findings are distinct from studies that examine *managers' ability* to extract information from their firm's stock price to make investment decisions (e.g., Chen et al., 2007; Foucault and Gehrig, 2008; Bennett et al., 2020). For instance, Foucault and Gehrig (2008) argue that since cross-listing improves price informativeness, it allows managers to better learn about the value of the firm's growth opportunities. As such, firms with sufficiently large growth opportunities are more likely to cross-list to benefit from this incremental price informativeness. This prediction is supported empirically in Foucault and Fresard (2012), who show that investment-price sensitivity is higher for cross-listed firms. Overall, these results suggest that the heightened stock price informativeness from cross-listing is a driver of greater investment-price sensitivity.

Our paper complements this literature by focusing on *investors' ability* to evaluate the firm's investment behavior and incorporate such evaluation into stock prices. More specifically, we argue that the reduction in litigation risk causes firms to change their investment, such that outside investors find it difficult to evaluate. At the same time, this reduction in litigation risk can motive managers to pursue projects that reflect the information from the firm's stock price. In other words, our results imply that both stock price informativeness and investment-price sensitivity are driven by the reduction in litigation risk operating via the change in investment toward more opaque projects.

6.3 Stock price crash risk

To provide additional evidence that the reduction in stock price informativeness following the passage of UD laws is unlikely to be harmful to either affected firms or their shareholders, we examine whether the reduction in stock price informativeness after UD law implementation is associated with higher incidences of stock price crashes.

If UD laws caused managers to withhold bad performance news from investors (i.e., the earning opacity channel), it would lead to bad news accumulation and cause the firm's stock price to become overvalued (Jin and Myers, 2006; Hutton et al., 2009). When the amount of bad news reaches a tipping point, it would become too costly for managers to continue withholding the accumulated negative information (Baik et al., 2011). When revealed to the market, the bad news would lead to a substantial revision of investors' expectations about the future prospects of the firm and eventually lead to a stock price crash (Jin and Myers, 2006).

Consistent with prior studies, we calculate firm-specific daily returns[25] and use them to construct four measures of firm-specific stock price crash risk. The first measure, *CRASH*, is a dummy variable equal to one for firms that experience one or more extreme negative firm-specific return in that year and zero otherwise (Jin and Myers, 2006).[26] The second measure, *COUNT*, is the number of extremely negative returns and extremely positive returns in each year. The third measure, *NCSKEW*, is defined as the coefficient of skewness of firm-specific daily returns multiplied by minus one (Kim et al., 2014). The fourth measure, *DUVOL*, is the natural log ratio of firm-specific return volatility in a "down" sample to volatility in an "up" sample (Chen et al., 2001).[27] Any increase in these variables suggests that the firm's stock price is more prone to crashes.

Table 10 reports the results. Overall, we do not find any evidence that stock price crash incidences increase after the passage of UD laws. In fact, we find some evidence that is suggestive of the opposite. The coefficient for *UD* is negative and marginally significant when we use *COUNT* as the dependent variable (column (2)). We do not find any significant results when we use other proxies for stock price crash risk. This is consistent with our previous finding that the reduction in litigation risk does not lead firms to withhold bad information.

It is also comforting to note that the coefficients on the control variables have the expected signs. For instance, the coefficients on *Bid-ask spread* are statistically positive across all specifications, indicating that less liquid stocks are more likely to crash. Furthermore, we find that

[25] Defined as the natural log of one plus the residual return from the Fama and French regression, i.e., $R_{i,t} = \ln(1 + \varepsilon_{i,t})$, where $\varepsilon_{i,t}$ is the estimated residual.

[26] An extreme negative firm-specific return is defined as a firm-specific return that is 3.2 standard deviations below the mean daily returns in that fiscal year (corresponding to a 0.1% probability event under the normal distribution). In unreported tests, we validate that our results are not sensitive to specific definitions of this threshold.

[27] For each firm-year, firm-specific daily returns are divided into "down" and "up" samples, where the "down" ("up") sample comprises firm-specific daily returns that are below (above) the annual mean.

higher changes in stock turnovers are associated with more crash incidences. This is consistent with the result documented in Chen et al. (2001), who argue that changes in stock turnovers is a proxy for the difference of opinions among investors and therefore, should be positively related to crash incidences.

7. Robustness checks

In this section, we present various robustness checks on our main finding that the enactment of UD laws causes the stock prices of affected firms to become less comprehensible to outside investors. First, we examine the validity of the parallel trend assumption in our difference-in-differences design by allowing the effect of UD laws to vary across time (Bertrand and Mullainathan, 2003). We decompose the *UD* variable into a series of dummy variables: UD_{-4}, UD_{-3}, UD_{-2}, UD_{-1}, UD_0, and $UD_{\geq+1}$. UD_s are dummy variables equal to one in the states that enact a UD law in the *s*-th year relative to the year of enactment, and zero otherwise. $UD_{\geq+1}$ is equal to one in the states that have enacted a UD law for at least one years. If the change in idiosyncratic volatility is indeed a result of UD law enactment, then the results should reveal significant effects only after, and not before, the laws are enacted. We find this to be the case. As indicated in Panel A of Table 11, we do not find any significant change in idiosyncratic volatility in the period before the enactment of the laws. The coefficients for the indicator variables are statistically significant only from one year after the laws have been enacted.

Next, we explore whether our results are influenced by other confounding legal changes that may also affect firms' stock price informativeness.[28] We control for potential confounding

[28] For instance, various anti-takeover laws that are introduced within our sample period can diminish the strength of the market for corporate control and prevent firm-specific information from being incorporated into stock prices (Ferreira and Laux, 2007).

changes to the law as compiled by Karpoff and Wittry (2017): control share acquisition laws, business combination laws, fair price laws, directors' duties laws, and poison pill laws. Specifically, we construct a dummy variable for each of these anti-takeover laws and control for them in our estimation. In Panel B, the coefficients on *UD* remain negative and statistically significant, with very similar economic magnitude to our baseline results in Column (4) of Table 2. Overall, the evidence in Panel B suggests that our results are not influenced by any confounding changes in other business laws.

Panel C shows that our main results remain unaffected after we introduce additional control variables. We introduce various proxies for other corporate governance mechanisms, including *G-Index* (Gompers et al., 2003), *% of independent directors* (Armstrong et al., 2014), and *% of co-opted directors* (Coles et al., 2014). More importantly, none of the governance variables enter the regression significantly (columns (1)-(3)). Thus, it is the change in shareholder litigation rights rather than governance quality that affects a firm's information environment.

Panel D shows that our results are not sensitive to changes in sample composition. In the specification for column (1), we exclude the sample during the global financial crisis (2008–2009) due to the high economic uncertainty and return volatility in that period. We further rule out the possibility that our results are due to opaque firms influencing lawmakers to introduce UD laws or endogenously choosing their state of incorporation. In the specification for column (2), we employ only treatment firms that were incorporated in Pennsylvania.[29] In the specification for column (3), we remove firms incorporated in Delaware from the sample because Delaware is known for its business-friendly legal environment (Daines, 2001). In the specification for column (4), we restrict

[29] Since the Pennsylvania state legislature passed a UD law only to maintain consistency with judicial precedent, rather than as a response to public policy concerns (Appel, 2019), this result alleviates concerns that firms may lobby their states to pass UD laws. We show in Table A2 that the information environment of local firms is not a significant determinant of the adoption of UD laws in our sample.

the sample to firms that are headquartered in the same state as their state of incorporation to alleviate concerns that firms strategically choose their state of incorporation to benefit from the state's legal environment. In all specifications, we find that our results continue to hold.

8. Conclusions

Using a sample of 92,460 US firm-years during 1982–2012, we find evidence that the reduction in litigation risk deteriorates firms' stock price informativeness. The results remain robust after we control for the effect of liquidity. We examine whether this is due to firms obfuscating or withholding firm-specific information through financial reports and disclosures, but the evidence supporting these conjectures does not bear out our data. Instead, our analysis suggests that the reduction in firms' stock price informativeness is due to firms making efficient but more opaque investments. Specifically, the reduction in litigation risk brought about by UD laws is associated with a significant increase in R&D expenditures. Since R&D is often unique to each firm and is difficult for outsiders to evaluate, it consequently leads to a deterioration in the corporate information environment.

While we find evidence of a decrease in stock price informativeness, our results do not indicate that the reduction in litigation risk is detrimental to affected firms. Specifically, we do not find that firms' stock prices are more prone to crashes after UD law enactment. On the contrary, once litigation pressure eases, investment expenditures are significantly more sensitive to firms' growth opportunity. Overall, our results indicate that the increase in information asymmetry is unlikely to be driven by heightened agency costs but is rather due to firms making value-maximizing investments that are more difficult for outsiders to evaluate.

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Figure 1: Timeline of universal demand law enactments

This figure displays a timeline of states that enacted the universal demand (UD) laws. Between 1989 and 2005, the UD laws were enacted in 23 states: Georgia (GA), Michigan (MI), Florida (FL), Wisconsin (WI), Montana (MT), Virginia (VA), Utah (UT), New Hampshire (NH), Mississippi (MS), North Carolina (NC), Arizona (AZ), Nebraska (NE), Connecticut (CT), Maine (ME), Pennsylvania (PA), Texas (TX), Idaho (ID), Hawaii (HI), Iowa (IA), Massachusetts (MA), Rhode Island (RI), and South Dakota (SD).

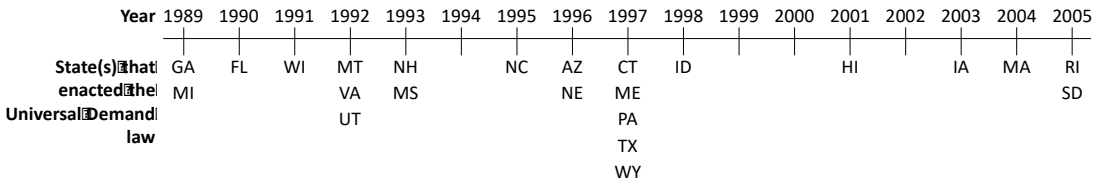

Figure 2: Timeline of universal demand law enactments

This figure shows a map of the United States. The gray states adopted universal demand laws from 1989 to 2005.

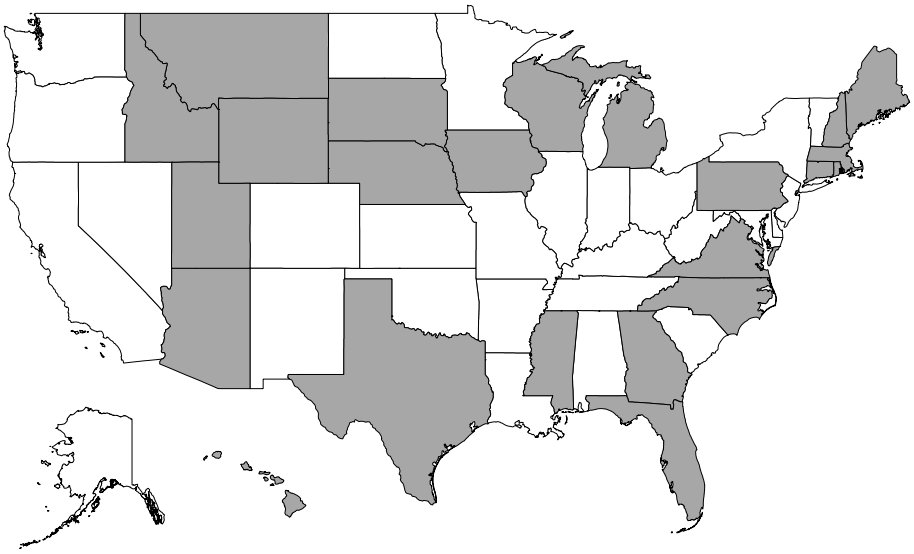

Table 1 Summary statistics

The full sample comprises 92,460 observations from 8,987 CRSP/Compustat firms from 1982 to 2012. Panel A reports the years when the universal demand (UD) laws were enacted in each affected state, the number of firm-years and the proportion of firm-years that were affected by the UD law in each affected state. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted universal demand law. The sample mean of UD is 8.36%. Data on state of incorporation is obtained from Bill McDonald's website and Compustat. Panel B reports summary statistics of key variables. All variables are winsorized at 1%. Variable definitions and data sources are in Table A1.

Panel A: Universal Demand law indicator variable

Year of enactment	State of incorporation	Relevant citation	Affected firm-years	% of full sample
1989	GA	Ga. Code Ann. § 14-2-742	851	0.92
	MI	Mich. Comp. Laws Ann. § 450.1493a	736	0.80
1990	FL	Fla. Stat. Ann. § 607.07401	1,602	1.73
1991	WI	Wis. Stat. Ann. § 180.742	667	0.72
1992	MT	Mont. Code. Ann. § 35-1-543	19	0.02
	VA	Va. Code Ann § 13.1-672.1B	722	0.78
	UT	Utah Code. Ann. § 16-10a-740(3)	331	0.36
1993	NH	N.H. Rev. Stat. Ann. § 293-A:7.42	5	0.01
	MS	Miss. Code Ann. § 79-4-7.42	38	0.04
1995	NC	N.C. Gen. Stat. § 55-7-42	390	0.42
1996	AZ	Ariz. Rev. Stat. Ann. § 10-742	82	0.09
	NE	Neb. Rev. Stat. § 21-2072	51	0.06
1997	CT	Conn. Gen. Stat. Ann. § 33-722	152	0.16
	ME	Me. Rev. Stat. Ann. 13-C, § 753	10	0.01
	PA	Cuker v. Mikalauskas (547 Pa. 600, 692 A.2d 1042)	881	0.95
	TX	Tex. Bus. Org. Code. Ann. 607.07401	796	0.86
	WY	Wyo. Stat. § 17-16-742	29	0.03
1998	ID	Idaho Code § 30-1-742	9	0.01
2001	HI	Haw. Rev. Stat. § 414-173	11	0.01
2003	IA	Iowa Code Ann. § 490.742	46	0.05
2004	MA	Mass. Gen. Laws. Ann. Ch. 156D, § 7.42	268	0.29
2005	RI	R.I. Gen. Laws. § 7-1.2-710(C)	21	0.02
	SD	S.D. Codified Laws 47-1A-742	9	0.01
		Total	7,726	8.36

Panel B: Summary statistics for key variables

	#Obs.	Mean	S.D.	25th percentile	50th percentile	75th percentile
Idiosyncratic volatility (closing CRSP returns)	92,460	2.695	1.579	1.519	2.668	3.791
Idiosyncratic volatility (quote-midpoint prices)	58,661	2.486	1.520	1.355	2.44	3.518
Earnings forecast dispersion	37,456	0.263	0.469	0.047	0.104	0.253
Mean absolute earnings forecast errors	39,027	0.429	0.899	0.055	0.129	0.365
Earnings quality (Jones)	45,431	0.059	0.065	0.017	0.039	0.077
Earnings quality (modified Jones)	45,431	0.061	0.068	0.018	0.040	0.079
Earnings quality (Dechow & Dichev)	45,431	0.045	0.052	0.013	0.029	0.058
Earnings quality (McNichols)	45,431	0.041	0.047	0.012	0.027	0.053
Abnormal cash flows from operations	57,973	0.007	0.159	-0.049	0.020	0.089
Abnormal discretionary expenses	57,973	-0.004	0.273	-0.155	-0.037	0.099
Abnormal production costs	57,973	-0.004	0.248	-0.123	-0.006	0.108
Frequency of voluntary disclosures	39,343	0.715	0.745	0.000	0.693	1.099
Frequency of other disclosures	39,343	1.373	1.049	0.000	1.609	2.303
Length of voluntary disclosures	24,915	4.962	1.025	4.248	4.860	5.533
Fog Index	24,915	16.739	4.010	14.200	16.344	18.749
R&D expenditures	80,065	0.047	0.107	0.000	0.000	0.053
Capital expenditures	80,065	0.062	0.071	0.020	0.041	0.078
Acquisition expenditures	80,065	0.021	0.063	0.000	0.000	0.006
Sales of PP&E	80,065	0.006	0.040	0.000	0.000	0.002
Total investment	80,065	0.124	0.136	0.042	0.091	0.167
ROE	92,460	0.084	0.277	0.000	0.000	0.000
SD ROE	92,460	-0.139	0.783	-0.087	0.072	0.148
Leverage	92,460	0.075	0.112	0.017	0.036	0.082
Market-to-book	92,460	0.211	0.189	0.031	0.183	0.338
Firm size	92,460	2.981	3.653	1.137	1.879	3.257
Dividend	92,460	4.899	2.158	3.327	4.803	6.395
Firm age	92,460	0.800	1.496	0.000	0.000	1.008
Diversification	92,460	2.386	0.741	1.792	2.398	2.996
Stock turnover	92,460	0.845	0.857	0.000	0.693	1.099
Bid-ask spread	92,460	0.057	0.061	0.028	0.042	0.065
% Zero return days	92,460	18.980	18.857	3.984	14.567	27.273
G Index	15,281	6.914	2.738	5.000	7.000	9.000
% Independent directors	10,407	0.681	0.175	0.571	0.714	0.818
% Co-opted directors	10,407	0.417	0.299	0.125	0.444	0.667

Table 2 Universal demand laws and idiosyncratic volatility

This table reports the fixed effects results that estimate the effect of universal demand (UD) laws on idiosyncratic volatility. The dependent variable is *Idiosyncratic volatility*, the logistic transformation of $1 - R^2$ is from a Fama and French three-factor model regression. *UD* is a dummy variable, which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable = *Idiosyncratic volatility*			
	(1)	(2)	(3)	(4)
UD	-0.087**	-0.070**	-0.081***	-0.075***
	(0.038)	(0.029)	(0.025)	(0.024)
ROE	0.016***	0.014***	0.016***	0.015***
	(0.004)	(0.005)	(0.004)	(0.005)
SD ROE	0.037	0.049	0.042	0.053
	(0.035)	(0.032)	(0.034)	(0.034)
Leverage	-0.022	-0.042	-0.020	-0.035
	(0.030)	(0.027)	(0.028)	(0.027)
Market/Book	0.014***	0.014***	0.014***	0.014***
	(0.001)	(0.001)	(0.001)	(0.001)
Firm Size	-0.441***	-0.445***	-0.439***	-0.443***
	(0.009)	(0.010)	(0.008)	(0.010)
Dividend	-0.004	-0.001	0.002	0.003
	(0.008)	(0.010)	(0.008)	(0.010)
Firm Age	0.106***	-0.003	0.071***	-0.015
	(0.018)	(0.017)	(0.017)	(0.015)
Diversification	-0.070***	-0.056***	-0.072***	-0.058***
	(0.009)	(0.011)	(0.008)	(0.010)
Stock turnover	-0.922***	-0.705***	-0.825***	-0.674***
	(0.151)	(0.132)	(0.138)	(0.125)
Bid-ask spread	-1.592***	-1.237***	-1.449***	-1.188***
	(0.224)	(0.163)	(0.203)	(0.158)
% Zero return days	0.016***	0.014***	0.016***	0.014***
	(0.002)	(0.001)	(0.002)	(0.002)
Firm FEs	Yes	No	No	Yes
Year FEs	Yes	No	No	No
Industry * Year FEs	No	Yes	No	Yes
HQ State * Year FEs	No	No	Yes	Yes
Observations	92,460	92,460	92,460	92,460
R-squared	0.737	0.750	0.745	0.756

Table 3 Universal demand laws and liquidity risk

In Panel A, we use an alternative dependent variable, which is idiosyncratic risk estimated using quote-mid-point price returns (Han and Lesmond, 2011). Panel B uses the CRSP closing price idiosyncratic volatility but includes higher-order forms of liquidity measures to further control for any non-linear effect of the bid–ask bounce. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are collapsed for brevity and are similar to those included in Table 2. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Idiosyncratic volatility computed using quote-midpoint prices (Han and Lesmond, 2011)

Dependent variable = *Idiosyncratic volatility (quote-midpoint prices)*	(1)
UD	-0.098***
	(0.031)
Control variables	Yes
Firm FEs	Yes
Industry * Year FEs	Yes
HQ State * Year FEs	Yes
Observations	58,661
R-squared	0.750

Panel B: Additional controls for the non-linear influence of the bid-ask bounce

Dependent variable = *Idiosyncratic volatility*	(1)	(2)	(3)
UD	-0.073***	-0.076***	-0.069***
	(0.025)	(0.024)	(0.024)
Squared Bid–ask spread	0.874*		4.086***
	(0.517)		(0.384)
*% Zero return days * Bid–ask spread*		-0.023***	-0.057***
		(0.007)	(0.007)
Control variables	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes
Observations	92,460	92,460	92,460
R-squared	0.756	0.756	0.757

Table 4 Universal demand laws and information asymmetry

This results in this table validate our baseline results on the effects of UD laws on analyst's forecast accuracy. The dependent variables are (1) *Earnings forecast dispersion*, the standard deviation of earnings-per-share forecasts scaled by the absolute value of mean forecasted earnings-per-share, and (2) *Mean absolute earnings forecast errors*, the average of the absolute values of earnings-per-share forecasts less the actual earnings-per-share, scaled by the absolute value of the actual earnings-per-share. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variables	
	Earnings forecast dispersion	*Mean absolute earnings forecast errors*
	(1)	(2)
UD	0.043***	0.054*
	(0.013)	(0.029)
ROE	-0.062***	0.002
	(0.014)	(0.012)
SD ROE	0.350***	0.535***
	(0.040)	(0.057)
Leverage	0.188***	0.348***
	(0.021)	(0.035)
Market-to-book	-0.006***	-0.008***
	(0.001)	(0.002)
Firm size	-0.194***	-0.303***
	(0.025)	(0.027)
Firm size squared	0.008***	0.011***
	(0.001)	(0.002)
Firm age	0.066***	0.114***
	(0.015)	(0.024)
Earnings growth	0.000	-0.000***
	(0.000)	(0.000)
Negative earnings	0.171***	0.125***
	(0.010)	(0.019)
Dividend	-0.015***	0.003
	(0.002)	(0.004)
Stock returns	-0.038***	-0.100***
	(0.005)	(0.011)
Sales growth	-0.080***	-0.101***
	(0.020)	(0.031)
Analyst coverage	0.051***	0.041***
	(0.010)	(0.011)
Firm FEs	Yes	Yes
Industry * Year FEs	Yes	Yes
HQ State * Year FEs	Yes	Yes
Observations	37,456	39,027
R-squared	0.423	0.337

Table 5 Universal demand laws and earnings opacity

This table reports the results of an examination of the impact of UD laws on several proxies for earnings opacity. In Panel A, the dependent variables are the absolute value of the residuals from discretionary accrual models of Jones (1991), Dechow et al. (1995), Dechow and Dichev (2002), and McNichols (2002). The dependent variables in Panel B are *Abnormal cash flows from operations*, *Abnormal discretionary expenses*, and *Abnormal production costs* (Roychowdhury 2006). *UD* is a dummy variable, which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Abnormal accounting accruals

	Dependent variables			
	Jones	*Modified-Jones*	*Dechow & Dichev*	*McNichols*
	(1)	(2)	(3)	(4)
UD	-0.000	-0.000	0.001	0.002
	(0.002)	(0.002)	(0.003)	(0.002)
Firm size	-0.001	-0.000	-0.001	-0.002***
	(0.001)	(0.001)	(0.000)	(0.000)
Market-to-book	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.016***	-0.015***	-0.014***	-0.013***
	(0.004)	(0.004)	(0.003)	(0.002)
Firm age	-0.008***	-0.009***	-0.010***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.001)
ROE	-0.005***	-0.006***	-0.005***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Stock return	0.001***	0.001**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Capital investment	-0.039***	-0.039***	-0.019***	-0.019***
	(0.007)	(0.006)	(0.003)	(0.003)
Intangibles	-0.006	-0.005	0.014***	0.013***
	(0.005)	(0.005)	(0.005)	(0.004)
Financing	0.035***	0.038***	0.036***	0.029***
	(0.002)	(0.002)	(0.002)	(0.001)
Acquisition	0.016***	0.018***	-0.001	0.002**
	(0.002)	(0.002)	(0.001)	(0.001)
Sales growth	0.006***	0.005***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Inventory	0.019***	0.022***	0.027***	0.013***
	(0.006)	(0.005)	(0.006)	(0.004)
Receivables	0.054***	0.067***	0.057***	0.040***
	(0.005)	(0.006)	(0.004)	(0.005)
Firm FEs	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes
Observations	45,431	45,431	45,431	45,431
R-squared	0.358	0.363	0.428	0.415

Panel B: Real earnings management

	Dependent variables		
	Abnormal cash flows from operations	*Abnormal Discretionary Expenses*	*Abnormal production costs*
	(1)	(2)	(3)
UD	-0.007	0.022**	-0.000
	(0.117)	(0.012)	(0.969)
Firm size	0.012***	-0.018***	-0.007***
	(0.000)	(0.000)	(0.000)
Market-to-book	-0.001***	0.008***	-0.005***
	(0.000)	(0.000)	(0.000)
ROE	0.027***	-0.014***	-0.034***
	(0.000)	(0.000)	(0.000)
SD ROE	-0.068***	0.199***	-0.009
	(0.000)	(0.000)	(0.575)
Leverage	-0.066***	-0.118***	0.065***
	(0.000)	(0.000)	(0.000)
Dividend	-0.001	-0.002**	0.000
	(0.110)	(0.022)	(0.826)
Firm age	0.020***	-0.005	-0.003
	(0.000)	(0.393)	(0.702)
Diversification	-0.002	-0.000	0.008***
	(0.147)	(0.953)	(0.000)
Firm FEs	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes
Observations	57,973	57,973	57,973
R-squared	0.588	0.740	0.665

Table 6 Universal demand laws and voluntary disclosures

This table provides the results of an examination of the impact of UD laws on voluntary disclosures. The dependent variables are *Frequency of voluntary disclosures, Frequency of other disclosures, Average length of voluntary disclosures, Readability of voluntary disclosures*. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Frequency		Quantity	Quality
	Frequency of *voluntary* disclosures	Frequency of *other* disclosures	Average length of voluntary disclosures	Readability of voluntary disclosures
	(1)	(2)	(3)	(4)
UD	0.112***	0.062	-0.075	-0.700**
	(0.038)	(0.041)	(0.047)	(0.303)
ROE	-0.043***	-0.020***	-0.005	-0.002
	(0.003)	(0.003)	(0.008)	(0.022)
S.D. (ROE)	0.350***	0.177***	0.152***	-0.068
	(0.035)	(0.043)	(0.039)	(0.130)
Leverage	0.252***	0.238***	0.114**	-0.039
	(0.025)	(0.031)	(0.044)	(0.229)
Market-to-book	-0.009***	-0.007***	-0.002	0.009
	(0.002)	(0.001)	(0.002)	(0.010)
Firm size	0.048***	0.021***	0.004	-0.086***
	(0.004)	(0.004)	(0.006)	(0.027)
Dividend	0.038***	-0.011***	-0.006	-0.071*
	(0.005)	(0.002)	(0.006)	(0.036)
Firm age	0.079***	0.037**	-0.041	0.446***
	(0.019)	(0.018)	(0.029)	(0.140)
Diversification	-0.012***	0.019***	-0.001	0.149**
	(0.004)	(0.006)	(0.007)	(0.059)
Stock turnover	0.436***	0.239***	0.290***	0.428***
	(0.032)	(0.026)	(0.024)	(0.127)
Firm FEs	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes
Observations	39,343	39,343	24,915	24,915
R-squared	0.486	0.866	0.393	0.363

Table 7 Universal demand laws and corporate investment policies

This table provides the results of an examination of the impact of UD laws on corporate investment policies. The dependent variables are *R&D expenditures* (column (1)), *Capital expenditures* (column (2)), *Acquisition expenditures* (column (3)), *Sales of PP&E* (column (4)), and *Total investment*, which is the sum of *R&D expenditures*, *Capital expenditures*, and *Acquisitions* less *Sales of PP&E* (column (5)). All dependent variables are scaled by total assets. *UD* is a dummy variable, which equals one if a firm is incorporated in the state that has adopted universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	R&D expenditures (1)	*Capital expenditures* (2)	*Acquisition expenditures* (3)	*Sales of PP&E* (4)	*Total investment* (5)
UD	0.005***	-0.001	0.001	-0.000	0.006**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
ROE	-0.013***	0.000	0.001**	-0.002***	-0.018***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)
SD ROE	-0.000	-0.009***	-0.016***	0.014***	-0.044***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)
Leverage	-0.043***	-0.016***	0.081***	-0.006**	0.014*
	(0.004)	(0.002)	(0.003)	(0.003)	(0.007)
M/B	0.002***	0.001***	-0.001***	-0.000**	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm size	-0.008***	0.007***	0.010***	-0.001***	0.010***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)
Dividends	0.001***	-0.002***	-0.002***	0.000	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.001	-0.008***	-0.009***	0.002***	-0.020***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
Cash	-0.012***	-0.054***	-0.047***	0.006***	-0.128***
	(0.004)	(0.002)	(0.003)	(0.002)	(0.006)
Stock return	-0.001***	-0.007***	-0.001	0.001	-0.010***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Sales growth	0.001	0.006***	0.013***	-0.002***	0.022***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.003)
Diversification	0.000	-0.003***	0.001	0.000	-0.002**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	80,065	80,065	80,065	80,065	80,065
R-squared	0.845	0.629	0.283	0.273	0.570

Table 8 Cross-sectional evidence

This table reports the effects of UD laws on idiosyncratic volatility across different subsets of firms. We split the sample into three subsamples according to the firm-level average of the corresponding sorting variable. The sorting variable is indicated at the top of each column. The dependent variable is *Idiosyncratic volatility*. Top tercile is a dummy variable which equals one when a firm's value of the sorting variable is in the above the 34th percentile (top 33%). Middle tercile is a dummy variable, which equals one when a firm's value of the sorting variable is between the 34th and 66th percentiles (middle 34%). Bottom tercile is a dummy variable which equals one when a firm's value of the sorting variable is between the 67th and 100th percentiles (bottom 33%). *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Firm characteristics

	Sorting variable				
	Firm size	*R&D*	*Market/Book*	*Tangibility*	*CapEx*
	(1)	(2)	(3)	(4)	(5)
*UD * Top tercile*	0.082	-0.179**	-0.088**	-0.020	-0.065
	(0.122)	(0.070)	(0.034)	(0.095)	(0.047)
*UD * Middle tercile*	-0.027	-0.029	-0.041	-0.047	-0.039
	(0.069)	(0.047)	(0.100)	(0.082)	(0.047)
*UD * Bottom tercile*	-0.092***	-0.077	0.004	-0.088**	-0.098**
	(0.027)	(0.049)	(0.088)	(0.037)	(0.045)
Control Variables	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes	Yes
Observations	92,460	92,460	92,460	92,460	92,460
R-squared	0.756	0.756	0.756	0.756	0.756

Panel B: Agency costs and institutional investors

	Sorting variable		
	Board independence	*G-index*	*Dedicated institutional investors*
	(1)	(2)	(3)
UD * Top tercile	-0.097**	0.017	-0.115**
	(0.047)	(0.093)	(0.057)
UD * Middle tercile	-0.055	-0.009	-0.011
	(0.085)	(0.068)	(0.034)
UD * Bottom tercile	-0.024	-0.129**	-0.006
	(0.202)	(0.060)	(0.074)
Control Variables	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes
Observations	35,216	32,357	62,754
R-squared	0.773	0.772	0.777

Table 9 Investment sensitivity to price

This table reports the fixed effects estimation results on the effect of UD laws on investment-price sensitivity. The dependent variables are *Total investment* (columns (1) and (3)) and *R&D expenditures* (columns (2) and (4)). *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted the universal demand law. The coefficient on UD_{t-1} * *Demeaned* Q_{t-1} captures the change in investment-price sensitivity after the passage of UD laws. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Total investment (1)	*R&D expenditures* (2)	*Total investment* (3)	*R&D expenditures* (4)
UD_{t-1} * *Demeaned* Q_{t-1}	0.011***	0.009***	0.011***	0.009***
	(0.004)	(0.003)	(0.004)	(0.003)
UD_{t-1}	0.013***	0.003**	0.013***	0.003**
	(0.004)	(0.002)	(0.004)	(0.002)
Demeaned Q_{t-1}	0.019***	0.000	0.019***	0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Ln Total assets$_{t-1}$	-0.023***	-0.012***	-0.023***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
Ln Cash flows$_{t-1}$	0.033***	-0.024***	0.033***	-0.024***
	(0.004)	(0.001)	(0.004)	(0.001)
Idiosyncratic volatility $_{t-1}$ * *Demeaned* Q_{t-1}			0.003***	0.002***
			(0.000)	(0.000)
Idiosyncratic volatility$_{t-1}$			0.001	0.003***
			(0.000)	(0.000)
Firm FEs	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes
Observations	67,088	67,088	67,088	67,088
R-squared	0.563	0.834	0.563	0.835

Table 10 Crash risk

This table reports the fixed effects estimation results on the effect of UD laws on stock price crashes. The dependent variables are (1) *CRASH*, a dummy variable which equals one for firms that experience at least one extreme negative firm-specific return (defined as 3.2 standard deviations below the sample mean) in each year and zero otherwise; (2) *COUNT*, the number of extreme negative firm-specific returns (defined as 3.2 standard deviations below the sample mean) minus the number of extreme positive firm-specific returns (defined as 3.2 standard deviations above the sample mean) in each year; (3) *NCSKEW*, minus one times the coefficient of skewness of firm-specific returns; and (4) *DUVOL*, the natural logarithm of the sample variance of firm-specific returns below the sample mean divided by the sample variance of firm-specific returns above the sample mean. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	CRASH	*COUNT*	*NCSKEW*	*DUVOL*
	(1)	(2)	(3)	(4)
UD	0.007	-0.069*	-0.033	-0.007
	(0.008)	(0.041)	(0.031)	(0.016)
$NCSKEW_{t-1}$	-0.007***	-0.018***	-0.074***	-0.023***
	(0.001)	(0.003)	(0.009)	(0.002)
Stock return volatility	0.001	-0.013**	-0.163***	-0.051***
	(0.003)	(0.006)	(0.009)	(0.002)
Stock return	-0.003***	-0.010***	-0.008***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.000)
Change in stock turnover	0.373***	1.084***	0.394***	0.368***
	(0.015)	(0.041)	(0.105)	(0.027)
Firm size	0.048***	0.133***	-0.027***	0.015***
	(0.002)	(0.007)	(0.008)	(0.004)
Market/Book	0.002***	0.009***	0.008***	0.005***
	(0.001)	(0.002)	(0.002)	(0.001)
Leverage	0.017	-0.066	0.070	-0.018
	(0.023)	(0.051)	(0.052)	(0.024)
Profitability	0.010***	0.074***	0.044***	0.026***
	(0.003)	(0.013)	(0.016)	(0.006)
Bid–ask spread	0.393***	2.145***	2.577***	1.155***
	(0.041)	(0.208)	(0.581)	(0.196)
% Zero return days	0.004***	-0.008***	-0.020***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.000)
Firm FEs	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes
Observations	74,562	74,562	74,562	74,562
R-squared	0.276	0.306	0.343	0.423

Table 11 Robustness checks

This table reports the results of various robustness checks on our baseline results on the effect of UD laws on idiosyncratic volatility. The dependent variable is *Idiosyncratic volatility*. In the specifications for Panel A, we replace the main indicator variable in the specification for Table 2, *UD*, with a set of indicator variables — $UD_{s,}$ where s is the year relative to the year in which the universal demand Law is enacted in a state of incorporation. In the specifications for Panel B, we control for other business laws enacted around the same time with UD laws: control share acquisition laws, business combination laws, fair price laws, directors' duties laws, and poison pill laws. In the specifications for Panel C, we include additional controls for firm governance: G-index, % independent directors, and % co-opted directors. Panel D presents the results using alternative samples. *UD* is a dummy variable which equals one if a firm is incorporated in the state that has adopted the universal demand law. Firm fixed effects, industry-year fixed effects, and state-year fixed effects are included in all models. Control variables are defined in Table A1. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Dynamic timing effects of the universal demand law

	(1)
$UD_{\geq+1}$	-0.091**
	(0.037)
UD_{0}	-0.048
	(0.050)
UD_{-1}	-0.047
	(0.042)
UD_{-2}	-0.034
	(0.040)
UD_{-3}	-0.054
	(0.035)
UD_{-4}	0.025
	(0.044)
UD_{-5}	0.045
	(0.045)
Control Variables	Yes
Firm FEs	Yes
Industry * Year FEs	Yes
HQ State * Year FEs	Yes
Observations	92,460
R-squared	0.770

Panel B: Controlling for potential confounded events

	(1)	(2)	(3)	(4)	(5)	(6)
UD	-0.079***	-0.069***	-0.077***	-0.072***	-0.069***	-0.067***
	(0.025)	(0.024)	(0.024)	(0.023)	(0.024)	(0.024)
Control share acquisition laws	0.017					0.020
	(0.034)					(0.036)
Business combination laws		0.056***				0.052***
		(0.018)				(0.019)
Fair price laws			0.019			0.011
			(0.028)			(0.034)
Directors' duties laws				-0.009		-0.012
				(0.027)		(0.023)
Poison pill laws					-0.017	-0.009
					(0.024)	(0.025)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	92,460	92,460	92,460	92,460	92,460	92,460
R-squared	0.756	0.756	0.756	0.756	0.756	0.756

Panel C: Controlling for alternative governance mechanisms and voluntary disclosure

	(1)	(2)	(3)
UD	-0.140**	-0.181***	-0.179***
	(0.052)	(0.064)	(0.065)
G-Index	-0.011		
	(0.008)		
% Independent directors		-0.045	
		(0.054)	
% Co-opted directors			-0.020
			(0.050)
Frequency of voluntary disclosures			
Control Variables	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes
Observations	15,281	10,407	10,407
R-squared	0.810	0.810	0.810

Panel D: Other robustness checks

	Excluding financial crisis (2008-2009) (1)	Treatment firms restricted to firms in Pennsylvania (2)	Excluding Delaware firms (3)	Headquarter state the same as state of incorporation (4)
UD	-0.064***	-0.141***	-0.232*	-0.203***
	(0.024)	(0.049)	(0.135)	(0.048)
Control Variables	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry * Year FEs	Yes	Yes	Yes	Yes
HQ State * Year FEs	Yes	Yes	Yes	Yes
Observations	87,692	75,942	22,208	17,127
R-squared	0.745	0.765	0.761	0.754

Appendix

Table A1: Variable definitions

Variable	Definition	Source
Idiosyncratic volatility	Logistic transformation of one minus R-squared from the Fama and French three-factor model: $r_{i,w} = \alpha_i + \beta_{1i} r_{m,w} + \beta_{2i} r_{smb,w} + \beta_{3i} r_{hml,w} + e_{i,w}$ where $r_{i,w}$ is the weekly return on stock i on week w. Logistic transformation of one minus R-squared from the Fama and French three-factor model: $r^d_{i,t} - r^d_{f,t} = \alpha_{it} + \beta_{mkt,i,t}\left(r^d_{mkt,t} - r^d_{f,t}\right) + \beta_{smb,i,t} r^d_{smb,t} + \beta_{hml,i,t} r^d_{hml,t} + \varepsilon^d_{i,t}$, where $r^d_{i,t}$ is the CRSP daily closing return (based on close-to-close prices) for firm *i* on day *d* of year *t*, and $r^d_{f,t}$ is the daily risk-free rate. The variables $r^d_{mkt,t}$, $r^d_{smb,t}$ and $r^d_{hml,t}$ are daily returns on the market, the small-minus-big (SMB) factor, and the high-minus-low (HML) factors respectively.	CRSP; Kenneth French's website
Idiosyncratic volatility (quote-midpoint prices)	Logistic transformation of one minus R-squared from the Fama and French three-factor model, with daily stock returns calculated using quote midpoints, (Ask + Bid)/2, instead of the CRSP daily closing return.	CRSP; Kenneth French's website
Earnings forecast dispersion	Standard deviation of earnings per share forecasts within 2 and 360 days before the earnings announcement date scaled by mean EPS forecasts.	I/B/E/S
Mean absolute earnings forecast errors	Average absolute value of earnings per share forecasts less actual earnings per share scaled by actual earnings per share.	I/B/E/S
Earning management		
Earnings quality (Jones)	Absolute value of the residuals from the regression of total accruals on change in revenue and value of property, plant, and equipment (Jones, 1991). The dependent variable and all regressors are scaled by total assets.	Compustat
Earnings quality (modified Jones)	Absolute value of the residuals from the regression of total accruals on the difference between change in revenue and change in account receivables, and value of property, plant, and equipment (Dechow et al., 1995). The dependent variable and all regressors are scaled by total assets.	Compustat
Earnings quality (Dechow & Dichev)	Absolute value of the residuals from the regression of change in working capital on lagged operating cash flows, contemporaneous operating cash flows, and future operating cash flows (Dechow and Dichev, 2002). The dependent variable and all regressors are scaled by total assets.	Compustat
Earnings quality (McNichols)	Absolute value of the residuals from the regression of change in working capital on lagged operating cash flows, contemporaneous operating cash flows, future operating cash flows, change in revenue, and value of property, plant, and equipment (McNichols, 2002). The dependent variable and all regressors are scaled by total assets.	Compustat
Abnormal cash flows from operations	Absolute value of the residuals from the regression of operating cash flows on lagged sales and sales growth. The dependent variable and all regressors are scaled by total assets.	Compustat
Abnormal discretionary expenses	Absolute value of the residuals from the regression of discretionary expenses (sum of advertising expenditures, R&D expenditures, and SG&A expenditures) on lagged sales and sales growth. The dependent variable and all regressors are scaled by total assets.	Compustat
Abnormal production costs	Absolute value of the residual from the regression of production costs (sum of costs of goods sold and the value of inventory) on lagged sales and sales growth. The dependent variable and all regressors are scaled by total assets.	Compustat
Firm disclosures		

Frequency of voluntary disclosures	Natural logarithm of one plus the number of 8-K filings that contain Item 8.01 (for filings in 2004 format) or Item 5 (for filings in pre-2004 format).	SEC EDGAR
Frequency of other disclosures	Natural logarithm of one plus the number of 8-K filings that does not contain Item 8.01 (for filings in 2004 format) or Item 5 (for filings in pre-2004 format).	SEC EDGAR
Average length of voluntary disclosures	Annual average of word counts of firm disclosures under Item 8.01 or Item 5	SEC EDGAR
Readability of voluntary disclosures	Annual average of Fog Index, measuring readability of firm disclosures under Item 8.01 or Item 5. Fog Index is defined as 0.4 times the sum of number of words per sentence and the proportion of complex words in percent. Complex words are defined as words that contain four or more syllables.	SEC EDGAR
Firm investment		
R&D expenditures	Research and development expenditures scaled by total assets.	Compustat
Capital expenditures	Capital expenditures scaled by total assets	Compustat
Acquisition expenditures	Acquisition expenditures scaled by total assets	Compustat
Sales of PP&E	Sales of property, plant, and equipment scaled by total assets	Compustat
Total investment	Sum of research and development expenditures, capital expenditures, and acquisition expenditures less sales of property, plant, and equipment scaled by total assets	Compustat
Stock price crashes		
CRASH	Dummy variable which equals one for firms that experience at least one extreme negative firm-specific return (defined as 3.2 standard deviations below the sample mean) in each year. Firm-specific return is defined as the residual from Fama and French three-factor model	CRSP
COUNT	The number of extreme negative firm-specific returns (defined as 3.2 standard deviations below the sample mean) minus the number of extreme positive firm-specific returns (defined as 3.2 standard deviations above the sample mean) in each year. Firm-specific return is defined as the residual from Fama and French three-factor model	CRSP
NCSKEW	Minus one times the coefficient of skewness of firm-specific returns	CRSP
DUVOL	Logarithm of the sample variance of firm-specific returns below the sample mean divided by the sample variance of firm-specific returns above the sample mean.	CRSP
Firm and industry controls		
ROE	Net income scaled by total value of common equity.	Compustat
SD ROE	Standard deviation of ROE in the currently and the previous two years.	Compustat
Leverage	Total long-term debt divided by total assets.	Compustat
Market-to-Book	Product of number of common shares outstanding and share price at the end of fiscal year divided by total common equity.	Compustat
Firm size	Natural logarithm of firm market capitalization.	Compustat
Firm age	Natural logarithm of one plus the number of years since the firm's inclusion in the Compustat database.	Compustat
Diversification	Natural logarithm of number of business segments.	Compustat
Tangibility	Net property, plant and equipment (PPE) scaled by total assets.	Compustat
Stock turnover	Trading volume scaled by number of shares outstanding, multiplied by 1,000.	CRSP
Bid-ask spread	Closing ask price minus closing bid price, scaled by the average of ask and bid prices.	CSRP
% Zero return days	Number of trading days in which daily return is equal to zero divided by total number of trading days, multiplied by 100.	CSRP
Governance variables		
% Independent directors	Number of directors classified as independent scaled by total number of directors.	RiskMetrics.
%Co-opted directors	Number of directors appointed after the CEO scaled by the total number of directors.	RiskMetrics
G Index	Index of governance provisions developed by Gompers et al. (2003).	RiskMetrics

Table A2: Does stock price informativeness determine the adoption of UD laws?

We estimate a duration model at the state-year level in which the dependent variable is the hazard ratio for the Cox regression (*_t*), the probability that a state will adopt UD laws in the next unit of time. The results are in column (1). We also estimate a probit model in which the dependent variable is a dummy that equals one on or after the state adopts UD laws. The results are in column (2). All variables are lagged by one-year. Standard errors clustered by state of incorporation are reported in parentheses. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% levels, respectively.

	Hazard model	Probit model
	(1)	(2)
Lagged idiosyncratic volatility	0.240	0.047
	(0.255)	(0.106)
Lagged ln(GDP)	-0.475	-0.023
	(0.324)	(0.092)
Lagged ln(GDP per capita)	-7.234***	-0.398
	(2.040)	(0.331)
Lagged ln(number of firms)	0.640***	-0.007
	(0.238)	(0.067)
Observations	814	814

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