

Shareholder Litigation and the Information Environment*

Audra Boone
Neeley School of Business
Texas Christian University
Fort Worth, TX 76109
audra.boone@tcu.edu

Eliezer Fich
LeBow College of Business
Drexel University
Philadelphia, PA 19104
emf35@drexel.edu

Thomas Griffin
Villanova School of Business
Villanova University
Villanova, PA 19085
thomas.griffin@villanova.edu

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Abstract

Prior research argues that universal demand (UD) laws, which weaken shareholders' litigation rights, incentivize managers to report more and better-quality information. This view relies on post-UD increases in the length and frequency of voluntary disclosure. We find that the increase in disclosure quantity coincides with a decrease in the quality of both voluntary and mandatory disclosure, leading to greater information asymmetry among analysts and in the trading environment. Moreover, managers appear to benefit from the reduced transparency through more profitable insider trades. Therefore, in contrast with prior work, we conclude that corporate information environments deteriorate when shareholder litigation rights decline.

Keywords: Information environment, shareholder litigation, insider trading, universal demand laws

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* Boone is at the Neeley School of Business, Texas Christian University, Fort Worth, TX 76109. Fich is at the LeBow College of Business, Drexel University, Philadelphia PA 19101. Griffin is at the Villanova School of Business, Villanova University, Villanova PA 19085. For helpful comments we thank Matthew Serfling (discussant), Colin Zhang (discussant), Lennart Ulrich, seminar participants at the Frankfurt School of Finance, University of Melbourne, University Technology Sydney, The University of New South Wales, The Australian National University, Monash University, The Otto Beisheim School of Management (WHU), and participants at the 2018 Corporate Finance Conference at the Manchester Business School, The 2018 American Law and Economics Association Annual Meeting, the 2018 U.S. Securities and Exchange Commission Doctoral Symposium, and the 2018 FMA Annual Meeting in San Diego. All errors are our responsibility.

1. Introduction

Shareholder monitoring is a crucial governance mechanism that helps constrain agency problems (Fama and Jensen, 1983; Shleifer and Vishny, 1997). A rich information environment facilitates shareholders' ability to monitor managerial behavior and agitate for corrective action (Fama, 1990). Managers, however, control the flow of information and can adjust the level of transparency to extract private benefits. While litigation is a fundamental avenue through which shareholders can remedy a breach of fiduciary duty, the relation between shareholder litigation and a firm's information environment remains unclear. Given the prevalence of high-profile shareholder lawsuits,¹ advancing our understanding in this area is of first order importance.

In this paper, we explore how the threat of shareholder litigation influences firms' information production and the level of information asymmetry between managers and investors, among analysts, and in the trading environment. For this purpose, we exploit the staggered adoption of universal demand (UD) laws by 23 U.S. states between 1989 and 2005. UD laws establish a procedural hurdle that requires shareholders to obtain approval from the board of directors before initiating a derivative lawsuit. Because these lawsuits often name officers and directors as defendants, board members rarely grant approval, and the universal demand requirement leads to a significant decline in derivative litigation against firms incorporated in a UD state (Appel, 2016).

We use this plausibly exogenous variation in litigation risk to examine how the information environment changes once management becomes less vulnerable to shareholder lawsuits. Our empirical analyses control for unobserved, time-invariant differences across firms with firm fixed effects and time-varying heterogeneity at the headquarter state-level and industry-level with

¹ For example, in 2016, both Qualcomm and Twitter faced derivative lawsuits alleging that their executives provided misleading financial statements to hide poor performance, while selling millions of dollars of personally held stock.

multiplicative fixed effects (Gormley and Matsa, 2014). Thus, our generalized difference-in-differences estimation strategy tests how the *threat* of shareholder litigation shapes firms' information environments, using a sample of 44,546 U.S. firm-year observations from 6,061 firms between 1987 and 2007.

We frame the empirical analysis around two hypotheses. Under the *agency hypothesis*, the threat of litigation restrains managers from obscuring the information environment for personal gain. Thus, a lower threat of litigation post-UD leads to less corporate transparency, and, in turn, to more information asymmetry between the firm and market participants. Alternatively, under the *liability hypothesis*, a lower threat of litigation promotes more disclosure by reducing the likelihood that the information would later be used to sue the firm (Johnson, Kasznik, and Nelson, 2001). In either case, UD laws influence the level of information production by shifting the potential costs and benefits of disclosure (Verrecchia, 2001). Notably, only the *agency hypothesis* unambiguously predicts that a change in information production would lead to higher information asymmetry.

We begin our analysis by examining the effect of UD laws on voluntary disclosure behavior. In a recent and related study, Bourveau, Lou, and Wang (2018) find that managers increase the quantity of voluntary disclosure after the passage of UD laws and interpret their results as evidence that UD laws incentivize managers to be more transparent, rather than to engage in opportunistic behavior. Like Bourveau et al., we also find that firms affected by UD laws (i) increase the length of management discussion and analysis (MD&A) in their 10-K filings, (ii) increase the frequency of voluntary 8-K filings and management earnings forecasts, (iii) increase the frequency of optimistic and pessimistic earnings forecasts, and (iv) decrease the width of earnings forecasts. At first glance, this evidence appears to support the litigation hypothesis and contrast with the agency

hypothesis. However, we note that an increase in *both* optimistic and pessimistic forecasts (defined as forecasts with actual earnings surprises greater than 10% and smaller than -10%, respectively) suggests that managers issue forecasts with large errors more frequently after UD laws pass. To evaluate this conjecture, we supplement Bourveau et al.'s analyses with a test of management forecast accuracy. This test reveals that the absolute difference between management forecasts and actual earnings increases by roughly one-third of the sample mean following the passage of UD laws. The deterioration in forecast accuracy contrasts with the conclusions in Bourveau et al. and suggests that the post-UD increase in the quantity of voluntary disclosures does not necessarily improve firm transparency (e.g., Loughran and McDonald, 2014; Lo, Ramos, and Rogo, 2017).

Because voluntary disclosure represents just one channel through which managers shape the information environment, we next examine how the threat of shareholder litigation affects the quality of mandatory disclosure. Using the disclosure quality measure of Chen, Miao, and Shevlin (2015), we find that firms provide less detailed financial reports after the adoption of UD laws. Firms become less likely to disclose information about comprehensive income and non-recurring items—two categories that are prone to manipulation (Sherman and Young, 2001). Together with our finding that management forecast accuracy declines post-UD, this result casts doubt on Bourveau et al.'s (p.800) interpretation that weakening shareholder litigation rights incentivizes managers to share better quality information with shareholders rather than to act opportunistically.

To assess the net effect of UD laws on the information environment, we study whether the change in disclosure post-UD corresponds to changes in information asymmetry. After the adoption of a UD law, analyst forecast dispersion increases by approximately 9% of a standard deviation and analyst forecast error increases by 8% of a standard deviation relative to firms operating in the same state and industry but not incorporated in a UD state. We find similar effects

in the trading environment. Bid-ask spreads and the probability of informed trading both increase, while dollar trading volume decreases after the adoption of a UD law. Thus, our results indicate that firms experience a marked decline in the information environment when facing a lower threat of litigation.

Given our results that UD laws represent a negative shock to firms' information environments and lead to higher information asymmetry, we explore whether reduced shareholder litigation affects the propensity for firms to be subjected to a regulatory enforcement action. An increase in misreporting, however, might not lead to an increase in enforcement activity without derivative litigation to attract regulators' attention (Dyck, Morse, and Zingales, 2010). Moreover, a less transparent information environment might make it more difficult for regulators to uncover evidence required to initiate an action against a firm. Our results indicate that firms incorporated in a state that passed a UD law are less likely to face an enforcement action from the U.S. Securities and Exchange Commission (SEC) or Department of Justice (DOJ). The reduced likelihood of regulatory enforcement is notable because we also find some evidence of greater earnings management by treated firms. These findings are consistent with recent remarks by SEC Commissioner Robert Jackson Jr., who argued that "shareholder suits also help ... the SEC identify and address corporate wrongdoing."²

Taken together, our results imply that a reduction in the threat of shareholder litigation increases information asymmetry between managers and investors, among analysts, and in the trading environment. Nevertheless, we acknowledge that some of our proxies are subject to caveats. Dechow, Ge, and Schrand (2010), for example, note that variables intended to measure the quality of the information environment can track benign firm characteristics that do not

² <https://www.sec.gov/news/speech/jackson-shareholders-conversation-about-mandatory-arbitration-022618>

necessarily indicate agency problems. Because of this possibility, we study the agency hypothesis by investigating whether managers avail themselves of the reduced transparency to extract private benefits. To this end, we examine insider trading profits. In a sample of 200,581 net daily insider trade transactions, we find direct evidence that supports the agency hypothesis: officers earn over 3% higher trading profits when protected by a universal demand requirement.

This paper makes several contributions to the literature that studies the effects of shareholder litigation on corporations. First, our results suggest that preventing shareholders from redressing breaches of fiduciary duty, through the passage of UD laws, leads to an increase in information asymmetry and opportunistic managerial behavior. This interpretation of the evidence, which supports the view that UD laws aggravate agency problems, contrasts sharply with the conclusions of Bourveau, Lou, and Wang (2018), who argue that managers improve the overall level of disclosure after the adoption of UD laws (p.824). Nonetheless, our evidence aligns with concurrent work by Houston, Lin, Liu, and Wei (2019) and Naughton, Rusticus, Wang, and Yeung (2019). They show that firms become less transparent after legal events reduce the threat of a class action lawsuit.³

Second, our results indicate that a decrease in litigation rights weakens other control mechanisms. Specifically, we find that the incidence of regulatory enforcement actions against firms declines, consistent with the discussion in Karpoff, Koester, Lee, and Martin (2017) that shareholder lawsuits can trigger regulatory oversight. Prior research emphasizes the importance of investor litigation rights (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997) and securities

³ Academic research on litigation and the information environment has focused almost entirely on 10b-5-related *class actions* alleging that the untimely disclosure of earnings injured a group or class of plaintiffs (consisting of *specific* shareholders, suppliers, and other third parties). In contrast, we focus on *derivative lawsuits* that address breaches of fiduciary duty that harm *all shareholders* of the corporation. Naughton, Rusticus, Wang, and Yeung (2019) describe many studies in this literature and discuss the nature of the endogeneity issues affecting them.

regulation (Jackson and Roe, 2009) in financial market development. Our analyses suggest that shareholder litigation plays a crucial role facilitating public enforcement of securities law.

Third, we find that managers benefit from the reduced litigation threat and heightened information asymmetry by earning greater profits on their personal trades. This evidence validates the conjecture of Cheng and Lo (2006) that insiders strategically exploit disclosure policy to maximize their own trading profits when the risk of litigation is low. This result also supports the prediction in Dann, Chalmers, and Harford (2002) that three common ingredients that often trigger managerial opportunism are: (1) the existence of private information, (2) the incentives managers have to exploit their informational advantages, and (3) the deterioration of disclosure quality.

The paper proceeds as follows. Section 2 provides institutional details on derivative lawsuits and UD laws. Section 3 describes the data. Section 4 discusses the main results and Section 5 reports the robustness tests. Section 6 concludes. The Appendix provides variable definitions.

2. Background on UD laws

Our goal is to examine how the threat of shareholder litigation affects firms' information environments. Studying this question is challenging because litigation and the information environment are jointly determined (Lowry, 2009). We address this issue by studying the adoption of UD laws, which generates plausibly exogenous variation in the threat of a derivative lawsuit. This section discusses the institutional details that serve as a platform for our tests.

2.1. Derivative lawsuits

Directors and officers of public companies owe a fiduciary duty to their corporation and its shareholders. If managers fail to act in the best interest of the corporation, shareholders can initiate a derivative lawsuit to redress the breach of duty. Derivative lawsuits address breaches of duty that harm the *entire* corporation. This broad scope differs from class action suits, which address

damages suffered by a *specific group* of shareholders or outsiders, such as suppliers, customers, and residents of a specific area.

In theory, if a derivative suit is successful, defendants must pay damages to the corporate treasury. In practice, however, derivative plaintiffs often seek non-monetary remedies, such as governance reforms. For example, in a sample of derivative suits filed between 2005 and 2006, Erickson (2009) reports that “more than 80 percent of the public company complaints alleged that the plaintiff corporation had misreported its financial results [and] ... approximately 60 percent of the public company suits included allegations of insider trading.” Settlement agreements in her sample include “specific provisions to address accounting irregularities alleged in the litigation ... the termination of particular individuals alleged to have participated in the misconduct ... [and] strengthening of insider trading policies.” Overall, the provisions and policies arising from these settlements appear aimed at strengthening corporate governance and improving internal controls.

Aside from the direct effect of past settlements, derivative litigation likely shapes management behavior indirectly via the threat of future lawsuits. Managers facing litigation can suffer both monetary and reputational penalties. While corporations have the power to indemnify management litigation expenses, managers lose this coverage if they are liable to the corporation (DGCL §145(g)). Firms can purchase director and officer (D&O) insurance for these situations, but most policies do not cover cases involving management dishonesty or intentional misconduct. This feature incentivizes management to settle derivative lawsuits without admitting dishonesty rather than risk personal liability at trial (Ferris, Jandik, Lawless, and Makhija, 2007). Early settlements and D&O insurance cannot protect management from the reputational cost of litigation, however.

The above institutional details and empirical evidence suggest that derivative lawsuits serve as an important governance mechanism that gives shareholders a channel to discipline managerial

misbehavior. Indeed, Solomon and Palmiter (1999) argue in their legal casebook that “derivative litigation breaks the stranglehold the board would otherwise hold over fiduciary accountability.” However, the efficacy of derivative litigation is not without debate. Legal scholars argue that settlements are often “cosmetic” and that some derivative lawsuits could be frivolous or motivated by attorney fees (e.g., Coffee and Schwartz, 1981; Romano, 1991). Moreover, derivative lawsuits represent one of many tools that shareholders can use to redress a breach of fiduciary duty.⁴ Ultimately, the effectiveness of derivative lawsuits is an empirical question which we address in this study. Our setting simply requires that universal demand laws impose a large enough procedural hurdle to create variation in the threat of a derivative lawsuit.

2.2. Universal demand laws

Shareholders, rather than the board of directors, initiate derivative lawsuits on behalf of the corporation. Corporate law allocates this power to shareholders because “officers and directors, who normally decide whether corporations should file lawsuits, are often implicated in the alleged wrongdoing and cannot be trusted to make unbiased decisions regarding the merits of these suits” (Erickson, 2009). The suit, however, cannot proceed without board approval. The demand requirement stipulates that shareholders must send a letter to the board identifying the alleged wrongdoing and demand that the board take corrective action or file the suit itself.

Unsurprisingly, boards (either directly or through a special litigation committee) often deny the request and halt litigation (Swanson, 1992). The futility exception shifts power back to shareholders by waiving the demand requirement if there exists reasonable doubt that the board can make an independent good faith decision on the suit. Plaintiffs frequently name directors as

⁴ For example, shareholders can file 10b-5 class actions lawsuits. Rule 10b-5 is a regulation formally known as the Employment of Manipulative and Deceptive Practices that was created under the Securities Exchange Act of 1934.

defendants, so the futility exception enables shareholders to circumvent the demand requirement and file a derivative lawsuit without needing board approval.

Between 1989 and 2005, 23 states eliminated the futility exception with a UD law. As noted by the American Bar Association, the universal demand requirement imposes a significant hurdle on derivative litigation by always requiring board approval, barring irreparable harm (Jost, 1994). Appel (2016) confirms that UD laws inhibit shareholder litigation.⁵ Importantly, Appel (2016) and Houston, Lin, and Xie (2018) find that the resulting decrease in derivative lawsuits post-UD is not accompanied by a change in the incidence of class actions.

Appel (2016) reports that adoption of UD laws did not appear to be politically motivated. Rather, the American Bar Association proposed the idea of a universal demand requirement with the intent of reducing procedural litigation costs and curbing frivolous lawsuits (Swanson, 1992). In sum, nothing in trade publications or the academic literature suggests that states adopted UD laws for reasons related to the corporate information environment.

3. Sample characteristics

3.1. Sample construction

Our main analyses rely on a sample of 44,546 firm-year observations from 6,061 U.S. firms between 1987 and 2007 with complete data available in the CRSP-COMPUSTAT merged database and I/B/E/S. The sample spans 1987 to 2007 – two years pre/post the adoption of the first/last UD law – to create a symmetric panel and to avoid confounding effects in the information environment prior to SFAS 95 and during the great recession.⁶ There are 4,237 firm-year

⁵ The likelihood of a derivative lawsuit falls by 40 percent from his sample mean after UD law adoptions.

⁶ Statement of Financial Accounting Standards No. 95 (SFAS 95) established a new standard for cash flow reporting that requires firms to classify receipts and payments according to operating, investing, and financing activities.

observations from 677 firms subject to a UD law (the treatment). We exclude utilities (SIC 4900-4999), financials (SIC 6000-6999), and public administration/non-classifiable firms (SIC 9000-9999) because these firms are subject to additional regulation and financial reporting requirements.

3.2. Sample distribution

Panel A of Table 1 presents the distribution of state of incorporation for our sample. As reported by Appel (2016), 23 states adopt a UD law over the 17-year period from 1989 to 2005. States that pass a UD law contain a similar number of firm-year observations as states that never pass it, apart from Delaware. We note that performing an event study upon state adoptions of UD laws is not feasible due a lack of clear event dates and possible information leakage around state legislation. Therefore, we focus on the long-term impact of UD laws on firms' information environments.

Panel B reports summary statistics for our outcome variables. As there is no single measure that fully captures the corporate information environment, we analyze a variety of proxies that contribute to its various aspects. Thus, we study measures of disclosure quality, sell-side analyst information production, information asymmetry in the trading environment, and the profitability of insider trades. Together, these proxies capture variation in information asymmetry between managers and shareholders and among outside investors. (Frankel and Li, 2004; Beyer, Cohen, Lys, and Walther, 2010). The Appendix provides a detailed explanation of these measures.

4. Empirical design and results

To study whether litigation risk affects the information environment of firms, we use the passage of UD laws in 23 states from 1989 to 2005 as a quasi-natural experiment. These laws decrease firms' litigation risk because they create obstacles for shareholders filing derivative lawsuits. UD legislation affects firms on the basis of their state of incorporation, which means that

not all companies headquartered in the same state are affected by these laws. In fact, 73 percent of firms in our sample are not located their state of incorporation. As a result, the variation in litigation risk produced by UD laws is plausibly exogenous to both firm-level characteristics and local shocks. We exploit these features using a difference-in differences (DiD) econometric strategy by comparing changes in the information environment over time between firms incorporated in states that enact UD laws (the treatment group) and firms incorporated in states that do not (the control group). Our empirical design is, therefore, well-suited to establish a causal relation between shareholder litigation and firms' information environments. Using ordinary least squares (OLS) regression analyses, we estimate the following baseline model,

$$y_{ijlst} = \beta_0 + \beta_1 \mathbf{UD}_{s,t} + \varepsilon_{ijlst} \quad (1)$$

In equation (1), y_{ijlst} is the outcome of interest for firm i , operating in industry j , headquartered in state l , incorporated in state s , in year t , and $\mathbf{UD}_{s,t}$ is an indicator set to one if a universal demand law is effective in incorporation state s at time t . Angrist and Pischke (2009) note that in a DiD estimation strategy, controlling for firm-level characteristics is undesirable because these variables might be affected by the policy under study. Therefore, as advised by Gormley and Matsa (2014), we estimate our baseline models using different combination of firm, year, headquarter state-year, and industry-year fixed effects. Firm fixed effects control for unobserved, time-invariant differences across firms; state-by-year fixed effects account for unobserved, time-varying differences across headquarter states; and industry-by-year fixed effects control for unobserved, time-varying differences across two-digit SIC industries. Thus, our most stringent specification compares within-firm changes around the adoption of a UD law for firms headquartered in the same state and operating in the same industry, where some firms are incorporated in a state that adopts UD and others are not. Importantly, the state-by-year and industry-by-year fixed effects

ensure that our DiD estimates are robust to the potentially confounding effect of numerous unobservable omitted variables. Moreover, our estimations of equation (1) cluster standard errors by state of incorporation to account for potential cross-firm correlation within states, serial correlation, and heteroscedasticity (Petersen, 2009). This process lessens the possibility of bias in the estimation of DiD standard errors noted by Bertrand, Duflo, and Mullainathan (2004).

4.1. Corporate disclosure

Managers have a fiduciary responsibility to provide shareholders with value-relevant information about firm activity. More detailed disclosures can reduce uncertainty and attenuate information risk borne by investors (Diamond and Verrecchia, 1991, Botosan, 1997). Yet, several studies note that many managers are unwilling to provide greater firm transparency due to the costs of preparing comprehensive disclosures (Graham, Harvey, and Rajgopal, 2005), fears of inadvertently disclosing proprietary information (Ali, Klasa, and Yeung, 2014), litigation concerns (Skinner 1994; Skinner 1997; Baginski, Hassell, and Kimbrough, 2002), and possible detrimental signaling effects from discontinuing future disclosure (Chen, Matsumoto, and Rajgopal, 2011). With these issues in mind, we examine whether changes in litigation risk affect the propensity for managers to provide greater transparency through corporate disclosure.

4.1.1. Voluntary disclosure

Bourveau et al. (2018) conclude that UD laws incentivize managers to share more and better-quality information with shareholders rather than to engage in opportunistic disclosure behavior. They base this conclusion on their empirical results showing that firms subject to UD laws (i) increase the length of MD&A in their 10-K filings, (ii) increase the incidence of voluntary 8-K filings and management earnings forecasts, (iii) increase the frequency of optimistic and

pessimistic earnings forecasts, and (iv) decrease the width of earnings forecasts. Because these results inform our research question, we attempt to replicate them with our data.

Panel A of Table 2 reports OLS estimates of the effect of UD laws on the frequency of voluntary disclosure. The dependent variable is the natural log of one plus the number of voluntary 8-Ks filed during the fiscal year in columns (1)-(3), the natural log of one plus the number of words in the MD&A section of the 10-K filing in columns (4)-(6), and the natural log of one plus the number of management EPS forecasts issued during the fiscal year in columns (7)-(9). We construct the sample following the instructions in Bourveau et al., but because First Call merged with I/B/E/S, we retrieve management forecasts from the I/B/E/S Guidance database rather than from First Call's Company Issued Guidance database.⁷ Nevertheless, our results match Bourveau et al. closely in both magnitude and direction. For example, we estimate that the frequency of voluntary 8-Ks and management forecasts increase by 7.6% and 33.3% relative to their respective sample means, whereas Bourveau et al. report increases of 7.2% and 23.9%, respectively.⁸

Panel B reports regressions in which the dependent variable is the frequency of optimistic forecasts in columns (1)-(3), the frequency of pessimistic forecasts in (4)-(6), and the forecast width in (7)-(9). Consistent with the results in Bourveau et al., we find post-UD increases in the frequency of both optimistic and pessimistic forecasts and a decrease in the forecast width. As noted earlier, based on these results, Bourveau et al., argue that "UD laws seem to incentivize managers to share more and better-quality information with shareholders..." We nevertheless note that the results showing an increase in both optimistic and pessimistic forecasts (defined as those

⁷ Since the SEC did not require electronic filing until the second quarter of 1996, estimates of the effect of UD laws on voluntary disclosure only use variation in the litigation regime of the 13 states that passed a UD law after 1995.

⁸ Based on model (3) $(0.114 / 1.5014) * 100 = 7.6\%$ and model (9) $(0.126 / 0.3782) * 100 = 33.3\%$ from Table 2 in our paper and model (8) $(0.0792 / 1.1018) * 100 = 7.2\%$ and model (2) $(0.1433 / 0.5997) * 100 = 23.9\%$ from Table 3 in Bourveau et al. (2018).

with actual earnings surprises higher than 10% and lower than -10%, respectively) suggest that firms covered by UD laws issue lower-quality forecasts more frequently. Moreover, narrower average forecast width does not necessary imply higher quality information. For example, Cheng, Luo, and Yue (2013) argue that managers strategically alter forecast precision for self-serving purposes and show that the width of management forecasts is related to insider trading behavior.⁹

We formally evaluate the accuracy of management EPS forecasts in the regressions reported in columns (10)-(12) of Panel B in Table 2, which use management forecast error as the dependent variable. The tests reveal that the absolute difference between management forecasts and actual earnings increases by roughly one third following the passage of UD laws (based on model (12) $(0.053 / 0.1563) * 100 = 33.9\%$).

Overall, the results in Table 2 show that firms increase the length and frequency of certain disclosure items after UD laws pass, but the accuracy of their disclosure decreases. These findings conform with the view that longer and more frequent disclosure might obfuscate rather than improve the information supplied to investors (e.g., Bloomfield (2008); Li (2008), Loughran and McDonald (2014).

4.1.2. Mandatory disclosure

Since voluntary and mandatory disclosure are complementary avenues through which managers can influence the information environment (Ball, Jayaraman, and Shivakumar, 2012), we next evaluate the impact of UD laws on financial statement disclosure quality. Following Chen, Miao, and Shevlin (2015), we measure disclosure quality (DQ) as the natural log of the value-weighted ratio of non-missing to total Compustat line items. DQ is based on the hypothesis that

⁹ Those authors find that, before insider sales, managers make more precise forecasts if the news is good (which generates a bigger boost to the stock price) and less precise forecasts if the news is bad (to mute the stock price impact of the forecast).

more detailed information is of higher quality. We construct the measure by counting the number of non-missing items in annual financial statements, as captured by Compustat, and comparing this to the total number of items that the firm could have reported given its operations. Because Compustat might code an item as missing either because the firm fails to report it or because the firm does not have operations that would produce such an item, we carefully screen the data applying the fact that balance sheet line items sum to larger accounts (see Chen et al., 2015 for details).¹⁰ One advantage of the DQ measure is that it accounts for the discretionary choices managers make within mandatory filings, such as shifting expenses between core expenses and special items or whether and how corporate R&D is disclosed. Another advantage of using DQ is that it is available for a longer time period than voluntary disclosure measures, which only become widely available in the mid 1990's. In our sample, the mean value of DQ is 0.62, which is close to the 0.58 reported by Chen et al. (2015).

Models (1)-(3) in Panel A of Table 3 use the DQ measure as the dependent variable. The results show that the quality of disclosure worsens by about 70 basis points once UD laws are in effect. According to the coefficient estimate in model 3, the average treated firm in our sample reports one or two fewer data items in their financial statements.¹¹ These findings show that the decrease in litigation risk related to the passage of UD legislation affects the quality of financial reporting by reducing firm transparency.

¹⁰ Alternatively, an item could be missing in Compustat as a result of a coding error. However, Chen et al. (2015) argue that Compustat data are of very high quality and unlikely to be systematically biased. In addition to mitigating the scope for type one errors (coding an item as missing, when in fact it is not missing), Compustat's nested layout enables us to determine which financial accounts are more likely to be unreported after the passage of UD. For each firm-year, we count the number of missing line items for each group account in Compustat's "Balancing Model" and aggregate these totals into seven major categories: assets, liabilities, shareholder's equity, taxes, operating and interest expense, non-recurring items, and comprehensive income.

¹¹ The calculations are as follows. $DQ \text{ falls by } (-0.007/-0.49) * 100 = 1.43\%$ of the sample mean after a UD is adopted. The average sample firm reports 84 line items used to construct DQ. Thus, the average firm reports $(84 * 1.43\%) = 1.2$ fewer DQ line items after UD.

On the surface, the decline in disclosure quality after UD laws pass seems modest. However, mandatory disclosures are unlikely to be drastically changed after UD laws pass since Regulation S-X requires public firms to provide reasonable financial statements. In addition, unscrupulous managers might not want to trigger unwanted attention by excluding too many data entries from their disclosures and instead opt for subtlety suppressing one or two key items. Existing empirical work appears to support this conjecture. For example, managers who habitually use their accounting discretion to alter the informativeness of reported earnings tend to limit Generally Accepted Accounting Principles (GAAP) line item disclosures (D'Souza, Ramesh and Shen, 2010). Other managers cleverly disguise poor performance by combining unprofitable and profitable segments to deliberately evade shareholder scrutiny (Berger and Hann, 2007). More recently, Fang, Huang and Wang (2017) show that the number of non-missing items in a firm's quarterly filings is related to both the incidence of financial reporting errors and intentional misapplications of GAAP. Fang et al. (2017) argue that since deliberate misstatements are hard to detect, they facilitate bias by providing camouflage.¹² Lev and Zarowin (1999) consider the welfare implications stemming from reporting omissions. They assert that since investors are generally unable to costlessly obtain the information missing from financial statements using alternative sources, the social penalties of reporting omissions are serious. With this background in mind, we interpret the decline in disclosure quality as likely portending more serious agency problems in the offending firms.

To understand the importance of the omitted data and ascertain which items are more likely to be unreported, we run firm-year regressions of missing Compustat items per group account. These tests are reported in models (4)-(10) in Panel A of Table 3. The results indicate that treated firms

¹² Fang et al. (2017) refer to intentional misapplications of GAAP as "bias propensity."

are more likely to disclose additional tax information following UD, which is consistent with the idea that managers may use deferred taxes to manipulate earnings (for a review, see Graham, Raedy, and Shackelford, 2012). More importantly, the results show that UD-impacted firms are less likely to disclose detailed information about comprehensive income and non-recurring items – two categories which are prone to manipulation (Sherman and Young, 2001).

4.2. Information asymmetry among market participants

In this section, we assess the net effect of UD laws on the information environment by examining the level of information asymmetry among market participants. Our results thus far imply that managers produce more, but lower quality, information when the threat of shareholder litigation falls. If the liability hypothesis holds, the increase in voluntary disclosure should be reflected by lower (or at least no increase in) information asymmetry among market participants. If, however, managers alter corporate disclosure to obscure the information environment for personal gain as predicted by the agency hypothesis, we expect the passage of UD laws to be associated with an increase in information asymmetry.

4.2.1. Analysts' information production

Information produced by sell-side analysts both reflects and influences the corporate information environment. Notably, the precision of analysts' forecasts relies on information firms provide through mandatory and voluntary disclosures. Therefore, if information is costlier to produce because firms' disclosure quality worsens post UD (Panel A Table 3), we would expect a decline in analyst coverage and in the accuracy of their reports after UD legislation is enacted. We examine these issues in Panel B of Table 3, by estimating equation (1) with three different outcome

variables: analyst coverage in models (1)-(3), forecast dispersion in models (4)-(6), and forecast error in models (7)-(8).

As in Armstrong, Balakrishnan, and Cohen (2012), we study analyst information production with one-year-ahead annual EPS estimates in the most recent I/B/E/S forecast summary before the fiscal year end. We define coverage as the number of analysts providing an estimate and forecast dispersion as the standard deviation of these estimates. Forecast error is the absolute difference between the mean estimate and the actual EPS reported in I/B/E/S. Like Cheong and Thomas (2011), we do not deflate dispersion or forecast error by a scale variable to ensure that our results are driven by changes in analyst disagreement and accuracy.¹³

According to models (1)-(3), the passage of a UD law has no effect on the number of analysts covering the average treated firm in our sample. Tests in Panel B, however, show a significant association between the enactment of UD legislation and the precision of analysts' forecasts. The estimates in models (4)-(6) indicate an increase in their dispersion while those in models (7)-(8) show a surge in their error. These effects are not only statistically significant but also economically important. After the adoption of a UD law, analyst forecast dispersion and error increase by almost 9% and 8% of a standard deviation, respectively.¹⁴ Thus, while UD legislation does not appear to impact analysts' decision to cover firms, it is associated with a drop in the accuracy of their forecasts. Consistent with the agency view, the tests in Table 3 indicate that weaker shareholder litigation rights lead to increased information asymmetry between insiders and outsiders.

¹³ The magnitudes of our analyst proxies are comparable to those reported elsewhere. For example, the mean number of analysts in our sample, 7.8, lies between the 7.1 reported in Frankel and Li (2004) and the 8.3 reported by Ferreira, Ferreira, and Raposo (2011). Likewise, the median (mean) analyst forecast error we report at the firm-level, 0.04 (0.22), is similar to the magnitude reported at the analyst-level in Harford, Jiang, Wang, and Xie (2018) of 0.07 (0.25).

¹⁴ Based on model (6), $(0.031 / 0.3398) * 100 = 9.12\%$, and based on model (9), $(0.062 / 0.7433) * 100 = 8.34\%$.

4.2.2. Trading environment

Empirical work finds that market liquidity improves in the presence of more corporate disclosure (Balakrishnan, Billings, and Ljungqvist, 2014) and lower analyst forecast dispersion (Sadka and Scherbina, 2007). Thus, to the extent that altering litigation risk affects corporate disclosure quality by managers and information production by analysts, we expect changes in the costs of trading the firm's stock (Diamond and Verrecchia, 1991). Likewise, increases in information asymmetry between managers and shareholders likely exacerbate the adverse selection problem between these parties, which should manifest in a decline in market liquidity (Easley and O'Hara, 2004; Beyer et al., 2010). Moreover, the same adverse selection should enhance the ability of some investors to profit from informed trading (Brown and Hillegeist, 2007).

We evaluate our conjectures in Table 4 with nine different tests based on equation (1). To track market liquidity, models (1)-(3) use bid-ask spread as the dependent variable and models (4)-(6) use average daily (dollar) trading volume. To evaluate informed trading, models (7)-(9) use the probability of informed trading (PIN) as the dependent variable. This measure, which is based on the imbalance between buy and sell orders, provides the probability that a trade originates from a privately informed investor; thereby capturing the extent of information asymmetry among investors. Because PIN data are not available before 1993, the sample in models (7)-(9) falls to 34,656 firm-year observations from 5,455 firms between 1993 and 2007.¹⁵

The regressions in Table 4 suggest that the trading environment deteriorates once UD laws are in effect. The average treated firm exhibits a bid-ask spread increase of 3.15% (based on model 3) and a decline in its daily trading volume of US\$4.85 million (according to model 6). Likewise,

¹⁵ We construct these proxies with data from the CRSP daily stock file and from Stephen Brown's website. Our summary statistics are close to those reported in the literature. We estimate the median (mean) bid-ask spread and PIN to be 1.58% (1.94%) and 0.168 (0.167), respectively, whereas Easley, Hvidkjaer, and O'Hara (2002) report median (mean) values of 1.14% (1.52%) and 0.18 (0.19), respectively, in their sample spanning 1983-1998.

using the estimates in model 9, PIN increases by almost 9% of a standard deviation.¹⁶ The higher PIN and bid-ask spreads, along with the decline in trading volume, suggest that the passage of UD laws leads to an increase in overall levels of information asymmetry and decrease in market liquidity. Thus, the findings in Table 4 also support the agency hypothesis.

4.3. Strength of control mechanisms

Strong control mechanisms that help monitor management are essential in preventing agency problems. Financial reporting and disclosure provide some of these control mechanisms (Healy and Palepu, 2001). But, when disclosure and financial reporting are strategically manipulated, these controls can be ineffective (Farber, 2005). We examine here whether UD laws also weaken a crucial external control of the information environment: enforcements actions by the SEC and DOJ. Indeed, regulatory enforcements provide a link to agency problems and corporate governance concerns (Dechow et al., 2010).¹⁷

4.3.1. Regulatory enforcement actions

We now evaluate the incidence of enforcement actions from the SEC and DOJ following the enactment of UD laws. Administrative releases detailing these enforcement actions are publicly available on the SEC's website and via written request.¹⁸ The releases provide a timeline of regulatory proceedings and often contain a link to the original inquiry. As described by Karpoff et al. (2017), the SEC and DOJ verify compliance of the following provisions of the Securities

¹⁶ The calculations are as follows. For bid-ask spread: $(EXP(0.031) - 1) * 100 = 3.15\%$. For PIN the calculation is: $(0.008 / 0.0891) * 100 = 8.98\%$.

¹⁷ It is reasonable to assume that typical firms facing SEC enforcement deliberately engaged in severe reporting violations, suggesting that agency costs exist. This view relies on the fact that the SEC pursues cases where it can show that management knew or should have known that their financial statements were inaccurate (Dechow, Sloan, and Sweeney, 1996). Nevertheless, Dechow et al. (2010) argue that there are many potential reasons for SEC enforcements and large abnormal accruals could have productive consequences for shareholders.

¹⁸ <https://www.sec.gov/fast-answers/answerspublicdocshtm.html>

Exchange Act of 1934 and Code of Federal Regulations: i) Section 13(b)(2)(a), which requires the maintenance of accurate and complete books and records, ii) Section 13(b)(2)(b), which requires the maintenance of a system of internal accounting controls, and iii) Section 13(b)(5) and Rule 17CFR 240.13b2-1, which prohibit falsification of these records and circumvention of the system of controls. Investigations are either brought by the SEC or DOJ depending on jurisdiction. While the DOJ has jurisdiction in all matters, it defers the majority of civil cases to the SEC.

In our sample, 1.88% of firm-year observations face a regulatory action for potential financial misconduct. This incidence is between the 0.32% reported by Karpoff, Lee, and Martin (2008) for all CRSP-listed firms between 1978 and 2002 and the 2.6% in Call, Martin, Sharp, and Wilde (2018) for their sample of Compustat firm-years from 2002 to 2012.¹⁹

Even if derivative lawsuits do not allege violations of securities laws, they can trigger regulatory attention (Karpoff et al., 2017). Moreover, a more opaque information environment might make it difficult for regulators to uncover evidence needed to start an enforcement action. Given these issues, it is possible that the passage of UD laws not only lowers the incidence of subsequent derivative lawsuits (Appel, 2016) but also the frequency of SEC and DOJ enforcement actions. To examine this issue, models (1)-(3) in Table 5 estimate linear probability models based on equation (1) in which the dependent variable is set to one if during the fiscal year the firm is subject to an SEC enforcement action or a financial misrepresentation investigation by the DOJ. Otherwise, the dependent variable is set to zero.²⁰ The results indicate that the likelihood of facing an enforcement action falls by approximately one percentage point after a UD law is adopted by

¹⁹ Our enforcement action indicator represents SEC/DOJ disciplinary action and does not encompass all instances of financial misconduct or capture investigations by these entities that do not eventually become enforcement actions. Furthermore, we do not examine other potential proxies of financial misconduct because of data limitations described by Karpoff et al. (2017). They show that the vast majority of restatements are unintentional errors and that Accounting and Auditing Enforcement Releases are unrepresentative of the universe of financial issues enforced by the SEC.

²⁰ We use linear probability models because Wooldridge (2010 pg. 612) argues that logit and probit models perform poorly in the presence of a high number of fixed effects.

the firm's state of incorporation. The effect of UD legislation is economically important: it halves the incidence of enforcement actions. Yet, because these actions seek to verify compliance, and because their execution does not always entail court proceedings, the post-UD drop in regulatory enforcement should not be viewed as a de facto decline in litigation.

4.3.2. Discretionary accruals

The results in models (1)-(3) of Table 5 show that enforcement actions against firms decline once UD laws are enacted. While this finding is consistent with the view that regulators are less likely to target firms unless a derivative lawsuit calls their attention, it also conforms to the non-mutually exclusive alternative that managers are less likely to engage in financial misconduct post UD law passage. To shed light on this issue, we study the absolute value of discretionary accruals - a commonly used proxy of earnings management.

We apply the modified Jones (1991) model proposed by Dechow, Sloan, and Sweeney (1995), to estimate discretionary accruals during the firm-year and use this measure as the dependent variable in models (4)-(6) in Table 5. In these regressions, which are based on OLS estimations of equation (1), all the coefficients for the UD indicator are positive but only the estimate in model 6 is statistically significant. This result, which indicates that the absolute value of discretionary accruals increases by 5.37% of the sample mean after UD legislation is promulgated, suggests that post-UD earnings are less informative. Under this interpretation, our discretionary accruals results are congruent with our tests showing declines in the quality of financial reporting (Panel A, Table 3). The results in Table 5, along with those by Huang, Roychowdhury, and Sletten (2018) showing

a post-UD increase in real earnings management, indicate that after UD laws pass, earnings management increases, while regulatory enforcements that often target this practice decline.²¹

4.4. Insider trading profitability

As noted by Dechow et al. (2010), there are many reasons for large abnormal accruals and regulatory enforcements, some of which are unrelated to agency problems. These variables can track benign firm attributes such as the inherent volatility of cash flows, the amount of resources designated to maintain good internal control systems, and the complexity of operations. Moreover, even if these variables proxy for earnings management, such activity might not always be detrimental to shareholder wealth. Due to this caveat, we consider insider trading as an alternative way to evaluate the agency hypothesis.

Specifically, we study insider trading profitability to assess the degree of information asymmetry between insiders and outsiders and to test whether managers monetarily benefit from the passage of UD laws. We obtain insider trading data from Thomson Reuters Insider Table 1. Thomson Reuters captures all insider activity reported on SEC Form 4 and classifies the integrity of the data according to cleanse codes. We begin with open market purchases and sales of preferred or common stock made by corporate officers (transaction codes “P” or “S”) that are verified or cleansed with a very high level of confidence (cleanse codes “R” and “H”).²² To focus on trades

²¹ The result in model (6) matches those in Ni and Yin (2018), who also find that the passage of a UD law leads to an increase in discretionary accruals. Nevertheless, our accrual results (and those by Ni and Yin, 2018) are opposite to those in Bourveau et al. (2018). The estimation by Bourveau et al. is similar to ours in that they also use the modified Jones model and follow the advice of Hribar and Collins (2002) to calculate discretionary accruals with information from the firm’s statement of cash flows. However, unlike us, Bourveau et al. use the *nominal* value of discretionary accruals instead of the *absolute* value. If we use nominal discretionary accruals like Bourveau et al., we also obtain negative and significant estimates for the UD law indicator.

²² We use Thomson Reuters’ primary relationship codes to classify insiders as officers. Corporate officers include CEOs, CFOs, COOs, Presidents, and other high-ranking executives. Transaction codes are not well populated before 1996. We drop observations with a missing transaction code in our main analysis and check that our results are similar using acquisition/disposition flags in unreported robustness tests.

motivated by opportunistic behavior, we remove routine trades using a method similar to Cohen, Malloy, and Pomorski (2012). Specifically, we code a transaction as routine if the insider trades a stock in the same month for three consecutive years. Finally, we follow Jagolinzer, Larcker, and Taylor (2011) and collapse this panel to the firm-day level to analyze net insider trades. This process yields a sample of 200,581 net daily transactions from 4,609 firms between 1987 and 2007.

Examination of the data reveals that insider sales are larger and more frequent than insider purchases. The ratio of insider sales to daily insider trading volume is 0.72 in our sample, which exactly matches the figure reported by Jagolinzer, Larcker, and Taylor (2011). On average, daily insider net sales consist of 26,240 shares (10,000 median) sold for US\$920,914 (US\$243,800 median) while daily net purchases consist of 12,332 shares (2,600 median) bought for US\$168,923 (US\$25,950 median). We calculate returns for a three-month horizon after insider trades under the assumption that the information that managers trade on should be revealed in the next quarterly report.²³ On average, insiders' profit 0.28-0.60 basis points per month from opportunistic trades, which is comparable to the 82 basis points per month reported by Cohen et al. (2012).

In Table 6, we estimate nine iterations of equation (1) with different dependent variables that track trading profitability. Specifically, models (1)-(3) analyze trading profits, defined as the three-month raw return following the transaction date, whereas models (4)-(6) examine abnormal trading profits, calculated as the three-month buy-and-hold abnormal return using the CRSP value-weighted index as market proxy. The dependent variable in the remaining regressions is trading

²³ Section 16(b) of the Securities Exchange Act of 1934 prohibits short-swing profits made by insiders opening and closing a position within six months. For this reason, insider transactions are more likely to be sales of old positions (or equity grants) and purchases of new positions than matched purchases and sales over a short horizon.

alpha, the intercept from the Fama and French (1993) three factor model estimated over the three months following the transaction date.²⁴

According to model (3), the average post-UD insider trade earns higher returns of about 3 percentage points. For the average treated firm, the regression estimate (3.096, standard error = 1.074) translates to higher insider trading profits per fiscal year in the order of US\$217,596.²⁵ The other regressions in Table 6 produce estimates that yield similar effects. These findings support the agency hypothesis: insider trading profits surge after UD laws pass.

In unreported tests, we find that the results in Table 6 are driven primarily by insider sales, implying that firms obscure the information environment while their top managers profitably dump their own shares. To bolster this interpretation, we explore the direction of analyst forecast errors using tests similar to those reported in Panel B of Table 3. According to the estimates, the average forecast is 1.7 cents higher than realized earnings post-UD.²⁶

Our findings of profitable insider sales and overly optimistic analyst earnings forecasts are congruent with Appel (2016), who shows that ROA falls post-UD, and is also supported by anecdotal evidence. In 2016, both Qualcomm and Twitter were subject to derivative lawsuits alleging that executives provided misleading financial statements to hide poor performance while selling millions of dollars of personally held stock. Our evidence suggests that managers are more likely to engage in this type of misbehavior when the threat of derivative litigation is lower.

²⁴ We multiply alpha by the number of trading days during the estimation period to make the scale consistent with our other measures of trade profitability.

²⁵ At the average sample firm, insiders combine to trade US\$7,028,299 of company stock per firm-year. Thus, our estimates correspond to US\$7,028,299 * (3.096/100) = US\$217,596.14 higher insider trading profits per fiscal year.

²⁶ The estimated model is: $Signed\ Forecast\ Error = \alpha + 0.017UD(0,1) + FirmFE + Industry \times YearFE$. The p -value for the UD coefficient estimate is 0.053.

5. Additional analyses

5.1. *Parallel trends and reincorporation events*

Our empirical analyses are based on DiD methodologies to compare changes in the information environment among firms incorporated in states that pass a UD law (the treatment group) with changes in the same environment among firms incorporated elsewhere (the control group). The key identifying assumption is that, absent treatment, the change in outcome variables for treated firms would have been similar to the change in outcome variables for untreated firms. While this “parallel trends” assumption is inherently untestable, we follow Roberts and Whited (2013) and check the internal validity of our empirical design by exploring the timing of the behavior change.

As treatment occurs at different times for different states, we use the method in Gormley and Matsa (2011) and construct cohorts of treated and control firms for the three years before and after each UD event, requiring control firms not to have been previously treated by another state. We then pool the data across cohorts and regress our main outcome variables on UD indicators for years (-3) through (+3), firm-cohort, headquarter state-year-cohort, and industry-year-cohort fixed effects. We exclude the indicator for UD Year (0) so that the OLS point estimates map out the effect relative to this year. In addition, we winsorize variables in these tests at the 5% tails to minimize noise in each period point estimate. The goal of these plots is to determine whether there is a clear visual change in the trend of the variables around UD adoptions. Visual inspection of Figure 1 reveals that the change in treatment group behavior is concentrated around the adoption of UD laws, suggesting that our data satisfy the parallel trends condition.

Because the treatment condition (passing a UD law) in our DiD models is coded at the state of incorporation, another potential caveat is related to firms that reincorporate to another state during our sample period. Since CRSP and Compustat assign firms to their current state of incorporation,

we collect historical firm incorporation data and find that 7% of the unique firms we examine reincorporate at least once during our sample period.²⁷ This incidence is close to the 6% rate of reincorporation reported by Gormley and Matsa (2016).

To assess the importance of reincorporation in our analyses, we re-estimate our tests removing firms affected by a reincorporation event. The results, which are reported in Panel A of Table 7, indicate that this exclusion does not change our results. In fact, parameter estimates for the UD indicator are very close in both magnitude and statistical significance to those reported in earlier tables. These results mitigate the concern that reincorporation events bias our main findings.

5.2. Corporate activities that increase litigation risk

One possible alternative explanation for our results is that UD laws could have a causal effect on certain corporate activities (e.g., acquisitions) related to the risk of shareholder litigation. Such activities may in turn increase the quantity informational asymmetry between the company and its analysts or shareholders, and potentially alter disclosure behavior. Under this scenario, the effects documented in our baseline tests could be driven by fundamental changes in the firm's activities and may not reflect deliberate decisions by managers to lower the quality of disclosure.

We uncover no evidence that the propensity to engage in acquisitions differs after a UD law passes. Yet, to be thorough, we perform more comprehensive analyses.²⁸ We first exclude all sample firms that complete a value-decreasing acquisition (as tracked by the SDC Platinum database and proxied by acquirers earning a negative 3-day M&A announcement CAR) within the prior three fiscal years. We then re-run our tests using the remaining observations and report the

²⁷ We determine historical state of incorporation using CST_HIST and COMPHIST databases available on WRDS and hand-collected data from Heron and Lewellen (1998).

²⁸ We consider other corporate activities in unreported tests. For example, results are similar when we exclude firms with large capital raising activities (net debt issuance or equity issuance > 5% of firm assets). Importantly, we find no evidence indicating that the incidence of these capital raising activities increases after UD laws are adopted.

estimates in Panel B of Table 7. The results, which are generally consistent with those from our main analyses, suggest that our baseline findings are not the byproduct of other corporate activities.²⁹

5.3. *Alternative monitors*

Shareholder litigation is one of many governance mechanisms seeking to mitigate agency problems. If litigation *substitutes* for other monitoring channels, it is possible that the effect of UD laws might be stronger for poorly governed firms. Alternatively, traditional monitors, such as outside directors, require accurate information to be effective (Duchin, Matsusaka, and Ozbas, 2010). Therefore, if shareholder litigation *complements* other monitoring channels by ensuring corporate transparency, the effect of UD laws might not vary based on ex ante governance.

To illuminate this issue, we test for cross-sectional variation in the effect of UD laws with the triple-difference method of Gormley and Matsa (2011). In unreported tests, we find that the information environment generally worsens post-UD regardless of the strength of other monitoring channels before the laws pass, which we track with (i) the fraction of outside directors, (ii) the presence of a blockholder, and (iii) the degree of shareholder rights (proxied by the E-index of Bebchuk, Cohen, and Ferrell, 2009). Along with our evidence of fewer regulatory enforcement actions post-UD, these results suggest that shareholder litigation rights play a unique role in mitigating agency issues that cannot be fully addressed by other monitoring channels.

²⁹ Estimates for the profitability of insider trades are slightly higher in the subsample tests. This could be due to internal policies related to insider trading discussed by Bettis, Coles, and Lemmon (2000). They note that internal policies of many public firms prohibit trading by their employees at other times in which such trading could be perceived as violating insider trading statutes (Sections 16(b) and 10(b) of the 1934 Securities Act). Therefore, outside of the periods in which trading is forbidden, managers rely on their ability to capitalize on their private information to enhance the profitability of their personal trades.

6. Conclusion

Market participants rely on accurate financial reporting to make informed investment decisions and monitor firm performance. However, due to the separation of ownership and control, managers have the incentive to obscure the information environment to conceal poor performance and extract private benefits. This problem could limit the effectiveness of traditional governance mechanisms that are at an informational disadvantage, such as independent directors and blockholders, and lead to large agency costs (Jensen, 1993). Therefore, shareholders require a mechanism that can be used to ensure corporate transparency. In this paper, we study one such provision, shareholder litigation rights, and examine how the threat of a derivative lawsuit affects firms' information environments.

Using the staggered adoption of UD laws at the state level as a source of variation, we find that managers alter their disclosure behavior when the risk of shareholder litigation declines. Consistent with prior research, we find that the quantity of voluntary disclosure increases post-UD. However, our results suggest that the increase in disclosure obscures, rather than enhances, the information environment. After UD laws pass, management earnings forecasts become less accurate and mandatory financial statements become less detailed, resulting in more information asymmetry among analysts and in the trading environment. Specifically, we find an increase in analyst forecast dispersion and error, bid-ask spread, and the probability of informed trading, as well as a reduction in trading volume. Moreover, firms incorporated in UD states become less likely to face regulatory enforcements even though insider trading profits are higher. Thus, the totality of our evidence suggests that UD laws pave the way for managers to obscure their firm's information environment for personal gain. In this vein, our work delivers compelling evidence that highlights the role of derivative litigation as an effective mechanism to monitor management, curb agency problems, and ensure corporate transparency.

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Table 1: Sample description. The main sample consists of 44,546 firm-year observations from 6,061 firms between 1987 and 2007 with data available in the CRSP-COMPUSTAT merged database and I/B/E/S. We exclude utilities (SIC 4900-4999), financials (SIC 6000-6999) and public administration/non-classifiable firms (SIC 9000-9999). The insider trading sample contains 200,581 net daily transactions from 4,609 firms with data available in the Thomson Reuters Insider Filing database. Panel A presents universal demand (UD) legislation by incorporation state and effective year, as reported by Appel (2016), and displays the distribution of firm-years in our sample. Panel B reports summary statistics for our outcome variables. Variables are winsorized at the 1/99 percent tails. Appendix 1 provides variable definitions.

Panel A: Distribution

State	UD Law Adopted	Number of Firm-years	Percent of Firm-years	State	UD Law Adopted	Number of Firm-years	Percent of Firm-years
AK		6	0.01	MT	1992	11	0.02
AL		48	0.11	NC	1995	390	0.88
AR		34	0.08	ND		2	0.00
AZ	1996	61	0.14	NE	1996	54	0.12
CA		999	2.24	NH	1993	2	0.00
CO		148	0.33	NJ		483	1.08
CT	1997	134	0.30	NM		5	0.01
DC		12	0.03	NV		723	1.62
DE		29,009	65.12	NY		1,076	2.42
FL	1990	734	1.65	OH		1,118	2.51
GA	1989	653	1.47	OK		71	0.16
HI	2001	5	0.01	OR		378	0.85
IA	2003	119	0.27	PA	1997	924	2.07
ID	1998	3	0.01	RI	2005	36	0.08
IL		104	0.23	SC		90	0.20
IN		487	1.09	SD	2005	20	0.04
KS		75	0.17	TN		406	0.91
KY		90	0.20	TX	1997	686	1.54
LA		133	0.30	UT	1992	151	0.34
MA	2004	941	2.11	VA	1992	621	1.39
MD		438	0.98	VT		13	0.03
ME	1997	20	0.04	WA		590	1.32
MI	1989	441	0.99	WI	1991	548	1.23
MN		1,110	2.49	WV		0	0.00
MO		289	0.65	WY	1997	18	0.04
MS	1993	37	0.08	Total		44,546	100.00

Panel B: Summary statistics

	Mean	S.D.	P25	Median	P75	Obs
<i>Financial reporting</i>						
Disclosure quality	0.6198	0.0975	0.5594	0.6055	0.6790	44,546
Enforcement action (0/1)	0.0188	0.1359	0.0000	0.0000	0.0000	44,546
Discretionary accruals	0.0931	0.1173	0.0235	0.0547	0.1130	44,546
<i>Analyst information production</i>						
Analyst coverage	7.8123	6.5764	3.0000	5.0000	10.0000	44,546
Forecast dispersion	0.1047	0.3398	0.0100	0.0200	0.0600	44,546
Forecast error	0.2147	0.7433	0.0100	0.0400	0.1150	44,546
<i>Trading environment</i>						
Bid-ask spread	0.0194	0.0175	0.0055	0.0158	0.0274	44,546
Dollar volume (US\$M)	13.5784	35.3991	0.5849	2.1984	8.9236	44,546
Probability of informed trading (PIN)	0.1667	0.0891	0.0980	0.1680	0.2320	34,928
<i>Insider trading profitability</i>						
Trading profit (%)	0.8296	27.1776	-13.3615	0.7000	15.4545	200,581
Abnormal trading profit (%)	1.7909	25.0835	-10.9866	1.9373	15.3060	200,581
Trading alpha (%)	1.0892	25.6109	-12.4947	0.3323	13.7898	200,581
<i>Voluntary Disclosure</i>						
Frequency of Voluntary 8-K	1.5014	0.6845	0.6931	1.3863	1.9459	18,034
Length of MD&A	8.6606	0.6271	8.2292	8.7050	9.1154	14,463
Frequency of Management Forecasts	0.3782	0.7107	0.0000	0.0000	0.6931	29,590
Frequency of Optimistic Forecast	0.1224	0.3739	0.0000	0.0000	0.0000	29,590
Frequency of Pessimistic Forecast	0.1306	0.3845	0.0000	0.0000	0.0000	29,590
Width of Forecast	0.1629	0.2923	0.0046	0.0628	0.1686	6,725
Management Forecast Error	0.1563	0.4347	0.0150	0.0369	0.1050	6,725

Table 2: Disclosure behavior for firms covered by a UD law. Panel A reports OLS estimates of the effect of UD laws on the frequency of voluntary disclosure. We construct the sample following Bourveau et al. (2018) and merge in voluntary 8-K information from WRDS SEC Analytics Suite, MD&A data from Stephen Brown’s website, and management EPS forecasts from I/B/E/S. Panel B reports OLS estimates of the effect of UD laws on the accuracy of management EPS forecasts. Sample sizes vary according to data availability. Appendix 1 provides variable definitions. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Frequency of voluntary disclosure

	Freq. of Voluntary 8-K			Length of MD&A			Freq. of Management Forecasts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
UD Law	0.024 (0.058)	0.088*** (0.028)	0.114*** (0.032)	0.062*** (0.023)	0.169*** (0.029)	0.154*** (0.036)	0.086 (0.062)	0.149*** (0.016)	0.126*** (0.015)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Headquarter state-year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	18,034	18,034	18,034	14,462	14,462	14,462	29,590	29,590	29,590
Adjusted R-squared	0.481	0.484	0.492	0.818	0.822	0.826	0.562	0.564	0.576

Panel B: Accuracy of voluntary disclosure

	Freq. of Optimistic Forecast			Freq. of Pessimistic Forecast			Forecast Width			Management Forecast Error		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
UD Law	0.001 (0.015)	0.036*** (0.010)	0.023* (0.013)	0.025 (0.022)	0.060*** (0.007)	0.055*** (0.008)	-0.055*** (0.004)	-0.103*** (0.001)	-0.090*** (0.011)	0.023** (0.009)	0.038*** (0.002)	0.053*** (0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
HQ state-year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Observations	29,590	29,590	29,590	29,590	29,590	29,590	6,725	6,725	6,725	6,725	6,725	6,725
Adj. R-squared	0.219	0.220	0.230	0.322	0.324	0.331	0.277	0.266	0.254	0.350	0.342	0.386

Table 3: Universal demand laws and the information environment. This table reports ordinary least squares (OLS) estimates of the effect of UD laws on the information environment. The sample consists of 44,546 firm-year observations from 6,061 firms between 1987 and 2007. Panel A reports the effect of UD laws on financial statement disclosure quality, measured as the natural log of the value-weighted ratio of non-missing to total Compustat line items (Chen, Miao, and Shevlin, 2015). In Models (4)-(10) of Panel A, we disaggregate this measure and report regressions of the UD indicator on the number of missing items in each financial account. Panel B reports the effect of UD laws on analyst information production, using annual EPS estimates in the last I/B/E/S forecast summary before the fiscal year end. UD is an indicator that equals one if the firm is incorporated in a state that passed a UD law. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

Panel A: Financial statement disclosure quality

	Disclosure quality			ln(1+number of missing items)						
	(1)	(2)	(3)	Assets	Liabilities	Equity	Taxes	Expense	Non-recurring items	Comp. income
UD Law	-0.008*	-0.008***	-0.007***	0.012	-0.012	-0.005	-0.042**	0.000	0.016***	0.019***
	(0.004)	(0.003)	(0.003)	(0.014)	(0.021)	(0.012)	(0.019)	(0.009)	(0.005)	(0.007)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	No	No	No	No	No	No
Headquarter state-year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	44,546	44,546	44,546	44,546	44,546	44,546	44,546	44,546	44,546	44,546
Adjusted R-squared	0.844	0.845	0.852	0.786	0.596	0.681	0.619	0.710	0.704	0.910

Panel B: Analyst information production

	Analyst coverage			Forecast dispersion			Forecast error		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
UD Law	-0.147 (0.395)	-0.207 (0.235)	-0.067 (0.202)	0.025*** (0.007)	0.032*** (0.007)	0.031*** (0.007)	0.043*** (0.013)	0.060*** (0.009)	0.062*** (0.012)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Headquarter state-year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	44,546	44,546	44,546	44,546	44,546	44,546	44,546	44,546	44,546
Adjusted R-squared	0.735	0.744	0.762	0.703	0.702	0.707	0.599	0.597	0.607

Table 4: Universal demand laws and the trading environment. This table reports OLS estimates of the effect of UD laws on the trading environment, using data from the CRSP daily stock file and Stephen Brown’s website. The sample consists of 44,546 firm-year observations from 6,061 firms between 1987 and 2007. Probability of informed trading (PIN) data are not available before 1993 so we estimate the PIN regressions on a subsample of 34,656 firm-year observations from 5,455 firms between 1993 and 2007. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

	Bid-ask spread			Dollar volume			PIN		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
UD Law	0.095*** (0.022)	0.044** (0.017)	0.031** (0.014)	-8.035*** (1.917)	-6.121** (2.809)	-4.854** (2.364)	0.012** (0.005)	0.009* (0.005)	0.008* (0.005)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Headquarter state-year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	44,546	44,546	44,546	44,546	44,546	44,546	34,656	34,656	34,656
Adjusted R-squared	0.838	0.846	0.855	0.579	0.589	0.623	0.537	0.540	0.550

Table 5: Universal demand laws and accounting manipulation. This table reports OLS estimates of the effect of UD laws on two proxies of accounting manipulation – the likelihood of facing an SEC or DOJ enforcement action and the absolute value of discretionary accruals. The sample consists of 44,546 firm-year observations from 6,061 firms between 1987 and 2007. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

	Enforcement action			Discretionary Accruals		
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	-0.012** (0.005)	-0.011*** (0.004)	-0.009** (0.004)	0.004 (0.002)	0.004 (0.003)	0.005* (0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No
Headquarter state-year FE	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes
Observations	44,546	44,546	44,546	44,546	44,546	44,546
Adjusted R-squared	0.318	0.320	0.326	0.308	0.309	0.344

Table 6: Universal demand laws and insider trading profitability. This table reports OLS estimates of the effect of UD laws on insider trading profitability. The sample consists of 200,581 net daily transactions from 4,609 firms with data available in the Thomson Reuters Insider Filing database between 1987 and 2007. For each trading day, we net the transactions made by firm executives and measure trade profitability as the return over the following three months for buys and the negative of this return for sales. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Appendix 1 provides variable definitions.

	Trading profit (%)			Abnormal trading profit (%)			Trading alpha (%)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
UD Law	3.188*** (1.086)	3.978*** (0.924)	3.096*** (1.074)	2.770** (1.130)	3.822*** (0.954)	3.049*** (0.964)	2.239** (0.835)	2.620*** (0.902)	1.874* (0.970)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Headquarter state-year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry-year FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	200,581	200,581	200,581	200,581	200,581	200,581	200,581	200,581	200,581
Adjusted R-squared	0.145	0.161	0.179	0.128	0.144	0.164	0.134	0.148	0.163

Table 7: Robustness tests. This table presents robustness checks of the effect of UD laws. Panel A reports OLS estimates using the subsample of firms that did not reincorporate between 1987 and 2007. This sample consists of 41,413 firm-year observations from 5,745 firms and 190,435 net daily transactions from 4,447 firms. Panel B reports OLS estimates using a subsample that excludes firms that completed a negative CAR acquisition within the prior three fiscal years. This sample consists of 33,532 firm-year observations from 5,482 firms and 140,244 net daily transactions from 4,161 firms. Heteroskedasticity-consistent standard errors clustered by state of incorporation are reported in parentheses. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Subsample excluding reincorporating firms

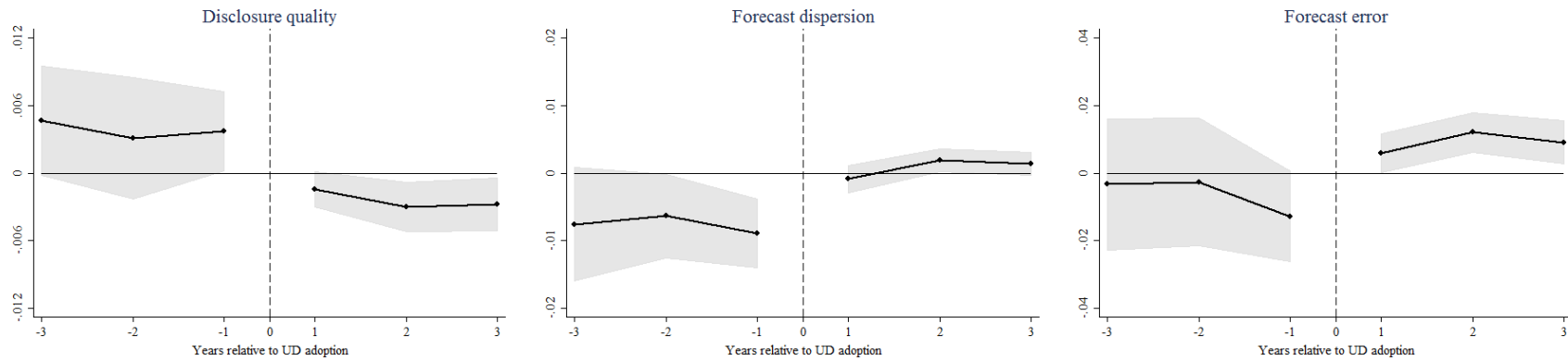
	DQ	Analyst coverage	Forecast disp.	Forecast error	Bid-ask spread	Dollar volume	PIN	Enf. action	Abs. Dis. accruals	Trading profit	Abn. tr. profit	Trading alpha
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
UD Law	-0.006** (0.003)	-0.130 (0.194)	0.031*** (0.006)	0.061*** (0.013)	0.039** (0.017)	-4.621* (2.414)	0.008* (0.005)	-0.009** (0.004)	0.006** (0.002)	3.126*** (1.052)	3.119*** (0.957)	1.925** (0.932)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HQ state-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,413	41,413	41,413	41,413	41,413	41,413	32,331	41,413	41,413	190,435	190,435	190,435
Adj. R-squared	0.853	0.764	0.699	0.602	0.857	0.621	0.548	0.324	0.350	0.181	0.166	0.165

Panel B: Subsample excluding firms that completed a negative CAR acquisition within the prior three years

	DQ	Analyst coverage	Forecast disp.	Forecast error	Bid-ask spread	Dollar volume	PIN	Enf. action	Abs. Dis. accruals	Trading profit	Abn. tr. profit	Trading alpha
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
UD Law	-0.012*** (0.003)	0.122 (0.205)	0.036*** (0.008)	0.045*** (0.013)	0.041** (0.019)	-4.579*** (1.521)	0.004 (0.005)	-0.010** (0.005)	0.005 (0.004)	6.370*** (2.088)	6.242*** (1.765)	5.557*** (1.538)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HQ state-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,532	33,532	33,532	33,532	33,532	33,532	25,470	33,532	33,532	140,244	140,244	140,244
Adj. R-squared	0.853	0.774	0.708	0.602	0.859	0.632	0.540	0.333	0.349	0.215	0.197	0.192

Figure 1: The dynamic impact of UD laws. This figure plots OLS point estimates of the effect of UD laws on our outcome variables of interest. To cleanly identify the timing of the effect, we construct cohorts of treated and control firms for six years around each UD adoption event, requiring control firms to not have been previously treated by another state. We then pool the data across cohorts and regress the outcome variable on UD indicators, firm-cohort, headquarter state-year-cohort, and industry-year-cohort fixed effects. The gray shading represents 90% confidence intervals using heteroskedasticity-consistent standard errors clustered by state of incorporation.

Panel A: The information environment



Panel B: The trading environment

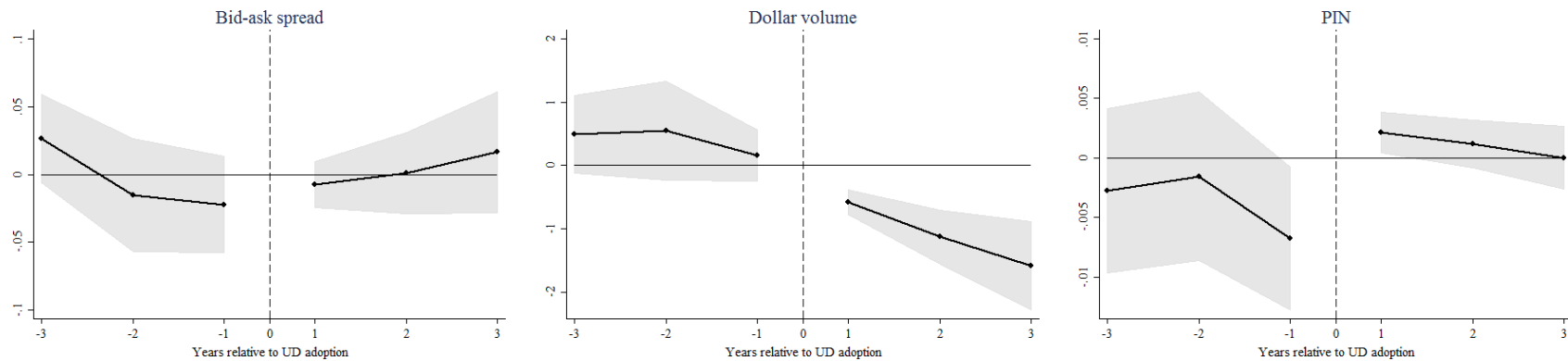
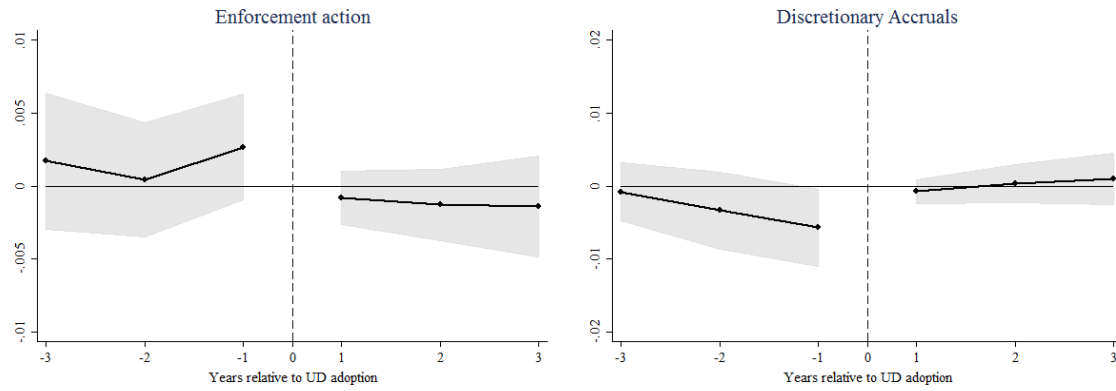
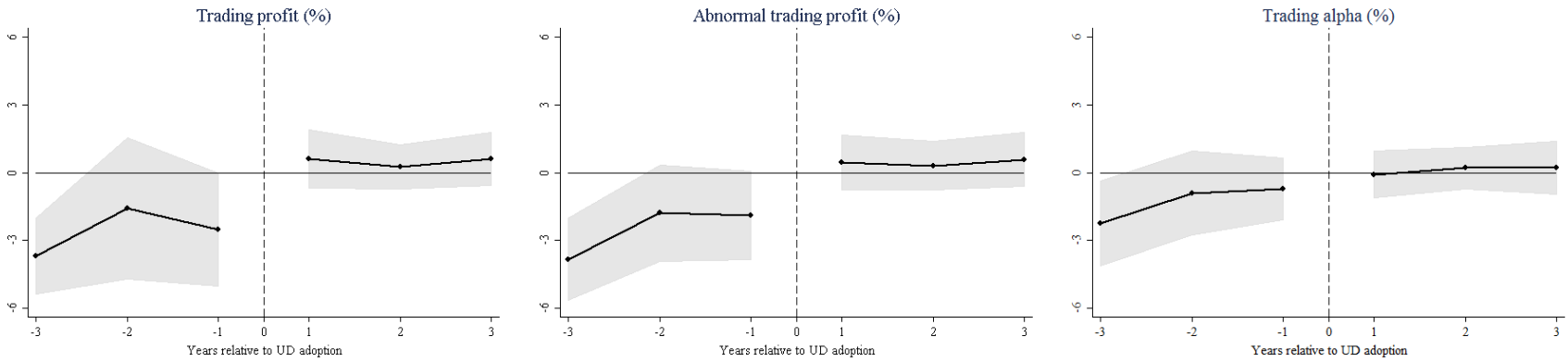


Figure 1: The dynamic impact of UD laws (Cont.)

Panel C: Accounting manipulation



Panel D: Insider trading profitability



Appendix 1: Variable definitions. The following table lists variable definitions and data sources. CRSP denotes the CRSP Daily Stock File. Compustat denotes the Compustat North America Fundamentals Annual File. TFN denotes Thomson Reuters Insider Filing Table 1. I/B/E/S denotes I/B/E/S Summary History with Actuals File and the I/B/E/S Guidance – Detail File.

Variable	Source	Description
UD law	Appel (2016)	Indicator that equals one if the firm is incorporated in a state that passed a universal demand law. UD laws establish a procedure hurdle that requires shareholders to obtain board approval before initiating a derivative lawsuit
Freq. of Voluntary 8-K	WRDS SEC Analytics Suite	Natural logarithm of one plus the number of voluntary 8-Ks filed during the fiscal year
Length of MD&A	Stephen V. Brown's website	Natural logarithm of one plus the number of words in the MD&A section of the 10-K filing
Freq. of Management Forecasts	I/B/E/S	Natural logarithm of one plus the number of management EPS forecasts issued during the fiscal year
Frequency of High (Low) Forecast	I/B/E/S	Natural logarithm of one plus the number high (low) management EPS forecasts issued during the fiscal year. Following Bourveau, Lou, and Wang (2018), we define a high (low) forecast as a forecast with actual earnings surprise greater than 10% (lower than -10%). Actual earnings surprise is the difference between the management forecast and the actual earnings, scaled by the absolute value of actual earnings
Width of Forecast	I/B/E/S	The difference between the upper and lower estimates for the last management EPS forecast issued before the forecast period end, scaled by the absolute value of actual earnings and averaged over the fiscal year. Point estimates have a range of zero
Management Forecast Error	I/B/E/S	The absolute difference between the last management EPS forecast before the forecast period end and the actual EPS reported in I/B/E/S, averaged over the fiscal year. We use the midpoint of the upper and lower estimates if a guidance range is given
Disclosure quality	Compustat	The value-weighted ratio of non-missing to total Compustat line items, calculated following Chen, Miao, and Shevlin (2015)
Enforcement action (0/1)	http://www.sec.gov and searches in the Lexis-Nexis FEDSEC:CASES database library	Indicator that equals one if the firm faces SEC or DOJ charges for financial misrepresentation during the fiscal year

Appendix 1: Variable definitions (Cont.)

Variable	Source	Description
Discretionary accruals	Compustat	The absolute value of discretionary accruals estimated using the modified Jones model (Dechow et al., 1995). The modified Jones model is: $\frac{TAC_{i,t}}{AT_{i,t}} = \alpha_{j,t} \frac{1}{AT_{i,t-1}} + B_{j,t} \frac{\Delta Sale_{i,t} - \Delta RECT_{i,t}}{AT_{i,t-1}} + \gamma_{j,t} \frac{PPENT_{i,t}}{AT_{i,t-1}} + \varepsilon_{i,t}$, where TAC = total accruals defined as earnings before extraordinary items and discontinued operations minus operating cash flow, AT = total assets, $\Delta Sale$ = sales in year t minus sales in year t-1, $\Delta RECT$ = account receivables in year t minus receivables in year t-1, and PPENT = net value of property, plant, and equipment. We estimate the model for each 2-digit SIC industry-year with at least 10 observations and use the absolute value of the residual $\hat{\varepsilon}_{i,t}$ as a measure of earnings management
Analyst coverage	I/B/E/S	The number of analysts providing an annual EPS estimate in the last I/B/E/S forecast summary before the fiscal year end
Forecast dispersion	I/B/E/S	The standard deviation of annual EPS estimates in the last I/B/E/S forecast summary before the fiscal year end
Forecast error	I/B/E/S	The absolute difference between the mean annual EPS estimate in the last forecast summary before the fiscal year end and the actual EPS reported in I/B/E/S
Bid-ask spread	CRSP	The daily closing ask price minus the closing bid price divided by the midpoint of the closing ask and bid prices in CRSP, averaged over the fiscal year
Dollar volume (US\$M)	CRSP	Daily trading volume multiplied by the closing price, averaged over the fiscal year
PIN	Stephen Brown website	An estimate of the likelihood that a trade originates from an informed investor, calculated using the Easley, Kiefer, and O'Hara (1997) model
Trading profit (%)	TFN + CRSP	Three-month raw return following the transaction date, multiplied by negative one for sales
Abnormal trading profit (%)	TFN + CRSP	Three-month buy-and-hold abnormal return, using the CRSP value-weighted index as market proxy. We multiply this value by negative one for sales
Trading alpha (%)	TFN + CRSP + Ken French site	Intercept from the Fama and French (1993) three factor model estimated over the three months following the transaction date. We multiply this value by negative one for sales