Late Filings and Insider Trading: Broken Windows or Opportunism?

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May 2022

Abstract:

The Securities Act of 1934 requires corporate insiders to publicly disclose transactions in their company's stock within two business days on Form 4. Despite this bright-line legal requirement, we identify more than 100,000 transactions, involving over $122 billion that were disclosed late. The conventional wisdom in the legal community is that these late filings are unintentional clerical errors and that it is a waste of resources to police these "broken windows." Perhaps as a result of this, the SEC has rarely enforced the filing deadline. We examine the phenomenon of late Form 4 filings and associated lack of enforcement. In contrast to the conventional wisdom, we find that trades reported in late filings are highly opportunistic—they earn significant abnormal returns relative to trades in timely filings and appear intended to conceal trading activity prior to material corporate events. Our evidence suggests that insiders may be exploiting the SEC's lack of enforcement of filing deadlines, resulting in unusually opportunistic insider trading.

We thank …. for helpful comments and suggestions. We acknowledge financial support from NYU Law School and The Wharton School.

"Like a tree that falls in the forest with no one to hear, a rule that is not enforced may fairly be said to be no rule at all."

- SEC Commissioner Allison Herren Lee in "*Send Lawyers, Guns and Money: (Over-) Zealous Representation by Corporate Lawyers*" Remarks at the Practice Law Institute

1. Introduction

In this paper we examine what happens when US securities laws are underenforced. Our paper is motivated by a desire to understand the importance of regulatory enforcement in the US––a country generally viewed as having a strong rule of law, with robust legal and compliance industries. On the one hand, scrutiny by shareholders and non-government gatekeepers may be sufficient to ensure compliance with the law even in the absence of formal regulatory enforcement. In this case, private-sector gatekeepers can substitute for a lack of regulatory enforcement resources, and a lack of enforcement does not lead to widespread violations of the law. On the other hand, scrutiny by private-sector gatekeepers may not be a sufficient deterrent, and as a consequence, regulatory enforcement is critical to prevent widespread opportunistic violations.

To shed light on what happens when US securities laws are underenforced, we focus our analysis on statutory filing deadlines concerning trading by corporate insiders. Section 16(a) of the Securities Act of 1934 requires corporate insiders to publicly disclose their trades in company equity securities on a Form 4 to the SEC "before the end of the second business day following the day on which the subject transaction has been executed."[1] It is a violation of federal securities law to report trades past this statutory deadline. Consequently, violations are straightforward to detect: one simply counts the number of business days between the reported trade date and the date the Form 4 is filed with the SEC.[2]

[1] Section 16(a)(2)(C) (15 U.S.C. 78p(a)(2)(C)), as amended by SOX.

[2] This feature of the reporting environment allows us to overcome the partial observability problem in prior work that relies on enforcement actions to infer violations of the law (Wang et al., 2010). In our setting, we observe compliance with the law independent of an enforcement action.

Despite the bright-line legal requirement, and the ease of detecting violations of the filing deadline, violations of the Form 4 deadline are rampant. Indeed, from 2004 to 2020, we find over 100,000 transactions, covering over $122 billion, that are disclosed late in violation of Section 16(a) of the Securities Act of 1934 (see Table 1). Strikingly—and perhaps not surprisingly given how widespread the violation are—the SEC is generally not enforcing filing deadlines on these disclosures. While the SEC routinely charges companies for filing financial statements late (e.g., 10-Qs and 10-Ks), the SEC has, to our knowledge, filed standalone charges for filing a Form 4 late just once.[3]

We begin our analysis by examining the prevalence and persistence of trades that are filed past the deadline ("late trades") and compare these trades to those filed on-time ("timely trades"). We find that late trades occur across a wide variety of firms (e.g., more than 20% of firms in any given year have at least one late trade) and that many firms persistently file late. We find a handful of firms have more than $100 million in total late trade volume, spread out over dozens of trades, and that late trades account for the *majority* of trades (majority of dollar volume) at 300 (401) firms.

Next, we examine whether late trades are strategic, i.e., tend to be more informed than timely trades. To answer this question, we compare the performance of late trades with timely trades using three distinct sets of tests. First, we measure trade performance using abnormal returns subsequent to the trade, and compare performance across the two types of trades. Second, we repeat this comparison but conduct the analysis within a given firm-quarter (e.g., comparing the

[3] We confirmed this through two mechanisms. First, we held discussions with SEC employees regarding the enforcement of late filings. Second. we searched the record of all SEC enforcement actions, orders, and opinions issued by the Commission relating to delinquent filings for charges related to Form 4 filings. (https://www.sec.gov/divisions/enforce/delinquent/delinqindex.htm). Beyond a September 2014 enforcement sweep, we find just *two* standalone actions, both of which are against individuals for not filing trades on Form 4 at all.

performance of late trades in firm A in Q1-2020 with timely trades in firm A in Q1-2020) and within a given insider (e.g., comparing the performance of a particular CEO's late trades to his timely trades). Third, we use a regression discontinuity design to examine whether there is a discontinuity in the relation between trade performance and the filing lag (i.e., the time between when the trade occurs and when the Form 4 is filed) at the two-day filing deadline.

Across all tests, we find that late trades outperform timely trades and appear highly opportunistic. For example, we find that timely trades earn a market-adjusted buy-and-hold return of 0.39% over the three months following the trade, whereas late trades earn a return of 2.10% over the same period, an economically and statistically significant difference of 171 basis points. These differences persist after adjusting for risk using the Fama-French six-factor model, and comparing timely and late trades placed within the same firm-quarter, and within the same insider. These differences in performance manifest in a striking discontinuity in trade performance after the two-day filing deadline. For example, we find trades filed on the day of the filing deadline earn market-adjusted returns of 0.34% over the next three months. In contrast, trades filed the next day, just after the deadline, earn 1.37% over the next three months. Similarly, trades filed two (three) days after the filing deadline earn 2.28% (2.70%). This suggests late trades are highly opportunistic.

Next, we test for a particular trading pattern that would suggest insiders are opportunistically disclosing their trades late. Prior work suggests insiders occasionally trade in advance of corporate events (Cohen et al., 2015; Ali and Hirshleifer 2017; Jagolinzer et al., 2020; Neissner, 2022). Building on this literature, we examine whether insiders trade in advance of corporate events and then strategically file their trades late—after disclosure of the event. The notion that insiders might trade in advance of corporate events and then strategically file their

trades late (after disclosure of the event) has two important implications. First, it would imply that late trades occurring in close proximity to corporate events perform better than timely trades, because the former would represent an informed strategic choice. Second, concealing the trade until after the corporate event is disclosed alters the mosaic of information available to the market when interpreting the corporate event. Because the trading activity is filed late, after the event occurs, the market cannot use knowledge of that trading activity to price the event. This robs the market of important contextual information at the time of the corporate event.[4]

When a material event occurs at a publicly traded company, the company is required to disclose the event on a Form 8-K. We examine the relation between trades placed over the ten days prior to the 8-K and the market reaction to the 8-K. Consistent with the notion that some corporate insiders trade in advance of corporate events and then strategically disclose their trades late, after the disclosure of the event, we find that the direction of late (timely) trades shortly before the 8-K predicts (does not predict) the market reaction to the 8-K. In particular, we find that late sales over the ten days prior to the 8-K are associated with economically meaningful negative announcement returns of –0.645% for earnings announcement, –0.714% for Reg FD disclosures, and –0.895% for material contracts. We find no evidence of an association between late trades and the announcement return to other types of 8-K filings (e.g., notice of shareholder meetings, notice of elections, change of directors, etc.). Collectively, these results emphasize how an absence of

[4] A large literature suggests information on insider trading activity is relevant to the pricing of corporate events. See for example Jagolinzer et al., (2011) and Ali and Hirshelifer (2016) for earnings news; Cohen et al. (2015) and Neissner (2022) for material contracts; Jagolinzer et al., (2020) for TARP infusions; Blackburne et al. (2020) for SEC investigations; and Arif et al. (2022) for audit reports. As an example of this type of trading pattern, consider the following anecdote. On Thursday May 7, 2015 a director sold approximately $182,000 in stock. Earnings were announced after hours on Tuesday May 12, 2015. The announcement was a large disappointment and over the next two-days prices plummeted by –17%. The director did not disclose his trades until May 21, 2015 by which point the stock had fallen more than –35%. Had the director disclosed trades within the statutory filing deadline, the market could have conditioned on the trading activity when reacting to earnings news on May 12. See also late trades at Co-Diagnostics discussed in Dreisbach (2020).

enforcement, of seemingly innocuous violations of statutory filing deadlines, can enable significant market abuses.

These results naturally raise the question of why the SEC has chosen to not prioritize enforcement of filing deadlines. To answer this question, we examine all SEC enforcement actions related to late filings and find that the only standalone enforcement action for late Form 4 filings occurred in 2014. On September 10, 2014, SEC Chair Mary Jo White announced "charges against 28 officers, directors, or major shareholders for violating federal securities laws requiring them to promptly report information about their holdings and transactions in company stock" (SEC Press Release 2014-190). Penalties to these individuals ranged from $34,125 to $135,375, and the average (median) penalty was 21% (11%) of trade size.

The response to this singular enforcement action was telling, and indicative of a normalization of illegal behavior within the legal community. Indeed, the response helps explain why this is the only standalone SEC enforcement action against late Form 4 filers. In the press and broader legal community, the enforcement action was largely derided as a failed "broken windows approach" to securities law that prioritized minor infractions over larger accounting frauds and Ponzi schemes, and had the effect of inflating case counts, an oft-used performance measure for the SEC (Piwowar, 2014; McGee, 2015; Velikonja, 2016).[5] Even to this day, the culture among legal observers and practitioners is that enforcing filings deadlines with is a waste of SEC resources.[6] Given the pushback from many in the legal community, and the observation that SEC Enforcement Directors (and SEC Chairs) are frequently drawn from this community, it should not

[5] At the time of the action, Commissioner Piwowar (2014) wrote: "a broken windows approach to enforcement may not achieve the desired result. If every rule is a priority, then no rule is a priority. If you create an environment in which regulatory compliance is the most important objective for market participants, then we will have lost sight of the underlying purpose for having regulation in the first place."

[6] The discussion in the popular press around Elon Musk's late filings regarding his purchase of Twitter stock indicates a continued indifference among many in the legal community to the enforcement of filing deadlines (Albergotti, 2022; Levine, 2022; Sherman and Kolodny, 2022)

be surprising that the SEC has imposed few penalties for violations of Section 16(a) of the Securities and Exchange Act of 1934.

In stark contrast to the criticism of the late filing enforcement sweep, our analysis suggests that the sweep was effective. Not only did it reduce the incidence of late filings at those firms named in the sweep, but it also deterred late filings at other firms that had previously violated filing deadlines but were not named in the sweep. Using a standard difference-in-difference design, where the treatment group is the set of firms mentioned in the enforcement sweep, we estimate that there was a 37% decrease in the probability of a late Form 4 filing at an enforced firm (relative to the control group). We repeat this analysis for late filers not mentioned in the sweep. We define the treatment group to be the set of firms that were not subject to the enforcement action but nonetheless had violated filing deadlines in 3 of the 5 years prior to the sweep. We estimate that there was a 29% decrease in the probability of a late Form 4 filing at these firms (relative to the control group). Collectively, this evidence suggests that lawyers who questioned the efficacy of the enforcement sweep were wrong: it had a direct effect on firms named in the sweep, as well as a deterrent effect on violators who were not named in the sweep.

Overall, our findings suggest that—given the lack of enforcement—the cost of late filings is effectively zero. Hence, we observe an apparent equilibrium where violations of filing deadlines are widespread and insiders are exploiting the lack of enforcement for private benefit. Viewing the performance difference between late trades and timely trades over three-month horizon as a measure of the ill-gotten gains, our results suggest that more than $1.25 billion in ill-gotten gains from trades that violated Section 16(a) of the Securities Exchange Act of 1934.

We propose a straightforward solution that would conserve scarce legal resources and effort. Rather than requiring the SEC to spend precious resources filing thousands of enforcement

actions against late filers each year, either in federal or administrative courts, we propose that Congress authorize the SEC to levy automatic fines on late filers equal to 10% of the trade's value.[7] Automatic fines are commonly used by local law enforcement to enforce traffic violations while conserving scarce resources, and a 10% fine is in keeping with the scope of penalties assessed in the 2014 enforcement sweep. We urge lawmakers to arm the SEC with tools to better enforce Section 16(a) of the Securities Exchange Act of 1934 and ensure market participants receive the timely information about insiders' trading activity required by the law.

2.0 Related Literature

Drawing on the institutional details of our setting and the assumption that corporate insiders are rational agents who tradeoff the expected costs and benefits of their actions, we can apply the model of Becker (1968) to understand why late filings—which are clear violations of securities law—are so prevalent. Becker (1968) uses an expected utility to framework to suggest that illicit activities will persist—and indeed be incentivized—whenever the expected benefits from the activity exceed the expected costs. As discussed earlier, given the lack of enforcement, the expected costs of late filing are near zero. Thus, if late filings are a strategic choice, then that choice will largely be guided by the benefits from late filing.

The academic literature suggests that informed traders benefit from infrequent disclosure of their trades. Using Kyle (1985) as a benchmark, Huddart et al. (2001) show that public

[7] As it did in 2014, the SEC could pursue individual enforcement actions, and obtain fines, under current law. But the Securities Enforcement Remedies and Penny Stock Reform Act of 1990 limits such fines on the basis of a tiered structure that, when the SEC pursues the matter in an administrative proceeding rather than federal district court, are based not on the violator's pecuniary gains but instead the number of "act[s] or omission[s]" giving rise to a violation of the securities laws. Many regard such case-specific penalty determinations as an important feature of the SEC's enforcement regime. We note, however, that the significant costs of making such determinations has likely contributed to the underenforcement we document here. It is unclear that the benefits of case-by-case determinations outweigh the costs of such underenforcement. We also note that, outside the SEC context, it is common for the government to impose a predetermined fine in order to conserve enforcement resources.

disclosure of an informed trader's trade at regular intervals accelerates price discovery, thereby reducing the value of the insider's information and their profits. Using a similar model, Agarwal et al. (2015) consider a circumstance where disclosure of the trade is required, but the timeliness of the disclosure varies. Agarwal et al. (2015) show that the informed trader's profits are decreasing in the timeliness of the disclosure.

In a similar vein, prior empirical work on the trading of corporate insiders hints at the notion that disclosure timeliness is negatively related to opportunistic trading. For example, Brochet (2010) examines the effect of SOX on informed trading by corporate insiders. SOX changed the filing deadline from Form 4s from 10 days to 2 days. Brochet (2010) finds a reduction in opportunistic stock sales after SOX. Cheng et al. (2007) study private, insider stock sales prior to SOX (e.g., a CEO who sells stock back to the firm). Prior to SOX, these trades were exempt from Form 4 reporting requirements, and had to be reported on Form 5 within 45 days of the end of the year.[8] Unlike Form 4 sales, Cheng et al. (2007) find that Form 5 sales were predictive of large negative future returns. They attribute their findings to corporate insiders choosing to exploit the lack of timely reporting requirements under Form 5 to sell opportunistically. Indeed, their findings support the stated rationale for why SOX curtailed the use of Form 5s, and required all such trades be reported within two business days on Form 4. Betzer and Theissen (2010) examine violations of the filing deadline in Germany (German insiders are required to report "without delay") and find violations vary with characteristics of the firm, but that delays are not associated with abnormal returns.

In contrast to these papers that focus on variations in disclosure timeliness within statutory filing deadlines, we focus on trades that violate securities law. We find that trades which violate

[8] Post-SOX, these sales must be reported within two business days on Form 4.

statutory filing deadlines tend to be more opportunistic. Further, we find that insiders appear to exploit a lack of enforcement of filing deadlines to conceal their trading activity prior to material corporate events, waiting to disclose their trade until after the event has been priced by the market. In addition, we examine the effect of the 2014 SEC enforcement sweep of late Form 4 filings and show that it reduced the incidence of late filings both among those named in the sweep, as well as those who had a history of late filings but were not named in the sweep. This suggests enforcement sweeps can serve as an effective deterrent and reduce the incidence of late filings.

3. Data and Sample Selection

3.1 Sample

We collect data on insider transactions reported on Form 4 from 2004 through 2020 from SEC EDGAR. For each Form 4, we parse the date the form was filed with the SEC, the reporting owner, ticker, transaction date, transaction code (e.g., P-purchase or S-sell), and the number of shares traded. We then merge the resulting dataset with CRSP for data on stock returns.[9] For each transaction, we measure the number of business days between the transaction date and the SEC filing date (*FilingLag*). Following Section 16 of the Securities Act of 1934, we label transactions filed after two business days as late (i.e., *Late* = 1) and all other transactions as timely (i.e., *Late* = 0).[10] The resulting sample consists of 2,975,345 equity transactions covering $3.2 trillion in

[9] After merging with CRSP, we take two steps to remove reporting errors. (1) We remove transactions where the reported transaction price is more than double the closing price in CRSP or the transaction size is greater than half of the shares outstanding in CRSP. (2) Form 4 has a dedicated box for filers to report the "Date of Earliest Transaction" corresponding to the earliest date of all the transactions on the filing. We remove those transactions where the transaction date indicated on the Form 4 predates the Date of Earliest Transaction.

[10] We remove gifts from the sample as they are not subject to the two-day filing deadline (transaction code = G), and transactions generated by dividend reinvestment plans (DRIPs) which are often exempt from the two-day filing deadline. We identify DRIP transactions by parsing the Form 4 footnotes and remarks for mention of the following keywords: "Reinvestment Plan", "DRIP", "Employee Stock Purchase Plan", "ESPP", "ESOP", "dividend". For details on the exemption for DRIPs see CD&A 111.01 and SEC's interpretation of Section 111 of Rule 16a-3. https://www.sec.gov/divisions/corpfin/guidance/sec16interp.htm

volume, of which 107,763 transactions covering $122 billion are filed past the two-day statutory filing deadline. Henceforth we refer to trades filed past the two-day deadline as "late trades" and all other trades as "timely trades."

Table 1 presents the number of transactions and dollar volume by transaction type reported on the Form 4. We find that the most common types of transactions reported on Form 4 are purchases and sales, covering 2 million transactions ($2.6 trillion in volume). Of these, 65,511 transactions or $72.5 billion are filed late. The next most common type of transaction is the exercise of stock options and other derivatives, covering 0.5 million transactions ($0.23 trillion in volume). Of these, 15,642 option exercises, or $18.0 billion are filed late. On average, more than $4.5 billion in transactions each year are filed past the statutory filing deadline specified by Section 16 of the Securities Act of 1934—and violate US securities law.

Table 2 presents the construction of the sample used in our analysis. Similar to prior literature (e.g., Cohen et al., 2012; Ali and Hirshleifer 2016; Jagolinzer et al., 2020), we restrict attention to purchases and sales of common stock (CRSP share code 10 or 11) and require the stock is listed on NYSE, NASDAQ, or AMEX (exchange code A, N, or Q). We then aggregate trades to the *insider-firm-tradedate-filingdate* level (e.g., Joe Smith, Acme Co., sold 500 shares on June 1, 2012, and filed June 3, 2012). For each trade, we then collect data on stock returns from CRSP, financial statement data from Compustat, and Fama-French factors from Ken French's website. Our final sample consists of 861,147 unique trades covering 7,700 firms, and 86,847 insiders. Within this sample, 34,546 trades are filed late (4% of trades), and these trades are spread out across 5,237 firms (68% of firms have at least one late trade) and 14,697 insiders (16.9% of insiders have at least one late trade).

3.2 Descriptive Statistics

Table 3 Panel A presents the distribution of the number of business days between the trade date and the SEC filing date (*FilingLag*). The mean (median) for all observations is 3 (1) business days. Among late trades, the mean *FilingLag* is 45 business days, the 50th percentile is 5 business days, and the 75th percentile is 22 business days. This suggests that 50% (75%) of all late trades are filed within a week (within a month).

Table 3 Panel B presents descriptive statistics on trade and firm characteristics separately for timely and late trades. Panel B shows that timely trades are larger (avg. *TradeSize* = $2.44 million v. $1.46 million), that timely trades are more likely to be sales (avg. *NetSale* = 0.82 v. 0.67), and that timely trades are more (less) likely to be filed by officers (directors and blockholders) than late trades are (avg. *Officer* = 0.61 v. 0.40; avg. *Director* = 0.27 v. 0.35; avg. *Blockholder* = 0.10 v. 0.22).

Panel B also suggests that late trades are associated with certain firm characteristics. Late trades tend to occur at smaller firms (avg *Size* of 6.90 v. 6.35) and firms that have experienced higher positive returns over the past month (avg. *PastMoRet* 1.43% v. 2.05%) and past year (avg. *PastYrRet* 20.42% v. 25.28%). The notion that late trades tend to occur at smaller firms is consistent with the notion that such firms have weaker internal control processes (Ettredge et al., 2011).

If late trades represent one-off "clerical errors" by a firm's internal processes, then while such errors might be more likely to occur at smaller firms with weaker internal control processes, they should not be habitual. Habitual late filings indicate a persistent failure of internal controls at the firm. To shed light on the extent of persistent late filings, Table 4 aggregates trades to the firm-level and presents the top 20 firms according to the dollar volume of late trades, restricting attention to firms with 10 or more such trades. For each firm we present five statistics: the number

of trades filed late (*# of Trades Late*), the percentage of trades filed late (*% of Trades Late*), the dollar volume of trades filed late (*$ Value Trades Late*), the percentage of dollar volume filed late *(% $ Value Trades Late*), and the average time between trade and filing date (*FilingLag*).

Table 4 suggests substantial persistence in late filings. Several firms routinely have late Form 4s. All 20 firms have more than $5 million in late trades, and the top 4 firms each have more than $100 million total late trade volume, spread over dozens of trades. Persistence in late trades is not restricted to this top 20 list. In untabulated statistics, we find 300 (401) firms in our sample have more than 50% of trades (50% of dollar volume) filed late.

Evidence that trades are consistently filed late at some firms challenges the notion that such filings are the result of unintentional clerical errors. Indeed, the evidence suggests that in the absence of meaningful SEC enforcement of the filing deadline, a fair number of firms have intentionally chosen to ignore the deadline and not prioritize compliance with US securities law.

4. Empirical Analysis of Late Filings

4.1 Trade Performance

In this section we examine whether late trades are strategic, i.e., tend to be more informed than timely trades. To answer this question, we compare the performance of late trades with timely trades using three distinct sets of tests. First, we measure trade performance using abnormal returns subsequent to the trades, and compare performance across the two types of trades. Second, we repeat the comparison but conduct the analysis within a given firm-quarter (e.g., comparing late trades in firm A in Q1-2020 with timely trades in firm A in Q1-2020) and within a given insider (e.g., comparing Joe's late trades to his timely trades). Third, we examine whether the sharp

discontinuity in the extent to which a filing is considered late (sharp discontinuity at the two-day filing deadline) is associated with a sharp discontinuity in trade performance.

4.1.1 Comparing Trades Filed Before and After the Filing Deadline

In our first set of tests, we test for systematic differences in trade performance between timely and late trades. Following a large literature on insider trading, we measure the performance of each trade using the abnormal stock returns after the trade. If trades are informed, they should systematically earn abnormal returns relative to standard asset pricing benchmarks (e.g., Lakonishok and Lee, 2001; Jeng et al., 2003; Ravina and Sapienza, 2010). Moreover, if late trades are comparatively more informed than timely trades, then the former should earn higher abnormal returns than the latter (e.g., Jagolinzer et al., 2011; Cohen et al., 2015).

We consider two measures of trade performance. First, following Ravina and Sapienza (2010), we measure trade performance as the market-adjusted return on the stock, calculated over the 20, 40, and 60 trading days after the date of the trade, multiplying by –1 for sales (*BHAR[0,20]*, *BHAR[0,40],* and *BHAR[0,60]* respectively). This represents the return (in excess of the market) that the investor would have earned had they mimicked the direction of the insider's trade and traded at the closing price on the same day the insider did.

Figure 1 plots the average *BHAR* following timely trades (using a solid line) and late trades (using a dashed line). Figure 1 shows that timely trades earn a market-adjusted return of 0.39% over the three months following the trade. This is not statistically different from zero at conventional levels. This is consistent with a large literature that suggests that, on average, insider trades are not informed. However, Figure 1 also shows that late trades earn a market-adjusted return of 2.1% over the three months following the trade.

Panel A of Table 5 presents results for testing for a difference in trade performance between timely trades (*Late* = 0) and late trades (*Late* = 1) at each of the 1, 2, and 3 month horizons. Panel A suggests that late trades earn economically and statistically larger returns. Indeed, over the one-month horizon, late trades outperform timely trades by 112 basis points (bps). At the two-month horizon, the performance gap expands to 150 bps, and at the three-month horizon, the performance gap is 173 bps. The differences in performance are highly significant regardless of horizon.

Our second measure of trade performance is the intercept (or alpha) from the six factor model of daily returns (Fama and French, 2015 and Carhart, 1997). Similar to Jagolinzer et al. (2011) and Blackburne et al. (2020), for each trade, we estimate the following factor model over the *N* days following the trade:

$$(R_i - R_f) = \alpha + \beta_1 (R_{mkt} - R_f) + \beta_2 SMB + \beta_3 HML + \beta_4 RMW + \beta_5 CMA + \beta_6 UMD + \varepsilon \qquad (1)$$

where R_i is the daily return to firm *i*'s equity, R_f is the daily risk-free interest rate; R_{mkt} is the CRSP value-weighted market return, *SMB*, *HML*, *RMW, CMA* and *UMD* are the size, book-to-market, profitability, investment and momentum factors respectively. This procedure yields a trade-specific α that represents the average daily abnormal return to the trade, expressed in percent.[11] We estimate this regression for each of three different horizons, *N* = 20, 40, and 60 days after the trade. As before, when the trade is a sale, we multiply α by –1. Finally, for interpretability, we multiply by the number of days in the respective horizon, either 20, 40, or 60 (*Alpha[0,20]*, *Alpha[0,40],* and *Alpha[0,60]* respectively). In this manner, average daily abnormal return of 0.05% over 60 days (which yields 3%) is indicative of larger performance than average daily abnormal returns of 0.05% over 20 days (which yields 1%).[12]

[11] Note that this regression adjusts for risk at the trade-level: every trade gets its own intercept and factor-loadings.
[12] Inferences are not sensitive to this research design choice.

Panel B of Table 5 presents results for testing for a difference in average trade performance using factor-model alphas. Inferences are similar to Panel A. Over the one-month horizon, late trades outperform timely trades by 97 bps. The performance gap expands to 146 bps at the two-month horizon and 175 bps at the three-month horizon. Notably, the estimate of the performance difference at the three-month horizon using the six-factor model (175 bps) is similar to that using market-adjusted returns (173 bps). This suggests the superior performance of late trades is not attributable to systematic differences in risk between timely and late trades.

4.1.2 Pooled Regression Tests

In our previous analysis, we pooled all firms and insiders and compared the performance of late trades and timely trades. In doing so, we implicitly assumed the counterfactual performance for a late trade was the sample average for a timely trade. In this section, we assess the robustness of our results to this assumption and test whether the difference in performance between late and timely trades is robust to within-firm, within-firm-quarter, and within-insider comparisons.

Specifically, we estimate pooled regressions of the following form:

$$TradePerformance = \beta_1 Late + Fixed\ Effects + \varepsilon \quad (2)$$

where *TradePerformance* is a measure of trade performance over the 60 days after the trade (i.e., *BHAR[0,60]*), *Late* is an indicator variable equal one if the trade is filed past the filing deadline and zero otherwise, and *Fixed Effects* is a vector of fixed effects. The coefficient of interest in eqn. (2) is β_1 which represents the performance difference between late and timely trades, and we two-way cluster standard errors by firm and date.[13]

Table 6 presents results. We estimate four versions of Eq. (1), represented in columns (1) through (4) respectively. The first specification is estimated using a pooled regression without any

[13] Two-way clustering by firm and date allows for arbitrary cross-sectional and temporal correlation. Results are stronger if we instead cluster by industry, by firm, or by insider.

fixed effects. The coefficient on *Late* in this specification represents the difference in sample averages between the performance of late trades and timely trades reported in Panel A of Table 5 (1.731%, *t*-stat 5.92). The second specification is a within-firm specification that includes date and firm fixed effects. Date effects subsume any common time trends or macroeconomic shocks. Firm effects subsume any persistent cross-sectional differences across firms (e.g., industry membership, governance structure, internal controls). In this specification, the counterfactual performance of a late trade is effectively a timely trade that occurs in the same firm. Column (2) presents results. We continue to find the difference in the performance of late and timely trades is economically and statically significant (0.79%, *t*-stat of 4.07).

The third specification replaces firm fixed effects with *firm-quarter* fixed effects. The firm-quarter fixed effects subsume any variables that do not vary within a given firm-quarter (e.g., within Coca-Cola's Q4 2009). In this regard, focusing on within-firm-quarter variation should alleviate concerns that our results are attributable to omitted firm-quarter characteristics, internal processes, and/or time trends. In this specification, the counterfactual performance of a late trade is effectively a timely trade that occurs in the same firm-quarter as the late trade. In this specification, the coefficient on *Late* is identified by observations where a given firm-quarter has both timely trades and late trades. Column (3) presents results. We continue to find the difference in the performance of late and timely trades is economically and statically significant (0.645%, *t*-stat of 5.61).

The fourth specification adds *insider* fixed effects. The insider fixed effects control for unobservable insider characteristics, e.g., skill, risk aversion, etc., and focuses on within-insider variation in whether a trade is filed late. In this specification, the counterfactual performance of a late trade is effectively a timely trade placed by the same insider. In this specification, the

coefficient on *Late* is identified by observations where the insider executes both timely trades and late trades. Column (4) presents results. We continue to find the difference in the performance of late and timely trades is economically and statically significant (0.476%, *t*-stat of 5.18). Collectively, these results suggest that late trades outperform timely trades regardless of the set of trades used to measure counterfactual performance for a late trade.

4.1.3 Regression Discontinuity Design

An interesting feature of our setting is that the relation between the number of business days between the trade date and filing date, i.e., *FilingLag*, and the indicator variable for whether a trade is late or not, i.e., *Late*, is characterized by a discontinuity at *FilingLag* = 2. For example, trades filed 0, 1, and 2 business days after the trade are considered timely (i.e., *Late* = 0 for *FilingLag* ≤ 2). Trades filed 3, 4, 5 or more business days after the trade are considered late (i.e., *Late* = 1 for *FilingLag* ≥ 3). A natural question is whether the sharp discontinuity in when a filing is considered late is associated with a sharp discontinuity in the performance of trades.

To shed light on this, Figure 2 plots average trade performance (*BHAR[0,60]*) for each value of *FilingLag* from 0 to 10 (i.e., up to two weeks after the trade). Strikingly, Figure 2 shows that there is a sharp discontinuity in trade performance at exactly the filing deadline. For example, trades filed on the day of the filing deadline (*FilingLag* = 2) earn on average 0.34% over the next three months. Trades filed one day *after* the filing deadline (*FilingLag* = 3) earn on average 1.37% over the next three months, a spread of 103 bps. Recall that Table 3 Panel A suggests that majority of late trades are filed between three days after the filing deadline (i.e., for observations where *Late* = 1, median *FilingLag* = 5). Figure 2 suggests these trades earn on average 2.70% over the next three months, a spread of 236 bps. We use two different types of regression discontinuity

designs (RDDs) to test whether the discontinuity observed in Figure 2 is statistically significant: quasi-RDD and sharp-RDD.

Panel A of Table 7 presents results from estimating a quasi-RDD design. Quasi-RDD compares the expected outcome for observations just to the left of the threshold, with the expected outcome for observations just to the right of threshold (e.g., Chava and Roberts 2008; Roberts and Sufi, 2009). We implement this design by estimating a pooled regression with indicator variables for the location of the observation relative to the threshold. Specifically, we estimate the following regression:

$$\begin{aligned} TradePerformance = {} & \beta_1 Day[+1] + \beta_2 Day[+2] \\ & + \beta_3 Day[+3] + \beta_4 Day[+4] + \beta_5 Day[\geq 5] + \varepsilon \end{aligned} \quad (3)$$

where *TradePerformance* is *BHAR[0,60]*, and *Day*[*t*] is an indicator variable equal to one if *FilingLag* = *t*. The coefficients β_1, …, β_5 in eqn. (3) represent the difference in expected trade performance between trades filed on the respective date, and trades filed on the day of the trade, i.e., the base category is *FilingLag* = 0. Here, the difference between β_3 and β_2 represents the change in trade performance exactly at the filing deadline.

Panel A shows that, among timely filings, we find no evidence of abnormal trade performance relative to trades filed on the day of the trade (i.e., $\beta_1 < 0$, $\beta_2 < 0$, and *t*-stats are –0.482 and –0.423 respectively). However, among late filings, we find: (i) statistically and economically significant trade performance (i.e., $\beta_3 \ldots \beta_5 > 0$, t-stats range from 2.291 to 4.796), (ii) that the increase in trade performance relative to timely trades occurs precisely after the filing deadline (i.e., $\beta_3 = 0.824$, $\beta_2 = -0.084$, and *p*-value for the difference is < 0.01), and (iii) that average trade performance appears to double between trades where *FilingLag* = 3 ($\beta_3 = 0.824$) and trades where *FilingLag* ≥ 5 ($\beta_5 = 1.790$).

Panel B of Table 7 presents results from estimating a sharp-RDD design (e.g., Imbens and Lemiuex, 2008; Lee and Lemieux, 2010). In this setting, *FilingLag* is the "running variable" and the threshold is at *FilingLag* = 2. Our sharp-RDD design entails estimating a second-order polynomial on either side of the threshold:

$$\begin{aligned} TradePerformance = \alpha &+ \beta_1 D(FilingLag - 2 > 0) \\ &+ \beta_2 (FilingLag - 2) \\ &+ \beta_3 (FilingLag - 2)^2 \\ &+ \beta_4 (FilingLag - 2) * D(FilingLag - 2 > 0) \\ &+ \beta_5 (FilingLag - 2)^2 * D(FilingLag - 2 > 0) + \varepsilon \end{aligned} \quad (4)$$

where $D(\cdot)$ is the indicator function. The primary coefficient of interest in eqn. (4) is β_1 which is an estimate of the discontinuity in trade performance occurring at the threshold. We find a statistically and economically significant discontinuity in trade performance at the threshold (β_1 = 1.577, *t*-stat of 6.374) and no evidence that trade performance is incrementally a function of *FilingLag* (*t*-stats on β_2 through β_5 range from –0.387 to 0.387).

Collectively, the evidence in Figure 1 and Tables 5 through 7 suggests that trades filed past the statutory two-day filing deadline systematically outperform those that are filed on time. Viewing the performance difference between timely trades and late trades over three-month horizon as a measure of the ill-gotten gains, our results suggest a total of more than $1.25 billion in ill-gotten gains from trades that violate Section 16 of the Securities Exchange Act of 1934.[14] The pervasiveness and non-random nature of late filings, in conjunction with systematic differences in trade performance calls into question the notion that late-filed trades are the result of unintentional clerical errors, or are otherwise innocuous. Indeed, the results suggest that insiders appear to be exploiting a lack of enforcement by the SEC, and strategically file trades late.

[14] We multiply the difference in trade performance at the three-month horizon of 173 (175 bps) in Table 5 times the total dollar volume of late filed purchases and sales in Table 1 ($73.8 billion). We consider these gains "ill-gotten" because they accrue to trades that violate Section 16 of the Securities Exchange Act of 1934.

4.2 Altering the Mosaic

When a material event occurs at a publicly traded company, the company is required to disclose the event on a Form 8-K within *four* days of the event occurring (Neissner, 2022). Prior work finds that some corporate insiders trade opportunistically in the gap between when the material event occurs and when the event is disclosed (Cohen et al., 2015). In this section, we examine another type of behavior in relation to 8-Ks. Specifically, we examine whether insiders trade in advance of corporate events and then strategically file their trades late—after the disclosure of the event.

The notion that insiders might trade in advance of corporate events and then strategically file their trades late—after the disclosure of the event—has two important implications. First, it would imply that late trades occurring in close proximity to corporate events perform better than timely trades in close proximity to corporate events, because the former would tend to be more informed. Second, concealing the trade until after the corporate event occurs alters the mosaic of information available to the market when interpreting the event. Because the trading activity is filed late, after the event occurs, the market cannot use knowledge of that activity to price the event. For example, Brockman et al. (2017) suggest that market reaction to conference calls is a function of insider trading activity. If this activity is not disclosed at the time of the conference call (i.e., the trades are filed late) it could distort how the market interprets and reacts to the conference call.

4.2.1 Sample of Corporate Events

To test whether insiders trade in advance of corporate events and then strategically file their trades after the disclosure of the event, we begin by compiling a set of material events. Consistent with prior work, we focus on 8-Ks filed on EDGAR (Cohen et al., 2015; Neissner,

2022). We collect all Form 8-Ks filed on EDGAR from 2004 to 2020. We then merge with CRSP and restrict attention to common stock traded on NYSE, NASDAQ, and AMEX. For each 8-K, we calculate the announcement return (*AnncRet*) as the market-adjusted buy-and-hold return over the two days following the 8-K filing.[15] This leads to a sample of 860,663 8-K observations from 2004 through 2020 (the unit of analysis in these tests is the 8-K filing). Similar to Jagolinzer et al., (2020), for each 8-K, we then collect data on insider trades over the 10 days prior to the 8-K filing and net insider trades over the 10-day window. We then repeat this computation focusing only on trades over the 10 days prior to the 8-K that are disclosed *after* the 8-K is filed ("late trades").

Table 8 Panel A presents descriptive statistics for our sample of corporate events reported on Form 8-Ks. Of the 860,663 corporate events we consider, column (2) suggests insiders are net buyers ahead of 31,608 events, and column (3) suggests insiders are net sellers ahead of 103,391 events.[16] Strikingly, the total volume of insider trades ten days before corporate events is $1.13 trillion, or roughly 5% of the annual GDP. $90 billion ($1.03 trillion) of this volume is associated with events where insiders are buying (selling) immediately prior to the event.[17] The skew towards sales is consistent with findings in prior work that sales are more common than purchases.

Panel A suggests that, across all events, the average announcement return is 0.02%. Interestingly, events where insiders are net buyers (net sellers) are associated with announcement returns of -1.65% (1.20%). This suggest that—on average—trades prior to 8-K filings are *not* informed, at least in regards to the market reaction to the 8-K. This mirrors the evidence in Jagolinzer et al. (2020, Table 7B) that net buying (net selling) ahead of corporate events is

[15] When an 8-K is filed after markets close, we begin our computation of the announcement return on the subsequent day. When multiple 8-Ks are filed on the same date, we combine them into a single firm-8-K file date observation.
[16] The remaining events have no insider trades 10 days prior to the 8-K.
[17] The remaining $8 billion of volume (1.4% of observations) is associated with observations where the dollar volume of insider purchases equals the dollar volume of insider sales.

associated with negative (positive) announcement returns; and Cohen et al. (2012, Table 3) that routine sales are associated with positive returns over the subsequent month.

Table 8 Panel B presents descriptive statistics for our sample of corporate events partitioned based on the timing of when the pre-event trades were disclosed. For trades occurring 10 days prior to the 8-K, but disclosed *after* the 8-K, net buys (net sells) predict a two-day announcement return of 1.075% (–0.170%), a difference of 1.245% that is both economically and statistically significant (p-value < 0.01). For trades occurring 10 days prior to the 8-K, but disclosed *prior* to the 8-K, results mirror those in Panel A: net buys (net sells) predict announcement returns of –1.730% (1.222%), a difference of –2.952%.

4.2.2 Event Study Regressions

To formally test whether trades that occur shortly before corporate events predict announcement returns, we follow Jagolinzer et al., (2020) and estimate regressions of the following form:

$$AnncRet = \beta_1 NetSell[-10,-1] + Controls + Date\ Effects + Firm\ Effects + \varepsilon \quad (5)$$

where *NetSell*[–10,–1] is an indicator variable equal to one if the dollar volume of sales exceeds that of purchases during the window [–10,–1] prior to the 8-K filing and zero otherwise. We additionally estimate a version of eqn. (5) that partitions *NetSell*[–10,–1] into *LateNetSell*[–10,–1] and *NonlateNetSell*[–10,–1]. *LateNetSell*[–10,–1] is an indicator variable equal to one if the aggregate dollar volume of late sales over the 10 days prior to the 8-K and filed after the 8-K exceeds that of late purchases, and zero otherwise. *NonlateNetSell*[–10,–1] is an indicator variable equal to one if the aggregate dollar volume of timely sales over the 10 days prior to the 8-K and filed before the 8-K exceeds that of timely purchases, and zero otherwise. *Controls* is a vector of control variables that includes *Size*, *BM*, *PastMoRet*, *PastYrRet* (see Table 3 for variable

definitions). *Date Effects* is a vector of fixed effects based on the filing date of the 8-K, and *Firm Effects* is a vector of firm fixed effects.[18]

Panel C presents results. Consistent with the descriptive statistics presented in Panel A, we find that net selling ahead of corporate events is predictive of positive returns *on average*. However, when we decompose net selling ahead of corporate events into late and timely trades, we find that late trades are predictive of economically large negative returns of –0.676% (*t*-stat range –4.361).

Table 9 repeats this analysis partitioning the sample based on the type of event filed on the 8-K. Panel A shows that earnings announcements, Regulation Fair Disclosure (Reg FD), and material contracts are the most common types of 8-Ks and account for roughly 86% of all 8-K filings in our sample. For each type of announcement, we calculate the total volume of late trades occurring ten days before the announcement. We find that the largest volume of late trades occurs ahead of earnings announcements and is roughly $9 billion, followed by material agreements and Reg FD disclosures with $3 billion and $1.7 billion in late trades, respectively. Notably, the average announcement return across all three types of events is positive.

Panel B of Table 9 presents results from estimating eqn. (5) separately for each type of event. Consistent with our earlier results, we find that late trades are associated with economically meaningful negative announcement returns of –0.645% for earnings announcement (*t*-stat –3.228), –0.714% for Reg FD disclosures (*t*-stat –2.216), and –0.895% for material contracts (*t*-stat –2.82). We find no evidence that of an association between late trades and the announcement return to other types of 8-K filings (e.g., notice of shareholder meetings, notice of elections, change of directors, etc.).

[18] We do not include firm-quarter effects because on average we have only 1.8 8-Ks per firm-quarter.

Collectively, we interpret the evidence in Tables 7 and 8 as consistent with the notion that some corporate insiders trade in advance of corporate events and then strategically conceal their trades, filing their trades late—after the disclosure of the event. In doing so, they rob the market of information about their trading activity that could have otherwise been used to interpret the valuation consequence of the event. These results emphasize how seemingly innocuous violations of statutory filing deadlines—deadlines the SEC has not enforced—can enable significant market abuses.

5. Empirical Analysis of Enforcement Sweep

Despite the fact that late Form 4 filings violate Section 16 of the Securities Act of 1934 and despite the fact that the SEC routinely charges companies for filing financial statements late (e.g., 10-Qs and 10-Ks), the SEC has only once filed standalone charges for violating Form 4 filing deadlines.[19] On September 10, 2014, the SEC announced "charges against 28 officers, directors, or major shareholders for violating federal securities laws requiring them to promptly report information about their holdings and transactions in company stock" (SEC Press Release 2014-190). This section analyzes not only the direct effect of the enforcement sweep on those firms named in the sweep, but also the indirect, deterrent effect of the sweep on other firms that previously had late Form 4s but were not named in the sweep.

4.3.1 Direct Effect of the Enforcement Sweep

[19] We confirmed this through two mechanisms. First, we held discussions with SEC employees regarding the enforcement of late filings. Second. we searched the record of all SEC enforcement actions, orders, and opinions issued by the Commission relating to delinquent filings for charges related to Form 4 filings. (https://www.sec.gov/divisions/enforce/delinquent/delinqindex.htm). Beyond the September 2014 enforcement sweep, we find just *two* standalone actions, both of which are against individuals for not filing trades on Form 4 at all.

Table 10 presents descriptive statistics for the 21 insiders and funds who were charged by the SEC and appear in our sample. For each corporate insider, we calculate the total dollar value of all trades described in the enforcement action (*Approx $ Value Trades*), the penalty in dollars *($ Penalty*) and as a percent of trade size (*% Penalty*), and the average number of business days between the trade and date the trades were filed (*FilingLag*). Tabel 10 shows that the total aggregate value of the late trades identified in the enforcement sweep is approximately $80 million. The average penalty was 21.3% of trade size and the median penalty was 11.5% of trade size. Notably, the late trades appearing in the enforcement sweep were filed anywhere from 3 days late (*FilingLag* = 5) to more than 3 years late (*FilingLag* = 796). This suggests the SEC is willing to charge violations of the statutory filing deadline regardless of how far beyond the deadline the Form 4 is filed. Some firms, such as Willis Lease, have multiple insiders who were named in the enforcement sweep (Bradley Forsyth, Thomas Nord, Donald Nunemaker, and Charles Willis IV). As such, the 21 insiders span a total of 17 unique firms in our sample from 2009 to 2019 (141 firm-years), henceforth the "Enforcement Sample."[20]

We examine the direct effect of the enforcement sweep on the Enforcement Sample using unmatched and entropy-balanced samples. The unit of observation in this analysis is the firm-year. The Unmatched Sample is constructed using all firms in our sample which were not named in the enforcement sweep and consists of 3,441 firms across 30,660 firm-years. The Entropy-balanced Sample is constructed using the entropy balancing method of Hainmueller (2012) which solves for a set of weights that, when applied to the Unmatched Sample, mirrors the first moments of the Enforcement Sample. We match on the first moments of *NetInc*, *Size*, *BM*, *Leverage*, *Loss*,

[20] There are 141 firm-years, rather than 187, because some of the firms in the Enforcement Sample do not span the full period from 2009 through 2019.

Surprise, *PastMoRet*, *PastYrRet*, and *IdioVol* (where all variables are measured at the end of the fiscal year as defined in Table 11).

Table 11 Panel A presents descriptive statistics of firm characteristics for the Enforcement Sample, the Unmatched Sample, and the Entropy-balanced Sample. Relative to the Unmatched Sample, firms in the Enforcement Sample are significantly smaller and have higher idiosyncratic volatility. Along all other firm characteristics examined, firms in the Enforcement Sample are statistically indistinguishable from firms in the Unmatched Sample. Panel A also shows that—by construction—the first moment of the variable for the Entropy-balanced Sample mirror those of the Enforcement Sample

Next, we construct three measures of late Form 4 filings at the firm-year level. *Pr(Late)* is an indicator variable equal one if the firm had a late Form 4 filing during the year and zero otherwise. *% Late* is the percentage of Form 4 filings which are filed late during the year. *% $ Late* is the percentage of total dollar volume of trades reported on Form 4 filings which are filed late during the year.

Figure 3 Panel A plots the average yearly value of *Pr(Late)* in event time for each of the three samples. Four notable patterns are present:

(1) The probability of a late filing across our entire sample is greater than 20%, suggesting that late filings occur at a large number of firms.

(2) In the years prior to the enforcement sweep (year = 0) the probability of late Form 4 filings within the Enforcement Sample is generally *three* times larger than the Unmatched Sample and the Entropy-balanced Sample. For example, *Pr(Late)* ranges from 60% to 90% for the Enforcement Sample versus 20% to 30% for the other two samples.

(3) In the year of the enforcement sweep and each year thereafter, *Pr(Late)* for the Enforcement Sample drops to the level of the other two samples and remains there for the duration.

(4) In the year prior to the enforcement sweep, there appears to be an anticipatory effect. This effect is likely the result of the fact that SEC investigations usually take at least two years (Blackburne et al., 2021). The firms in the Enforcement Sample likely began changing behavior as soon as they were contacted by the SEC, a year or two prior to the public disclosure (and resolution) of the enforcement sweep.

Table 11 Panel B presents the average yearly values of our three measures of late filings in event time. Temporal patterns in each measure are similar to those in Figure 3. Specifically, during 2012, two years *before* the enforcement sweep, *% Late* for the Enforcement Sample is 7.4 (4.9) times that of the Unmatched (Entropy-balanced) Samples, and *% $ Late* is 6.8 (4.5) times that of the Unmatched (Entropy-balanced) Sample. During 2016, two years *after* the enforcement sweep, *% Late* is 1.0 (0.8) times that of the Unmatched (Entropy-balanced) Sample, and *% $ Late* is 0.6 (0.4) times that of the Unmatched (Entropy-balanced) Sample.

To test whether the decline in late filings is statistically significant and robust to controlling for time trends and firm characteristics, we employ the generalized difference-in-differences estimator of Bertrand et al. (2004). Specifically, we estimate regressions of the following form, pooling across all firm-years,

$$Late = \beta_1 Post * Treat + Controls + Year\ Effects + Firm\ Effects + \varepsilon \quad (6)$$

where *Late* is one of our three measures of late filings, *Post* is an indicator variable equal to one for years 2014 onward and zero otherwise, and *Treat* is an indicator variable equal to one for the 17 firms in our enforcement sample and zero otherwise.[21] *Controls* is a vector of control variables

[21] The *Post* (*Treat*) main effect is subsumed by the year (firm) effects.

including *Size*, *BM*, *Leverage*, *Loss*, *Surprise*, *PastMoRet*, *PastYrRet*, and *IdioVol*. For each measure of late filing behavior, we estimate eqn. (6) with and without control variables and calculate standard errors clustered by firm.[22]

Table 11 Panel C (Panel D) presents results from estimating eqn. (6) using the Unmatched (Entropy-balanced) Sample. Across all three measures of late filings, across all specifications, and regardless of whether an unmatched or matched sample is used, we find strong evidence of a statistically and economically significant decrease in late filings after the enforcement sweep for the firms in the Enforcement Sample (*Post x Treat t*-stats range from –6.474 to –4.140). Notably, the difference-in-difference estimates (i.e., coefficient on *Post x Treat*) are approximately the same regardless of whether the Unmatched Sample or Entropy-balanced Sample is used. Following the enforcement sweep, we estimate that there is a 37% decrease in the likelihood of an enforced firm filing a late Form 4 late relative to the Unmatched (Entropy-balanced) sample. Collectively, this evidence suggests that the SEC enforcement sweep had an economically significant and persistent effect on the behavior of the firms named in the enforcement sweep.

4.3.2 Deterrent Effect of the Enforcement Sweep

One of the notable patterns from Figure 3 Panel A is that in any given year, more than 20% of firms filed at least one Form 4 late. This begs the question as to whether there were spillover effects of the enforcement sweep on firms which persistently file Form 4 late yet were not named in the sweep. We examine this question by forming an *Unenforced Late Filing Sample*, and then comparing our measures of late filings for this sample to that of a new Unmatched Sample and a new Entropy-balanced Sample. The Unenforced Late Filing Sample is comprised of firms that filed Form 4 late in at least three of the five years prior to the enforcement sweep, i.e., 2009 through

[22] We do not cluster by year because our sample includes only 11 years (Petersen, 2009).

2013. This leads to an Unenforced Late Filing Sample of 416 firms (3,885 firm-years). The corresponding Unmatched Sample consists of 3,025 firms (26,775 firm-years).

Table 12 Panel A presents descriptive statistics of firm characteristics for these three new samples. Relative to the Unmatched Sample, firms in the Unenforced Late Filing Sample have statistically significantly higher net income, lower book-to-market, are less likely to have a loss, and lower idiosyncratic volatility. Panel A also shows that—by construction—the first moment of the variables for the Entropy-balanced Sample mirror those of the Unenforced Late Filing Sample.

Figure 3 Panel B plots the average yearly value of *Pr(Late)* in event time relative to the SEC's public disclosure of the enforcement sweep for the unenforced late filing, unmatched, and entropy-balanced samples. Three notable patterns are present:

(1) In the years prior to the enforcement sweep (year = 0) the probability of late Form 4 filings within the Unenforced Late Filing Sample is generally *three* times larger than the Unmatched Sample and the Entropy-balanced Sample. For example, *Pr(Late)* ranges from 70% to 75% for the Unenforced Late Filing Sample versus 20% to 30% for the other samples.

(2) In the year of the enforcement sweep and each year thereafter, *Pr(Late)* for the Unenforced Late Filing Sample drops to the level of the other two samples and remains there for the duration.

(3) In the year prior to the SEC's public disclosure of the enforcement sweep, there *does not* appear to be an anticipatory effect of the enforcement sweep. This is consistent with the notion that only those firms who would eventually be named in the enforcement sweep, i.e., the Enforcement Sample, knew that the sweep was coming, presumably because the SEC engaged them to collect evidence and negotiate settlements. Instead, *Pr(Late)* remains elevated for the unenforced late filing sample until the SEC's public disclosure of the sweep.

Table 12 Panel B presents the average yearly values of our three measures of late filings in event time. Temporal patterns in each measure are similar to those in Figure 3. Specifically, during 2012, two years *before* the enforcement sweep was publicly disclosed, *% Late* for the Unenforced Late Filing Sample is 3.0 (3.3) times that of the Unmatched (Entropy-balanced) Sample, and *% $ Late* is 2.7 (3.0) times that of the Unmatched (Entropy-balanced) Sample. During 2016, two years *after* the enforcement sweep, *% Late* is 1.5 (1.6) times that of the Unmatched (Entropy-balanced) Sample, and *% $ Late* is 1.5 (1.7) times that of the Unmatched (Entropy-balanced) Sample. These patterns suggest that the enforcement sweep had an important deterrent effect on firms that persistently file Form 4 late yet were not named in the sweep.

To test whether the decline in late filings for the Unenforced Late Filing Sample is statistically significant and robust to controlling for time trends and firm characteristics, we re-estimate eqn. (6) using the Unenforced Late Filing Sample as the treatment group. Table 12 Panel C (Panel D) presents results for the Unmatched (Entropy-balanced) Sample. Across all three measures of late filings, across all specifications, and regardless of whether an unmatched or matched sample is used, we find strong evidence of a statistically and economically significant decrease in late filings after the enforcement sweep for the firms in the Unenforced Late Filing Sample (*Post x Treat t*-stats range from –19.478 to –7.107). Notably, the difference-in-difference estimates (i.e., coefficient on *Post x Treat*) are approximately the same regardless of whether the Unmatched Sample or Entropy-balanced Sample is used. Following the enforcement sweep, we estimate that there is a 29% decrease in the likelihood of a firm in the Unenforced Late Filing Sample filing a late Form 4 late relative to the Unmatched (Entropy-balanced) sample. Collectively, this evidence suggests that the SEC enforcement sweep had an economically

significant and persistent effect on the behavior of not just the firms named in the enforcement sweep, but also those persistent late filers who were *not* named in the sweep.

6. Conclusion

Section 16(a) of the Securities Act of 1934 requires corporate insiders to publicly disclose transactions in their company's stock within two business days on Form 4. Despite this bright-line legal requirement, we identify more than 100,000 transactions, involving over $122 billion that were disclosed late. Despite the pervasiveness of late filings, and ease of detection, the SEC has rarely enforced the filing deadline. This lack of enforcement reflects the conventional wisdom in the legal community is that these late filings are unintentional clerical errors and that it is a waste of resources to police these "broken windows."

We show that the conventional wisdom is categorically wrong. First, we find that late trades occur across a wide variety of firms (e.g., more than 20% of firms in any given year have at least one late trade) and that many firms persistently file late. For example, we find a handful of firms have more than $100 million in total late trade volume, spread out over dozens of trades, and that late trades account for the *majority* of trades (majority of dollar volume) at 300 (401) firms.

Next, we examine whether late filings are strategic. Across a variety of different test specifications and performance benchmarks, we find clear and consistent evidence that trades on late filings consistently outperform trades on timely filings, and that the performance differences are economically significant and in excess of 100 basis points over a three month period. Moreover, we find that some insiders appear to be trading in advance of corporate events and then strategically file their trades late—well after the disclosure of the event. As a result of filing late, the market cannot use knowledge of the trading activity prior to the event, to price the event.

Finally, we examine the effect of the 2014 enforcement sweep on late filers. Our analysis suggests that the sweep was effective. Not only did it reduce the incidence of late filings at those firms named in the sweep, but it also deterred late filings at other firms that had previously violated filing deadlines but were not named in the sweep. We estimate that there was a 37% decrease in the probability of a late Form 4 filing at an enforced firm and a 29% decrease in the probability of a late Form 4 filing at peer firms.

Our evidence sheds light on the importance of regulatory enforcement in US capital markets. In the absence of regulatory enforcement actions, ethics, norms, and scrutiny by shareholders and non-government gatekeepers is not sufficient to deter widespread violations of the law. Collectively, the results are inconsistent with the notion that late filings are innocuous clerical error. At best the evidence suggests that a fair number of firms have intentionally chosen to ignore the filing deadline and not prioritize compliance with US securities law. At worst, the evidence suggests insiders are exploiting the lack of enforcement to engage in highly opportunistic trading.

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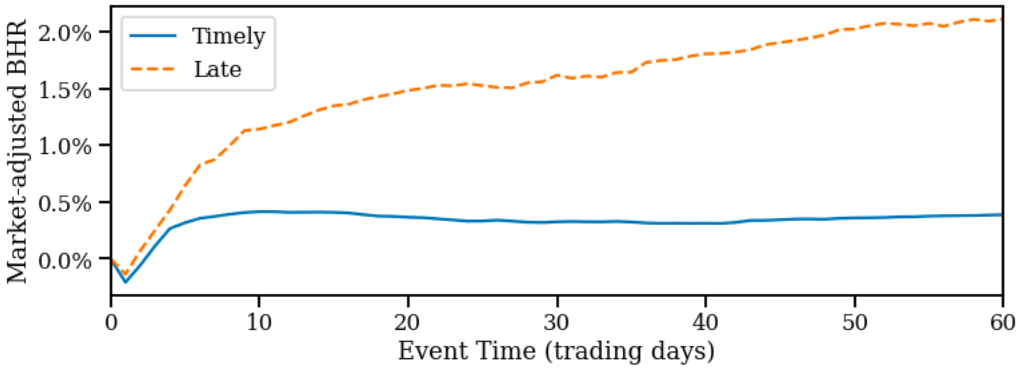
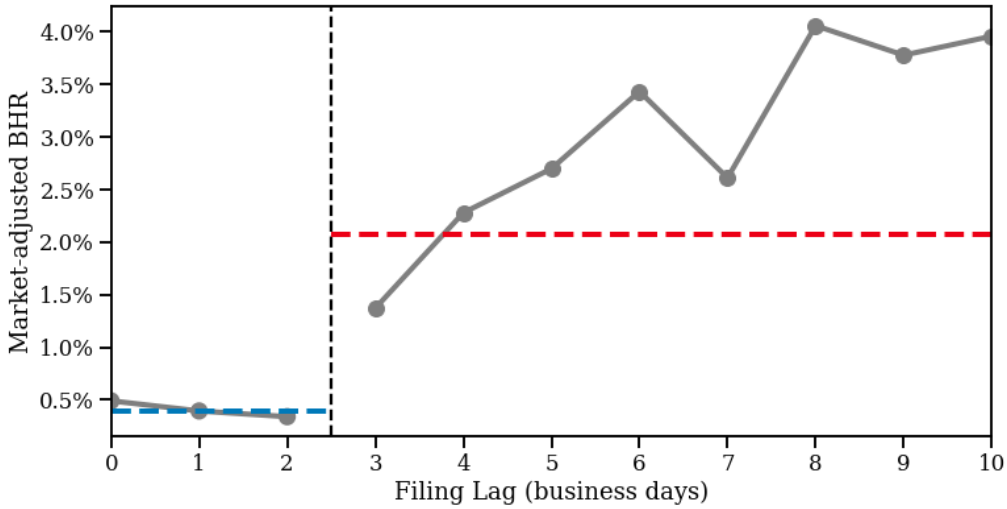
Figure 1. Late Trades and Future Stock Returns



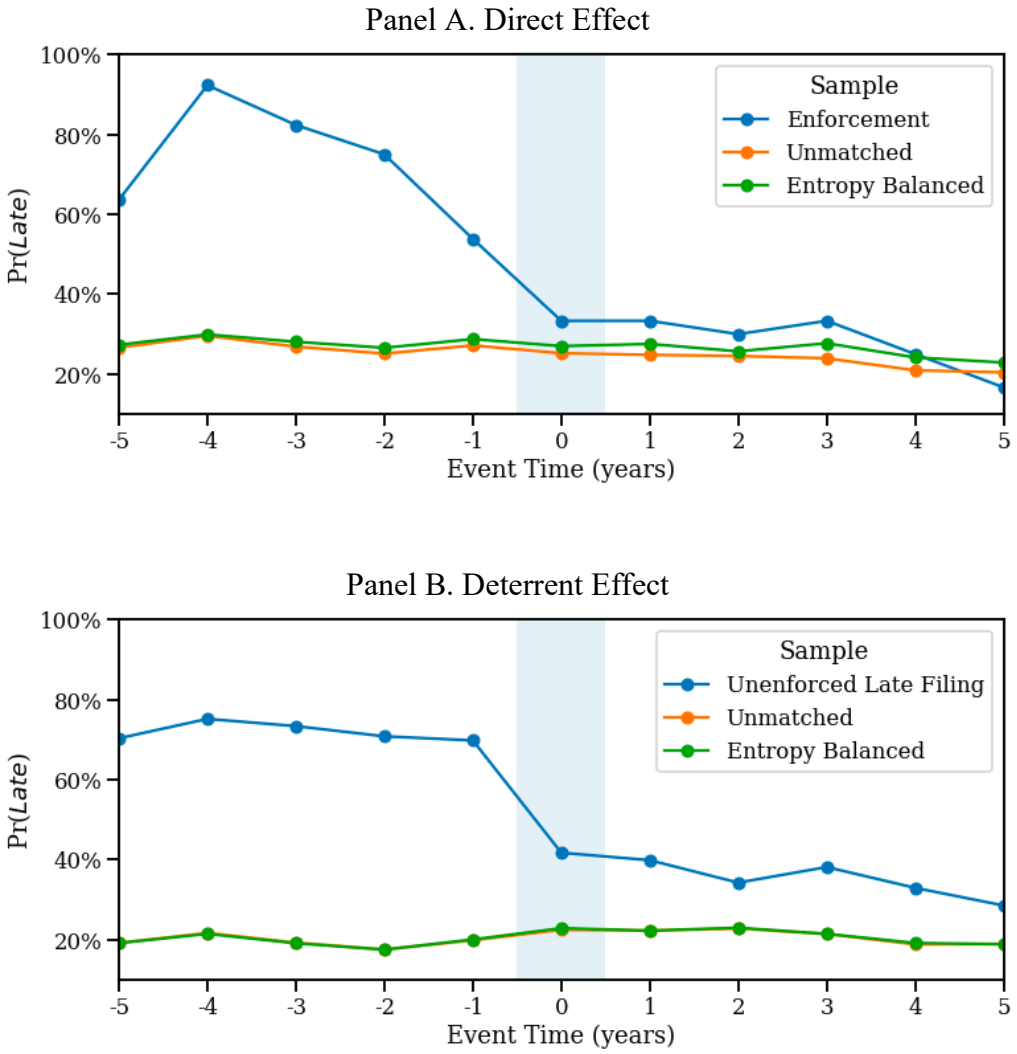
This figure plots market-adjusted buy-and-hold returns in event time, relative to the trade date. The return for sales is multiplied by minus one, to measure loss avoidance. The solid lines represent average market-adjusted buy-and-hold returns for all trades that were filed on time ("timely"). The dashed line represents average market-adjusted buy-and-hold returns trades filed past the two-business day statutory deadline ("late").

Figure 2. Discontinuity



This figure plots the average market-adjusted buy-and-hold return for all trades based on the lag between the filing date and the trade date. The return for sales is multiplied by minus one, to measure loss avoidance. The vertical line represents the two-business day statutory deadline for filing trades on Form 4. The dashed blue line presents the average performance of timely trades (i.e., *FilingLag* = 0, 1, 2) and the dash red line presents the average performance of near-deadline, late trades (i.e., *FilingLag* = 3, …, 10).

Figure 3. Late Filing Enforcement Sweep



This figure plots the average probability of late filing by year. $t = 0$ is the year that the SEC announced the enforcement sweep for late-filed Form 4s. Panel A plots the average probability of late filing for the firms that the SEC brought an enforcement action against, an unmatched sample, and an entropy-balanced sample. Panel B plots the average probability of late filing for persistent late filers which the SEC *did not* bring an enforcement action against, an unmatched sample, and an entropy-balanced sample.

Table 1. Details on Late Form 4 Filings on EDGAR 2004-2020

		All Transactions		Late Transactions	
Transaction	Form 4 Code	Transactions	$ Volume (billions)	Transactions	$ Volume (billions)
Open market purchase or sale	P, S	1,964,389	$2,609	65,511	$72.5
Derivative transaction	C, M, O, X	490,933	$228	15,642	$18.0
Payment of exercise price or tax	F	338,704	$119	12,974	$3.2
Grant, award, or other acquisition	A	131,530	$37	9,993	$13.3
Sale or transfer back to company	D	43,027	$156	2,875	$8.9
Change of control	U	6,762	$93	768	$5.8
Total		2,975,345	$3,243	107,763	$121.6

This table presents the distribution of Form 4 transactions by Form 4 Code during our sample period. Form 4 Codes for gifts (G), other (J), and those with fewer than 100 observations (E, I, L, W, and Z) are omitted. Transactions filed past the two-business day statutory deadline are deemed "Late." Sample of 3,119,271 unique transactions.

Table 2. Sample Construction

Sample	All Trades	Late Trades
Open market purchases and sales reported on Form 4 from 2004 to 2020 with valid data on CRSP	1,964,389	65,511
Requiring common stock traded on NYSE, NASDAQ, or AMEX (share code = 10, 11 and exchange code = A, N, Q)	1,849,013	57,416
Aggregating to the *insider-firm-tradedate-filingdate* level	861,147	34,546
Final sample of transactions	861,147	34,546
# of unique firm-quarters (e.g., Acme Co, Q2:2012)	144,155	16,472
# of unique firms (e.g., Acme Co)	7,700	5,237
# of unique insiders (e.g., John Smith)	86,847	14,697

This table presents the impact of various filters and aggregations on our sample construction. Final sample consists of 861,147 unique insider-firm-tradedate-filingdate observations spanning 144,155 unique firm-quarters, 7,700 unique firms, and 86,847 unique insiders. Late trades are responsible for 34,546 unique insider-firm-tradedate-filingdate observations spanning 16,472 unique firm-quarters, 5,237 unique firms, and 14,697 unique insiders.

Table 3. Descriptive Statistics

Panel A. Distribution of Filing Lag

	Distribution of *FilingLag*	
	All Trades	Late Trades
Mean	3.02	45.14
Percentiles		
1-st	0	3
5-th	0	3
25-th	1	3
50-th	1	5
75-th	2	22
95-th	2	251
99-th	22	611

Panel B. Differences in Trade and Firm Characteristics

	Timely Filings (*Late* = 0)		Late Filings (*Late* = 1)	
Variable	Mean	Median	Mean	Median
Trade Characteristics				
FilingLag	1.26	1.00	45.14***	5.00***
TradeSize	2.44	0.20	1.46***	0.08***
NetSale	0.82	1.00	0.67***	1.00
Officer	0.61	1.00	0.40***	0.00
Director	0.27	0.00	0.35***	0.00
Blockholder	0.10	0.00	0.22***	0.00
Other	0.02	0.00	0.03***	0.00
		Firm Characteristics		
Size	6.90	6.86	6.35***	6.25***
BM	1.64	0.45	0.84	0.46***
Leverage	0.54	0.55	0.53***	0.53***
Loss	0.24	0.00	0.25***	0.00
Surprise	–11.33	0.03	0.06	0.03
PastMoRet	1.43	0.92	2.05***	1.13***
PastYrRet	20.42	10.85	25.28***	12.51***
IdioVol	2.21	1.76	2.50***	1.97***

This table presents descriptive statistics for various trade and firm characteristics used in our analysis. *FilingLag* is the number of calendar days between the date of the transaction and the date that the Form 4 was filed on EDGAR. *TradeSize* is the dollar value of the trade, reported in millions. *NetSale* is an indicator variable if the trade is a sale. *Officer* is an indicator variable if the Form 4 indicates the trade was made by an officer. *Director* is an indicator variable if the Form 4

indicates the trade was made by a director. *Blockholder* is an indicator variable if the Form 4 indicates the trade was made by a 10% owner. *Size* is the natural logarithm of market value. *BM* is book value of equity scaled by market value of equity. *Leverage* is total liabilities scaled by total assets. *Loss* is an indicator variable equal to one if the firm had negative net income and zero otherwise. *Surprise* is the change in earnings from the same quarter one year prior scaled by market value of equity at the end of the prior quarter. *PastMoRet* is the buy and hold return on the stock over the month prior to the trade. *PastYrRet* is the buy and hold return on the stock over the year prior to the trade. *IdioVol* is the standard deviation of the residual from a Fama-French (2015) and Carhart (1997) six-factor expected returns model using the daily returns over the prior fiscal quarter. All financial statement variables are measured as of the quarter-end immediately prior to the trade. ***, **, and * denote that the respective statistic for the late filing sample is statistically different from the same statistic for the timely sample at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 4. Persistent Late Filers

Company	# of Trades Late	% of Trades Late	$ Value Trades Late (millions)	% $ Value Trades Late	Avg. *FilingLag*
Purple Innovation	30	54%	$259.7	94%	74
Erin Energy Corp	51	39%	$136.5	97%	53
Rignet	17	11%	$124.5	74%	60
Green Plains	17	9%	$109.0	65%	24
Viewtran Group	13	37%	$71.7	58%	53
Sangamo Therapeutics	69	18%	$68.5	60%	187
Peoplesupport	47	36%	$39.8	61%	52
California Coastal Communities	17	20%	$38.2	81%	47
Raptor Pharmaceutical	95	44%	$34.2	65%	383
Juno Lighting	92	77%	$18.8	78%	405
Digital Angel Corp	17	33%	$17.6	93%	120
Memsic Inc	23	38%	$14.4	82%	53
Perfumania Holdings	14	25%	$13.2	62%	14
Autoweb	16	16%	$11.3	52%	56
India Globalization Capital	19	58%	$9.3	78%	68
Navidea Biopharma	14	24%	$8.3	60%	21
Eyenovia	16	57%	$6.9	61%	36
Southtrust Corp	16	62%	$6.8	95%	13
RCN Corp	44	88%	$6.2	68%	184
Precipio	43	61%	$5.6	57%	307

This table presents descriptive statistics for filing characteristics of firms that persistently file Form 4s late. For each firm, we calculate the total number of late trades (*# of Trades Late*), the percent of all trades which are filed late (*% of Trades Late*), the total dollar value of all late trades (*$ Value Trades Late*), the percent of total dollar volume which is filed late (*% $ Value Trades Late*), and the average number of business days between the trade and date the trades were filed (*FilingLag*).

Table 5. Late Filings and Trade Performance

Panel A. Buy-and-Hold Returns

Variable	*Late* = 0	*Late* = 1
BHAR[0,20]	0.37%	1.48%
Difference	1.12%	
p-value	[< 0.01]	
BHAR[0,40]	0.32%	1.81%
Difference	1.50%	
p-value	[< 0.01]	
BHAR[0,60]	0.39%	2.12%
Difference	1.73%	
p-value	[< 0.01]	

Panel B. Fama-French Alpha

Variable	*Late* = 0	*Late* = 1
Alpha[0,20]	0.41%	1.39%
Difference	0.97%	
p-value	[< 0.01]	
Alpha[0,40]	0.29%	1.75%
Difference	1.46%	
p-value	[< 0.01]	
Alpha[0,60]	0.15%	1.89%
Difference	1.75%	
p-value	[< 0.01]	

This table presents the performance to timely and late trades. Panel A measures performance using the market-adjusted buy-and-hold return measured over *N* trading days after the trade. Panel B measures performance using the alpha from a six factor Fama-French model estimated separately for each trade using daily returns over the *N* trading days after the trade. We consider *N* = 20, 40, 60, and multiply the performance of sales by –1 so that performance of sales measures loss avoidance. Two-tailed *p*-values appear in brackets and test for a statistical difference in the performance of timely and late trades.

Table 6. Within-Firm and Within-Insider Analysis

Independent Variable	Pooled (1)	Within Firm (2)	Within Firm-Quarter (3)	Within Insider (4)
Late	1.731***	0.790***	0.645***	0.476***
	(5.922)	(4.078)	(5.617)	(5.180)
Fixed Effects	None	Date and Firm	Date and Firm-Quarter	Date, Firm-Quarter, and Insider
F	184.01	48.03	85.94	50.94
Observations	861,147	860,624	825,149	806,104
# of Unique Firms	7,700	7,508	7,383	7,246
# of Unique Firm-Quarters	144,155	143,934	108,445	107,808
# of Unique Insiders	86,847	86,710	82,649	63,604

This table presents results for testing for a difference in performance of late-filed trades and timely trades using various comparison groups. Performance is measured using market-adjusted buy-and-hold returns over the 60-days after the trade, multiplied by –1 for sales. *t*-statistics appear in parentheses and are based on standard errors clustered by firm and trade date. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 7. Discontinuity Design

Panel A. Quasi-RDD

Independent Variable	(1)
Day[+1]	–0.076
	(–0.482)
Day[+2]	–0.084
	(–0.423)
Late	
Day(+3)	0.824**
	(2.291)
Day(+4)	1.503***
	(3.325)
Day(>=5)	1.790***
	(4.796)
F	45.60
Observations	861,147
p-value Day(+2) = Day(+3)	[< 0.01]

Panel B. Sharp-RDD

Independent Variable	(1)
D(FilingLag–2>0)	1.577***
	(6.374)
Controls	
(FilingLag–2)	0.027
	(0.166)
(FilingLag–2)^2	0.034
	(0.387)
D(FilingLag–2>0)(FilingLag–2)*	–0.029
	(–0.176)
D(FilingLag–2>0)(FilingLag–2)*^{2}	–0.034
	(–0.387)
F	42.84
Observations	861,147

This table presents results for testing for a discontinuity in the performance of trades based on the filing lag, measured in business days, between the trade and the respective Form 4 filing (*FilingLag*) The dependent variable is market-adjusted buy-and-hold returns over the 60-days after the trade, multiplied by –1 for sales. Panel A presents results from a regression of market-adjusted buy-and-hold returns on indicator variables for the day of the Form 4 filing, measured relative to

the day of the trade. *Day(S)* is an indicator variable equal to one if the trade is filed on day *S*, measured in business days relative to the trade date. The base category is filing on the day of the trade (i.e., *Day[0]* = 1). Panel B presents results from estimating a regression discontinuity design, where *FilingLag* is the running variable, and the threshold value is *FilingLag* = 2. *t*-statistics appear in parentheses and are based on standard errors clustered by firm and trade date. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 8. Late Filings and Front-Running Corporate Events

Panel A. Corporate Events Partitioned by Pre-Event Insider Trade

Variable	All Events [–10,–1] N = 860,663	Events Where Insiders are *Net Buyers* [–10,–1] N = 31,608	Events Where Insiders are *Net Sellers* [–10,–1] N = 103,391
Total # of Trades	333,130	66,722	261,646
Total Insider Volume ($B)	1,131	90	1,033
Avg. AnncRet	0.019	–1.654	1.201
p-value for test of differences in *AnncRet*		[< 0.01]	

Panel B. Corporate Events Partitioned by Pre-Event Insider Trades Filed Late

	Late Filing: Yes		Late Filing: No	
Variable	*Net Buyers* [–10,–1] N = 858	*Net Sellers* [–10,–1] N = 1,562	*Net Buyers* [–10,–1] N = 30,750	*Net Sellers* [–10,–1] N = 101,829
Total # of Trades	1,918	4,206	64,804	257,440
Total Insider Volume ($B)	1.8	8.7	87.9	1024.1
Avg. AnncRet	1.075	–0.170	–1.730	1.222
p-value for test of differences in *AnncRet*	[< 0.01]		[< 0.01]	

Table 8. Late Filings and Front-Running Corporate Events (cont'd)

Panel C. Event Study Regressions

	Dependent Variable: *AnncRet*	
Independent Variable	(1)	(2)
NetSell[–10,–1]	1.066***	
	(40.804)	
LateNetSell[–10,–1]		–0.676***
		(–4.361)
NonlateNetSell[–10,–1]		1.082***
		(41.040)
Size	–0.473***	–0.473***
	(–18.370)	(–18.360)
BM	0.000**	0.000**
	(2.209)	(2.153)
PastMoRet	–0.623***	–0.623***
	(–5.480)	(–5.474)
PastYrRet	–0.094***	–0.094***
	(–4.115)	(–4.090)
Fixed Effects	Date and Firm	Date and Firm
F	585.46	493.65
Observations	835,934	835,934

This table presents results from estimating the relation between the market reaction to corporate events and those trades that occur *before* the event but that are filed *after* the event. Panel A presents descriptive statistics on the trades occurring less than 10 trading days prior to corporate events. Panel B presents descriptive statistics after partitioning based on whether the pre-event trades are late. Panel C presents results from a regression of the market reaction on the direction of insider trades over the 10 trading days prior to the event, and whether those trades were filed after the event. *Total # of Trades* (*Total Insider Volume*) is the total number (dollar volume) of trades over the 10 days prior to the event. *AnncRet* is the market-adjusted buy-and-hold return over the [0,+1] window relative to the event. *NetSell[–10,–1]* is an indicator variable equal to one if the net insider trade over the 10 trading days prior to the event is a sale. *LateNetSell[–10,–1]* is an indicator variable equal to one if the net of all late-filed trades over the 10 trading days prior to the event is a sale. *NonLateNetSell[–10,–1]* is an indicator variable equal to one if the net of all timely-filed trades over the 10 trading days prior to the event is a sale. All other variables previously defined. *t*-statistics appear in parentheses and are based on standard errors clustered by firm and 8-K file date. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 9. Types of Corporate Events

Panel A. Descriptive Statistics

8-K Item	# of 8-K Filings	# of 8-K Filings Front-run	# of Late Trades	Volume Late ($B)	Avg. *AnncRet*
Earnings	655,291	136,207	3,632	9.0	0.046
RegFD	167,680	30,549	1,017	1.7	0.162
Material Agreements	136,762	59,966	1,068	3.0	0.474
Other	155,735	80,320	1,215	1.2	–0.138

Panel B. Event Study Regressions

Independent Variable	Dependent Variable: *AnncRet*			
	Earnings (1)	RegFD (2)	Material Agreements (3)	Other (4)
LateNetSell[–10,–1]	–0.645***	–0.714**	–0.895***	–0.206
	(–3.228)	(–2.216)	(–2.818)	(–0.859)
NonlateNetSell[–10,–1]	1.220***	1.028***	0.503***	0.430***
	(41.273)	(18.294)	(7.335)	(10.470)
Size	–0.523***	–0.530***	–0.552***	–0.115***
	(–18.472)	(–9.266)	(–10.095)	(–3.169)
BM	0.000**	0.000	0.000***	0.000
	(2.243)	(–0.404)	(–3.202)	(1.315)
PastMoRet	–0.689***	–1.255***	–1.089***	–0.272
	(–5.260)	(–3.545)	(–4.499)	(–1.040)
PastYrRet	–0.100***	–0.158***	–0.027	–0.121**
	(–3.784)	(–2.789)	(–0.610)	(–2.348)
Fixed Effects	Date and Firm	Date and Firm	Date and Firm	Date and Firm
F	436.94	104.10	49.73	34.82
Observations	653,169	160,382	132,523	136,906

This table presents results from estimating the relation between the market reaction to corporate events and those trades that occur *before* the event but that are filed *after* the event. Panel A presents descriptive statistics for the types of corporate events included in the sample. Panel B presents results from re-estimating the regression specifications in Table 8 after partitioning the sample by the type of event. *Earnings* is an 8-K related to *Results of Operations and Financial Condition* or *Financial Statements and Exhibits*. *RegFD* is an 8-K related to *Regulation FD Disclosure*. *Material Agreements* is an 8-K related to *Entry into a Material Definitive Agreement* or *Termination of a Material Definitive Agreement*. *Other* refers to all other 8-Ks. All other variables are as previously defined. *t*-statistics appear in parentheses and are based on standard errors clustered by firm and trade date. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 10. Late Filing Enforcement Sweep: List of Trades and Penalties

Insider	Approx $ Value Trades	$ Penalty	% Penalty	Avg. *FilingLag*
Ridgeback Capital Management LP	$40,000,000	104,500	0.30%	5
Brown Brothers Harriman & Co.	$18,000,000	120,000	0.70%	164
Alan M. Schnaid	$5,200,000	100,000	1.90%	349
Peter R. Kellogg	$5,000,000	75,000	1.50%	163
Gregory M. Shepard	$2,500,000	80,000	3.20%	16
Charles F. Willis IV	$2,478,748	112,500	4.50%	19
Justin Tang	$1,000,000	100,000	10.00%	796
Ligang Wang	$1,000,000	101,250	10.10%	118
Trinad Management LLC	$825,000	95,000	11.50%	39
Paul D. Arling	$788,806	135,375	17.20%	20
Donald A. Nunemaker	$583,823	62,500	10.70%	9
Edgar W. Levin	$565,364	46,300	8.20%	61
Bradley S. Forsyth	$479,000	62,500	13.00%	60
Thomas C. Nord	$423,246	116,000	27.40%	10
Del Mar Asset Management LP	$330,687	66,000	20.00%	114
P.A.W. Capital Partners LP	$316,834	68,000	21.50%	28
Lazarus Management Company LLC	$274,276	60,000	21.90%	9
Stephan Gans	$182,304	100,000	54.90%	52
Paul C. Cronson	$164,287	47,250	28.70%	33
Neil Gagnon	$132,644	75,000	56.50%	14
Sidney C. Hooper	$61,264	34,125	55.70%	23

This table presents value of trades, penalties, and filing lags for corporate insiders named by the SEC in a 2014 enforcement sweep for late-filed Form 4s. We calculate the total dollar value of all trades by the corporate insider described in the enforcement action (*Approx $ Value Trades*), the penalty in dollars (*$ Penalty*) and as a percent of trade size (*% Penalty*) and the average number of business days between the trade and date the trades were filed (*FilingLag*).

Table 11. Effect of the Late Filing Enforcement Sweep

Panel A. Firm Characteristics

Variable	Enforcement Sample (N = 17 firms)	Unmatched Sample (N = 3,441 firms)	Entropy Balanced Sample (N = 3,441 firms)
NetInc	–0.01	0.00	–0.01
Size	5.28	6.65***	5.28
BM	0.85	0.71	0.85
Leverage	0.52	0.55	0.52
Loss	0.32	0.24	0.32
Surprise	0.04	–0.01	0.04
PastMoRet	0.00	0.00	0.00
PastYrRet	0.11	0.16	0.11
IdioVol	0.03	0.02**	0.03

Panel B. Late Filings Over Time

Variable	*t* = –2	*t* = –1	2014 *t* = 0	*t* = +1	*t* = +2
Enforcement Sample					
Pr(Late)	75.00%	53.85%	33.33%	33.33%	30.00%
% Late	36.26%	16.33%	3.00%	3.52%	4.60%
% $ Late	32.73%	13.04%	0.60%	3.72%	2.19%
Unmatched Sample					
Pr(Late)	25.13%	27.18%	25.21%	24.82%	24.53%
% Late	4.93%	4.66%	4.91%	4.87%	4.54%
% $ Late	4.80%	4.30%	4.75%	4.71%	3.90%
Entropy Balanced Sample					
Pr(Late)	26.60%	28.80%	27.03%	27.52%	25.65%
% Late	7.34%	6.65%	7.09%	7.17%	5.96%
% $ Late	7.27%	6.39%	6.97%	7.24%	5.21%

Table 11. Effect of the Late Filing Enforcement Sweep (cont'd)

Panel C. Difference-in-Differences Design—Unmatched Sample

	Dependent Variable					
Independent Variable	Pr(*Late*) (1)	*% Late* (2)	*% $ Late* (3)	Pr(*Late*) (4)	*% Late* (5)	*% $ Late* (6)
Post x Treat	–0.371***	–0.159***	–0.174***	–0.373***	–0.158***	–0.173***
	(–4.753)	(–6.474)	(–4.638)	(–4.877)	(–6.368)	(–4.624)
NetInc				0.051	0.011	0.021
				(1.113)	(0.559)	(0.586)
Size				0.032***	–0.005***	–0.010***
				(5.370)	(–2.754)	(–3.844)
BM				–0.017***	–0.002	–0.000
				(–2.683)	(–0.954)	(–0.078)
Leverage				–0.039	–0.011	–0.005
				(–1.420)	(–1.323)	(–0.372)
Loss				0.003	0.003	–0.000
				(0.312)	(1.348)	(–0.101)
Surprise				–0.001	0.000*	0.000
				(–0.530)	(1.743)	(1.238)
PastMoRet				0.007	0.010*	0.020**
				(0.388)	(1.724)	(2.049)
PastYrRet				0.016***	0.001	0.002
				(3.169)	(0.684)	(0.885)
IdioVol				0.358	0.142	0.041
				(1.389)	(1.384)	(0.216)
Fixed Effects	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm
F	22.59	41.91	21.51	12.92	6.30	4.82
Observations	30,801	26,484	26,474	30,801	26,484	26,474

Table 11. Effect of the Late Filing Enforcement Sweep (cont'd)

Panel D. Difference-in-Differences Design—Entropy Balanced Sample

	Dependent Variable					
Independent Variable	Pr(*Late*) (1)	*% Late* (2)	*% $ Late* (3)	Pr(*Late*) (4)	*% Late* (5)	*% $ Late* (6)
Post x Treat	–0.378***	–0.156***	–0.167***	–0.376***	–0.155***	–0.165***
	(–5.030)	(–6.534)	(–4.474)	(–5.294)	(–6.455)	(–4.140)
NetInc				0.219	0.074	0.042
				(0.788)	(0.537)	(0.274)
Size				0.016	–0.018	–0.017
				(0.391)	(–0.972)	(–0.977)
BM				0.000	–0.001	–0.001
				(0.006)	(–0.044)	(–0.030)
Leverage				–0.161	0.028	0.105
				(–1.521)	(0.454)	(0.994)
Loss				–0.015	–0.000	0.012
				(–0.206)	(–0.001)	(0.534)
Surprise				–0.004	0.000	0.002
				(–0.633)	(0.042)	(0.650)
PastMoRet				0.046	0.074**	0.145**
				(0.404)	(2.129)	(2.404)
PastYrRet				0.031*	0.008	–0.001
				(1.662)	(0.652)	(–0.063)
IdioVol				–0.590	–0.461	–0.832
				(–0.518)	(–0.888)	(–1.036)
Fixed Effects	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm
F	25.30	42.69	20.02	8.14	10.70	6.80
Observations	30,801	26,484	26,474	30,801	26,484	26,474

This table presents our analysis of the enforcement sweep and late filing. Panel A presents descriptive statistics of firm characteristics for the Enforcement, Unmatched, and Entropy Balanced samples. All variables are measured at the end of the fiscal year and are defined in Table 3. Panel B presents descriptive statistics of late filing around the enforcement sweep. *Pr(Late)* is the probability of having at least one late filing in a given year. *% Late* is the percent of filings which are late in a given year. *% $ Late* is the percent of dollar volume reported late in a given year. Panel C presents results for a difference-in-differences analysis around the enforcement sweep based on the Enforcement and Unmatched samples. Panel D presents results for a difference-in-differences analysis around the enforcement sweep based on the Enforcement and Entropy Balanced samples. *t*-statistics appear in parentheses and are based on standard errors clustered by firm. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.

Table 12. Spillover Effect of Enforcement Sweep

Panel A. Firm Characteristics

Variable	Unenforced Late Filing Sample (N = 416 firms)	Unmatched Sample (N = 3,025 firms)	Entropy Balanced Sample (N= 3,025 firms)
NetInc	0.01	0.00***	0.01
Size	6.76	6.63	6.76
BM	0.66	0.72**	0.66
Leverage	0.54	0.55	0.54
Loss	0.19	0.25***	0.19
Surprise	–0.11	0.00	–0.11
PastMoRet	0.01	0.00	0.01
PastYrRet	0.18	0.16	0.18
IdioVol	0.02	0.02**	0.02

Panel B. Late Filings Over Time

Variable	$t = -2$	$t = -1$	2014 $t = 0$	$t = +1$	$t = +2$
Unenforced Late Filing Sample					
Pr(Late)	70.83%	69.82%	41.76%	39.89%	34.28%
% Late	11.47%	11.64%	7.18%	7.36%	6.21%
% $ Late	10.49%	10.65%	7.07%	6.86%	5.51%
Unmatched Sample					
Pr(Late)	17.57%	19.90%	22.48%	22.30%	22.82%
% Late	3.85%	3.46%	4.53%	4.45%	4.24%
% $ Late	3.86%	3.21%	4.36%	4.34%	3.61%
Entropy Balanced Sample					
Pr(Late)	17.55%	20.08%	22.90%	22.29%	23.01%
% Late	3.47%	3.31%	4.17%	4.11%	3.96%
% $ Late	3.46%	3.04%	4.01%	3.88%	3.28%

Table 12. Spillover Effect of Enforcement Sweep (cont'd)

Panel C. Difference-in-Differences Design—Unmatched Sample

	Dependent Variable					
Independent Variable	Pr(*Late*) (1)	*% Late* (2)	*% $ Late* (3)	Pr(*Late*) (4)	*% Late* (5)	*% $ Late* (6)
Post x Treat	–0.294***	–0.046***	–0.046***	–0.297***	–0.045***	–0.045***
	(–19.098)	(–10.658)	(–7.220)	(–19.478)	(–10.580)	(–7.107)
NetInc				0.041	0.010	0.019
				(0.896)	(0.490)	(0.552)
Size				0.038***	–0.004**	–0.009***
				(6.655)	(–2.218)	(–3.512)
BM				–0.014**	–0.002	0.000
				(–2.298)	(–0.752)	(0.064)
Leverage				–0.031	–0.011	–0.005
				(–1.157)	(–1.305)	(–0.409)
Loss				0.003	0.003	–0.000
				(0.347)	(1.380)	(–0.137)
Surprise				–0.000	0.001*	0.000
				(–0.352)	(1.788)	(1.249)
PastMoRet				0.002	0.008	0.017*
				(0.103)	(1.420)	(1.788)
PastYrRet				0.014***	0.001	0.002
				(2.829)	(0.516)	(0.817)
IdioVol				0.367	0.153	0.056
				(1.455)	(1.508)	(0.294)
Fixed Effects	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm
F	364.7	113.6	52.13	49.58	13.43	7.78
Observations	30,660	26,361	26,351	30,660	26,361	26,351

Table 12. Spillover Effect of Enforcement Sweep (cont'd)

Panel D. Difference-in-Differences Design—Entropy Balanced Sample

	Dependent Variable					
Independent Variable	Pr(*Late*) (1)	*% Late* (2)	*% $ Late* (3)	Pr(*Late*) (4)	*% Late* (5)	*% $ Late* (6)
Post x Treat	–0.293***	–0.046***	–0.046***	–0.298***	–0.045***	–0.045***
	(–18.897)	(–10.724)	(–7.264)	(–19.413)	(–10.688)	(–7.247)
NetInc				0.031	0.013	0.048
				(0.385)	(0.412)	(0.896)
Size				0.052***	–0.005	–0.011**
				(5.546)	(–1.581)	(–2.021)
BM				–0.016	0.002	0.006
				(–1.266)	(0.300)	(0.568)
Leverage				–0.067	–0.019	–0.006
				(–1.574)	(–1.290)	(–0.263)
Loss				–0.011	0.000	–0.004
				(–0.908)	(0.054)	(–0.709)
Surprise				0.000	0.000*	0.000
				(0.046)	(1.911)	(1.406)
PastMoRet				0.036	0.005	–0.004
				(1.205)	(0.535)	(–0.236)
PastYrRet				0.017**	–0.001	0.001
				(2.393)	(–0.632)	(0.413)
IdioVol				0.293	0.270	0.407
				(0.709)	(1.353)	(1.026)
Fixed Effects	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm	Year and Firm
F	357.1	115	52.76	48.67	14.13	8.01
Observations	30,660	26,361	26,351	30,660	26,361	26,351

This table presents our analysis of the enforcement sweep and spillover effects. Panel A presents descriptive statistics of firm characteristics for the Unenforced Late Filing, Unmatched, and Entropy Balanced samples. Panel B presents descriptive statistics of late filing around the enforcement sweep. Panel C presents results for a difference-in-differences analysis around the enforcement sweep based on the Unenforced Late Filing and Unmatched samples. Panel D presents results for a difference-in-differences analysis around the enforcement sweep based on the Unenforced Late Filing and Entropy Balanced samples. All variables are as previously defined. *t*-statistics appear in parentheses and are based on standard errors clustered by firm. ***, **, and * indicate statistical significance (two-sided) at the 0.01, 0.05, and 0.10 levels (two–tail), respectively.