

# **Does Litigation Risk Deter Insider Trading? Evidence from Universal Demand Laws**

Binay K. Adhikari, Anup Agrawal, Bina Sharma\*

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Comments welcome

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\* Adhikari: College of Business, University of Texas at San Antonio, San Antonio, TX 78249, binay.adhikari@utsa.edu, 210.458.5349. Agrawal: Culverhouse College of Business, University of Alabama, Tuscaloosa, AL 35487-0224, aagrawal@cba.ua.edu, 205.348.8970. Sharma: College of Business, Bellevue University, 1000 Galvin Road South, Bellevue, NE 68005-3098, bisharma@bellevue.edu, 402.557.7559. We thank Ian Appel, Yonathan Arbel, Jennifer Arlen, Mehran Azimi, Diego Escobari, Chris Herpfer, Rachel Li, Andre Mollick, Katie Moon, Sugata Ray, Ken Rosen, Shane Underwood, Daniel Weagley and seminar and conference participants at Emory University, Georgia Tech, Stevens Institute of Technology, Suffolk University, University of Alabama (Economics and Finance, and Law School), University of Miami, University of Oklahoma, University of Texas at RGV, University of Texas at San Antonio and 2020 MFA meetings for useful comments. Special thanks are due to David Cicero for detailed comments and suggestions, to Shuping Chen for sharing the financial statement disclosure quality data, and to Lukasz Pomorski for sharing the insider trade classification data. Agrawal acknowledges financial support from the William A. Powell, Jr. Chair in Finance and Banking.

# **Does Litigation Risk Deter Insider Trading?**

## **Evidence from Universal Demand Laws**

### **Abstract**

We exploit US states' staggered adoption of Universal Demand laws to study how the risk of shareholder lawsuits affects opportunistic insider trading. UD laws, which make it harder for shareholders to bring derivative lawsuits against directors and officers (see, e.g., Houston, Lin and Xie 2018; and Appel 2019), lead to significantly more profitable insider trades, especially sales. This effect is greater in firms with higher information asymmetry or lower institutional monitoring and comes from more opportunistic and riskier timing of trades. Our findings suggest that a decrease in litigation threat emboldens insiders to trade more opportunistically.

**JEL Classification Number:** G14, G38, K22

**Keywords:** Shareholder Lawsuits, Derivative Lawsuits, Universal Demand Laws, Litigation risk, Insider trading

# Does Litigation Risk Deter Insider Trading?

## Evidence from Universal Demand Laws

### 1. Introduction

Many scholars and policymakers believe that opportunistic trading by corporate insiders erodes outside investors' confidence in the fairness and integrity of financial markets, and if left unchecked, this practice may even lead to market failures.<sup>1</sup> Therefore, there is continuing interest in understanding the impact of regulatory mechanisms designed to discourage insider trading. However, empirical evidence on the efficacy of insider trading regulations has been mixed. One set of studies finds that insider trading regulations have been effective in reducing the frequency and profitability of opportunistic trades (e.g., Agrawal and Jaffe 1995; Garfinkel 1997; and Xu 2008). But several other studies cast doubt on the efficacy of such regulations (see, e.g., Seyhun 1992; Jaffe 1974; and Banerjee and Eckard 2001).

An important reason for the mixed findings on this issue seems to be the lack of strong identification techniques to disentangle the causal effect of litigation risk on insider trading. An important hurdle for identification is posed by the fact that most modern insider trading laws in the United States are adopted at the federal level<sup>2</sup> and are intended to affect all the firms at the same time. Moreover, regulatory reforms are hardly ever random. In fact, they often follow heightened concerns about illegal insider trading activities. The resulting lack of adequate cross-sectional variation and potential endogeneity of regulatory changes limit the ability of existing studies using federal regulations to cleanly establish causality. For instance, a decrease in insider trading after the passage of a stricter law may simply reflect mean-reversion after a period of rampant insider trading that engendered the law. Other studies that focus on enforcement intensity and court decisions (e.g., Del Guercio, Odders-White, and Ready 2017; Cheng, Huang, and Li

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<sup>1</sup> For a recent review of the literature that argues for and against this view, see Bhattacharya (2014).

<sup>2</sup> For example, SEC rule 10b-5, Section 16b of the Securities Exchange Act of 1934, Insider Trading Sanctions Act of 1984 (ITSA), and Insider Trading and Securities Fraud Enforcement Act of 1988 (ITSFEA).

2016) also face similar limitations. Accordingly, Bhattacharya (2014) concludes his extensive review of the insider trading literature with the verdict that “We need methodologies (such as natural experiments) to evaluate the efficacy of current and future insider trading rules.”

This paper attempts to fill this important gap in the literature. We exploit the staggered adoption of Universal Demand (UD) laws in 23 U.S. states and the District of Columbia over 23 years to examine the effect of shareholder litigation risk on opportunistic insider trading. Our research is motivated by recent studies that find that UD laws significantly reduce shareholders’ ability to bring derivative lawsuits (DLs) against directors and officers (D&O) for breach of their fiduciary duty to the company (see, e.g., Davis, 2008; Houston, Lin and Xie 2018; and Appel, 2019).

How do UD laws affect insider trading? DLs, which typically allege that D&O breached their fiduciary duty, often also include allegations of insider trading (see Erickson 2010), especially insider selling. Evidence of insider trading by D&O provides a motive for the alleged wrongdoing by D&O in these cases. Prior studies find that D&O misconduct is much more likely to result in shareholder lawsuits when it is accompanied by evidence of insider trading by D&O (see, e.g., Johnson, Nelson and Pritchard 2007). Therefore, the threat of DLs should deter insiders from trading opportunistically.<sup>3</sup> Houston, Lin, and Xie (2018) and Appel (2019) estimate that the adoption of a UD law decreases the annual probability of DLs against a firm by as much as about one-half,<sup>4</sup> and DLs are not substituted by increased direct shareholder (class action) lawsuits. Therefore, we posit that by making it harder to bring DLs, UD laws embolden insiders who are subject to derivative lawsuits (i.e., D&O) to trade more opportunistically.

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<sup>3</sup> We discuss the merit of DLs in section 2.2.

<sup>4</sup> A recent study by Donelson, Kettell, McInnis, and Toynbee (2022) finds similar negative effect of UD laws on DLs during our sample period, which ends in 2013 (see column (5) of their Table 5). But when they extend the sample past 2013 to include Louisiana, which adopted its UD law in 2015, this effect loses statistical significance, although the point estimate remains similar (see columns (3) and (4) vs. (1) and (2)). As the authors acknowledge, this loss of statistical significance seems to be entirely driven by an unusually large positive coefficient on Louisiana’s adoption of UD law. It is worth noting that relatively few public companies (about 0.4% of all public companies) are incorporated in Louisiana. The effect comes back when they exclude early and late adopters of UD Laws in column (6). We further discuss the relevance of Donelson’s et al.’s (2022) critiques for our study in section 4.10.

From an identification perspective, states' adoption of UD laws serves as excellent quasi-natural experiments to study the effect of regulation on insider trading for two reasons. First, UD laws are adopted by different states at different times over many years. So their adoption offers rich time-series and cross-sectional variation in the *ex-ante* probability of shareholders bringing DLs. Second, UD laws satisfy both the relevance and exclusion restrictions for a natural experiment in our setting. The relevance condition is satisfied because, as noted above, UD laws dramatically reduce the empirical probability of DLs. This happens because, in practice, the demand requirement significantly reduces the possibility of a successful lawsuit whether or not the board acts on the demand.<sup>5</sup> The exclusion restriction is satisfied because most states seem to have adopted these laws for reasons largely unrelated to concerns about insider trading. This feature makes the passage of UD laws likely exogenous to pre-existing levels and profitability of insider trading.

Our empirical methodology builds on recent studies such as Bertrand and Mullainathan (2003), Gormley and Matsa (2016), and Appel (2019), who employ multiple exogenous shocks for identification to make causal inferences. We create treatment and control groups using indicator variables based on the timing of adoption of UD laws by firms' states of incorporation. We then employ difference-in-differences (DiD) regression specifications to estimate the effect of shareholders' *ex-ante* litigation threat on the volume and profitability of insider trades. Following similar previous studies, our baseline regression models include firm, industry-by-time, and firm headquarters state-by-time fixed effects, which control for time-invariant heterogeneity across firms, and time-varying differences across and within industries and headquarters states that may have coincided with the passage of UD laws. We include firm-level control variables in our main tests but our conclusions remain the same even when we exclude them.

Using our full sample of trades, we analyze the effect of UD laws on the profitability of trades by D&O measured as their estimated buy-and-hold abnormal return (BHAR).<sup>6</sup> Our DiD

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<sup>5</sup> In section 2.1, we discuss the reason for this phenomenon in a greater detail. See Appel (2019) for more elaborate evidence for this argument.

<sup>6</sup> Our conclusions remain generally unchanged when we use alternative ways to measure returns such as raw return (CRET), cumulative abnormal return (CAR) or characteristic-adjusted return of Daniel, Grinblatt, Titman, and Wermers (1997; henceforth, DGTW), instead of BHAR. We report some of these tests in the Appendix.

regressions show that compared to control firms, the D&O<sup>7</sup> of treatment firms avoid losses of about 2.2%, 4.7%, and 8.1% in BHAR over one, three, and six months following a sale, respectively.<sup>8</sup> These returns translate into abnormal loss avoidance of about \$25,000, \$61,000 and \$91,000 respectively, over one, three, and six months per trade. As Bhattacharya and Marshall (2012) point out, the magnitudes of these insider trading profits are likely relatively small compared to insiders' pay and wealth. Is it realistic to believe that D&O increase their legal risk for relatively small profits after a state adopts a UD law? Well, since the legal risk to insiders from shareholder lawsuits reduces substantially after UD law adoption (see, e.g., Houston, Lin, and Xie (2018)), it is perhaps not surprising that insiders feel less constrained to forego profitable trading opportunities. Moreover, while the average profits per trade may seem small, profitable trading opportunities for insiders arise periodically, so the profits add up over time.

In the full sample, the effect of UD laws on the profitability of insider purchases in terms of abnormal stock returns is mostly insignificant. However, it is significant in some pertinent subsamples such as insider purchases before quarterly earnings announcements (pre-QEA). Moreover, abnormal dollar profits (which consider both the trade volume and the subsequent stock return) from insider purchases significantly increase after UD Laws for one holding period.

The evidence of more profitable insider sales after UD laws is prevalent in our overall sample, while purchases become more profitable only in certain specific situations. What explains this asymmetry? The premise of a DL is a breach of fiduciary duty, which often entails negative information or *harm* to the company. By decreasing the threat of shareholder lawsuits, UD laws embolden D&O to withhold timely disclosure of negative firm-specific information or, worse, misbehave in ways that can harm the firm, e.g., by earnings manipulation, self-dealing or neglect. Knowledge of this negative information or harm provides insiders an opportunity to sell stock based on their private information. Consequently, many DLs include evidence of insider sales as a secondary complaint, as we discuss in section 2.2. Of course, opportunistic insider trading, by

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<sup>7</sup> DLs, which are affected by UD laws, do not usually apply to 10% blockholders, who are also required to report their trades to the SEC. We treat these blockholders as a placebo group and analyze their trades separately in section 4.9. Unlike for D&O, the evidence is much weaker that blockholders' trades become more profitable after UD laws.

<sup>8</sup> When we exclude firm level control variables from the regressions, the magnitude of these effects declines somewhat, but they remain statistically significant.

itself a breach of fiduciary duty, is an issue in some shareholder lawsuits, which explains why we also find some evidence of an increase in the profitability of insider purchases, e.g., before quarterly earnings announcements.

We conduct many additional tests to understand UD Laws' effects on the timing and opportunism in insider trades. We find that UD laws predict increases in the dollar volume of shares sold within a given period, but not the number of shares sold. This finding supports the view that the reduction in litigation risk encourages insiders to time their sales more opportunistically, i.e., they are more likely to sell when prices are inflated and large price declines are likely. In addition, we find that in treatment firms, UD Laws lead to an increase in the proportion of opportunistic sales, as defined by Cohen, Malloy, and Pomorski (2012), to total insider sales. Moreover, we analyze insider trades immediately before quarterly earnings announcements (pre-QEA), which are highly likely to be opportunistic trades (see Ali and Hirshleifer 2017). We find that pre-QEA insider trades - both purchases and sales - become more profitable after the adoption of UD laws. These results suggest that the risk of shareholder litigation deters more risky insider trades: opportunistic sales and trades (both sales and purchases) before a major recurring corporate information event.

We further find that these effects are larger among firms with greater information asymmetry, such as firms with higher R&D and lower stock liquidity, which offer more opportunities for profitable insider trading. Moreover, after the adoption of UD laws, insider sales become more profitable in treatment firms which are 1) smaller, so are likely to have fewer corporate governance mechanisms such as company rules against opportunistic insider trading, and 2) subject to less monitoring by institutional blockholders.

Finally, we conduct a rich set of robustness checks of our main results. First, we check if our conclusions are robust to alternative ways of estimating the profitability of trades. Second, we confirm that our results are robust to Heath, et al.'s (2022) critique about reusing natural experiments. Specifically, as we discuss above, UD laws appear to satisfy both the relevance and exclusion restrictions for a natural experiment in our setting. We also confirm the statistical significance of our tests that account for multiple hypothesis testing based on previously published results. Third, our findings are not affected by the recent financial crisis. Fourth, our results also remain intact when we control for potential confounding effects of many other state laws important

for corporate governance and *ex-ante* litigation risks. Fifth, our results remain similar when we drop all firms located in states under the jurisdiction of the ninth circuit court to disentangle the effect of a 1999 court decision that restricted shareholders' ability to bring securities class action lawsuits. Finally, our results hold for firms incorporated in Pennsylvania, whose UD law was mandated by the state supreme court and therefore was less subject to corporate lobbying.

This study makes several contributions to the literature. First, it contributes to the literature discussed in the first two paragraphs of this section on the efficacy of regulations in deterring opportunistic insider trades. Our novel contribution is our identification strategy, which uses plausibly exogenous shocks to *ex-ante* litigation risk due to states' staggered adoption of UD laws. As discussed earlier, our approach is more suitable for establishing causality than those of many previous related studies which rely on federal laws.

Second, our evidence challenges a view, especially prevalent in the legal literature, that shareholder litigation is often frivolous and imposes a deadweight loss on the firm (see, e.g., Romano (1991), West (2001)). Our evidence suggests that by limiting opportunistic insider trading, the threat of shareholder litigation provides considerable benefits that offset, and can potentially outweigh, the costs associated with frivolous lawsuits.

Third, our paper is related to recent papers that examine various economic effects of the adoption of UD laws. Houston, Lin and Xie (2018) find that UD laws, which make it harder for shareholders to bring DLs, result in a higher cost of capital for firms due to a decrease in information quality, greater risk-taking, and higher level of insider trading. Boone, Fich, and Griffin (2022) find that UD laws lead to more opaque financial reporting and a worse information environment. Our paper complements these studies by focusing on how UD laws affect insiders' incentives for opportunistic trading and provide an in-depth analysis of the resulting changes in the profitability of insider sales and purchases.

Our paper is also related to a concurrent working paper by Jung, Nam, and Shu (2021), who analyze the *volume* of opportunistic insider trading after UD laws, while we focus on its *profitability*. We identify riskier trades and more opportunistic timing as the drivers of higher profitability after UD laws. Jung et al. argue that while direct lawsuits are likely to be effective mainly against sales, DLs can also be effective against opportunistic insider purchases because they are based on a breach of fiduciary duty and do not need to show economic injury to



shareholders. But they find (in Tables 4 and 5) that the volume of opportunistic sales increases much more than purchases after UD laws, which reduce the threat of DLs. Our paper complements theirs by showing that the profitability of insider trades increases after UD laws, particularly for sales. Moreover, our research is the first to dig into the question of whether derivative lawsuits complain about insider sales or purchases, an issue on which there appears to be no empirical evidence. Our preliminary evidence suggests that allegations of opportunistic purchases hardly ever show up in derivative lawsuits (see section 2.2). That explains why our empirical evidence of an increase in the profitability of opportunistic sales after UD laws is much stronger than the evidence on opportunistic purchases.

Fourth, our study contributes to an important but often overlooked issue of public vs. private enforcement of opportunistic insider trading. Most prior studies focus on public enforcement of illegal insider trading, i.e., prosecution by regulators such as the SEC and the Department of Justice, based, for example, on SEC rule 10(b)-5, ITSA, and ITSFEA. Agrawal and Nasser (2012) conjecture that private enforcement (e.g., by shareholder lawsuits) can sometimes be more effective than public enforcement in deterring opportunistic insider trading.<sup>9</sup> This is plausible because, for insiders of most firms, the risk of being sued by shareholders is higher than the risk of being sued by regulators. Regulators such as the SEC have limited staff and resources, so they are outgunned in monitoring and enforcing insider trading laws against numerous potential insiders in a large number of public companies. Therefore, regulators tend to focus their monitoring and enforcement efforts on a few high-profile cases that are likely ‘slam-dunks’ and likely to generate substantial media coverage (see, e.g., Dechow, Sloan and Sweeney 1996; Agrawal and Chadha 2005; and Agrawal and Cooper 2015). While that may be an effective strategy for a resource-constrained regulator, it is unlikely to deter all, or even most, insider trading. Because DLs are filed by shareholders against corporate insiders, our evidence here that roadblocks against shareholder lawsuits increase insider trading profits speaks for the efficacy of private enforcement in deterring opportunistic insider trading.

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<sup>9</sup> Indeed, Agrawal and Jaffe (1995) find that the threat of DLs by shareholders appears to be quite effective in deterring insider trading in takeover targets in the pre-1961 era when the SEC did not enforce its main tool against insider trading (rule 10b-5) in public companies. This effect persists in the modern regulatory era (see Agrawal and Nasser (2012)). This is an important finding given that takeover targets offer a tempting opportunity for insider trading.

Fifth, our findings that on average, insider sales are more profitable after UD laws, while most insider purchases are not, stand in sharp contrast to a large literature on insider trading in general that finds that insider purchases are more profitable than insider sales (see, e.g., Lakonishok and Lee 2001; and Jeng, Metrick and Zeckhauser 2003).<sup>10</sup> As we discuss above, opportunistic insider sales are more prone to DLs than opportunistic insider purchases. Consequently, the adoption of UD laws, which reduce insiders' risk of being targeted by DLs, should affect insider sales more than insider purchases. Our findings point to the potency of UD laws in reducing the threat of DLs from insider selling, making insiders more audacious.

Finally, our paper also contributes to the literature on corporate governance. Specifically, our study complements several recent studies that exploit exogenous shocks to establish causal effects of litigation risk and new laws on corporate governance and firm value (see, e.g., Bertrand and Mullainathan 2003; Gormley and Matsa, 2011, 2016; and Appel, 2019).

## **2. Background, Literature Review, and Hypothesis Development**

### **2.1 DLs, UD laws, and insider trading**

A DL is filed by a shareholder against D&O on behalf of the company for breach of their fiduciary duties of loyalty (e.g., fraud, mismanagement, earnings manipulation, accounting irregularities, self-dealing or dishonesty) or care (e.g., negligence to timely disclose pertinent, especially negative, information to investors). DLs can be a potent check on the behavior of D&O, who face a high risk of incurring out-of-pocket expenses because state laws typically do not allow firms to reimburse D&O for losses in cases involving misconduct (e.g., criminal or fraudulent activities) or illegal profits, nor are these losses covered by D&O insurance (see, e.g., Willis 2005; Lin, Officer and Zou 2011; Jung, Nam and Shu 2021; and Embroker 2019). Moreover, lawsuits and the underlying misconduct can cause insiders to lose their positions in the company and damage their reputation in the labor market (see, e.g., Agrawal, Jaffe and Karpoff 1999; Ferris, et al. 2007; Karpoff, Lee and Martin 2008; and Brochet and Srinivasan 2014).

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<sup>10</sup> Aldredge and Cicero (2015), and Drobetz, Mussbach and Westheide (2020) are notable exceptions.

To have the standing to bring a DL, the plaintiff usually needs to have been a shareholder at the time of the wrongdoing by the insider. But in some cases, these lawsuits can be brought by attorneys themselves, who simply have to buy one share to become a shareholder before bringing a lawsuit, as in section 16b cases (short-swing rule; see, e.g., Agrawal and Jaffe, 1995).

To initiate a DL, most states require an eligible shareholder to file a demand on the board (known as ‘demand requirement’) to sue the alleged wrongdoers. Shareholders can initiate derivative suits themselves only if the board refuses the demand or does not act on it. However, because DLs typically name most or all of the board members as defendants, the board is obviously not eager to act on the demand! So, boards typically either just ignore the demand or appoint a board committee, which sits on it for months before declaring that it looked into the matter and found no wrongdoing. Therefore, many jurisdictions allow an exception to the demand rule, known as a futility exception. The standards for determining futility vary across jurisdictions (see, e.g., Swanson 1992). For example, Delaware has a two-prong test requiring shareholders to allege ‘particularized facts’ that create a reasonable doubt that: 1) the directors are disinterested and independent, and 2) the challenged transaction was a product of a valid exercise of business judgment (Kinney 1994). While that sets a high hurdle for bringing a DL, in the wake of corporate scandals such as Enron and Worldcom and the adoption of Sarbanes-Oxley Act in 2002, Delaware made it easier for shareholders to bring DLs (see, e.g., Jones 2004; and Qi and Pederson 2019).

The critics of demand futility argue that the demand requirement allows management to address shareholder allegations, and a chance to either take corrective action or reject the proposed action. Besides, the demand requirement helps to resolve a dispute without costly litigation (see, e.g., Swanson 1992). American Law Institute (ALI) and the American Bar Association (ABA) advocated the need for ending the futility exception. ABA proposed demand requirement in all derivative actions (Universal Demand) in its Model Business Corporation Act (MBCA). In response to MBCA, 23 states plus DC have adopted UD laws from 1989 to 2011.

The demand requirement, imposed on all DLs against companies incorporated in a state by its adoption of a UD law, significantly reduces shareholders’ incentive to bring a DL by substantially reducing the chances of a lawsuit succeeding. Boards obviously don’t want to be sued! So they either simply reject the demand or appoint a special committee that can (pretend to)

investigate the matter endlessly.<sup>11</sup> And courts almost always side with the board's decision. This happens because if the board refuses the demand, courts can typically only review if the board failed to exercise a valid business judgement (Pinto and Branson (2013), Appel (2019)). If the court ascertains that a majority of the board or the special committee is independent (which is true in most cases), they will dismiss the suit (Kinney 1994). Empirically, Houston, Lin and Xie (2018) and Appel (2019) find that the probability of DLs indeed decreases substantially after a state adopts a UD law. Thus, time variation in the adoption of UD laws by different states leads to time-series and cross-sectional variations in shareholders' ability to bring DLs against insiders for breach of their fiduciary duties (Davis, 2008; Appel, 2019).

DLs typically allege that D&O breached their fiduciary duty. In addition, they often include allegations of insider trading (in about 60% of the cases; see Erickson 2010).<sup>12</sup> Evidence of insider trading, which is publicly available due to the section 16a reporting requirement, serves to establish a motive for D&O to engage in the alleged wrongdoing involving the company and increases the odds of the shareholder lawsuit succeeding (see, e.g., Johnson, Nelson and Pritchard 2007; and Choi, Nelson and Pritchard 2009). The most common type of settlement in a DL is governance reform, rather than monetary compensation (see, e.g., Ferris, et al. 2007; and Erickson 2010), although there have been several large dollar settlements.

States claim to have adopted UD laws primarily to discourage frivolous lawsuits and to allow boards to take corrective actions instead of immediately facing lawsuits. Importantly, their decision to adopt UD laws appears largely unrelated to concerns about insider trading. This feature

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<sup>11</sup> Under MBCA, shareholders must wait for 90 days after making a written demand to file a DL. Exceptions include corporations that refuse the demand within 90 days and corporations that will suffer irreparable injury if the suit is not brought earlier (see, e.g., Kinney 1994).

<sup>12</sup> Donelson et al. (2022, Table 2) find that 57 out of 1,775 DLs in their sample have insider trading as the *primary* allegation. They do not tabulate allegations of insider trading that accompany other primary allegations (such as disclosure, accounting and transactions). As we discuss above, most DLs do not involve insider trading as the primary allegation. Instead, allegations of insider trading are included as part of broader allegations of breach of fiduciary duty and to establish a motive for the breach. In fact, the appeal of UD laws as an instrument for litigation risk partly comes from the fact that DLs, which UD laws make harder to bring, are rarely aimed primarily at insider trading. Accordingly, the adoption of UD laws is rarely due to concerns about insider trading. For identification, this is a desirable feature that suggests that UD laws satisfy the exclusion restriction needed for testing the effect of DLs on insider trading behavior.

makes the adoption of UD laws an ideal quasi-natural setting to test the effect of shareholders' litigation risk on insider trading because UD laws are mostly free from concerns about reverse causality concerning insider trading. Thus, our approach contrasts with those of most previous studies, which rely on federal laws or court decisions specifically designed to address elevated concerns about opportunistic insider trading.

## **2.2 Are DLs more relevant for opportunistic insider sales or purchases?**

As discussed in section 1, a DL is filed by a shareholder against D&O on behalf of the company for breach of their fiduciary duties to the company. These breaches often result in *harm* to the company. The primary claims of harm are usually accompanied by claims that insiders sold stock to avoid losses from the harm. The additional evidence of insider trading by D&O increases the merit of a lawsuit, and therefore increases the probability of its being filed (see, e.g., Johnson, Nelson and Pritchard 2007).

An example is a derivative action brought by Citigroup Inc.'s shareholders against the company's current and former D&O in 2009.<sup>13</sup> This lawsuit alleges that the D&O committed five types of wrongdoing in connection with Citigroup's mortgage-related losses: 1) breached fiduciary duties of care and loyalty by allowing Citigroup to knowingly make risky mortgage-related investments, 2) failed to inform shareholders of Citigroup's subprime exposure 3) wasted corporate assets by repurchasing stock 4) committed securities fraud by making or authorizing misleading statements that omitted the extent of Citigroup's investment in subprime mortgages, and 5) some defendants committed insider trading by selling Citigroup stock while in the possession of material, non-public information.

Clearly, in this case the complaint about insider trading is about sales. But do DLs that include complaints of insider trading typically complain about insider sales or purchases? We cannot find any empirical evidence on this issue. To shed some light on this question, we take two tacks. First, we did a search on Google Scholar Case Law on February 10, 2022, using the following search terms: "insider trading" + "derivative action" OR "derivatively" OR "derivative

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<sup>13</sup> "In re Citigroup Inc. Shareholder Derivative Litigation", retrieved March 21, 2022 from <https://casetext.com/case/in-re-citigroup-inc-shareholder-derivative-litigation>.

litigation” but *without specifying purchases or sales*. The search covered all state courts for our sample period of years 1996 to 2013. We then carefully read the case files of the top 20 cases listed by relevance in the search results. The complaint in 11 (0) of these cases includes allegations of insider sales (purchases). In 6 cases, the direction of insider trades is unclear because, for instance, the cases refer to previous (often several) related cases, which we cannot track down. In 3 cases, we do not find any mention of insider trading in the complaint. This limited evidence suggests that DL cases that include complaints about insider trading are more likely to complain about insider sales, rather than insider purchases, even though opportunistic purchases also involve a breach of fiduciary duty and can therefore be a subject of DLs. Second, we find that many of the high-profile DLs reported by the media that involve allegations of insider trading are also predominantly about sales.<sup>14</sup>

### **2.3 Are direct or derivative shareholder lawsuits more relevant for insider trading?**

Shareholders often prefer to bring direct lawsuits because any monetary compensation goes directly to them, instead of the company as in DLs. But direct lawsuits require evidence of direct harm to the plaintiffs which is hard to show in cases involving insider purchases, whereas DLs only need to allege breach of fiduciary duty. So, except for the demand requirement, there is a lower hurdle to pursue a DL. Moreover, plaintiffs often file both types of lawsuits to increase their chances of a favorable verdict or settlement. Appel (2019) shows that DLs are generally as prevalent as direct shareholder lawsuits (often filed as class actions) against public companies.

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<sup>14</sup> Here are some prominent recent examples of DLs that involve allegations of insider trading. Oracle CEO Larry Ellison settled for \$100 million a lawsuit alleging that he sold about \$900 million of stock before the company announced poor earnings results (New York Times, September 12, 2005); Chipotle D&O sold stock during the firm’s problems with food illness outbreaks (Marketwatch, June 2016); Fitbit D&O sold \$115 million of stock in its IPO while being aware of widespread issues with the company’s heart-rate monitoring technology (Yahoo! Finance, December 14, 2018); Yahoo! settled a case for \$23 million over allegations that D&O sold stock before revealing the company’s massive data breaches (D&O Diary, January 21, 2019); Wells Fargo settled a case for \$320 million that alleged that D&O sold stock during the company’s phony customer accounts scandal (D&O Diary, March 3, 2019); and Facebook D&O sold \$1.5 billion of stock while the company faced a looming crisis over privacy concerns and the Cambridge Analytica scandal (Dodd-Frank.com, May 1, 2019).

## 2.4 Literature review and hypothesis development

A large literature in law and finance finds that legal protection of shareholder rights is an important mechanism for reducing agency problems between managers and shareholders (see Shleifer and Vishny 1997 for a review). But a sizeable legal literature argues that most shareholder litigation is frivolous, and mainly benefits lawyers and insurance companies. A common theme in this literature is that DLs are brought not so much to protect shareholder interests, but rather by plaintiffs' attorneys hoping to extract settlement fees. D&O are usually reimbursed for any financial liability either by the company or by D&O insurance. Therefore, D&O do not bear much financial risk for their misbehavior. Consequently, litigation threat does not really deter managerial misbehavior (see, e.g., Romano 1991; Weiss and Beckerman 1995; Baker and Griffith 2008; Coffee 2006).

But many empirical studies find that DLs have important effects, especially on corporate governance. Ferris, et al. (2007) find that boards improve on several dimensions following DLs. More recently, several studies find that a reduction in the threat of shareholder litigation leads to less institutional blockholding and weaker internal governance provisions (see, e.g., Crane and Koch 2016; Appel 2019; and Huang, Roychowdhury, and Sletten 2022). Weaker corporate governance, in turn, leads to an increase in corporate misconduct such as hoarding of negative news, earnings management (see, e.g., Houston et al. 2019; and Huang et al. 2022), a deterioration in firms' information environment (e.g., Boone, Fich, and Griffin 2022), and ultimately an increase in firms' cost of capital (see Houston, Lin and Xie 2018).

In the context of insider trading, many studies find that corporate insiders face real litigation risk and take costly actions to circumvent it. For example, Cheng and Lo (2006) find that insiders strategically time firm policies to maximize their profits from insider trading. Lee, Lemmon, Li and Sequeira (2014) suggest that insiders in firms that put voluntary restrictions on insider trading continuously take advantage of private information while being more cautious with exploiting negative private information. Dai, Kang, and Lee (2016) also suggest that insiders deliberately use their information advantage to avoid litigation risk.

Since the adoption of UD laws reduces the risk of shareholder lawsuits faced by D&O, the laws can also change the ways that they trade their firms' stock. Specifically, UD laws can embolden them to engage in more profitable, more opportunistic, and riskier types of insider

trading in firms covered by these laws. Moreover, unlike insider purchases, opportunistic insider sales occur before the revelation of negative corporate news, and are therefore more prone to DLs from shareholders. Consequently, the adoption of UD laws, which reduce insiders' risk of being targeted by DLs, should affect insider sales more than insider purchases.

### 3. Data, Variables, and Summary Statistics

#### 3.1 Sample and data

Our main explanatory variable (*After UD Law*) is an indicator variable which equals 1 if a firm's state of incorporation has a UD law in a given year; it equals 0 otherwise. Table A.7 presents the timeline of states' adoption of UD Laws. Following the prior literature, we define *After UD Law* based on firms' historical states of incorporation.<sup>15</sup>

Our data on insider trades comes from Thomson Reuters Insider Filing data (TIF). Our sample begins in January 1996, when TIF starts reporting this data in earnest, and ends in December 2013, two years after the last UD law was adopted.<sup>16</sup> This data includes all open market trades reported by corporate insiders (directors, officers, and beneficial owners of 10% or more of the company's stock) through SEC Forms 3, 4, and 5. We drop beneficial owners' transactions because they do not have any fiduciary duty to fellow shareholders, so they are not subject to UD laws.<sup>17</sup> We analyze directors' and officers' open-market purchases and sales of common stock (CRSP share codes 10 or 11) of firms listed on NYSE, Amex, or Nasdaq and exclude financial and utility firms. Our sample includes transactions without missing data and verified for accuracy by

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<sup>15</sup> We use historical state of incorporation to define UD law, following Cohen (2012), Gormley and Matsa (2016), and Appel (2019). We obtain each firm's historical state of incorporation from SEC filings. We use the oldest state of incorporation for backfilling the incorporation state before 1994, when online filing became mandatory. We drop observations where the state of incorporation is not correctly reported. Prior studies exclude firms that reincorporated during the sample period. However, Appel (2019) finds little effect from this adjustment. Besides, the current state of incorporation differs only for less than 5% of the sample.

<sup>16</sup> Our sample includes the period of the recent financial crisis. Our conclusions remain unchanged if we limit our sample to the end of 2007, or include an interaction of the crisis period (years 2008 and 2009) with the *UD Law* variable.

<sup>17</sup> In section 4.9, we consider beneficial owners as a potential placebo group.



Thompson Reuters and indicated by cleanse codes of R, H, L, C, or Y.<sup>18</sup> Following prior studies,<sup>19</sup> we exclude trades where the transaction price falls outside the trading range for the day on CRSP, where less than 100 shares or more than 20% of the outstanding shares are traded, and where the share price is less than \$2 at the beginning of the calendar year (penny stocks). Following the prior literature on insider trading,<sup>20</sup> we separately add up the purchases and sales by all insiders on a given day. We analyze insiders' sales and purchases separately because UD laws have differential effects on insiders' incentives to sell and buy, as discussed in section 2.2.<sup>21</sup>

Accounting and stock price data are from Compustat and CRSP databases. The main dependent variables, all at the firm level, include buy-and-hold abnormal return (BHAR), the total number and dollar value of shares traded and total dollar abnormal profits. We calculate BHAR for 3 months (i.e., 63 trading days; *bhar3m*) and 1 month (i.e., 21 trading days; *bhar1m*) starting with the insider trading day, using Carhart's four-factor model. When estimating factor loadings, we exclude the returns for 50 days before an insider trading day to avoid any price run-up (or run-down) effects.<sup>22</sup> BHAR can incorporate compounding effects and are better suited for testing for longer-term abnormal returns (Barber and Lyon (1997)), while accounting for asset pricing factors. Therefore, following previous studies (e.g., Kallunki, et al. (2018), Kallunki, Nilsson and Hellström (2009), and Huddart, Ke and Shi (2007)), we use BHAR for different holding periods computed using daily data as our main profitability measure. As discussed in para 1 of section 4.10 and shown in Table A.2, we also use two alternative measures of insider trading profitability,

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<sup>18</sup> Following Aldredge and Cicero (2015). These cleansing codes indicate the following: R = Data verified through cleansing process; H = Cleansed with a very high level of confidence; L = Cleansed; C = Corresponding record added; Y = Informational.

<sup>19</sup> See, e.g., Lakonishok and Lee (2001), and Marin and Olivier (2008). Thomson Reuters Insider Filing (TIF) database does not use separate codes for open-market and private transactions. The various data screens we use following previous studies also serve as a way of isolating open-market transactions, albeit imperfectly.

<sup>20</sup> See, e.g., Huddart and Ke (2007), Kallunki et al. (2018), and Wu (2018).

<sup>21</sup> The results are similar when we drop the firm-trade days that have both a purchase and a sale (4,006 observations, about 1% of our sample).

<sup>22</sup> The parameter estimation window is from -250 days to -50 days. Because asset pricing models do not have strong explanatory power at the individual security level, and the intercept (alpha) is significant in most cases, we also include the estimated alpha to calculate expected returns, following standard practice in the literature.

neither of which requires estimation of asset pricing parameters or alpha, for robustness checks. These measures are (1) cumulative total returns (CRETs), and (2) DGTW's characteristics-adjusted abnormal returns. Both these measures also support our conclusions based on BHAR. We winsorize all continuous variables at the 1<sup>st</sup> and 99<sup>th</sup> percentiles to minimize the influence of outliers.

For additional analysis, we obtain institutional ownership data from Thomson Reuters institutional holdings (13F filings) database. We define higher ownership based on whether a firm's largest institutional investor owns at least 5% (or 10%) of the firm's stock. We obtain data on quarterly earnings announcements (QEA) from Compustat Fundamentals Quarterly. Finally, we obtain data on the disclosure quotient (DQ) from the authors of Chen, Miao and Shevlin (2015).

### **3.2 Summary statistics**

Table 1 reports the summary statistics of the main variables of interest separately for our insider purchases and sales samples. Our full sample includes 333,201 firm-sale days and 100,941 firm-purchase days, showing that insider sale days are about three times as frequent as insider purchase days, on average. Average BHAR is negative for sales and positive for purchases, consistent with prior findings that on average, stock prices decline after insiders sell and increase after they buy stock. Over the 1 month (i.e., 21 trading days), 3 months (i.e., 63 days) and 6 months (126 days) following the insider trade day, insider sales have average BHAR of -3%, -9% and -22%, respectively, while these returns for insider purchases are 3%, 3%, and 1%. The average total number of shares traded per day and their dollar values are substantially higher for insider sales than for insider purchases. The distribution of insiders' abnormal dollar profits is highly skewed. For instance, the mean estimated dollar abnormal loss avoidance for 1 month, 3 months and 6 months are about \$24,000, \$83,000 and \$189,000, respectively, while their median values are much smaller at about \$1,000, \$5,000 and \$12,000. The corresponding dollar profits from purchases are much smaller.

Sellers' firms are larger and more profitable, and their stock is more liquid (i.e., has lower bid-ask spread) than buyers' firms. Sellers' firms also have lower leverage, slightly lower asset tangibility (PPENT) and higher cash holdings than buyers' firms.

## 4. Empirical Methodology and Main Results

Our empirical methodology follows recent studies that deal with endogeneity issues by exploiting natural experiments, especially multiple exogenous shocks which vary by time and location (e.g., Bertrand and Mullainathan 2003; Gormley and Matsa 2011; Karpoff and Wittry 2018; and Appel 2019). Specifically, we use the following difference-in-differences (DiD) regression model to examine the effect of UD laws on opportunistic insider trading:

$$y_{ijkst} = \beta \cdot \text{After UD Law}_{st} + \omega \mathbf{X}_{i(t-1)} + \theta_i + \gamma_{jt} + \delta_{kt} + u_{ijkst} \text{-----}(1)$$

The dependent variable ( $y$ ) measures either abnormal returns or dollar profits earned by insiders in different holding periods, or the number or volume of shares traded.  $ijkst$  indicates firm  $i$ , in industry  $j$ , state of headquarters  $k$ , state of incorporation  $s$ , and time  $t$ .  $\text{After UD Law}_{st}$  is an indicator variable for a firm that is incorporated in a state that has a UD Law in a given year. Notice that  $\text{After UD Law} = \text{UD State} \times \text{After}$ , where  $\text{UD State} = 1$  for a firm is incorporated in a state that has a UD law, and 0 otherwise; and  $\text{After} = 1$  for firm-years starting with the year of UD law adoption in the firm's state of incorporation, and 0 otherwise. The regression does not include the main effect variables  $\text{UD State}$ , which is time-invariant, and  $\text{After}$  because the former (latter) is subsumed by the firm (year) fixed effects. Thus,  $\beta$  is the DiD parameter measuring the treatment effect of  $\text{UD Law}$  on our outcome variables of interest. Following previous studies (e.g., Gormley and Matsa, 2016), we also include firm ( $\theta_i$ ), industry-time ( $\gamma_{jt}$ ), and headquarters (HQ) state-time ( $\delta_{kt}$ ) fixed effects to control for time-invariant heterogeneity across firms, and time-varying heterogeneity within and across industries and states. Time is defined as the year and month of the insider trades. The industry is defined by 3-digit SIC codes. HQ state-time fixed effects are important controls to subsume varying economic and regulatory conditions across states over time, e.g., state-level business cycles that affect local companies' stock returns significantly (see, e.g., Korniotis and Kumar 2013). Similarly, industry-time fixed effects control for time-varying industry effects such as industry momentum on stock returns (see, e.g., Moskowitz and Grinblatt 1999).

We also include a set of continuous control variables, lagged by one-period ( $\mathbf{X}_{i(t-1)}$ ) that may affect our dependent variables.<sup>23</sup> Appel (2019) finds that UD laws decrease the quality of corporate governance, lead to lower profitability, and, in some cases, lead to declines in firm values. Our main variables of interest are abnormal stock returns following insider trades. So one concern is that the negative abnormal returns we observe after UD laws are unrelated to insider trades, but are a general effect of these laws in depressing stock prices across-the-board. So we include control variables important for asset pricing (such as size, book-to-market, past returns) and firm-specific variables that Appel (2019) finds to be affected by UD laws (such as profitability). We also control for bid-ask spread (*Spread*) to account for the possibility that a decrease in litigation threat can lead to changes in a firm's information environment, thus providing profitable trading opportunities to insiders.<sup>24</sup>

#### **4.1 UD law adoptions and opportunistic insider trading: Baseline results**

Table 2 summarizes the results from DiD regressions of insider trading profitability measured by buy-and-hold abnormal returns (BHAR) for three holding periods: one, three, and six months. In panel A, *After UD Law* obtains negative and statistically significant (at 1% or better levels) coefficients in explaining buy-and-hold abnormal returns after an insider sale for all holding periods. These results suggest that insiders of treatment firms avoid about -2.2%, -4.7% and -8.1% in abnormal losses (i.e., BHAR) over one, three and six-months after their open market sale dates. These returns are economically large and support our hypothesis that insider sales become more opportunistic after the passage of UD laws, which make it difficult for shareholders to sue insiders for trading on private information.

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<sup>23</sup> The literature is divided on whether or not to include endogenous control variables in these regressions. When using natural experiments such as changes in state laws, Gormley and Matsa (2016) recommend not including time-varying endogenous control variables to avoid any biases caused by the possibility of control variables being affected by the main event. On the other hand, the exclusion of relevant control variables creates an omitted variables problem. As shown in Appendix Table A.6, several firm characteristics differ before and after UD Laws. Therefore, we include control variables in our tests, although our main results hold with or without control variables.

<sup>24</sup> We tackle issues related to information and disclosure more substantially in sections 4.6 and 4.7 below.

Panel B shows a similar set of results related to the profitability of insider purchases. While the coefficient estimates on *After UD Law* are positive, they are statistically insignificant in predicting BHAR following insider purchases.

We next check how robust our conclusions are to the specification of estimated returns. Following standard practice in the literature, we include the estimated alpha in calculating expected returns. One concern is that asset pricing parameters (including alpha) estimated right before insider trading may be biased if insider trades follow price run-ups or run-downs. To reduce this concern, we follow standard practice and exclude the 50 trading days immediately before an insider trading day when estimating the parameters.

Another issue is whether alpha should be included in computing the expected return used to compute BHAR. If alpha is included, the expected return will include any abnormal performance prior to insider trading. Since insider sales (purchases) tend to follow high (low) returns, alphas might be more positive (negative) for sales (purchases), which will increase (decrease) expected returns. Therefore, the inclusion of alpha in the expected return calculation reduces (increases) the abnormal returns following sales (purchases). On the other hand, if alpha is not included, then expected returns are lower (higher) than linear projections of four factors made based on returns prior to insider transactions when alphas are positive (negative), which can be a problem if the four-factor model is not a well-defined pricing model. To alleviate this concern, in Table A.2 in the Appendix, we show our baseline results using cumulative total returns (CRETs) and DGTW-adjusted returns as dependent variables, neither of which require estimation of asset pricing parameters, including alpha.<sup>25</sup> These results largely mirror our main results in Table 2. The results on sales are negative for all three holding periods and statistically significant for 1-month and 3-month periods. For purchases, all the results are statistically insignificant.<sup>26</sup>

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<sup>25</sup> We calculate DGTW-adjusted returns by subtracting the compounded daily DGTW benchmark return from the compounded daily stock return over a given holding period (i.e., 1, 3 or 6 months) after an insider trading day. We lose some sample because we rely on DGTW's characteristic quintile cutoffs, which are available only through the year 2012.

<sup>26</sup> Can insiders profit from stock price declines within 6 months after a stock sale, given that the short-swing rule effectively removes their incentive to buy back the stock within 6 months of the sale (because if they do, they have to return the profit from the round-trip trade to the company)? But given that stock grants (and stock acquired upon option exercises) are such an important part of D&O compensation packages, these insiders are unlikely to have a pressing need to buy back

We find that *After UD Law* predicts negative BHAR following insider sales in both economically and statistically significant ways. For purchases, even though the point estimates are roughly comparable to those for sales, they are statistically insignificant in the full sample. However, as we discuss in section 4.4, the effect of UD laws is significant in a subsample of purchases that are riskier and potentially more profitable, namely, pre-QEA purchases. These results are consistent with the notion that UD laws affect more serious and more litigation-prone insider trading, especially sales based on private information.<sup>27</sup> Moreover, the differential results for purchases and sales provide further assurance that the negative coefficient on *After UD Law* in predicting BHAR following sales is driven by more informed selling by insiders rather than a general drop in stock prices caused by the adoption of UD laws. A general drop in stock prices would predict no difference in the effect of *After UD Law* on future returns between the sales and purchase samples.<sup>28</sup>

## 4.2 Profitability during the years surrounding UD law adoptions

Given that we find significant effects of UD laws on the profitability of insider sales, we dig deeper to ensure that the timing of these laws coincides with the increased profitability of these trades. Specifically, we create dummy variables indicating two or more years before ( $UD_{t-2}$ ), a year before ( $UD_{t-1}$ ), the year of ( $UD_t$ ), a year after ( $UD_{t+1}$ ), and two or more years after ( $UD_{t+2}$ ) the adoption of UD law in a firm's state of incorporation. Then we re-estimate the regressions in Table 2 panel A after replacing the variable *After UD Law* with these five indicator variables. Figure 1 graphically presents point estimates and confidence intervals for each of the five years

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the stock within 6 months after they sell it. Moreover, since 1991, even immediate sale of stock acquired through exercise of options (granted at least 6 months earlier) is exempt from the short-swing rule. Therefore, the short-swing rule is unlikely to be a binding constraint for insider sales, allowing insiders to profit from price declines within 6 months after their stock sales.

<sup>27</sup> In Table 2, the coefficient estimates are noisier for the full sample of purchases (Panel B) than for sales (Panel A). This is likely due to (1) smaller sample sizes for the former and (2) the inclusion of many insider purchases that are not relevant for DLs in the full sample of purchases, as discussed in the introduction.

<sup>28</sup> The prior finding that firm-level stock price crashes, i.e., extreme negative returns, are *less* prevalent after UD laws (see Obaydin, et al. (2021)) also suggests that more profitable insider sales after UD laws are not driven by changes in general stock price dynamics.

surrounding the passage of UD laws. Panel A shows that up until the year of passage of UD laws, the difference in the 6-month BHAR associated with the sales of insiders in UD law and non-UD law firms is not significantly different from zero (i.e., the bars indicating point estimates are small, and the 95% confidence bands contain a BHAR of 0.00%). However, as expected, insider sales are followed by significantly lower 6-month BHAR (i.e., insiders avoid significantly greater losses) in UD law firms compared to non-UD law firms starting a year after the passage of UD laws. Panel B shows a similar pattern for 3-month BHAR, which become negative only after the passage of UD laws. Even though the 1-month BHAR in Panel C does not show a similar post-trend, it also does not show any pre-trend. This evidence that there is generally no pre-trend in the profitability of insider sales supports the parallel trends assumption and provides further assurance that UD laws have a causal effect on the profitability of insider sales.

### 4.3 Size vs. timing of insider trades

The next sets of tests are aimed at more cleanly isolating the source of increased profitability of insider trading after UD laws. Given a set of profitable trading opportunities, insiders exploit their private information to increase their profits by either 1) increasing the size of trades or 2) by timing the trades more opportunistically, or 3) by combining these two strategies. Our litigation risk hypothesis implies that a reduction in litigation risk after UD laws should have a greater effect on the timing of insiders' transactions than on its volume because the risk of being sued largely depends on *when* insiders trade.

To isolate these channels, we examine the effect of UD Law on the total number of shares bought or sold (*lnshares*) by insiders in a given month and the total dollar value of such trades (*Indolvol*). Table 3 reports the results. The dependent variables in Panel A (for sales) and Panel B (for purchases) are *lnshare* (natural log of total shares traded) and *Indolvol* (natural log of the total dollar value of trades) of all insider transactions in a firm in each month that has at least one insider trade. Total dollar value is the sum of the dollar values of all trades in the month (trade price x shares). Column (1) of Panel A shows that in the months with an insider sale, the average number of shares sold by insiders per firm per month (*lnshare*) does not change after the adoption of a UD Law. However, column (2) shows that the total dollar value of insider sales (*Indolvol*) in these months increases by about 22% ( $= e^{0.201} - 1$ ) in treatment firms compared to control firms. Thus,

after the adoption of UD laws, while insiders do not increase the volume of their sales, they appear to time them more opportunistically using their private information that stock prices are inflated and a price decline is likely. But as per columns (1) and (2) in Panel B, insiders in treatment firms increase neither the number of shares purchased nor their dollar volume in a significant way.

Column (3) in each panel shows estimates of the regressions of the ratios of opportunistic trades to all trades.<sup>29</sup> In the partitionable trade sample, which is a much smaller subset of the full sample of all trades, the proportion of opportunistic sales to all trades in a month increases by 0.092 in treatment firms following UD laws. This increase is both statistically and economically significant. On the other hand, in Panel B, in the ratio of opportunistic purchases decreases slightly, pointing to a shift towards more opportunistic sales after UD laws.<sup>30</sup>

Overall, these results suggest that while that there is not a significant increase in the level of insider selling in treatment firms after the adoption of UD laws, their sales become more opportunistic, and therefore, more profitable.

#### **4.4 Profitability of pre-QEA trades**

Our analysis so far suggests that after the adoption of UD laws, insiders avoid losses by timing their sales more opportunistically. It appears that because of the reduction in the risk of shareholder-initiated lawsuits due to UD laws, insiders become more willing to push the boundaries of the law in their trading. To further explore this possibility, we examine the effect of

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<sup>29</sup> We calculate opportunistic trades during our sample period using Cohen, Malloy and Pomorski's (2012) methodology.

<sup>30</sup> Please note the following two points about this result. First, it does not necessarily contradict our occasional findings of more profitable insider purchases after UD laws in the full sample. Only a small fraction of all insider trades are included in Cohen, Malloy and Pomorski's (2012) partitionable sample, which likely leaves out many profitable trades, especially from smaller firms, which are more likely to be excluded (see Table I in Cohen et al. (2012)). Moreover, it is possible that purchases classified as "routine" by their algorithm become more profitable after UD laws. Second, this purchase result is different from Jung, Nam and Shu (2021) likely because i) following Cohen et al. (2012), we use monthly aggregation and include the partitionable sample only, whereas Jung et al. (2012) use annual aggregation and do not clarify whether they use their entire sample or only the partitionable sample, and ii) we scale by total traded shares, while Jung et al. (2012) scale by total shares outstanding.



UD laws on an arguably perilous and litigation-prone insider trading: trading before quarterly earnings announcements (pre-QEA).

Bettis, Coles and Lemmon (2000) and Lee, Lemmon, Li and Sequeira (2014) find that many firms voluntarily adopt company policies on insider trading, and do not allow their insiders to trade before earnings announcements without prior permission from the firm. In general, it is hard to know for sure which firms have such policies in place and how strictly they enforce them. Prior studies identify firms that have such policies based either on surveys, predictions based on the pattern of insider trading between successive QEAs, or voluntary disclosures of ethics rules in company websites. Both Bettis, Coles and Lemmon (2000) and Lee, et al. (2014) find that some insiders trade pre-QEA, though the frequency of trading is lower in firms that have (or are likely to have) such policies.

In a recent study, Ali and Hirshleifer (2017) find that despite heavy scrutiny from regulators, voluntary policies in some companies and high risks, pre-QEA insider trades are common. They find that pre-QEA trades tend to be among the most profitable insider trades and, in fact, the profitability of such trades can be used to identify the most opportunistic insider traders. We ask whether UD laws encourage insiders to profit more from pre-QEA trades. We follow Ali and Hirshleifer (2017) to identify pre-QEA trades and to calculate their profitability. The pre-QEA period is defined as the 21 trading day period ending three trading days before a quarterly earnings announcement date. We measure the profitability of such trades using cumulative abnormal return (CAR) and cumulative total return (CRET) for three alternate windows around QEA: (-2, +2), (-1, +4), and (0, +5).

Table 4 reports the results. Panel A shows the results of pre-QEA sales. We find that insider sales avoid significant losses of 2.7% to 3.5% [2.6% to 3.3%] in terms of CRET [CAR] over days (-1, +4) and (0, +5) around QEA. Notably, these CRETs are substantially larger than the effect of UD laws on CRETs in the full sample (1.3% to 1.6% over 1 to 6 months after the trade; see columns (4) to (6) of Table A.2 in the Appendix). This result further supports our hypothesis that insiders are less hesitant to engage in riskier sales based on more profitable private information after the passage of UD laws.

Interestingly, we find that after the adoption of UD laws, insiders also buy more profitably pre-QEA. As shown in panel B of Table 4, *After UD Law* positively predicts the profitability of

pre-QEA insider purchases in all three alternative windows around QEA and with both CAR and CRET. The magnitudes of these effects range from 5.7% to 29%. CAR is statistically significant in two of the windows and CRET in one. The fact that the profitability of purchases is highly concentrated in pre-QEA trades may explain why the effect of UD laws on the profitability of purchases is sizable, but noisy, in the full sample. Overall, the results in both panels support the notion that insiders become less hesitant to engage in riskier and more opportunistic trades after the adoption of UD laws.

We next analyze the effect of UD laws on the total quarterly dollar volume of insider trades aggregated over the pre-QEA days as described earlier. Panel C shows that the dollar volume of pre-QEA insider sales increases statistically significantly, while the increase in purchases is statistically insignificant.

#### **4.5 Insiders' abnormal dollar profits**

We next estimate the impact of UD laws on the dollar volume of insiders' profits as an alternate way to understand the economic significance of UD Laws. These measures consider both the volume of trades and stock returns following the trades to estimate the dollar profits on insider trades. We estimate the buy-and-hold abnormal dollar profits of each trade over 1, 3 and 6 month periods (i.e., 21, 63 and 126 trading days, respectively; denoted as profit1m, profit3m and profit6m) after the insider trading date by multiplying the total dollar value of a trade and its BHAR for a given period. Table 5 reports the results. Columns (1) - (3) of panel A show that after UD laws, sales by treatment firms' insiders avoid abnormal losses of about \$25,000, \$61,000 and \$91,000, respectively, over the next one, three, and six-month periods.

Panel B shows that for the three-month holding period, the adoption of a UD Law also leads to statistically significant higher dollar profits on insiders' purchases. This result is somewhat surprising because, in the full sample (Table 2, panel B), we find generally positive, but statistically insignificant effects of UD Law on % BHAR. This difference can perhaps be explained by the fact that BHAR is an equal-weighted average, while dollar profit is an average weighted by trading volume. Therefore, this result is consistent with our earlier findings that after UD laws, insiders time their trades more opportunistically, e.g., pre-QEA.

## 4.6 Information asymmetry

We now dig deeper into the role of opportunism as the underlying channel for the increased profitability of insider sales that we observe after the adoption of UD laws. Insiders' opportunity to trade on private information should be greater among firms with higher information asymmetry. To test this conjecture, we use two measures of information asymmetry. First, Aboody and Lev (2000) find that outside investors face greater information asymmetry with insiders in more R&D intensive firms, which provides greater opportunity for profitable insider trading. We define high (low) R&D based on above- (below-) yearly median of R&D intensity of a firm. Our second measure of information asymmetry is stock liquidity, as measured by the bid-ask spread. So we partition our sample by the median of firms' average bid-ask spread over a year.

Table 6 reports the results. Panel A1 shows that the profitability of insider sales in terms of BHAR after UD law increases more in R&D-intensive treatment firms over each of the three holding periods. The coefficients of *After UD Law* are statistically different between high and low R&D firms in two of the three windows.

In Panel A2, we partition the sample by high and low bid-ask spreads as indicators of illiquid and liquid stocks. Here too, the magnitude of the effect of UD law is higher in illiquid firms (which have greater information asymmetry) than in liquid firms, even though the difference between the two subsamples is statistically significant only for the 6-month period. Overall, these results provide some evidence that the reduction in litigation threat provides insiders opportunities to sell more opportunistically, especially in firms with higher information asymmetry.

On the other hand, in panels B1 and B2, we do not find a consistent moderating effect of information asymmetry on the profitability of insider purchases.

## 4.7 Financial statement disclosure quality

Boone et al. (2022) find that after the adoption of UD laws, managers produce less informative financial reports to increase information asymmetry. While we postulate that more profitable insider trades (especially sales) after UD laws is a direct consequence of decreased litigation risk that emboldens managers to make riskier trades, Boone et al.'s (2022) findings imply that this profitability can be a consequence of poorer disclosure quality. As one measure of financial

disclosure quality, Boone et al. use Chen, Miao and Shevlin's (2015) disclosure quotient (DQ) variable, which is based on the number of non-missing Compustat line items in financial statements. Higher DQ indicates better disclosure quality. So we next examine whether changes in the profitability of insider trading are related to DQ.

We obtain data on DQ directly from Chen, Miao and Shevlin (2015).<sup>31</sup> We then re-estimate the regressions in Table 2 in two different ways. First, we add the DQ variable to the regression to test the possibility that the increased profitability of insider trades after UD laws is mainly driven by DQ. If so, DQ should subsume the effect of UD laws. As reported in Table 7, panel A1, even after controlling for DQ, insider sales after UD laws continue to predict negative BHAR as before. This result supports our hypothesis that profitable trades after UD laws are not merely due to the deterioration of DQ.

Second, we partition the sample by the median DQ each year. High (Low) DQ is an indicator variable for firms with above- (below-) median DQ in a given year. Results in Panel A2 suggest that, after UD laws, insider sales are significantly more profitable for both High and Low DQ firms. Moreover, UD Laws makes these sales *more* profitable in High DQ firms than in Low DQ firms for all three holding periods. These results are contrary to Boone et al.'s conjecture that low DQ is the cause of profitable insider trades.

In Panel B1, the profitability of insider purchases is unaffected by the inclusion of DQ. Moreover, as shown Panel B2, UD Laws' effect on the profitability of insider purchases is either the same or higher in high DQ firms. This finding is also not consistent with the notion that higher profits are a result of poorer DQ. Overall, our evidence supports the idea that increased profitability, especially from insider sales, is likely a direct consequence of managers being less hesitant to make riskier trades.

#### **4.8 Firm size and institutional blockholdings**

Davis (2008) finds that the importance of DLs has diminished for highly visible large corporations, which are subject to many other governance mechanisms that can substitute for the effects of DLs. One such mechanism is company rules on insider trading (see, e.g., Bettis, Coles

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<sup>31</sup> Their updated data goes until 2017. We are grateful to Shuping Chen for sharing this data with us.

and Lemmon (2000)). This finding implies that the effect of UD laws on insider trading profitability should be greater for small firms which tend to have fewer alternative mechanisms in place.

We test this prediction first by partitioning our sample into large and small firms each year based on the firms' median market capitalization for the year. Second, we consider institutional blockholders as a specific example of an alternate governance mechanism because prior literature suggests that institutional blockholders monitor corporate insiders, improve corporate governance, and discipline managers.<sup>32</sup> Accordingly, we define more (fewer) institutional blockholders as an indicator variable that equals one for firm with above- (below-) median number of 13F institutional investors that own 5% or more of the firm's outstanding equity during the year, and zero otherwise.

Table 8 shows the results. Panel A1 shows that on average, after UD laws, the profits (i.e., loss avoidance) of insiders of smaller treatment firms increase by about 18.4%, 8.3% and 3.3% in BHAR over the next six, three and one months, respectively, following a sale. The corresponding effect on larger firms is much lower. These cross-sectional differences based on firm size are economically meaningful for all three holding periods and statistically significant for the 3- and 6-month holding periods.

Panel A2 show the results of insiders sales on samples partitioned by the number of 5% institutional blockholders. We find that, on average, treatment firms with fewer blockholders avoid a loss of 11.3%, 6% and 2.8% in BHAR over the next six, three and one months, respectively, following a sale. The magnitude of this loss-avoidance is much smaller and even changes sign for insiders in treatment firms with more blockholders. The difference in the effect of UD laws between firms with fewer and more blockholders is statistically significant for all three holding periods.

Results from a similar set of analyses for insider purchases are inconclusive. While the results based on firm size in Panel B1 are generally as expected, they are inconsistent for sample partitions based on the number of institutional blockholders in Panel B2.

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<sup>32</sup> See, e.g., Ferreira and Matos (2008), Brav, Jiang and Kim (2015), and Appel, Gormley and Keim (2016).

#### 4.9 Blockholders as a placebo group

Our main analysis excludes trades by 10% blockholders, who are also required to report their trades to the SEC. But unlike D&O, blockholders do not owe any fiduciary duty to other shareholders and therefore are not subject to DLs. We next consider whether this distinction allows us to use blockholders as a potential placebo group because UD laws should not affect their trading patterns. But this prediction is not obvious. First, many firms lack a 10% blockholder, and where they exist, many of them are likely passive institutional investors, who do not trade (especially sell) as frequently. This issue is apparent from our untabulated finding that the number of firm-trade days in our sample where blockholders sell (buy) is barely 10% (one-third) of those for D&O. Second, even though blockholders are not affected by the decreased risk of DLs, they can mimic trades by D&O, which become more informative after the adoption of UD laws.

Nevertheless, we estimate regressions similar to our baseline (Table 2) regressions separately for the samples of blockholders' sales and purchases. The results, untabulated for brevity, show little resemblance with our main results on D&O transactions. *After UD Law* obtains signs and significance in the predicted direction only for *bhar1m* for sales. In fact, in three cases, the signs and significance are the opposite of what we expect: the coefficient of *bhar6m* for sales is positive and statistically significant at 10%, and the coefficients of *bhar3m* and *bhar6m* for purchases are negative and significant at 10% and 1% levels, respectively.

While we view these results tentatively, they support our litigation risk hypothesis and increase the hurdle for other interpretations of our results, such as an increase in information asymmetry. UD laws predominantly affect opportunistic sales by D&O, who are subject to DLs.

#### 4.10 Discussion and additional robustness checks

We conduct a rich set of tests to check the robustness of our main results. First, we consider whether our main results hold when we use alternate methods to calculate abnormal returns on insider trades. We consider two other approaches: raw returns and DGTW's characteristic-adjusted abnormal returns, neither of which require estimation of parameters of asset pricing models. We show these results in Table A.2 of the Appendix. We find that consistent with our main results,

UD Law obtains negative coefficients in predicting abnormal returns from insider sales. One difference is that unlike our baseline results, the six month returns lose statistical significance.<sup>33</sup>

Second, Heath, et al. (2022) point out that when different researchers use the same natural experiment as a treatment to test different hypotheses, the likelihood of false positives increases. This is the problem of multiple hypothesis testing. Following their recommendation, we justify the relevance and exclusion restrictions for using UD laws as a natural experiment in our setting in the introduction. The relevance condition is satisfied because UD laws dramatically reduce the probability of DLs by as much as one-half during our sample period (see, e.g., Houston, Lin, and Xie 2018; Appel 2019; and Donelson et al. 2022). The exclusion restriction is satisfied because UD law adoptions by states are usually not in response to elevated concerns about insider trading. Heath, et al. also point out that UD laws have been used as a natural experiment in about 30 papers to date. Based on their simulations, the adjusted critical value of the t-statistic given 30 prior results for staggered shocks is about 3.1 (see their Table 3, column 1 and Figure 6, Panel A). Most of our results far surpass this modified threshold for statistical significance, which corrects for multiple hypothesis testing.

Third, we consider the various critiques of Donelson et al. (2022), who show that Houston, Lin, and Xie (2018) and Appel's (2019) evidence of a decline in DLs after UD laws loses statistical significance, even though the magnitude remains similar, when the sample is extended past 2010. This finding likely has little effect on our conclusions for several reasons. First, our inferences are based on changes in litigation *risk*, not on realized lawsuits per se. Realized changes in the number of DLs underestimate the change in litigation risk if managers adjust their behavior in response to the change in risk. Second, as the authors acknowledge, the loss of statistical significance in Donelson et al. (2022) appears solely driven by an unusually large positive coefficient on Louisiana, which adopted UD laws in 2015. Our sample period ends in 2013, so firms incorporated in Louisiana are not part of our treated sample. Moreover, we find that only about 0.40% of U.S.

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<sup>33</sup> Note that the profitability of the six-month holding period is not critical for our general conclusions. The six-month returns would be important if most insider sales were subject to the short-swing rule. However, given that D&O likely receive more stock as part of their compensation packages (including stock acquired due to option exercises) than they want to hold, they are unlikely to have a pressing need to buy back the stock within 6 months after their sale. So, the short-swing rule is unlikely to be effective for insider sales by D&O.

public companies are incorporated in Louisiana, suggesting that this result is likely driven by outliers. Within our sample, less than 0.2% of trades pertain to Louisiana-incorporated firms. Third, Donelson et al.'s (2022) study is more about UD laws' effect on litigation risk related to accounting or disclosure. Our evidence of the effect of UD laws on insider trading activities does not depend on its effect on accounting practices or disclosure. Finally, Donelson et al. (2022) also document that only 57 out of 2,775 DLs (i.e., about 2%) in their sample have insider trading as the *primary* allegation, raising the question of whether insider trading is a significant issue in DLs. As we point out in the introduction, insider trading is rarely the primary complaint in most DLs. Instead, allegations of insider trading are usually a part of a broader set of complaints about breaches of fiduciary duty by D&O and provide evidence that bolsters the merit of the lawsuit. Accordingly, Erickson (2010) finds that insider trading is one of the allegations in 60% of DLs.

Fourth, our main sample includes the period of the recent financial crisis, raising a concern that our results may be influenced by large negative shocks in stock prices during the crisis. To examine this issue, we re-estimate our baseline regressions by including the interaction of *After UD Law* and a variable indicating the peak of the recent financial crisis (years 2008 and 2009). The results shown in Table A.3 of the Appendix are qualitatively similar to our main results. In untabulated tests, the results are also similar when we re-estimate our main regressions after limiting the sample to the end of 2007.

Fifth, Karpoff and Wittry (2018) argue that a firm's pre-existing legal environment can confound the effects of a new law. So, we control for potential confounding effects of other state laws that may have coincided with or affected the states' adoption of UD laws. Following Karpoff and Wittry, we control for control share acquisition law (CS), business combination law (BC), fair price law (FP), directors' duties law (DD), and poison pill law (PP) that were adopted by various states at different times during our sample period. Table A.4 shows the results with *bhar6m* as the dependent variable. In Panel A, the effect of UD Law on the profitability of insider sales remains essentially unchanged after controlling for each of these laws separately (in columns (1) to (5)) or jointly (column (6)). The corresponding effect for insider purchases in Panel B is statistically insignificant as in Table 2.

Finally, prior studies (e.g., Crane and Koch 2016) find that the 9<sup>th</sup> Circuit Court ruling of 1999 affected the ownership structure, litigation filing, and corporate governance of firms located



in the 9<sup>th</sup> circuit. We check the robustness of our results by excluding firms incorporated in states under the jurisdiction of the 9<sup>th</sup> Circuit Court, namely, Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington. The results on BHAR, shown in columns (1) to (3) of Panels A and B in Table A.5, are similar to our baseline results in Table 2. Finally, we redefine our treatment sample as firms incorporated in Pennsylvania only, where the UD law was mandated by the state supreme court, which arguably should not have been influenced by corporate lobbying. Here, our results, shown in columns (4) to (6) of both panels in Table A.5, are generally similar to our baseline results in Table 2, except that they are now also statistically significant for one- and three-month holding periods for purchases.

## **5. Conclusion**

Despite a large literature, the issue of whether stricter regulations deter opportunistic insider trading has not been settled. We consider the possibility that the reason behind the lack of strong evidence for the effectiveness of regulations on insider trading is the lack of strong identification. In this study, we employ U.S. states' staggered adoption of Universal Demand laws, which significantly decreased shareholders' ability to sue corporate insiders, as a natural experiment to examine the relation between shareholder litigation risk and the patterns and profitability of insider trading. We find that the reduction in shareholder-initiated litigation risk caused by UD laws leads insiders to trade more opportunistically and profitably. Our evidence suggests that following a decrease in litigation risk, insiders engage in otherwise riskier and more litigation-prone and profitable trades. Thus, our results support the idea that the threat of shareholder lawsuits plays a vital role in deterring opportunistic insider trading. Our findings challenge a deep-rooted view, especially in the legal literature, that shareholder lawsuits mainly benefit attorneys and impose a deadweight cost on firms by showing that litigation rights also directly benefit investors by protecting them from unfair insider trades.

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Table 1: Summary statistics

The table reports summary statistics of the main variables used in this study. The sample consists of open-market trades of D&O in common stock of firms listed on NYSE, Amex, or Nasdaq, excluding financial and utility firms, during 1996-2013. Observations are at the firm-trade day level. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. Abnormal returns are in percentages and <sup>a</sup> indicates whether mean and median values are significantly different from zero at the 5% or better level. Table A1 provides variable definitions and data sources.

Panel A: Insider sales						
Variables	Mean	SD	25%	50%	75%	Observations
bhar6m (%)	-21.76 <sup>a</sup>	55.64	-42.29	-13.23 <sup>a</sup>	8.30	333201
bhar3m (%)	-9.41 <sup>a</sup>	29.83	-22.85	-6.59 <sup>a</sup>	6.69	333201
bhar1m (%)	-2.82 <sup>a</sup>	14.56	-9.74	-2.11 <sup>a</sup>	4.58	333201
cret6m (%)	2.48 <sup>a</sup>	37.44	-19.77	0.60 <sup>a</sup>	20.54	333201
cret3m (%)	1.15 <sup>a</sup>	26.43	-13.61	0.37 <sup>a</sup>	14.10	333201
cret1m (%)	0.86 <sup>a</sup>	14.92	-6.85	0.63 <sup>a</sup>	8.04	333201
dgtw6m (%)	-2.38 <sup>a</sup>	31.83	-21.05	-4.14 <sup>a</sup>	12.99	296244
dgtw3m (%)	-1.31 <sup>a</sup>	22.30	-13.88	-2.08 <sup>a</sup>	9.78	296244
dgtw1m (%)	-0.33 <sup>a</sup>	12.72	-7.06	-0.61 <sup>a</sup>	5.91	296244
lnshare	9.06	1.51	8.01	9.10	10.09	333201
lndolvol	12.13	1.83	10.87	12.16	13.41	333201
bhar profit6m	-\$189,319 <sup>a</sup>	\$783,475	-\$105,846	-\$11,661 <sup>a</sup>	\$7,324	333201
bhar profit3m	-\$82,690 <sup>a</sup>	\$392,551	-\$52,907	-\$5,229 <sup>a</sup>	\$6,939	333201
bhar profit1m	-\$24,276 <sup>a</sup>	\$171,962	-\$19,782	-\$1,375 <sup>a</sup>	\$6,041	333201
Size	6.58	1.84	5.36	6.49	7.73	327060
BEME	-1.16	0.81	-1.63	-1.10	-0.62	321801
Leverage	0.19	0.24	0.00	0.11	0.30	333026
Ret (t-1)	0.05	0.16	-0.04	0.03	0.11	333201
Ret (t-12, t-1)	0.20	0.51	-0.05	0.19	0.46	318462
ROA	0.01	0.19	0.00	0.05	0.10	332752
PPENT	0.22	0.20	0.07	0.15	0.30	332661
Cash	0.17	0.17	0.04	0.11	0.24	330857
Institutional Ownership Size	2.07	1.48	1.00	2.00	3.00	282815
R&D	0.09	0.10	0.01	0.06	0.12	248522
Spread	0.22	0.52	0.02	0.06	0.23	328987
<b>Pre-QEA Summary:</b>						
CAR [-2, +2] (%)	0.16 <sup>a</sup>	7.38	-2.95	0.00	3.19	44474
CRET [-2, +2] (%)	0.59 <sup>a</sup>	8.11	-3.03	0.61 <sup>a</sup>	4.16	44474
CAR [-1, +4] (%)	0.10 <sup>a</sup>	8.24	-3.53	-0.07 <sup>a</sup>	3.62	44474
CRET [-1, +4] (%)	0.59 <sup>a</sup>	9.10	-3.61	0.55 <sup>a</sup>	4.63	44474
CAR [0, +5] (%)	0.04	8.46	-3.68	-0.16 <sup>a</sup>	3.55	44474
CRET [0, +5] (%)	0.52 <sup>a</sup>	9.40	-3.61	0.40 <sup>a</sup>	4.42	44474



Panel B: Insider purchases

Variables	Mean	SD	25%	50%	75%	Observations
bhar6m (%)	0.92 <sup>a</sup>	69.89	-32.01	-1.75 <sup>a</sup>	29.40	100941
bhar3m (%)	3.35 <sup>a</sup>	39.33	-18.14	0.43 <sup>a</sup>	20.67	100941
bhar1m (%)	3.08 <sup>a</sup>	20.93	-8.31	1.00 <sup>a</sup>	11.78	100941
cret6m (%)	15.36 <sup>a</sup>	58.80	-19.05	5.43 <sup>a</sup>	34.46	100941
cret3m (%)	9.41 <sup>a</sup>	37.50	-12.50	4.28 <sup>a</sup>	24.04	100941
cret1m (%)	4.70 <sup>a</sup>	21.35	-7.21	2.13 <sup>a</sup>	13.33	100941
dgtw6m (%)	3.57 <sup>a</sup>	51.17	-25.61	-3.68 <sup>a</sup>	21.01	87534
dgtw3m (%)	3.73 <sup>a</sup>	32.95	-15.37	0.04	16.87	87534
dgtw1m (%)	2.92 <sup>a</sup>	18.85	-7.62	0.92 <sup>a</sup>	10.71	87534
lnshare	8.09	1.57	6.91	8.01	9.21	100941
lndolvol	9.96	1.70	8.82	9.90	11.05	100941
bhar profit6m	-\$1,933 <sup>a</sup>	\$84,365	-\$5,985	-\$114 <sup>a</sup>	\$5,425	100941
bhar profit3m	\$2,005 <sup>a</sup>	\$50,218	-\$3,011	\$27 <sup>a</sup>	\$4,048	100941
bhar profit1m	\$3,280 <sup>a</sup>	\$27,365	-\$1,279	\$73 <sup>a</sup>	\$2,543	100941
Size	5.05	1.90	3.66	4.86	6.28	98781
BEME	-0.76	0.93	-1.29	-0.70	-0.15	94838
Leverage	0.27	0.31	0.03	0.20	0.39	100727
Ret (t-1)	-0.04	0.19	-0.15	-0.04	0.05	100935
Ret (t-12, t-1)	-0.20	0.63	-0.54	-0.13	0.20	96155
ROA	-0.08	0.30	-0.10	0.02	0.06	100448
PPENT	0.25	0.22	0.08	0.18	0.35	100554
Cash	0.14	0.17	0.02	0.07	0.19	100107
Institutional Ownership Size	1.67	1.54	0.00	1.00	3.00	81560
R&D	0.11	0.17	0.01	0.05	0.14	66835
Spread	0.78	1.26	0.11	0.39	0.98	97547
<b>Pre-QEA Summary:</b>						
CAR [-2, +2] (%)	1.38 <sup>a</sup>	10.63	-3.79	0.37 <sup>a</sup>	5.31	15332
CRET [-2, +2] (%)	1.50 <sup>a</sup>	11.23	-3.91	0.40 <sup>a</sup>	5.77	15332
CAR [-1, +4] (%)	1.67 <sup>a</sup>	11.36	-4.30	0.50 <sup>a</sup>	6.13	15332
CRET [-1, +4] (%)	1.68 <sup>a</sup>	12.21	-4.35	0.46 <sup>a</sup>	6.30	15332
CAR [0, +5] (%)	1.56 <sup>a</sup>	11.87	-4.42	0.19 <sup>a</sup>	6.17	15332
CRET [0, +5] (%)	1.81 <sup>a</sup>	12.96	-4.41	0.36 <sup>a</sup>	6.41	15332

Table 2: Universal Demand laws and profitability of insider trading

The table reports our baseline regression results. The sample starts in 1996 and ends in 2013. The dependent variables are buy-and-hold abnormal returns (BHAR) over 6 months (i.e., 126 trading days; bhar6m), 3 months (i.e., 63 trading days; bhar3m) and 1 month (i.e., 21 trading days; bhar1m) after the date of an insider trade. BHAR is calculated using Carhart's four-factor model. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. Control variables are defined in Appendix Table A1. Robust standard errors, clustered within states of incorporation, are reported in the parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider sales

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	-0.081*** (0.024)	-0.047*** (0.010)	-0.022*** (0.006)
Size	-0.117*** (0.006)	-0.069*** (0.003)	-0.025*** (0.001)
BEME	0.021** (0.010)	0.007* (0.004)	-0.000 (0.002)
Leverage	-0.041*** (0.010)	-0.007 (0.005)	-0.001 (0.002)
Ret (t-1)	-0.145*** (0.016)	-0.071*** (0.009)	-0.014*** (0.005)
Ret (t-12, t-1)	-0.620*** (0.005)	-0.271*** (0.002)	-0.083*** (0.001)
ROA	0.093*** (0.011)	0.024** (0.009)	0.015*** (0.002)
PPENT	0.146*** (0.042)	0.057*** (0.016)	0.038*** (0.013)
Cash	-0.032 (0.020)	0.003 (0.011)	0.003 (0.005)
Spread	0.009* (0.005)	0.005** (0.002)	0.003 (0.002)
Constant	0.709*** (0.036)	0.424*** (0.018)	0.151*** (0.008)
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	297,945	297,945	297,945
R-squared	0.665	0.559	0.412

Panel B: Insider purchases

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	0.038 (0.050)	0.049 (0.038)	0.020 (0.026)
Size	-0.143*** (0.010)	-0.073*** (0.006)	-0.021*** (0.002)
BEME	0.047*** (0.011)	0.021** (0.009)	0.001 (0.003)
Leverage	-0.066** (0.025)	-0.023** (0.011)	-0.021*** (0.007)
Ret (t-1)	-0.242*** (0.023)	-0.134*** (0.010)	-0.075*** (0.008)
Ret (t-12, t-1)	-0.594*** (0.006)	-0.277*** (0.007)	-0.102*** (0.004)
ROA	0.021 (0.030)	0.025* (0.014)	0.008 (0.009)
PPENT	0.040 (0.041)	0.090** (0.040)	-0.011 (0.017)
Cash	-0.043 (0.046)	0.015 (0.023)	0.021* (0.011)
Spread	0.016*** (0.004)	-0.002 (0.003)	-0.004 (0.002)
Constant	0.629*** (0.049)	0.331*** (0.029)	0.121*** (0.013)
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	79,498	79,498	79,498
R-squared	0.736	0.675	0.568

Table 3: Trading volume and opportunism

The table reports regression results based on the volume and opportunism of insider trades. The dependent variables in each panel are *lnshare* (natural log of total shares traded), *lndolvol* (natural log of total dollar value of trade), and the ratio of opportunistic trades to all trades (Opp. sales/All trades or Opp. buys/All trades). The sample starts in 1996; it ends in 2013 for *lnshare* and *lndolvol*. Opportunistic trades are defined as in Cohen et al. (2012). These variables are measured for all insider transactions in a firm within a month with non-zero transactions. Panel A reports the results for sales and Panel B for purchases. Total dollar value is the sum of the dollar values of all trades in the month (trade price x shares). All continuous variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales

VARIABLES	(1)	(2)	(3)
	lnshare	lndolvol	Opp. sales/All trades
After UD Law	0.070 (0.069)	0.201** (0.089)	0.092*** (0.022)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Year FE	Yes	Yes	Yes
Ind×Year FE	Yes	Yes	Yes
Observations	104,589	104,589	41,701
R-squared	0.344	0.509	0.505

Panel B: Insider purchases

VARIABLES	(1)	(2)	(3)
	lnshare	lndolvol	Opp. buys/All trades
After UD Law	-0.033 (0.083)	0.034 (0.086)	-0.032* (0.004)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Year FE	Yes	Yes	Yes
Ind×Year FE	Yes	Yes	Yes
Observations	44,390	44,390	41,701
R-squared	0.465	0.469	0.586

Table 4: Profitability of Insider Trading before Quarterly Earnings Announcements

The table reports regression results for the profitability of Pre-QEA insider trading. The sample starts in 1996 and ends in 2013. The pre-QEA period is defined as the 21 trading days period ending three trading days before a quarterly earnings announcement (QEA) date. The dependent variables in Panel A (for sales) and B (for purchases) are cumulative abnormal return (CAR) and cumulative total return (CRET) over days (-2, +2), (-1, +4), and (0, +5) surrounding a QEA (day 0). CAR is calculated using the market-adjusted model. In panel C, the dependent variables are the dollar volume of pre-QEA insider sales and purchases for each quarter. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales

	(1)	(2)	(3)	(4)	(5)	(6)
	CAR [-2 +2]	CRET [-2 +2]	CAR [-1 +4]	CRET [-1 +4]	CAR [0 +5]	CRET [0 +5]
After UD Law	0.001 (0.006)	0.003 (0.006)	-0.033*** (0.006)	-0.035*** (0.006)	-0.026*** (0.006)	-0.027*** (0.006)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,074	38,074	38,074	38,074	38,074	38,074
R-squared	0.754	0.800	0.757	0.800	0.760	0.805

Panel B: Insider purchases

	(1)	(2)	(3)	(4)	(5)	(6)
	CAR [-2 +2]	CRET [-2 +2]	CAR [-1 +4]	CRET [-1 +4]	CAR [0 +5]	CRET [0 +5]
After UD Law	0.278*** (0.050)	0.290*** (0.047)	0.163* (0.088)	0.149 (0.091)	0.057 (0.049)	0.065 (0.056)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,181	10,181	10,181	10,181	10,181	10,181
R-squared	0.925	0.929	0.923	0.929	0.922	0.931

Panel C: Pre-QEA Quarterly Trading Volume

VARIABLES	(1) Pre-QEA Sales Ln(total_dolvol)	(2) Pre-QEA Purchase Ln(total_dolvol)
After UD Law	0.224* (0.119)	0.167 (0.569)
Firm level controls	Yes	Yes
Firm FE	Yes	Yes
HQ State×Year FE	Yes	Yes
Industry×Year FE	Yes	Yes
Observations	15,573	5,004
R-squared	0.620	0.720

Table 5: Insiders' Abnormal Dollar Profits

The table reports regression results for insiders' abnormal dollar profits. The sample starts in 1996 and ends in 2013. The dependent variables are buy-and-hold abnormal profit over 6 months (i.e., 126 trading days; profit6m), 3 months (i.e., 63 trading days; profit3m) and 1 month (i.e., 21 trading days; profit1m) after an insider trade day (day 0). BHAR is calculated using Carhart's four-factor model. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales

	(1) profit6m	(2) profit3m	(3) profit1m
After UD Law	-90,599** (37,683)	-60,870*** (16,163)	-24,620*** (4,722)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	297,945	297,945	297,945
R-squared	0.374	0.338	0.272

Panel B: Insider purchases

	(1) profit6m	(2) profit3m	(3) profit1m
After UD Law	21 (4,339)	7,452*** (2,060)	2,663 (2,532)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	79,498	79,498	79,498
R-squared	0.555	0.536	0.488

Table 6: Role of information asymmetry

The table reports regression results partitioned by measures of information asymmetry. The sample starts in 1996 and ends in 2013. The dependent variables are buy-and-hold abnormal returns (BHAR) over 6 months (i.e., 126 trading days; *bhar6m*), 3 months (i.e., 63 trading days; *bhar3m*) and 1 month (i.e., 21 trading days; *bhar1m*) after the date of an insider trade. BHAR is calculated using Carhart's four-factor model. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. High (Low) R&D indicates a firm that has greater (less) than the sample median ratio of R&D expenses to total assets for the year. Liquid (illiquid) indicates a stock with a smaller (larger) than the median bid-ask spread for the year. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A1: Profitability of insider sales partitioned by R&D intensity

	(1)		(2)		(3)		(4)		(5)		(6)	
	<i>bhar6m</i>		<i>bhar3m</i>		<i>bhar3m</i>		<i>bhar3m</i>		<i>bhar1m</i>		<i>bhar1m</i>	
	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D
After UD Law	-0.154*** (0.012)	0.059 (0.050)	-0.062*** (0.007)	-0.025 (0.020)	-0.037*** (0.003)	-0.012* (0.006)						
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	148,012	147,061	148,012	147,061	148,012	147,061	148,012	147,061	148,012	147,061	148,012	147,061
R-squared	0.641	0.822	0.532	0.753	0.385	0.609						
Test of difference in After UD Law across High vs. Low		3.92***			1.59						3.45***	

Panel A2: Profitability of insider sales partitioned by liquidity

	(1)		(2)		(3)		(4)		(5)		(6)	
	<i>bhar6m</i>		<i>bhar6m</i>		<i>bhar3m</i>		<i>bhar3m</i>		<i>bhar1m</i>		<i>bhar1m</i>	
	Illiquid	Liquid	Illiquid	Liquid	Illiquid	Liquid	Illiquid	Liquid	Illiquid	Liquid	Illiquid	Liquid
After UD Law	-0.116*** (0.025)	-0.050*** (0.018)	-0.053*** (0.013)	-0.042*** (0.011)	-0.026*** (0.007)	-0.018* (0.009)						
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	148,555	144,196	148,555	144,196	148,555	144,196	148,555	144,196	148,555	144,196	148,555	144,196
R-squared	0.744	0.761	0.662	0.672	0.509	0.528						
Test of difference in After UD Law across Illiquid vs. Liquid		2.64**			0.58						1.18	



Panel B1: Profitability of insider purchases partitioned by R&D intensity

	(1)	(2)	(3)	(4)	(5)	(6)
	bhar6m		bhar3m		bhar1m	
	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D
After UD Law	0.001 (0.076)	0.066 (0.086)	0.039 (0.054)	0.092* (0.046)	0.030 (0.045)	-0.039 (0.034)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	39,415	37,004	39,415	37,004	39,415	37,004
R-squared	0.728	0.886	0.666	0.836	0.563	0.724
Test of difference in After UD Law across High vs. Low		0.49		0.76		1.36

Panel B2: Profitability of insider purchases partitioned by liquidity

	(1)	(2)	(3)	(4)	(5)	(6)
	bhar6m		bhar3m		bhar1m	
	Illiquid	Liquid	Illiquid	Liquid	Illiquid	Liquid
After UD Law	0.173 (0.136)	0.083 (0.071)	0.137 (0.099)	0.104*** (0.029)	0.125** (0.052)	0.032 (0.027)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,023	36,707	38,023	36,707	38,023	36,707
R-squared	0.866	0.831	0.824	0.781	0.708	0.681
Test of difference in After UD Law across Illiquid vs. Liquid		0.81		0.37		2.3**

Table 7: Firms' disclosure quality and the profitability of insider trades

The table reports regression results controlling for (in Panels A.1 and B.1) or partitioned by (in Panels A.2 and B.2) the effect of a firm's disclosure quality on the profitability of insider trades. The sample starts in 1996 and ends in 2013. The dependent variables are defined in Table 2. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. High DQ (Low DQ) indicates a firm with above- (below-) median disclosure quality (DQ) for the year. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A1: Insider sales

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	-0.081*** (0.022)	-0.045*** (0.009)	-0.023*** (0.006)
DQ	0.062 (0.067)	-0.000 (0.039)	0.023*** (0.008)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	275,990	275,990	275,990
R-squared	0.668	0.562	0.414

Panel A2: Insider sales partitioned by DQ

VARIABLES	(1) bhar6m		(3) bhar3m		(6) bhar1m	
	High DQ	Low DQ	High DQ	Low DQ	High DQ	Low DQ
After UD Law	-0.153*** (0.015)	-0.086** (0.032)	-0.088*** (0.007)	-0.040*** (0.013)	-0.043*** (0.006)	-0.022** (0.008)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	136,511	135,085	136,511	135,085	136,511	135,085
R-squared	0.702	0.799	0.610	0.715	0.462	0.564
Test of Diff in After UD Law across High vs. Low	2.02**		3.32***		3.46***	

Panel B1: Insider Purchases

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	0.030 (0.050)	0.051 (0.037)	0.025 (0.026)
DQ	0.135 (0.141)	0.098 (0.079)	0.033 (0.042)
Firm level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes
Observations	74,413	74,413	74,413
R-squared	0.740	0.682	0.574

Panel B2: Insider Purchases partitioned by DQ

VARIABLES	(1) bhar6m		(2) bhar3m		(3) bhar1m	
	High DQ	Low DQ	High DQ	Low DQ	High DQ	Low DQ
After UD Law	0.032 (0.079)	-0.280*** (0.080)	0.016 (0.045)	-0.051 (0.047)	0.005 (0.032)	-0.027 (0.032)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,480	34,489	35,480	34,489	35,480	34,489
R-squared	0.801	0.889	0.757	0.840	0.656	0.724
Test of Diff in After UD Law across High vs. Low	2.84***		1.12		0.68	

Table 8: Firm size, institutional ownership and the profitability of insider trades

The table reports regression results for the effect of firm size and institutional ownership on the profitability of insider trades. The sample starts in 1996 and ends in 2013. The dependent variables are defined in Table 2. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. Large (Small) market cap indicates a firm with above- (below-) median market capitalization in the sample for the year. High (Low) blockholders indicates a firm with above- (below-) median number of institutional investors that own at least 5% of the firm's outstanding equity during the year. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A1: Profitability of insider sales partitioned by firm size

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	bhar6m		bhar3m		bhar1m	
	Large	Small	Large	Small	Large	Small
After UD Law	-0.046** (0.022)	-0.184*** (0.023)	-0.030** (0.012)	-0.083*** (0.009)	-0.027*** (0.003)	-0.033*** (0.010)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State× time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	147,344	145,667	147,344	145,667	147,344	145,667
R-squared	0.725	0.765	0.643	0.668	0.496	0.520
Test of Diff in After UD Law across Large vs. Small market cap	3.7***		2.80***		0.46	

Panel A2: Profitability of insider sales partitioned by the number of 5% institutional blockholders

VARIABLES	(1)	(2)	(3)	(4)	(5)	
	bhar6m		bhar3m		bhar1m	
	More	Fewer	More	Fewer	More	Fewer
After UD Law	0.054** (0.021)	-0.113*** (0.020)	-0.004 (0.006)	-0.060*** (0.017)	-0.003 (0.005)	-0.028*** (0.006)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	96,483	152,209	96,483	152,209	96,483	152,209
R-squared	0.781	0.760	0.706	0.668	0.562	0.525
Test of Diff in After UD Law across High vs. Low Institutional Owership	5.21***		2.89***		2.92***	

Panel B1: Profitability of insider purchases partitioned by firm size

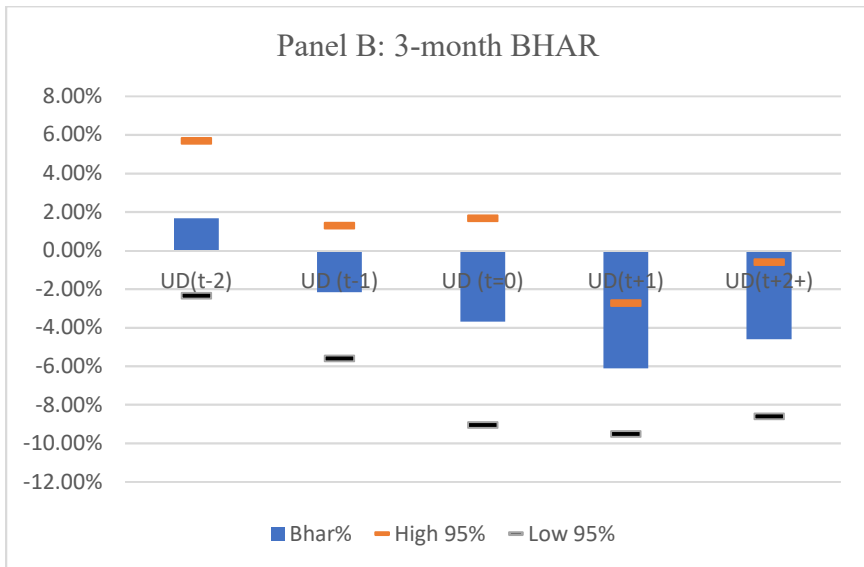
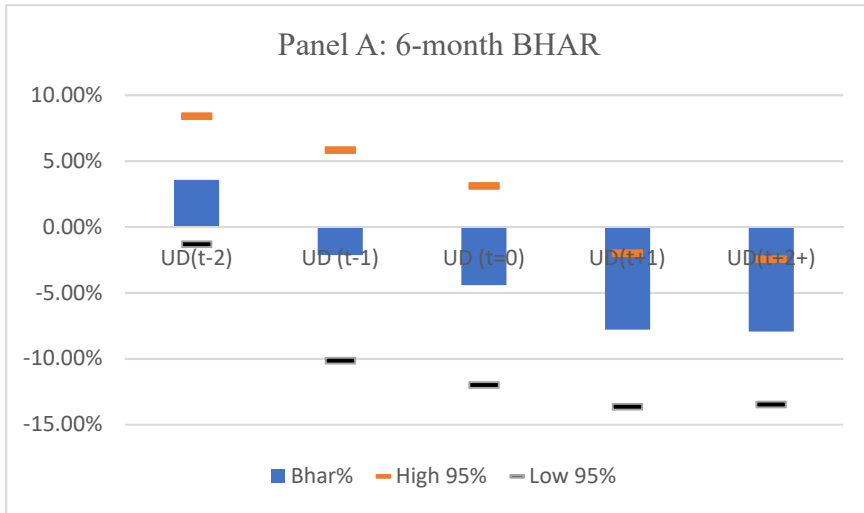
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	bhar6m		bhar3m		bhar1m	
	Large	Small	Large	Small	Large	Small
After UD Law	0.065 (0.083)	0.148 (0.104)	0.044 (0.053)	0.152*** (0.056)	-0.006 (0.027)	0.127*** (0.041)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State× time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	36,422	38,718	36,422	38,718	36,422	38,718
R-squared	0.826	0.850	0.779	0.800	0.672	0.688
Test of Diff in After UD Law across Large vs. Small market cap	0.69		2.15**		2.82***	

Panel B2: Profitability of insider purchases partitioned by the number of 5% institutional blockholders

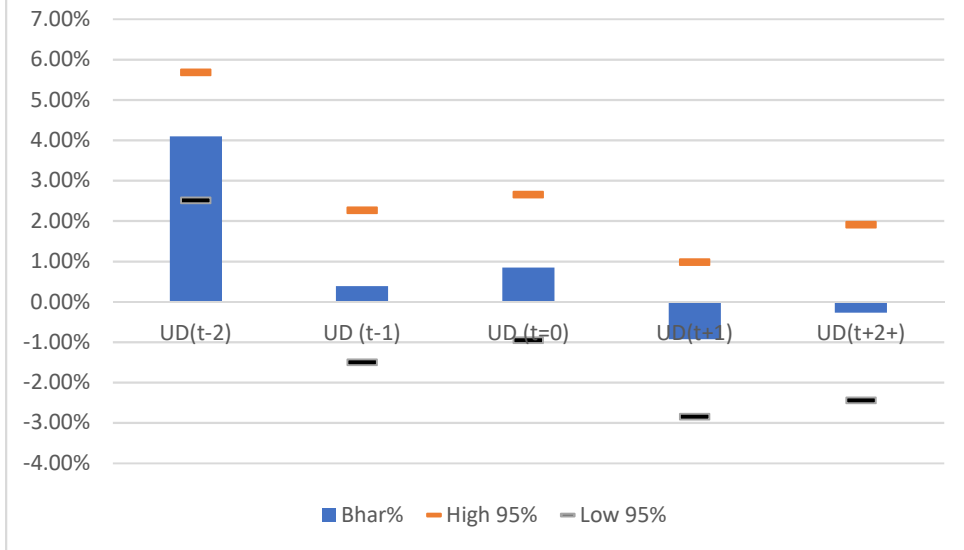
VARIABLES	(1)	(2)		(3)		(4)	(5)
	bhar6m		bhar3m		bhar1m		
	More	Fewer	More	Fewer	More	Fewer	
After UD Law	-0.203** (0.093)	-0.206 (0.125)	0.008 (0.074)	0.002 (0.089)	-0.069** (0.030)	0.098 (0.065)	
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23,975	35,217	23,975	35,217	23,975	35,217	
R-squared	0.907	0.868	0.877	0.814	0.766	0.708	
Test of Diff in After UD Law across High vs. Low Institutional Ownership	0.02		0.05		2.75***		

**Figure 1. Dynamics of Buy-and-Hold Abnormal Returns (BHAR) from Insider Sales**

These charts show estimated average buy-and-hold abnormal returns (BHAR) for 6-month (Panel A), 3-month (Panel B) and 1-month (Panel C) holding periods following the day of insider sales during the years surrounding the passage of UD laws. The solid bars and lines, respectively, indicate the point estimates and 95% confidence intervals from regressions of BHAR similar to Table 2, where the *After UD Law* variable is replaced by indicators for the years surrounding the passage of UD laws in a firm's state of incorporation, except that year  $t-2$  ( $t+2$ ) is for years  $\leq t-2$  ( $\geq t+2$ ).



Panel C: 1-month BHAR



# Appendix

## Appendix

Table A.1: Variable definitions

The table provides the definitions and data sources for all the variables.

After UD Law	An indicator variable that equals one if a firm's state of incorporation has adopted Universal Demand (UD) laws in a given year. We use firms' historical states of incorporation obtained from SEC online filings from 1994 to 2013.
BHAR (bhar1m, bhar3m, and bhar6m)	A buy-and-hold abnormal return (BHAR) between any two periods T1 and T2 is the compounded daily stock return minus the compounded daily expected return from a risk model for the same period. $BHAR_{jt} = \prod_{i=\bar{T}_1}^{\bar{T}_2} (1 + R_{jt}) - \prod_{i=\bar{T}_1}^{\bar{T}_2} (1 + R_{RiskModel})$ We use Carhart's four-factor model as the risk model and estimate parameters over the window from -250 to -50 days. bhar1m, bhar3m and bhar6m are calculated using 21, 63 and 126 trading days after the insider trading day (day 0), respectively.
DGTW adjusted returns (dgtw1m, dgtw3m, and dgtw6m)	Holding period returns adjusted for Daniel, Grinblatt, Titman, and Wermers (DGTW; 1997) characteristics-based benchmarks by using daily returns. For example, dgtw1m = A stock's compounded daily returns for one month (cret1m) – compound daily returns for one month on market value-weighted DGTW benchmark portfolio. The annual stock assignments until 2012 are obtained from Russ Wermers' website: <a href="http://terpconnect.umd.edu/~wermers/ftpsite/Dgtw/coverpage.htm">http://terpconnect.umd.edu/~wermers/ftpsite/Dgtw/coverpage.htm</a>
Total shares traded (lnshares), and total dollar value of trade (ln dolvol)	Calculated from Thomson Reuters insider trading data. Total shares traded is the total number of shares traded (bought or sold) by corporate insiders (directors, officers, and beneficial owners of 10% or more of a firm's outstanding equity) in the open market on each insider trading day per firm. The total dollar value of trade is the product of transaction price per share (tprice) and the total number of shares traded. We take the natural log of both variables.
Total abnormal profit (profit1m, profit3m, profit6m)	Total abnormal profit for 1, 3 and 6 month holding periods, computed as the product of abnormal return (BHAR or CAR) and total dollar value of an insider trade.
Size, large cap, small cap	Natural log of market capitalization, calculated from Compustat using $\ln(\text{csho} * \text{PRCC\_C})$ , lagged by one year. Large (small) cap indicates larger (smaller) than the sample median market capitalization.
BEME	Natural log of the book to market ratio, calculated from Compustat using $\ln[\text{ceq} / (\text{csho} * \text{PRCC\_C})]$ , lagged by one year.
Leverage	Total debt to total assets ratio, calculated from Compustat using $(\text{dltt} + \text{dlc}) / \text{at}$ , lagged by one year.
Ret (t-1)	Past month's total return, calculated from CRSP.
Ret (t-12, t-1)	Cumulative total return for past twelve months, calculated from CRSP.
Spread, Liquid, Illiquid	$[(\text{Ask-Bid}) / (\text{Ask} + \text{Bid}) / 2]$ , calculated from CRSP. We use spread to measure the liquidity of a firm's stock. Liquid (illiquid) is an indicator (0/1) variable for a stock with a smaller (larger) than the median spread.
ROA	Net income to total assets ratio, calculated from Compustat using $(\text{ni} / \text{at})$ .
PPENT	The ratio of net property, plant, and equipment to total assets, calculated from Compustat using $(\text{ppent} / \text{at})$ .
Cash	The ratio of cash to total assets, calculated from Compustat using $(\text{ch} / \text{at})$ .
High and low R&D	High (low) R&D indicates higher (lower) than median ratio of research and development expenses to total assets for a given year, calculated from Compustat using $(\text{xrd} / \text{at})$ .
QEA CAR[d <sub>1</sub> , d <sub>2</sub> ] and CRET[d <sub>1</sub> , d <sub>2</sub> ]	Market-adjusted cumulative abnormal return (CAR) and cumulative total return (CRET) over days d <sub>1</sub> to d <sub>2</sub> surrounding a quarterly earnings announcement (QEA, day 0).



More (fewer) institutional blockholders	More (fewer) institutional blockholders indicates a firm with above- (below-) median number of institutional investors that own at least 5% of the firm's outstanding equity during the year. Source: Thomson Reuters institutional holdings (13F) file.
Disclosure Quotient (DQ)	A disclosure quality score of a firm's financial statements, computed by Chen, Miao and Shevlin (2015). DQ is based on a count of non-missing data items in firms' annual reports as reported by Compustat. It measures the granularity of a firm's financial reports.

Table A.2: UD Law and Insiders' profitability using cumulative abnormal return (CAR)

The table reports our baseline regression results with and without firm-level controls. The sample starts in 1996 and ends in 2013. The dependent variables are cumulative total returns (CRET) and DGTW-adjusted abnormal returns (DGTW) over 6 months (i.e., 126 trading days; cret6m, dgtw6m), 3 months (i.e., 63 trading days; cret3m, dgtw3m) and 1 month (i.e., 21 trading days; cret1m, dgtw1m) after an insider trading day. DGTW returns are characteristics-adjusted abnormal returns calculated as in Daniel et al. (1997), but based on compounded daily returns. All variables are winsorized at their 1st and 99th percentiles. After UD Law is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales						
VARIABLES	(1) cret6m	(2) cret3m	(3) cret1m	(4) dgtw6m	(5) dgtw3m	(6) dgtw1m
After UD Law	-0.013 (0.020)	-0.016* (0.009)	-0.015*** (0.006)	-0.014 (0.016)	-0.015* (0.008)	-0.013*** (0.004)
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	297,945	297,945	297,945	281,232	281,232	281,232
R-squared	0.623	0.568	0.459	0.544	0.483	0.386

Panel B: Insider purchases						
VARIABLES	(1) cret6m	(2) cret3m	(3) cret1m	(4) dgtw6m	(5) dgtw3m	(6) dgtw1m
After UD Law	0.060 (0.051)	0.058 (0.039)	0.015 (0.028)	0.060 (0.043)	0.036 (0.036)	0.015 (0.026)
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	79,498	79,498	79,498	74,708	74,708	74,708
R-squared	0.733	0.689	0.586	0.686	0.637	0.543

Table A.3: UD Law and Insiders' profitability controlling for the crisis

The table reports result from regressions that include an interaction of *After UD Law* and *Crisis* in our baseline regressions. The sample starts in 1996 and ends in 2013. *Crisis* takes the value of 1 for all trades that take place in the years 2008 and 2009, and 0 otherwise. The dependent variables are buy-and-hold abnormal returns (BHAR) over 6 months (i.e., 126 trading days; bhar6m), 3 months (i.e., 63 trading days; bhar3m) and 1 month (i.e., 21 trading days; bhar1m) after the date of an insider trade. BHAR is calculated using Carhart's four-factor model. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. Control variables are defined in Appendix Table A1. Robust standard errors, clustered within states of incorporation, are reported in the parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Insider sales

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	-0.082*** (0.026)	-0.048*** (0.011)	-0.022*** (0.007)
After UD Law × Crisis	0.007 (0.030)	0.008 (0.017)	-0.004 (0.006)
Firm-level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State × Time FE	Yes	Yes	Yes
Ind × Time FE	Yes	Yes	Yes
Observations	297,945	297,945	297,945
R-squared	0.665	0.559	0.412

Panel B: Insider purchases

VARIABLES	(1) bhar6m	(2) bhar3m	(3) bhar1m
After UD Law	0.020 (0.058)	0.050 (0.040)	0.019 (0.027)
After UD Law × crisis	0.113** (0.050)	-0.003 (0.032)	0.005 (0.017)
Firm-level controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
HQ State × Time FE	Yes	Yes	Yes
Ind × Time FE	Yes	Yes	Yes
Observations	79,498	79,498	79,498
R-squared	0.736	0.675	0.568

Table A.4: Controlling for the effects of other laws

The table reports regression results controlling for the effects of other state laws. The sample starts in 1996 and ends in 2013. The dependent variables are defined in Table 2. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if the firm is incorporated in a state that has adopted a UD law, and zero otherwise. *DD Law* is an indicator variable that equals one if a firm is incorporated in a state that has a Directors Duty Law, and zero otherwise. *PP Law* is an indicator variable that equals one if a firm is incorporated in a state that has a Poison Pill Law, and zero otherwise. *CS Law* is an indicator variable that equals one if a firm is incorporated in a state that has a Control Share Law, and zero otherwise. *BC Law* is an indicator variable that equals one if a firm is incorporated in a state that has a Business Combination Law, and zero otherwise. *FP Law* is an indicator variable that equals one if a firm is incorporated in a state that has a Fair Price Law, and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales

VARIABLES	(1) bhar6m	(2) bhar6m	(3) bhar6m	(4) bhar6m	(5) bhar6m	(6) bhar6m
After UD Law	-0.089*** (0.022)	-0.092*** (0.021)	-0.094*** (0.020)	-0.081*** (0.025)	-0.082*** (0.024)	-0.096*** (0.019)
DD Law	0.078** (0.030)					0.027 (0.037)
PP Law		0.078*** (0.021)				0.083*** (0.025)
CS Law			0.090*** (0.025)			0.042 (0.039)
BC Law				-0.041** (0.020)		-0.036 (0.022)
FP Law					0.017 (0.025)	-0.098*** (0.033)
Constant	0.688*** (0.036)	0.686*** (0.037)	0.690*** (0.035)	0.745*** (0.043)	0.704*** (0.034)	0.726*** (0.044)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	297,945	297,945	297,945	297,945	297,945	297,945
R-squared	0.665	0.665	0.665	0.665	0.665	0.665

Panel B: Insider purchases

VARIABLES	(1) bhar6m	(2) bhar6m	(3) bhar6m	(4) bhar6m	(5) bhar6m	(6) bhar6m
After UD Law	0.060 (0.054)	0.050 (0.054)	0.044 (0.060)	0.039 (0.049)	0.061 (0.052)	0.041 (0.052)
DD Law	-0.123*** (0.038)					-0.207** (0.090)
PP Law		-0.062 (0.038)				0.103 (0.066)
CS Law			-0.025 (0.080)			0.164** (0.077)
BC Law				0.030 (0.051)		0.041 (0.045)
FP Law					-0.156*** (0.045)	-0.159*** (0.059)
Constant	0.666*** (0.050)	0.650*** (0.048)	0.635*** (0.044)	0.602*** (0.088)	0.679*** (0.050)	0.631*** (0.081)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	79,498	79,498	79,498	79,498	79,498	79,498
R-squared	0.736	0.736	0.736	0.736	0.736	0.736

Table A.5: Excluding 9<sup>th</sup> circuit firms and restricting treatment firms to Pennsylvania

The table reports regression results after excluding firms incorporated in states under the jurisdiction of the 9<sup>th</sup> circuit (in columns (1) and (2)) or restricting the treatment firms to Pennsylvania (in columns (3) and (4)). The sample starts in 1996 and ends in 2013. The dependent variables are defined in Table 2. All the variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. *After UD Law* is an indicator variable that equals one if a firm is incorporated in a state that has adopted a UD Law, and zero otherwise. Robust standard errors clustered at the state of incorporation level are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Insider sales

VARIABLES	Dropping Ninth Circuit Firms			Pennsylvania Firms		
	(1) bhar6m	(2) bhar3m	(3) bhar1m	(4) bhar6m	(5) bhar3m	(6) bhar1m
After UD Law	-0.072*** (0.024)	-0.039*** (0.009)	-0.020*** (0.007)	0.037 (0.050)	-0.082** (0.034)	-0.035*** (0.009)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	267,636	267,636	267,636	260,328	260,328	260,328
R-squared	0.672	0.570	0.422	0.676	0.571	0.421

Panel B: Insider purchases

VARIABLES	Dropping Ninth Circuit Firms			Pennsylvania Firms		
	(1) bhar6m	(2) bhar3m	(3) bhar1m	(4) bhar6m	(5) bhar3m	(6) bhar1m
After UD Law	0.019 (0.052)	0.046 (0.043)	0.017 (0.029)	0.115 (0.073)	0.082** (0.037)	0.082*** (0.008)
Firm level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HQ State×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry×Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,275	71,275	71,275	68,517	68,517	68,517
R-squared	0.748	0.692	0.583	0.755	0.696	0.586

Table A.6: Firm characteristics before and after UD laws

The table reports summary statistics of the firm characteristics used in this study before and after UD laws separately for purchase and sales samples. The sample consists of firms in which D&O make open-market trades in common stock of firms listed on NYSE, Amex or Nasdaq, excluding financial and utility firms, during 1996-2013. Observations are at the firm-trade day level. All variables are winsorized at their 1<sup>st</sup> and 99<sup>th</sup> percentiles. Table A1 provides variable definitions and data sources.

Panel A.1: Sales Sample Firm Characteristics before UD Laws

Variables	Mean	SD	25%	50%	75%	Observations
Size	6.62	1.85	5.39	6.52	7.78	287952
BEME	-1.19	0.81	-1.66	-1.13	-0.63	283067
Leverage	0.19	0.24	0.00	0.10	0.30	293494
Ret (t-1)	0.05	0.16	-0.04	0.03	0.12	293655
Ret (t-12, t-1)	0.20	0.51	-0.06	0.19	0.46	279680
ROA	0.01	0.19	0.00	0.05	0.10	293232
PPENT	0.21	0.20	0.06	0.14	0.29	293247
Cash	0.17	0.17	0.04	0.12	0.24	291757
Spread	0.21	0.52	0.02	0.06	0.23	289944

Panel A.2: Sales Sample Firm Characteristics after UD Laws

Variables	Mean	SD	25%	50%	75%	Observations
Size	6.28	1.72	5.14	6.30	7.28	39108
BEME	-1.00	0.74	-1.41	-0.95	-0.51	38734
Leverage	0.19	0.22	0.00	0.14	0.29	39532
Ret (t-1)	0.04	0.15	-0.04	0.03	0.11	39546
Ret (t-12, t-1)	0.20	0.45	-0.03	0.19	0.42	38782
ROA	0.04	0.15	0.02	0.06	0.10	39520
PPENT	0.25	0.20	0.09	0.19	0.34	39414
Cash	0.13	0.14	0.03	0.09	0.19	39100
Spread	0.23	0.52	0.02	0.06	0.24	39043

Panel B.1: Purchase Sample Firm Characteristics before UD Laws

Variables	Mean	SD	25%	50%	75%	Observations
Size	5.07	1.91	3.66	4.89	6.30	85666
BEME	-0.77	0.94	-1.32	-0.71	-0.15	81990
Leverage	0.27	0.31	0.02	0.19	0.40	87349
Ret (t-1)	-0.04	0.19	-0.15	-0.04	0.05	87547
Ret (t-12, t-1)	-0.20	0.64	-0.55	-0.14	0.20	83279
ROA	-0.09	0.30	-0.11	0.01	0.06	87110
PPENT	0.25	0.22	0.08	0.18	0.34	87196
Cash	0.14	0.18	0.02	0.07	0.20	86848
Spread	0.77	1.22	0.11	0.38	0.97	84615

Panel B.2: Purchase Sample Firm Characteristics after UD Laws

Variables	Mean	SD	25%	50%	75%	Observations
Size	4.94	1.82	3.63	4.75	6.24	13115
BEME	-0.64	0.85	-1.14	-0.60	-0.10	12848
Leverage	0.27	0.28	0.06	0.22	0.39	13378
Ret (t-1)	-0.04	0.18	-0.13	-0.04	0.05	13388
Ret (t-12, t-1)	-0.16	0.60	-0.48	-0.10	0.21	12876
ROA	-0.03	0.26	-0.03	0.03	0.07	13338
PPENT	0.26	0.21	0.10	0.20	0.38	13358
Cash	0.11	0.15	0.02	0.05	0.14	13259
Spread	0.84	1.45	0.13	0.43	1.06	12932



Table A.7: Timeline of the adoption of UD laws

The table reports the timeline of the adoption of the UD laws by 23 U.S. states and DC.

Source: Appel (2019) and Jung, Nam and Shu (2021)

Year	State
1989	GA
	MI
1990	FL
1991	WI
1992	MT
	VA
	UT
1993	NH
	MS
1995	NC
1996	AZ
	NE
1997	CT
	ME
	PA
	TX
	WY
1998	ID
2001	HI
2003	IA
2004	MA
2005	RI
	SD
2011	DC