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When Do Investors Know? Security Class-Action Lawsuits, Short Selling, and Pre-filing News Releases

Abstract

Prior literature on security class-action lawsuits generally treats the lawsuit filing day as the day when the event become public, in terms of evaluating event-study returns and informed shorting activity. However, in the days prior to the lawsuit filing, our investigation reveals that there are public announcements of law-firm investigations into more than half of the sued firms. Over our 2009-2019 sample, accounting for these pre-filing investigation announcements weakens prior evidence that suggested short-selling investors tend to anticipate the lawsuit filing from private information or inference from related industry litigation. Strikingly, the average cumulative abnormal return over the 5-day pre-event filing window is about -6.5% for our full sample (similar to prior studies) but it is only about -2.2% when excluding the lawsuits with a recent pre-filing investigation announcement. Regarding responses to the public news releases, we find that: (1) the coincident abnormal short selling and negative abnormal returns are much larger for the higher quality lawsuits, and (2) the abnormal shorting coincident with the initial public news about the lawsuit is reliably negatively related to the post-news abnormal return. Thus, in addition to weakening an anticipatory shorting view, our evidence provides considerable support to conclusions in Engelberg, Reed, and Ringenber (2012), who argue that short sellers are skilled at analyzing publicly available information.

JEL Classification: G11, G12, G14

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1. Introduction

When studying investors' trading activities and return responses around corporate news events, it is critical that researchers assess investors' information with precision. In this paper, we re-examine shorting activity and return responses around securities class-action lawsuit filings with new shorting data over the lengthy August 2009 to June 2019 period. Our additional innovation is to document that public news releases about the law-firm investigation precede the securities class-action lawsuit filings in a majority of the lawsuits, importantly impacting prior conclusions about anticipatory shorting. Our findings highlight how a refined measurement of investors' information set can lead to different conclusions with regard to both investor behavior and market informational efficiency.

The economics of securities class-action (SCA) lawsuits seems clear: they are known to have a potentially significant negative impact on defendant firms' value. According to Zingales (2006), the total value of securities class action lawsuit settlements increased from \$150 million in 1997 to \$9.7 billion in 2005. Historically, the largest settlements include: Enron (\$7.2 billion), Worldcom (\$7.2 billion), and Tyco International (\$3.2 billion).¹ We emphasize that the settlement amount likely understates the real costs to defendant firms. For example, Gande and Lewis (2009) report that in their sample from 1996 to 2003, during the three-day event window around the lawsuit filing date, the average loss in shareholder wealth is \$355.65 million. There is also interesting evidence that suggests the mere threat from securities litigation can significantly impact firms' liquidity, investment and financing decisions, as well as their innovative capability (see, e.g., Arena and Julio (2015); Lowry and Shu (2002) , and Lin, Liu, and Manso (2020)). Given the potentially damaging impact from litigation threats, many studies have proposed models to help predict litigation risks.²

Prior studies in this literature rely principally on the SCA lawsuit filing date as the 'event day' to evaluate market response; in terms of event-study returns and short selling activity. For example, Romano (1991) finds that the average return in a two-day window around the filing date is -0.41% in an early sample from 1966 to 1987. Blau and Tew (2014) report that the mean filing day return is about -1% in their sample of 224 filings from 2005 and 2006. Gande and Lewis (2009) argue that the filing day return probably underestimates

¹Historical top 10 settlement figures are available from <http://securities.stanford.edu/top-ten.html>.

²For example, see Kim and Skinner (2012) and the references therein.

the true market reaction because investors can partially anticipate these lawsuits based on lawsuit filings against other firms in the same industry. Consistent with this anticipation hypothesis, they find that in the 10 days preceding the filing date window, share prices of defendant firms on average suffer from a staggering decline of 9.79%.

In this article, we find intriguing new evidence that indicates investors do not necessarily have to use complex modeling techniques to predict and assess the likelihood of upcoming lawsuits—in many cases there is advance public news that largely tips off the pending lawsuit. Specifically, we find that, for more than half of the firms in our sample (52.4%), the law-firm investigation into the later sued firms are publicly announced in the days prior to the formal filing of a security class-action lawsuit. Law firms announce their investigations as a form of advertisement to recruit shareholders who could potentially become participating plaintiffs in the subsequent class action lawsuits. Importantly, these investigation news are published in the financial press, which allows us to measure precisely the gap between the investigation announcement and the subsequent filing of a law suit (if any). The mean (median) number of days between the announcement of an investigation by law firms and the filing date is 10 (8) days. There is a large variations in the number of days between the investigation and the filing dates, ranging anywhere from 1 to 42 days in our sample.

To study the implications of this new information revelation, we evaluate investors' short selling activities and stock return behavior around SCA litigation news days - - both pre-filing investigation news and the lawsuit-filing news. Our goal is to shed light on the long-standing debate in the literature on the informational role of short selling as well as its implications for market efficiency.

Our study contributes to the literature in two primary areas. First, prior studies have documented substantial negative cumulative returns and elevated short selling prior to the security class-action lawsuit filing, suggestive that short sellers anticipate the lawsuit - - presumably based on private information or inference based on the industry litigation environment. Weakening such an anticipatory view, we find that the pre-filing cumulative negative returns are largely attributed to the lawsuits that had a public pre-filing investigation announcement coincident with (or in close proximity to) the 5-day pre-filing event window. Strikingly, the average cumulative abnormal return over the 5-day pre-event filing window is about -6.5% for our full sample (similar to that reported in prior studies) but

it is only about -2.2% when excluding the lawsuits with a recent pre-filing investigation announcement.

Also related to an anticipatory-shortening evaluation, we find that the pre-event abnormal shorting activity for the lawsuit filings *without* a pre-filing investigation news release (as compared to the lawsuit filings *with* a recent pre-filing investigation news release) is: (1) appreciably lower, on average, and (2) appreciably less informative about the subsequent abnormal return over the filing event window. In sum, when accounting for the public news from pre-filing law-firm investigation announcements, our results imply appreciably less support for an anticipatory-shortening hypothesis than is suggested by prior SCA lawsuit studies, such as Gande and Lewis (2009) and Blau and Tew (2014).

Our second contribution area relates to the conclusions from Engelberg, Reed, and Ringgenberg (2012) - - that short sellers are skilled at using public information to take profitable positions. Several of our findings provide support for this view. First, for the higher-quality lawsuits with an investigation announcement that closely precedes the lawsuit filing,³ we find: (1) much higher average abnormal shorting over the investigation-news event window; and (2) a stronger economic relation between the investigation-news event-window shorting and variation in the post-news abnormal returns. Second, when evaluating the abnormal shorting activity that is approximately contemporaneous with the *initial* public news release for all the lawsuits in our sample, we find that the event-window shorting is reliably negatively related to the subsequent post-news abnormal return.

On the other hand, for the lawsuits that had a pre-filing investigation announcement, the filing-day event-window shorting is not reliably related to variation in the subsequent post-filing abnormal returns. So, for the lawsuits where the lawsuit filing announcement is *not* the initial public news release about the pending lawsuit, our results suggest that the shorting activity and return response over the preceding investigation announcement already largely accounted for the lawsuit implications - - consistent with short sellers being skilled at analyzing the initial public news release and with the follow-on filing news containing relatively little new information.

The rest of this paper is organized as follows. Section 2 provides additional background

³We refer to this category of lawsuits as ‘higher quality’ because they exhibit more negative abnormal returns over both the investigation-news event window and the post-event window, and their likelihood of being settled (rather than dismissed) is greater than the other lawsuit cases.

and literature discussion. Section 3 describes the two primary short-selling hypotheses and related predictions, which are the focus of our subsequent empirical evaluation. Section 4 describes the data as well as the sample selection process. We present our main empirical results regarding the anticipatory shorting hypothesis in Section 5, and our main results regarding the ‘analysis of public news’ shorting hypothesis in Section 6. Section 7 provides additional supplemental analysis to evaluate robustness, and Section 8 concludes..

2. Additional Literature Discussion

In some sense, short sellers are the ultimate Dr. Jekyll and Mr. Hyde of financial markets. For some investors and even government officials, short selling is predatory (e.g., Brunnermeier and Oehmke (2014)) and often the scapegoat for market crashes. For others, especially among academicians, short sellers are generally viewed as the quintessential rational investors, making informed bets against overvalued securities in a speculative bubble (e.g., Miller (1977); Diamond and Verrecchia (1987); Bris, Goetzmann, and Zhu (2007)).

Past empirical studies on the informativeness of short selling have had mixed results. Using monthly short interest data, Dechow, Hutton, Meulbroek, and Sloan (2001) and Desai et al. (2002) find that short sellers use information from valuation ratios to take advantage of overvalued firms, and both high levels and large increases in short interest lead to lower subsequent monthly stock returns, consistent with the hypothesis that short sellers possessing private information. However, other researchers find the predictive power of short interest to be largely limited to small stocks (Asquith, Pathak, and Ritter (2005)) and short sellers in aggregate are unable to impede speculative bubbles (Lamont and Stein (2004)) .

Since short interest is only available on a semi-monthly basis, it is not well-suited to study short selling activities in the short run⁴ and for event-study type of research that focuses on short sellers’ trading around corporate news. More recently, the availability of high frequency shorting flow data allow researchers to investigate whether short sellers are informed about stock returns with greater precision. For example, with the help of

⁴Boehmer, Jones, and Zhang (2008) report that the average duration of a short position is only 37 days, whereas the average duration of a long position is about 1.2 years.

proprietary shorting flow data for the New York Stock Exchange (NYSE), Boehmer, Jones, and Zhang (2008) report that heavily shorted stocks underperform lightly shorted stocks by about 1.16% over the following 20 trading days from 2000 to 2004. Christophe, Ferri, and Angel (2004) and Christophe, Ferri, and Hsieh (2010) analyze the short-sales transactions in NASDAQ firms in 2000 and 2001, and find evidence of informed trading 3 to 5 days prior to earnings announcements and analyst downgrades. More closely related to our paper, Blau and Tew (2014) find that short selling surges in the days preceding the filing of a securities class action lawsuit. Citing anecdotal evidence based on two reports from the Securities and Exchanges Commission (SEC), they conjecture that short sellers are tipped off by law firms about the timing of upcoming lawsuits.

Contrary to these findings, Daske, Richardson, and Tuna (2005) find no evidence that short sale transactions are concentrated prior to corporate news events in a sample of NYSE firms from 2004 to 2005. They attribute the differences in these findings to: (a) a rise in short selling activities in recent years, which lowers the signal-to-noise ratio, and (b) Regulation Fair Disclosure (Reg FD), which requires publicly traded companies to make equal and simultaneous dissemination of corporate news, thus reducing the likelihood of informed trading by investors who has early access to information. Using a sample from January 2005 to December 2006, Henry and Koski (2010) find no evidence of informed short selling around seasoned equity offerings announcements.

Engelberg, Reed, and Ringgenberg (2012) evaluate daily short sales data from the NYSE Regulation SHO database (over 01/2005 to 07/2007), in combination with all news stories from the Dow Jones Archive. They find that short sellers' information advantage does not appear to come from anticipation of news, but rather from their ability to process and trade public news.⁵ Their focus on public news suggests additional implications for our new data that we also explore, with over half the lawsuits having a pre-filing public new releases about the law-firm investigation.

We contribute to this debate by highlighting the importance of understanding more precisely short sellers' public information set, and the implications for market informational efficiency. We emphasize that the flow of information is likely to be more complicated than

⁵Blau and Wade (2012) as well as Blau and Pinegar (2013) also cast doubt on short sellers act as informed traders prior to analyst downgrades and earnings announcements.

previously suggested in the extant literature. In particular, in the context of SCA lawsuits, short sellers who act upon the announcement of an investigation could be mistaken as privately informed traders if we use the filing date as the main event date and disregard the investigation news.

3. Hypotheses and Predictions

In this section, we focus on two different hypotheses regarding short sellers' trading around security class-action lawsuit filings. Our empirical work evaluates the hypotheses' predictions for the relation between short selling activity and subsequent market reactions in the context of the two major securities litigation news events: the filing date (hereafter FD) and the investigation announcement date (hereafter ID). Note that in the case of the FD sample, there two types of lawsuit filings - - those with an advance pre-filing news release of the related law-firm investigation and those without such advance public news. Therefore, in our following discussion, we will refer separately to the FD sample without prior public news of the law-firm investigation, the FD sample with a prior public news release of the law-firm investigation, and the ID sample.

First, the evidence from Boehmer, Jones, and Zhang (2008), Christophe, Ferri, and Angel (2004), and Blau and Tew (2014) suggests that short sellers could possess privately acquired information that would enable them to appear to anticipate the upcoming event. For example, Blau and Tew (2014) suggest that the investigating law firm might tip off some investors, prior to the lawsuit filing. Gande and Lewis (2009) suggest that short sellers might anticipate the lawsuit filing due to rational inference from the industry litigation environment and/or knowledge of the corporate misdeed. In our context, these possibilities suggest an *anticipatory-shorting* hypothesis, where shorting activity is elevated prior to the lawsuit filing day in a manner that suggests meaningful profits to the short sellers - - even without an advance public news release of the law-firm investigation preceding the lawsuit filing. For this hypothesis, even for the FD sample without an advance investigation news release, we would expect that advance short selling over the FD pre-event window should be associated with sizable negative returns over both the FD pre-event window and the actual FD event window.

Second, Engelberg, Reed, and Ringgenberg (2012) present evidence that a substantial portion of short sellers' trading advantage is based on their ability to analyze publicly available information. The implication is that short sellers do not necessarily possess superior private information, but rather they tend to be better at processing and analyzing public news. Thus, this view suggests that the apparent profitability of FD pre-event shorting activity might largely be linked to the lawsuits that had an advance public news release of the law-firm investigation. Further, this hypothesis suggests that the shorting activity coincident with the *initial* public news release about the lawsuit (either the pre-filing investigation news for the lawsuit with an advance law-firm announcement, or the lawsuit filing news for those lawsuits without an advance law-firm announcement) is likely to be negatively related to the post-event returns, suggestive of short-seller profits. We refer to this second hypothesis as the *analysis-of-public-news shorting* hypothesis, or the *APN-shorting* hypothesis (for short).⁶

4. Description of Data and Sample

4.1. Securities Class Action Lawsuits Data

Data for securities class action lawsuits are from the Securities Class Action Clearinghouse (SCAC) (<http://securities.stanford.edu/>) at Stanford Law School. According to its website, the database tracks all securities class action cases filed in Federal Court (but not state court) after the Private Securities Litigation Reform Act of 1995, and is updated on each business day. Our initial sample contains 5388 lawsuits from 01/1996 to 06/2019.

For each lawsuit, we collect the following information: (a) company name; (b) its ticker symbol; (c) lawsuit filing date; (d) district court where the lawsuit is filed; (e) the stock exchange where the defendant firm is listed; (f) a brief case summary; and (g) current case status. The case status in this paper is updated through 12/2020. There are four possible case status: settled, dismissed, ongoing, or unknown. The SCAC database also contains links to the original court documents if they are available.

⁶We point out that these two hypotheses are not necessarily competing hypotheses in that short sellers could both: (1) tend to possess superior private information, prior to the lawsuit filing; and (2) be highly skilled at analyzing the related public news releases. Our investigation recognizes this possibility.

4.2. Daily Short Selling Data

To alleviate concerns about results that might be unique to specific market conditions due to a relatively short sample, we investigate a sample of daily short sales that covers the longest (as far as we know) sample period among all existing studies that use high frequency shorting flow data.⁷ This data set is from the Financial Industry Regulatory Authority (FINRA), which, per request from the Securities and Exchange Commission, publishes daily short sales data on its website (<https://www.finra.org>). The same short selling data are also used in two recent papers by Reed, Samadi, and Sokobin (2020) as well as Wang, Yan, and Zheng (2020). The FINRA database covers all stocks listed on major exchanges as well as OTC stocks in the U.S. market. As noted by Wang, Yan, and Zheng (2020), the daily data are usually updated on the same trading after the end of regular trading hours, and are retained on FINRA website for up to the past 12 months.

In order to increase our sample size, we rely on FINRA’s historical data archive stored in monthly file format, which provides much longer time series. The monthly files start from 08/2009 and contain intraday short sales data for each intra-month trading days. For each short sale transaction, the data file records the market center for the security, ticker symbol, date, timestamp, exempt or non-exempt short volume, and the transaction price. We aggregate all intraday short sales during the regular trading hours to obtain the daily short volume for each security.

As noted by many authors (e.g., Boehmer, Jones, and Zhang (2008), Diether, Lee, and Werner (2009), and Engelberg, Reed, and Ringgenberg (2012)), exempt short volumes represent bona fide market making activities by market makers and are usually not informative. As a result, we follow the literature and focus exclusively on the information content from non-exempt short volumes. We also follow Asquith, Pathak, and Ritter (2005), Christophe, Ferri, and Hsieh (2010), as well as Blau and Tew (2014), and measure the amount the short shorting using the ratio of daily non-exempt short volume over the number of shares outstanding (in thousands of shares). The shares outstanding variable is from the Center for Research in Security Prices (CRSP).

⁷Studies that evaluate relatively short samples might find results that do not generalize; for example, if they focus on abnormal times such as around the so-called tech bubble in the late 1990’s to 2000 or the Great Recession and its aftermath around 2008-2010.

4.3. Sample Formation

We merge the SCAC data with the short selling data, which determines that our sample period is from 08/2009 to 06/2019. We then match the data with CRSP to obtain stock price information. We select domestic common stocks (share code 10 and 11) that are listed on NYSE, NASDAQ, and American Stock Exchange (AMEX) but exclude ADRs, closed end funds, and foreign companies. We further merge the data with COMPUSTAT to obtain defendant firms' financial statement information. At a minimum, we require our sample firms to have sufficient price and financial information so that we can compute momentum (which requires at least 6-month stock returns before the the filing date), book-to-market ratio, firm size, as well as bid-ask spread. We also require that firms have trading information for 21 days around the filing date and investigation announcement dates. As a result, in our main sample, we have a total of 1017 lawsuits.⁸

For each case in our main sample, we search for related law firm investigation news in days preceding the filing date using the FACTIVE database. In cases where there are announcements of investigation by multiple law firms, we use the earliest identified announcement date as the news date. In some cases, we also find law firms send reminders to investors that reiterates the subject firm is under investigation. In such cases, we trace to the earliest announcement date that we can find. In appendix A, we provide more detailed description of the search process and give a specific example (see also Figure 1). After some extensive searches, we are able to identify law firm investigation announcements for 52.4% (533 cases) of our sample. This allows us to study investors' trading activities in three distinct sub-samples: (a) cases where law firm investigation dates (ID) are identified; (b) the lawsuit filing date (FD) sample where firms have known investigations by law firms; (c) the FD sample where there are no known investigations.

To estimate abnormal short selling, we use a matching portfolio procedure that has been used in many related studies.⁹ More specifically, we first sort all firms in our sample into five portfolios based on their size quintiles. Within each size quintile, we further sort firms into five portfolios based on their lagged book-to-market ratios. Finally, we match each firm

⁸In our sample, there are only 48 cases out of 1017 where the stocks were priced less than \$1/share on event days. Our results are essentially the same when excluding these cases.

⁹For example, please see Loughran and Ritter (2000), Dechow, Hutton, Meulbroek, and Sloan (2001), Desai, Krishnamurthy, and Venkataraman (2006), and Christophe, Ferri, and Hsieh (2010).

with one of these 25 portfolios double-sorted on their size and book-to-market. On any given day, the amount of abnormal short selling for stock i is defined as the difference between its unadjusted short selling and the median short selling in the matching portfolio. We find our results are very robust when replacing the median with the mean in the matching portfolio. Similarly, we also compute the abnormal returns by taking the difference between the return of stock i and the median return of its matching portfolio on any given day.

Later, as a robustness check, we investigate alternative abnormal metrics for abnormal short selling and abnormal returns around the SCA lawsuit filing. We find that the lawsuit-related patterns in abnormal shorting and returns are very similar with our alternative abnormal metrics. See Section 7.2, as well as the results shown in Figure 3.

4.4. Features of the Sample

Panel A of Table 1 describes the distributions of securities class action lawsuits in our main sample sorted by year, district court, and status with regard to law firm investigation. Compared with the annual total case numbers reported on the SCAC website during the same sample period, our main sample represents about 43% of the unfiltered data, and the ratio is quite steady over time. For example, our sample (the SCAC website) has 115 (271), 172 (411), and 168 (402) cases from 2016 to 2018 respectively, and the ratios range from 41.8% to 42.4% for the three-year period. In addition, we notice that in our sample there appears to be a surge in the number of class action lawsuits in recent years, which is also consistent with the overall trend from the original SCAC database. Based on this observation, we conclude that our sample seems to be representative of the overall unfiltered data, and is not influenced by outliers in any given year.

Table 1 also reveals that the distribution across district courts is heavily skewed. Among the 94 US district courts, the top three district courts handle a total of 333 cases, which is about 1/3 of our sample. The top 10 courts cover about 61% of the total cases. Importantly, 533 out of the total 1017 cases have public announcements of investigations by law firms, and the other 484 cases do not. Among the three listing exchanges, the technology-dominated NASDAQ has 627 cases, followed by NYSE (350) and AMEX (40).

4.5. Financial Characteristics of Defendant Firms

Panel B of Table 1 reports the summary statistics of defendant firms' financial variables. We report the mean, median, standard deviation, as well as the 25th and 75th percentiles for sample firms' total assets, sales revenue, earnings per share (EPS), size as measured by a firm's market value of equity, and book-to-market ratio. Size and book-to-market are computed following the method of Fama and French (1993). Other financial variables are taken from COMPUSTAT for the year prior to the filing date. The average total assets, sales, and firm size are \$7.8 billion, \$4.2 billion, and \$5.8 billion, respectively. However, the median values are much lower, indicating a skewed distribution. The mean reported earnings per share is \$0.67 (median \$0.48), suggesting that the average defendant firm in the sample is profitable.

4.6. Distribution of Days between Investigation News and Filing Dates

Panel C of Table 1 reports the summary statistics of the distribution of days between law firm investigation announcement date (ID) and the formal lawsuit filing date (FD). We find that the average number of days between the ID and FD is 10 days with a median of 8 days. The 25th (75th) percentile is 4 (15) days. The longest gap is 42 days whereas the shortest is only 1 day.

5. Main Results I: Pre-filing Shorting Activity and Filing-Window Returns, with and w/o Advance Investigation News

Prior studies have suggested that short sellers anticipate the SCA lawsuit filings. Blau and Tew (2014) suggest the source is likely private information; for example, investigating law firms might tip off some investors. Gande and Lewis (2009) suggest that informed short sellers might anticipate the lawsuit filing through rational inference of the industry litigation environment or knowledge of the corporate misdeed.

In this section, we show that the short-selling activity and abnormal returns around the lawsuit filing depend importantly upon whether there was a recent public news release of the lawsuit investigation. When excluding lawsuit filings with an advance public news release of the law-firm investigation, the evidence weakens appreciably for the anticipatory-

shorting hypothesis - - that short sellers can anticipate the subsequent lawsuit filing in a manner suggestive of meaningful short-seller profits.

Specifically, in this section, our focus is on contrasting two subsets of lawsuit-filing observations, based on differences in their public information flows. The first subset has the filing-day (FD) cases where there was not a preceding investigation-news release (484 cases), or ‘no-IN FD cases’. The second subset has the FD cases where there was a recent investigation-news release (285 cases), or ‘recent-IN FD cases’.

By ‘recent’, we refer to the FD cases where the number of days between the IN release and the FD is less than or equal to the sample median of 8 days. This choice is based on the following: In our empirical work, for the pre-event window that precedes the 2-day FD event window, we follow from Blau and Tew (2014) and focus on a pre-event window over trading-days -5 to -1, relative to filing-day 0. Thus, with this convention for classifying ‘recent IN’ releases, this mean that the FD pre-event window will either include the IN release (for IN releases on day -5 through -1) or the IN release just precedes the FD pre-event window (for IN releases over days -8 to -6). Presumably, for IN releases over days -8 to -6, there may be spillover shorting activity in the FD pre-event window attributed to this recent investigation news. Thus, our method conveniently categorizes ‘FD cases with recent IN releases’ as those observations where the difference between the investigation news and lawsuit filing days is less than or equal to the median of 8 days.¹⁰

With this approach, this section offers new evidence that bears on the anticipatory-shortening hypothesis and the APN-shortening hypothesis. For the no-IN FD cases, the pre-event short selling is not driven by an associated pre-filing public news release about the law-firm investigation. Thus, for the no-IN FD cases, a finding of high short selling and large negative abnormal returns in the pre-event window and a negative predictive relation between the pre-event short selling and the FD event-window returns would be supportive of the anticipatory-shortening hypothesis. Conversely, for the recent-IN FD cases, the short selling in the FD pre-event window is likely substantially related to the recent public news release about the law-firm investigation. Thus, for the recent-IN FD cases, a finding of high short selling and large negative abnormal returns in the pre-event window and a negative

¹⁰We later also examine the 248 FD cases where the IN release precedes the FD by more than the median of 8 days.

predictive relation between the pre-event short selling and the FD event-window returns - - that is stronger for any comparable patterns in the no-IN FD cases - - would imply support for the APN-shorting hypothesis.¹¹

5.1. Average FD Pre-Event Shorting Activity and FD Pre-event and Event-Window Abnormal Returns, with and w/o Recent Investigation News

Table 2 reports the average daily abnormal short selling (ABSS) and abnormal return (ABRET), both adjusted by size and book-market sorted matching portfolios, for three different event windows. Row-1 in each panel reports on the 5-day pre-event window, [-5,-1]. Row-2 in each panel reports on the 2-day event window, [0,1], where $t = 0$ is the event day and $t = 1$ denotes the day after. Finally, Row-3 in each panel reports on a 5-day post-event window, [2,6]. We report separately for windows based on the lawsuit filing day and on the investigation-news release day, as denoted in the subpanel headings.

Panel A reports on the no-IN FD cases and Panel B on the recent-IN FD cases. We highlight the following three results for these two different subsets of FD cases. First, we find that the average pre-event shorting, ABSS(-5,1), is much larger for the recent-IN FD subset at 7.81, over 2.4 times the average pre-event ABSS(-5,-1) for the no-IN FD subset at 3.19. Second, we find that the pre-event ABRET(-5,-1) is also much more negative for the recent-IN FD subset at -3.46%, versus -0.57% for the no-IN FD subset. Third, we note that the ABRET(0,1) over the FD event window is somewhat more negative for the recent-IN FD cases at -0.69%, versus -0.33% for the no-IN FD cases.

We emphasize that these abnormal returns are ‘average daily returns’ over the respective windows. Thus, for example, the implied average cumulative return over the 5-day FD pre-event window for the recent-IN FD cases is around -17%, versus about -2.8% for the no-ID FD cases. By comparison, results in Table 2 of Gande and Lewis (2009) suggest an average cumulative abnormal return of about -8.1% over the 5-day FD pre-event window for their sample of class-action lawsuit filings over 1996-2003. And, results in Table 2 of Blau and Tew (2014) suggest an average cumulative abnormal return of about -6.2% over the 5-day FD pre-event window for their sample of class-action lawsuit filings over 2005-2006.

These 5-day pre-event returns from those two earlier studies on SCA lawsuits are close

¹¹Later, in Section 6, we investigate other implications to help distinguish between these two hypotheses.

to the weighted average of about a -6.5% abnormal return for the FD cases in our Table 2, Panels A, B, and D (weighted by the relative numbers of lawsuits in each category). However, when excluding the recent-IN FD cases in Table 2, Panel B; the weighted average of the implied cumulative 5-day pre-event abnormal return for the remaining lawsuits is much less negative at about -2.2%. These observations and our findings suggest both: (1) that there is a consistent sizably negative cumulative return over the FD pre-event period, with similar returns across three different studies covering three different time periods; and (2) that the FD cases that had an IN release either coincident with, or in close proximity to, the 5-day pre-event period (the Panel B cases) are primarily responsible for the sizably negative pre-event abnormal returns (at least over our approximate 10-year sample over August 2009 to June 2019). Thus, without knowledge that there were preceding IN releases, a researcher would conclude that the pre-event abnormal returns support the anticipatory-shortening hypothesis.

However, such an anticipatory-shortening conclusion is weakened appreciably when taking into account the public IN release that precedes the FD in many cases. Consider the results in Table 2, Panel C, which reports on the pre-event ABSS and ABRET for windows based on the day of the investigation-news release, for the same set of recent-IN lawsuits examined in Panel B. In row-2 of Panel C, we report relatively very large shorting activity (13.10) and large average negative abnormal daily returns (-6.43%) over the ID-event window (0,1). We stress that these shorting and return numbers are *contemporaneous* with the public IN release and are approximately concurrent with the pre-event window for the FD-based windows for the recent-IN FD cases. Further, the much lower average negative returns for the no-IN FD cases (Panel A), over both the FD pre-event and event windows, imply relatively little profitability for short positions taken over the pre-event window for these no-IN FD cases. Thus, after accounting for the law-firm investigation news release, the results in Table 2 indicate less support for the anticipatory-shortening hypothesis than is suggested by the earlier SCA lawsuit literature.

Figure 2 further depicts the differences in abnormal shorting and abnormal returns between the FD-based windows and the ID-based windows. This figure plots the time series of daily average abnormal short selling (top panel) and abnormal returns (bottom panel) from day -10 to day 10, with day 0 being the day of the public news release. We

report separately for the FD subsample with a prior IN release, the FD subsample without a prior IN release, and the ID sample. Here, for the FD subsample with a prior IN release, we include all the relevant FD cases to more broadly depict the results for this category of FD cases (rather than reporting only on the recent-IN FD cases, as in Table 2, Panel B). The figure reinforces the characteristic patterns indicated in Table 2. The event-day market reaction is strongest for the ID sample with a return of nearly -4.5% and abnormal short selling exceed 12. The ID sample also seems to experience larger and more persistent negative returns after the investigation announcement day. Further, the FD sample with a prior IN release has a more distinct pre-event pattern, with heavier short selling and more negative returns during the pre-event days, relative to the FD sample without a prior IN release.

5.2. FD Pre-Event Shorting and FD Event-Window Abnormal Returns, with and w/o Recent Investigation News: Regression Analysis

We next examine how the abnormal shorting activity in the pre-event window ($ABSS(-5,-1)$) is related to the subsequent abnormal returns over the event window ($ABRET(0,1)$) in a multivariate regression analysis. We again focus on the no-IN FD cases and the recent-IN FD cases separately, to present additional evidence on the anticipatory-shorting hypothesis and the APN-shorting hypothesis.

The anticipatory-shorting hypothesis predicts that pre-event short selling should be negatively correlated with event-day window returns, even for the FD cases without a pre-filing IN release. To evaluate this premise, we estimate variations of the following regression model:

$$ABRET(0,1)_i = \beta_0 + \beta_1 ABSS(-5,-1)_i + \beta_2 ABRET(-5,-1)_i + CONTROLS_i + \varepsilon_i \quad (1)$$

where $ABRET(0,1)_i$ is the average daily abnormal return during the 2-day event window for lawsuit i , we evaluate both FD-based and ID-based event windows; $ABSS(-5,-1)_i$ is the abnormal short selling from the pre-event window and the main explanatory variable of interest; $ABRET(-5,-1)_i$ is the pre-event abnormal return; $CONTROLS_i$ denotes a set of additional control variables that include momentum, the natural log of the book-to-market

equity ratio, the natural log of the firm’s market capitalization (size), the bid-ask spread, and dummy variables for district courts and calendar months.

Momentum, book-to-market, and firm size are known to have explanatory power for the cross-section of average stock returns. The bid-ask spread is from CRSP and is included to proxy for liquidity. We include monthly dummy variables to account for seasonality. The use of court dummies is motivated by the results from Huang, Hui, and Li (2019) who find that judge ideology is an important measure of litigation risk and firms in liberal circuits are 33.5% more likely to be sued in securities class action lawsuits than those in conservative circuits. If short sellers have private information about the securities class action lawsuits, then it is likely that they have insider knowledge about the relation between the court jurisdiction of a lawsuit and the likelihood of obtaining a favorable ruling. Detailed descriptions of all these variables are provided in the Appendix B, including a correlation table for the key abnormal short selling and abnormal return variables.

Table 3 reports the results, with β_1 being the primary coefficient of interest. We again begin by evaluating the no-IN FD cases (those without a preceding investigation news release) in Panel A. We find that the estimated β_1 coefficient is not statistically significant for the first model specification, where the pre-event *ABSS* is the only explanatory term. The β_1 coefficients are statistically significant for the multivariate specifications in columns 2 through 5; and about 43% larger, on average, as compared to the first specification. Yet, the implied economic significance seems modest. For model-1 with no-ID FD cases where *ABSS*(-5,-1) is one standard deviation above its mean, the implied abnormal return over the 2-day event window (0,1) would be only about -0.58% lower than the mean case, with an adjusted R^2 of only 0.3% for this case.¹²

Next, Panel B of Table 3 reports on this investigation for the recent-IN FD cases. Here, for all five model specifications, we find that the estimated β_1 coefficients are negative and statistically significant with only a modest variation across the different specifications. Here, for model-1 with recent-ID FD cases where *ABSS*(-5,-1) is one standard deviation above its mean, the implied abnormal return over the 2-day event window (0,1) would be about -1.7% lower than the mean case, with an adjusted R^2 of 1.7% for this case.

¹²For these sensitivity examples, we use the subsample-specific standard deviations of the *ABSS* and *ABRET* observations, rather than the full-sample standard deviations. The -0.58% is approximated as twice the implied change in the value for the daily average return over this window.

Thus, when comparing Panel A to Panel B in Table 3, the implied predictive information of the pre-event shorting for the event-window abnormal return is appreciably larger and more robust for the recent-IN FD cases, relative to the no-ID FD cases. Without knowledge of the pre-event IN releases for the FD cases in Panel B, a researcher would infer support for the anticipatory-shorting hypothesis for the FD cases in Panel B. However, evaluation of the anticipatory-shorting hypothesis should be more appropriately based on the weaker evidence from the no-IN FD cases in Panel A only.¹³

And, as discussed in Section 5.1, much of the shorting in the pre-event FD window for the recent-IN FD cases in Panel B is likely attributable to high short selling associated with the recent public IN release. For the Panel B FD cases, this suggests that the predictive information from the pre-event *ABSS* is likely driven by the shorting activity taken in response to the investigation public news release. If so, these FD cases would suggest support for the APN-shorting hypothesis (rather than the anticipatory-shorting hypothesis). In Section 6, we present additional results that supports this premise, by showing that the abnormal shorting over the event window (coincident with the public information news release) has predictive information about the post-event abnormal returns (*ABRET*(2,6)).

We next shift to evaluate windows based on the investigation-news day (ID) (rather than FD-based windows). We examine the predictive information in the pre-event short selling prior to the public IN release (*ABSS*(-5,-1)) for the abnormal return over the ID event window (*ABRET*(0,1)).

Table 4 reports the results, with the estimated β_1 again being the primary coefficient of interest. Here, as previously explained, we bifurcate the ID events into two subsets, cases where the difference between the ID and FD are less than or equal to the median (Panel A) and cases where this difference is greater than the median (Panel B). In both panels, we find that the estimated β_1 coefficients are negative and statistically significant for all five specifications. These results provide some support for the anticipatory-shorting hypothesis, because the pre-event shorting precedes both the public IN release and the public lawsuit-filing news release.

However, the ability of the pre-event short selling to explain variation in the event-

¹³And, an analysis of the combined FD cases in Panels A and B of Table 3 together would suggest more support for the anticipatory-shorting hypothesis than would the proper analysis of the no-IN FD cases only.

window returns seems quite modest. In Table 4 for the first specification, we note that the pre-event short selling can only explain about 1% of the variation in the event-window abnormal returns. Further, for the ID cases in both Panels A and B of Table 4, a one standard deviation increase in the pre-event ABSS implies that the event-window ABRET would only be about 1/10 of a standard deviation lower than the unconditional case.¹⁴

5.3. Section 5 Summary

Our investigation reveals that over half of SCA lawsuit filings over our 2009-2019 sample are preceded by a public news release about the lawsuit investigation. Well over half of these investigation announcements occur within 8 days of the lawsuit filing. Prior studies have documented substantial negative cumulative returns prior to the lawsuit filing, attributed to either private information or inference based on the industry litigation environment or corporate misdeed. However, we find that the substantial pre-filing cumulative negative returns are largely attributed to the lawsuits that had a public IN release either coincident with, or in close proximity to, the 5-day pre-filing period. This suggests that the public IN release is primarily responsible for the sizably negative pre-event abnormal returns, rather than apparent anticipation of the lawsuit filing.

Further, as compared to the lawsuit filings with a recent IN release, we find that the pre-event abnormal shorting activity for the lawsuit filings *without* a preceding IN release is: (1) appreciably lower, on average, and (2) appreciably less informative about the subsequent abnormal return over the filing event window. In sum, when accounting for the public news from law-firm investigation announcements, our results here imply less support for the anticipatory-shortening hypothesis than is suggested by prior SCA lawsuit studies.

6. Main Results II: Event-Window Short Selling and Post-Event Abnormal Returns

Next, we evaluate how the short selling over the event window, $ABSS(0,1)$, is related to the abnormal returns over the post-event window, $ABRET(2,6)$. For our interpretation, we

¹⁴For the ID cases in Panel A of Table 4, the standard deviation of the pre-event ABSS (event-window ABRET) is 11.37 (15.33%). For the ID cases in Panel B of Table 4, the standard deviation of the pre-event ABSS (event-window ABRET) is 12.60 (18.54%).

presume that short-selling activity over the event window is largely driven by reaction to the public news release of either the lawsuit filing (for the FD-based event windows) and/or the preceding law-firm investigation (for the ID-based event windows). Under this view, an economically meaningful relation between the event-window shorting and the subsequent post-event return would suggest support for the APN-shortening hypothesis.

However, without the exact intraday timing of the news announcement, returns, and shorting; we cannot rule out that some of the short selling over the event windows (0,1) might reflect superior private information that was obtained in the hours (or minutes) preceding the public news release. Given this, our investigation here better addresses an extended APN-shortening hypothesis that considers analysis based on all information obtained nearly contemporaneous with the public news release (more specifically, all information flows over the event window).

6.1. Average FD Event-Window Shorting Activity and Average Post-Event Abnormal Returns

Recall that Table 2 also reports on the average event-window shorting activity ($ABSS(0,1)$) and the average post-event abnormal returns ($ABRET(2,6)$). Here, we highlight these results from Table 2 that bear on the APN-shortening hypothesis.

Panels A, C, and E of Table 2 capture the three categories of public news release windows where the event-window shorting should largely be in response to news releases that *initially* reveal the lawsuit intentions.¹⁵ Across these three panels, we see that both the event-window abnormal shorting, the event-window negative abnormal returns, and the post-event negative abnormal returns are all appreciably stronger for the ID-based window in Panel C when the IN is within 8 days of the FD. The $ABSS(0,1)$ for Panel C is 13.1 versus an average of 4.81 for Panels A and E. And, the implied average cumulative abnormal returns are about -12.8% for the 2-day $ABRET(0,1)$ window and -3.1% for the 5-day $ABRET(2,6)$ window for Panel C versus an average of about +0.5% for the 2-day $ABRET(0,1)$ window and -0.5% for the 5-day $ABRET(2,6)$ window for Panels A and E.

These abnormal-return differences suggest that the lawsuit cases in Panel C are the

¹⁵Conversely, for the FD cases in Panels B and D of Table 2, the FD-based event window does not reflect the *initial* public news about a pending lawsuit, because there was a preceding news release about the lawsuit investigation.

higher quality lawsuits, in terms of the potential adverse economic impact to the firm and the potential profitability for short sellers. Further, these patterns in shorting activity suggest that short sellers can substantially distinguish between the lawsuits' economic prospects upon the public news release, with greater shorting profits suggested for the Panel C cases than for the Panel A and E cases (especially for short positions established early in the ID event window).

To further investigate whether the Panels A, C, and E also subdivide the lawsuit cases by quality, we calculate the proportion of cases with settlements for the plaintiffs versus dismissal. Consistent with the view that Panel C captures the higher-quality lawsuits, we find that proportion of cases 'settled' (versus 'dismissed') is appreciably higher for the lawsuit filings in Panel C at 40.2% versus an average of 22.4% for the cases in Panel A and Panel E. Further, we note that both: (1) the event-window and post-event abnormal returns ($ABRET(0,1)$ and $ABRET(2,6)$) are more negative for the Panel A cases than for the Panel E cases, and (2) the proportion of cases 'settled' (versus 'dismissed') is higher for the Panel A cases (at 31.5%) than for the Panel E cases (at 13.4%).¹⁶

In sum, we feel that these above cross-panel patterns from Table 2, along with the related settlement statistics, suggest support for the APN-shortening hypothesis. Upon the initial public news release of a lawsuit (or likely lawsuit), short sellers favor the apparent higher quality cases in Panel C and would appear to earn associated shorting profits. However, we acknowledge that the higher average event-window shorting ($ABSS(0,1)$) for the Panel E cases, relative to the Panel A cases, is puzzling under a skilled APN-shortening view, but rather seems to indicate limited real-time ability for short sellers to distinguish *ex ante* between the higher-quality IN cases in Panel C and the lower-quality IN cases in Panel E.

6.2. Event-Window Shorting and Post-Event Abnormal Returns: Regression Analysis

We next investigate how the level of event-window shorting is related to variation in the post-event abnormal returns in a multivariate regression framework. We estimate five variations of the following regression model:

¹⁶These settlement percentages are based on the cases that have either a settled or dismissed status; thus, excluding the approximately 11% of the lawsuits that do not have a 'settled' or 'dismissed' status reported in the Stanford SCAC data base.

$$ABRET(2, 6)_i = \beta_0 + \beta_1 ABSS(0, 1)_i + \beta_2 ABRET(0, 1)_i + CONTROLS_i + \varepsilon_i \quad (2)$$

where $ABRET(2,6)_i$ is the post-event average daily abnormal return for lawsuit i ; $ABSS(0,1)_i$ is the abnormal daily short selling during the event window; $ABRET(0,1)_i$ is the abnormal return over the event window: and the other terms are as defined for equation (1). We again perform separate estimations based upon either the lawsuit-filing event or the law-firm investigation news event, and the estimated β_1 s are again the coefficients of interest.

Table 5, Panel A, presents the estimation results for equation (2) when fitted to the FD cases without a prior IN release. The estimated β_1 coefficients on $ABSS(0,1)$ are highly significant and negative with t -statistics ranging from -3.9 to -4.7 across the five different model specifications. For a case when the $ABSS(0,1)$ observation is one standard deviation above its mean, the implied average abnormal return over the 5-day post-event window is about -1.10% lower than the mean case, and the adjusted R^2 is 2.0%.

Next, Table 5, Panel B, reports the estimation results from the FD sample with a prior announcement of a law-firm investigation. Interestingly, we find completely different results when compared to the results from Panel A. In particular, all of the estimated β_1 coefficients on the event-window abnormal short selling, $ABSS(0,1)$, lack statistical significance, and the adjusted R^2 for specification-1 with the sole $ABSS(0,1)$ explanatory term is only 0.6%.

The sharp contrast between the FD cases with and without pre-filing IN news releases (Panel B versus Panel A) seems consistent with our APN-shortening hypothesis under the follow explanation. For Panel B, the filing-day window occurs after the public IN news release. Thus, the pending lawsuit has substantially already been publicly revealed for the FD cases in Panel B, prior to the actual announcement of the lawsuit filing. Thus, the skilled short traders should have largely reacted to this event upon the occasion of the investigation-news release, leaving relatively little information revelation with the actual filing. Accordingly, for these cases, the FD event-window abnormal shorting has little relation to the FD post-event returns.

This above explanation, regarding the contrast between Panels A and B of Table 5, also suggests the abnormal shorting over the IN event window should be negatively related to the post-event returns (qualitatively similar to the results in Table 5, Panel A). As we report next, this is exactly what we find for the event-windows based on the public IN release.

Table 6 reports the estimation results for equation (2) using the ID-based event windows. Panel A evaluates all the ID-based windows together. As predicted, here we find that the β_1 estimates on ABSS(0,1) are highly significant for all five specifications, with t -statistics from about -3.7 to -4.4.

Table 6, Panels B and C, report on comparable estimations on two subsamples of the ID-based event windows, with Panel B (Panel C) reporting on the cases when the IN release was less than or equal to (greater than) the median of 8 day before the FD. For both panels, we again see that the estimated β_1 coefficients are negative and statistically significant in all cases.

However, the implied negative post-event returns are somewhat larger for Panel B than for Panel C, fitting with our earlier arguments that suggests short sellers seem to focus on the higher-quality lawsuits represented by the Panel B cases.¹⁷ Specifically, for cases when the ABSS(0,1) is one standard deviation above its mean, then the implied average cumulative 5-day post-event abnormal return is about -4.2% for the cases in Panel B versus -1.7% for the cases in Panel C.

6.3. Shorting Before the Initial Public News Release about the Lawsuit and Post-Announcement Returns: A Comparative Analysis

In Section 6.2, we presented evidence that event-window shorting, over the event windows when the initial public news release about the pending lawsuit was released, is reliably negatively related to variation in the subsequent post-announcement returns (Table 5, Panel A, and Table 6). Since this shorting was coincident with the initial public news release of the lawsuit, this relation suggests support for the APN-shorting hypothesis.

However, for these ‘initial public news’ events, support for the APN-shorting hypothesis (over the anticipatory-shorting hypothesis) would be bolstered if: (1) any predictive relation between the pre-event shorting for the post-announcement returns is marginal; and (2) the predictive relation between the event-window shorting and post-announcement returns is more reliable and more substantial than any predictive relation between the pre-event shorting and the post-announcement returns. This is exactly what we find.

¹⁷From Table 2, recall that the average ABSS(0,1) for the ID events when the IN was within 8 days of the FD was about twice the average ABSS(0,1) for the ID events when the ID preceded the subsequent FD by more than 8 days.

Specifically, while the estimated coefficients for the relation between the pre-event shorting (ABSS(-5,-1)) and the post-announcement abnormal returns (ABRET(2,6)) are always negative for these events, the estimated coefficients lack statistical significance in four of the 10 estimations and the p-values are never better than the 5% level for the cases where there is statistical significance. Further, for the specifications that only include the pre-event shorting as an explanatory term, the adjusted R² values are 0.8% or lower. For brevity, the tabular details are relegated to Appendix C.

By comparison, recall that the estimated coefficients for the relation between the event-window shorting and the post-announcement abnormal returns for these ‘initial public news’ events are always negative and statistically significant at the 1% level. Further, for the specifications that only include the event-window shorting as an explanatory term, the adjusted R² values are in the 2 to 3% range.

6.4. Section 6 Summary

The evidence in this section, in combination with the evidence in Section 5, seems supportive of the APN-shortening hypothesis, as advocated in Engelberg, Reed, and Ringgenberg (2012). First, for the higher-quality lawsuits with a recent IN release,¹⁸ we find: (1) much higher average abnormal shorting over the investigation-announcement event window; and (2) a stronger economic relation between this shorting over the news-event window and variation in the post-news abnormal returns. Second, when evaluating the abnormal shorting activity that is approximately contemporaneous with the *initial* public news release for all the lawsuits,¹⁹ we find that the event-window shorting is reliably negatively related to the subsequent post-news abnormal return.

Conversely, for the lawsuits that had a pre-filing IN release, the FD event-window shorting is not reliably related to variation in the subsequent post-event abnormal returns. For these FD cases where the lawsuit filing announcement is *not* the initial public news release about the pending lawsuit, this finding suggests that the shorting activity and return

¹⁸Recall that we refer to this category of lawsuits as ‘higher quality’ because they exhibit more negative abnormal returns over both the IN event window and the post-event window and their likelihood of being settled (rather than dismissed) is greater than the other lawsuit cases.

¹⁹The ‘initial public news’ refers to either the first investigation announcement for the cases with a pre-filing law-firm investigation announcement, or the filing-day news for the cases without a pre-filing law-firm investigation announcement.

response over the preceding IN release already largely accounted for the lawsuit information, as one would substantially expect if short sellers are skilled at analyzing public information.

7. Further Investigation and Robustness Checks

In this section, we report on a three additional empirical evaluations that extend our investigation and address robustness.

7.1. Sub-period Results

Since our sample starts in August 2009, the early part of our sample is likely influenced by market stress associated with the 2008-09 financial crisis and its aftermath. Thus, it is an interesting empirical question whether the abnormal return and shorting patterns are qualitatively similar for the earlier and later parts of our sample.

Accordingly, we subdivide our sample into two approximately equal-length sub-periods: 08/2009 to 10/2014 and 11/2014 to 06/2019. We note that October 2014 also marks the end of Federal Reserve’s quantitative easing, which was taken in response to the long-term economic weakness associated with the severe 2008-09 recession.

We find that the results from the two sub-samples are qualitatively similar to the full sample results. In particular, for both sub-periods, we find that: (1) for the event windows, the negative abnormal returns and abnormal shorting are the most pronounced for the earlier investigation-news releases, as compared to the lawsuit-filing news releases; and (2) for the pre-event windows, the abnormal shorting and negative abnormal returns are most pronounced for the ‘FD with investigation’ cases, presumably reflecting the public IN releases that were coincident with the FD pre-event window. For brevity, the tabular details are provided in Appendix C.

7.2. Alternatives for Abnormal Shorting and Abnormal Returns

We also find that the SCA-lawsuit patterns in abnormal returns and abnormal shorting remain very similar when we investigate alternative methods to adjust for abnormality. In Figure 3, we reproduce the time-series plots of abnormal returns and abnormal short selling for 21 days around the event date. Instead of using the matching portfolio approach as we

did in Figure 2, in this figure we compute abnormal returns by subtracting CRSP value-weighted index returns. For abnormal short selling, Figure 3 adjusts the event-window short selling for each lawsuit case by subtract the own-firm’s sample mean of short selling in a pre-event window from 66 to 22 trading days before the filing date. We choose a substantial 17-day gap (day $t - 22$) for this adjustment average, prior to day $t - 5$ for the beginning of the pre-event window, to guard against the event having an undue influence on the benchmark average. A comparison of Figures 2 and 3 indicates that the patterns are very similar for both our featured and our alternative metrics for abnormal shorting and abnormal returns. Thus, we conclude that our results are robust to the alternative measures of abnormal returns and abnormal short selling.

7.3. Extended Regression Models

Next, as robustness checks, we augment the regression models in equations (1) and (2) with additional control variables. Blau and Tew (2014) find that it is important to include variables that indicate the status of a case. For example, if a case is eventually settled, then it shows that the lawsuit has merits. Otherwise, it indicates that the case might have little merit in the first place. We rely on the case status information from the Stanford database, which has four possible case status for each case: settled, dismissed, ongoing, or unknown. Since the last two statuses are not very interesting, we only include two additional dummy variables in our regressions: DISMISSED and SETTLED. Our data rely on the case status variables that are updated through December 2020.

In addition, the literature also suggests that other variables might also be important indicators that can signify the potential severity of a lawsuit. Consequently we also search for information that indicates a lawsuit belongs to at least one of following categories.

1. Initial public offerings (IPO): Lowry and Shu (2002) find that firms with higher litigation risk often under-price their IPOs to insure against and to deter possible future securities class action lawsuits. The dummy variable IPO is equal to 1 if a lawsuit is found to be in this category.
2. Investigation by the U.S. Securities and Exchange Commission (SEC): Karpoff and Lou (2010) report that short interest rises steadily in the 19 months prior to the public

revelation of financial misconducts, particularly when the misconduct is severe. These financial misconducts usually trigger SEC investigations and/or enforcement actions. We set the SEC dummy variable to 1 if an SEC or other regulatory investigation is mentioned in the case summary.

3. Merger and acquisition (M&A): This dummy variable is equal to 1 if the case summary indicates that the lawsuit is related to a merger and acquisition deal.

More formally, after the inclusion of the above five dummy variables, our new augmented regression models are as follows:

$$ABRET(0, 1) = \beta_0 + \beta_1 ABSS(-5, -1) + \beta_2 ABRET(-5, -1) + \beta_3 SETTLED \quad (3)$$

$$+ \beta_4 DISMISSED + \beta_5 SEC + \beta_6 IPO + \beta_7 M\&A + CONTROL + \varepsilon$$

$$ABRET(2, 6) = \beta_0 + \beta_1 ABSS(0, 1) + \beta_2 ABRET(0, 1) + \beta_3 SETTLED \quad (4)$$

$$+ \beta_4 DISMISSED + \beta_5 SEC + \beta_6 IPO + \beta_7 M\&A + CONTROL + \varepsilon$$

Table 7 reports the estimation results for the above two models, separately for the ‘FD-based windows with a prior IN release’, the ‘FD-based windows without a prior IN release’, and the ID-based windows. We highlight the following results.

First, Table 7, Panel A, reports on the FD-based event windows. For equation (3), the estimated β_1 coefficients on the FD pre-event shorting are negative with 5% p-values, quite similar to the comparable coefficients in Table 3. The estimated β_1 for the ‘FD with a prior IN announcement (Panel A.1)’ cases is somewhat larger than the β_1 for the ‘FD without a prior IN announcement (Panel A.2)’ cases. For these ‘FD with a prior IN announcement’ cases, we also note that: (1) the FD pre-event shorting tends to be larger and more variable (relative to the ‘FD without an IN announcement’ cases); and (2) many of the FD pre-event windows are coincident with a public IN news release. Thus, these observations indicate that the pre-event shorting is relatively more informative about the event-window returns for the ‘FD with a prior IN announcement’ cases and the response to the public IN release over the FD pre-event window is likely a factor. This view aligns with our earlier arguments.

For equation (4), the results in Table 7, Panel A, are also similar to our earlier comparable results in Table 5. Specifically, we find a negative but small and statistically insignificant

β_1 (on the event-window shorting) for the ‘FD with a prior IN announcement’ cases and a sizably negative and statistically significant β_1 for the ‘FD without a prior IN announcement’ cases.

Next, Table 7, Panel B, reports on the ID-based event windows. Again the results are similar to our comparable earlier results in Tables 4 and 6. Here, for equation (3), the estimated β_1 on the pre-event shorting is smaller than our comparable earlier results and statistically significant only at a 10% p-value; which casts further doubt on the anticipatory-shortening hypothesis.

For equation (4) for the ID-based windows, we again find that the estimated β_1 on the event-window shorting is negative with a 1% p-value. Considering the results from equation (4) in Panels A and B of Table 7 together, our results for the extended regression reinforce the view that the event-window shorting is meaningfully negatively related to the post-event abnormal returns only for the *initial* news release about the SCA lawsuit. We feel this finding support an APN-shortening view.

Finally, we note that the SETTLED and DISMISSED dummy variables are statistically significant and in the predicted direction (negative for SETTLED and positive for DISMISSED) only in Panel B for equation (3). These results suggest that investors can somewhat infer the quality of the lawsuit upon the IN news release, with a more negative return being evident for lawsuits that are eventually settled. This observation also seems consistent with an APN-shortening view. Overall, we conclude that our earlier results and conclusions are robust to the inclusion of these additional control variables in these extended regressions.

8. Conclusions

Boehmer, Jones, and Zhang (2008) observe that “short sellers occupy an exalted place in the pantheon of investors as rational, informed market participants who act to keep prices in line.” Yet, while the literature has largely supported the existence of profitable short selling, there is an ongoing debate as to the source of the short sellers’ trading advantage.

Prior studies that have analyzed securities class-action (SCA) lawsuits, while treating the lawsuit filing news as the initial public news release about the lawsuit, have concluded

that investors tend to substantially anticipate a securities class-action (SCA) lawsuit filing - - presumably due to superior private information or rational inference about the industry litigation environment (see, e.g., Gande and Lewis (2009) and Blau and Tew (2014)). However, evidence in Engelberg, Reed, and Ringgenberg (2010) suggest that the basis of shorting profits looks to be more attributable to short-sellers' skillful analysis of public information, rather than short sellers possessing superior private information prior to the corporate event.

In this article, we contribute to this debate by studying short selling around news events that are related to SCA lawsuits. Relative to the earlier SCA lawsuit literature, our primary innovation is to document and analyze the related pre-filing public news releases about the law-firm investigation that signals the pending lawsuit. These pre-filing investigation announcements occur in 52.4% of the lawsuit cases in our sample over August 2009 to June 2019; the median investigation announcement is 8 days in advance of the lawsuit-filing day, with a range between 1 and 42 days in advance.

Our findings contributes in two primary ways. To begin with, after accounting for the public news from the pre-filing law-firm investigation announcements, our results imply appreciably less support for the anticipatory-shorting hypothesis than is suggested by prior SCA lawsuit studies. We highlight the following two findings in support of this assertion. First, the sizably negative average pre-filing cumulative returns in our sample are about two-thirds attributable to the lawsuit cases that had a public pre-filing investigation announcement within (or in close proximity to) the 5-day pre-filing event window. Second, we find that the pre-filing abnormal shorting activity for the lawsuit filings *without* a pre-filing investigation news release is appreciably lower, on average, and appreciably less informative about the subsequent abnormal return over the filing event window; relative to the lawsuit filings *with* an accompanying pre-filing investigation news release.

Shifting to our second contribution area, our evidence also suggests support for the view in Engelberg, Reed, and Ringgenberg (2012), where short-sellers' profits tend to be based more on skillful analysis of public information. We especially note that the higher-quality lawsuits in our study (which have an investigation announcement within eight days of the lawsuit filing) have both: (1) a much higher average abnormal shorting over the investigation-news event window, and (2) a stronger economic relation between the

investigation-news event-window shorting and the post-news abnormal returns - - relative to the weaker lawsuit cases.

Beyond SCA lawsuits, the implications of our study likely bear on other earlier studies that have treated lawsuit filings (in general) as the initial public new release. For example, see Bhagat, Bizjak, and Coles (1998) for an earlier study that examines all corporate lawsuits and that focuses on a 2-day event window around the lawsuit-filing announcement. Given our evidence, it seems likely that their findings would have understated the negative-return impact of the lawsuit investigation and filing. Finally, regarding market informational efficiency and public versus private information, our findings suggests that event studies on abnormal returns or abnormal shorting around other corporate events (beyond lawsuits) might also need to carefully search for pre-event public news releases.

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Table 1: Summary Statistics

This table reports the summary statistics of firms subject to securities class action lawsuits in our sample, which is collected from the Securities Class Action Clearinghouse database at Stanford Law School. Our sample is from August 2009 to June 2019 and includes all common stocks (share code 10 and 11) listed on NASDAQ, NYSE and AMEX that are subject to the class action lawsuits during this period. There are 1017 total cases in our sample. Panel A reports case numbers by year, district court, and whether or not they are targets of investigation by law firms. Panel B reports the summary Statistics of sample firms' financial and market performance metrics. Panel C reports the statistics for the number of days between the law firm investigation news date (ID) and lawsuit filing date (FD).

| Panel A: Distributions of Securities Class action Lawsuits | | | | | |
|--|-------|------------------|-------|------------------------|-------|
| Year | Cases | District Court | Cases | Law Firm Investigation | Cases |
| 2009 (Aug. to Dec.) | 34 | S.D. New York | 117 | Yes | 533 |
| 2010 | 77 | N.D. California | 116 | No | 484 |
| 2011 | 80 | D. Delaware | 100 | | |
| 2012 | 50 | C.D. California | 75 | | |
| 2013 | 83 | D. Massachusetts | 53 | | |
| 2014 | 71 | D. New Jersey | 46 | | |
| 2015 | 96 | S.D. Texas | 31 | | |
| 2016 | 115 | N.D. Illinois | 29 | | |
| 2017 | 172 | S.D. California | 26 | | |
| 2018 | 168 | E.D. New York | 25 | | |
| 2019 (Jan. to Jun.) | 71 | Others | 399 | | |

| Panel B: Summary Statistics of Sample Firms' Financial and Market Performance Metrics | | | | | |
|---|-------|--------|-----------|-----------|-----------|
| | Mean | Median | 25th Pctl | 75th Pctl | Std. Dev. |
| Total Assets (million \$) | 7,811 | 814 | 197 | 3,373 | 29,169 |
| Sales (million \$) | 4,153 | 511 | 99 | 2,161 | 23,354 |
| EPS (\$) | 0.67 | 0.48 | -0.43 | 1.85 | 9.42 |
| Size (million \$) | 5,758 | 777 | 239 | 2,767 | 28,500 |
| Book-to-Market | 0.647 | 0.461 | 0.231 | 0.810 | 0.905 |

| Panel C: Summary Statistics of the Distribution of Days between ID and FD | | | | | | | |
|---|-------|--------|-----------|-----------|-----------|------|-------|
| | Mean | Median | 25th Pctl | 75th Pctl | Std. Dev. | Min | Max |
| Days between ID and FD | 10.07 | 8.00 | 4.00 | 15.00 | 7.78 | 1.00 | 42.00 |

Table 2: Returns and Short-selling Activity around SCA Lawsuit Filings

This table reports the average daily returns and short-selling activities of firms that had security class-action lawsuits filed against them over August 2009 to June 2019. We report on windows based on both the lawsuit filing date (FD) and on the law-firm investigation announcement date (ID), where applicable. Our sample includes all domestic common stocks listed on NASDAQ, NYSE and AMEX. We report the average daily abnormal short selling (ABSS) and average daily abnormal return (ABRET), both adjusted by size and book-market sorted matching portfolios, during the event windows [0,1], the pre-event window [-5,-1], and the post-event window [2,6], where $t = 0$ is the event day (for either FD or ID). We show results for three samples. Panel A (columns 1 and 2) report on the FD-window observations without prior investigation news (IN) releases. Panel B (columns 3 and 4) report on the FD-window observations with recent prior IN releases, where the difference between the ID and FD is less than or equal to our sample's median of 8 days. Panel C (columns 5 and 6) report on the ID-window observations for the observations where the difference between the ID and FD is less than or equal to our sample's median of 8 days. Panel D (columns 7 and 8) report on the FD-window observations with distant prior IN releases, where the difference between the ID and FD is greater than our sample's median of 8 days. Panel E (columns 9 and 10) report on the ID-window observations for the observations where the difference between the ID and FD is greater than our sample's median of 8 days. For completeness, Panels F and G (columns 11 to 14) report on all the 'FD with prior IN' cases together and all the ID cases together, respectively. Rows 4 to 6 report on the denoted difference between the statistics in rows 1 to 3. t-statistics are reported in parentheses for rows 1 to 3 and p -values are reported in square brackets for rows 4 to 6.

| | Panel A: FD without prior IN | | Panel B: FD with prior IN (ID-FD \leq 8) | | Panel C: ID when (ID-FD \leq 8) | |
|----------------------|------------------------------------|---------------------|--|---------------------|---|---------------------|
| Window | 1. ABSS | 2. ABRET(%) | 3. ABSS | 4. ABRET(%) | 5. ABSS | 6. ABRET(%) |
| 1: [-5,-1] | 3.1923 (36.11) | -0.5702 (-18.34) | 7.8131 (39.43) | -3.4629 (-52.34) | 3.9048 (36.29) | -1.1402 (-23.89) |
| 2: [0,1] | 2.9274 (38.72) | -0.3304 (-7.43) | 5.388 (36.6) | -0.694 (-11.71) | 13.0971 (34.9) | -6.4384 (-49.14) |
| 3: [2, 6] | 2.0872 (38.71) | -0.2814 (-18.73) | 3.6647 (32.83) | -0.2535 (-9.35) | 4.3323 (41.04) | -0.6202 (-21.29) |
| 4. differ. (2-1): | -0.2649 [0.0001] | 0.2398 [0.0000] | -2.4251 [0.0000] | 2.7689 [0.0000] | 9.1922 [0.0000] | -5.2981 [0.0000] |
| 5. differ. (2-3): | 0.8402 [0.0000] | -0.049 [0.3352] | 1.7232 [0.0000] | -0.4405 [0.0000] | 8.7647 [0.0000] | -5.8181 [0.0000] |
| 6. differ. (1-3): | 1.1051 [0.0000] | -0.2888 [0.0000] | 4.1484 [0.0000] | -3.2093 [0.0000] | -0.4275 [0.0000] | -0.5200 [0.0000] |

Table 2: (continued)

| | Panel D: FD with prior IN (ID-FD>8) | | Panel E: ID when (ID-FD>8) | |
|------------------------|---|---------------------|----------------------------------|--------------------|
| Window | 7. ABSS | 8. ABRET(%) | 9. ABSS | 10. ABRET(%) |
| 1: [-5,-1] | 2.0210 | -0.2247 | 3.5658 | 0.3365 |
| <i>p</i> -value | (30.22) | (-11.06) | (37.14) | (5.59) |
| 2: [0,1] | 1.6759 | 0.1015 | 6.6933 | 0.8288 |
| <i>p</i> -value | (32.51) | (3.69) | (25.12) | (4.19) |
| 3: [2, 6] | 1.3434 | -0.0892 | 2.0833 | -0.1945 |
| <i>p</i> -value | (35.46) | (-5.18) | (34.26) | (-9.79) |
| 4. differ. (2 - 1): | -0.3450 [0.0000] | 0.3261 [0.0000] | 3.1274 [0.0000] | 0.4923 [0.0165] |
| 5. differ. (2 - 3): | 0.3325 [0.0000] | 0.1906 [0.0000] | 4.6099 [0.0000] | 1.0233 [0.0000] |
| 6. differ. (1 - 3): | 0.6776 [0.0000] | -0.1355 [0.0000] | 1.4824 [0.0000] | 0.5310 [0.0000] |

| | Panel F: FD with prior IN (all) | | Panel G: ID (all) | |
|-----------------------|---------------------------------------|---------------------|-------------------------|---------------------|
| Window | 11.ABSS | 12. ABRET(%) | 13. ABSS | 14. ABRET(%) |
| 1: [-5,-1] | 5.1491 | -1.9637 | 3.7552 | -0.4361 |
| | (44.74) | (-48.67) | (51.77) | (-11.31) |
| 2: [0,1] | 3.6861 | -0.3249 | 10.0791 | -2.9894 |
| | (43.33) | (-9.41) | (42.63) | (-24.59) |
| 3: [2, 6] | 2.6057 | -0.1764 | 3.2811 | -0.4175 |
| | (40.79) | (-10.61) | (51.39) | (-23.09) |
| 4. differ. (2 - 1) | -1.4630 [0.0000] | 1.6388 [0.0000] | 6.3238 [0.0000] | -2.5532 [0.0000] |
| 5. differ. (2 - 3) | 1.0803 [0.0000] | -0.1485 [0.0000] | 6.7980 [0.0000] | -2.5718 [0.0000] |
| 6. differ. (1 - 3) | 2.5434 [0.0000] | -1.7873 [0.0000] | 0.4742 [0.0000] | -0.0185 [0.6518] |

Table 3: Pre-Event Shorting Activity and Event-Window Returns for FD-based Windows

This table reports the results from estimating the below equation as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX, that were subject to securities class action lawsuits from 08/2009 to 06/2019.

$$ABRET(0,1)_i = \beta_0 + \beta_1 ABSS(-5,-1)_i + \beta_2 ABRET(-5,-1)_i + CONTROLS_i + \varepsilon_i$$

where $ABSS(-5,-1)_i$ is the abnormal short-selling in the five-day period before the filing of lawsuit i ; $ABRET(-5,-1)_i$ and $ABRET(0,1)_i$ are the abnormal returns (in percentages) during the pre-event and event windows, respectively; $CONTROLS_i$ denotes a set of additional control variables that include momentum (MOM), log of book-to-market ratio (BM), log of firm size (SIZE), bid-ask spread (SPREAD), as well as dummy variables for district courts and calendar months (unreported); the β s are coefficients to be estimated; and ε_i is the residual. Detailed descriptions of all variables are provided in the appendix. Panels A and B report results for two different filing date (FD) subsamples; A for the non-ID FD cases and B for the recent-ID FD cases. Newey-West (1994) Heteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: Lawsuit Filings without a Pre-filing Announcement of a Law-firm Investigation | | | | | |
|--|----------|------------|------------|------------|------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.2422* | -0.3759*** | -2.9367** | -2.4387* | -1.5928 |
| | (-1.91) | (-3.37) | (-2.14) | (-1.87) | (-1.10) |
| ABSS(-5,-1) | -0.0277 | -0.0493*** | -0.0398*** | -0.0358** | -0.0341** |
| | (-1.03) | (-3.09) | (-2.61) | (-2.43) | (-2.49) |
| ABRET(-5, -1) | | -0.3554*** | -0.3849*** | -0.4175*** | -0.4110*** |
| | | (-3.06) | (-3.28) | (-3.48) | (-3.50) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | Yes | No | Yes |
| Month Dummies | No | No | Yes | No | No |
| Adjusted R^2 | 0.003 | 0.065 | 0.085 | 0.112 | 0.135 |

Table 3: (continued)

| Panel B: Lawsuit Filings with a Recent Investigation News Releases ($ID - FD \leq 8$ days) | | | | | |
|---|-----------|------------|-----------|-----------|-----------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.3837* | -0.5617*** | -3.8379** | -3.5219** | -3.1063 |
| | (-1.94) | (-2.68) | (-2.29) | (-1.99) | (-1.51) |
| ABSS(-5,-1) | -0.0397** | -0.0452** | -0.0375** | -0.0406** | -0.0343** |
| | (-2.21) | (-2.49) | (-2.08) | (-2.27) | (-2.05) |
| ABRET(-5, -1) | | -0.0638 | -0.0736 | -0.0789 | -0.0969** |
| | | (-1.21) | (-1.42) | (-1.52) | (-1.99) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.017 | 0.022 | 0.033 | 0.066 | 0.105 |

Table 4: Pre-Event Shorting Activity and Event-Window Returns for ID-based Windows

This table reports the regression results of the below equation as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX over 08/2009 to 06/2019, with announcements of law-firm investigations prior to the official filing of a security class action lawsuit.

$$ABRET(0,1)_i = \beta_0 + \beta_1 ABSS(-5,-1)_i + \beta_2 ABRET(-5,-1)_i + CONTROLS_i + \varepsilon_i$$

where $ABSS(-5,-1)_i$ is the abnormal short-selling in the five-day period before the public announcement of law-firm investigation for case i ; $ABRET(-5,-1)_i$ and $ABRET(0,1)_i$ are the the abnormal returns (in percentages) during the pre-event and event windows, respectively; $CONTROLS_i$ denotes a set of additional control variables that include momentum (MOM), log of book-to-market ratio (BM), log of firm size (SIZE), bid-ask spread (SPREAD), as well as dummy variables for district courts and calendar months (unreported); the β s are coefficients to be estimated; and ε_i is the residual. Detailed descriptions of all variables are provided in the appendix. Newey-West (1994) ueteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: ID sample with $ID - FD \leq 8$ days | | | | | |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -5.9287*** (-13.78) | -6.2443*** (-13.98) | -17.8426*** (-4.98) | -17.5896*** (-4.83) | -18.9099*** (-4.59) |
| ABSS(-5,-1) | -0.1305** (-2.04) | -0.1260** (-2.06) | -0.0918 (-1.54) | -0.0759 (-1.24) | -0.0143 (-0.25) |
| ABRET(-5, -1) | | -0.2611** (-2.17) | -0.2764** (-2.36) | -0.3456*** (-3.14) | -0.4541*** (-4.08) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.011 | 0.020 | 0.043 | 0.122 | 0.189 |

| Panel B: ID sample with $ID - FD > 8$ days | | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | 1.4347* (1.96) | 1.4286* (1.95) | 11.3355** (2.13) | 11.1870* (1.67) | 11.2696 (1.57) |
| ABSS(-5,-1) | -0.1699*** (-3.40) | -0.1805*** (-3.79) | -0.1685*** (-4.03) | -0.1445*** (-2.83) | -0.1668*** (-2.89) |
| ABRET(-5, -1) | | 0.1299* (1.85) | 0.1023 (1.22) | 0.0788 (0.86) | 0.0605 (0.62) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.007 | 0.008 | 0.017 | 0.038 | 0.068 |

Table 5: Event-window Short-selling and Post-Event Returns, for FD-based Windows

This table reports the regression results of the below equation as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX, that were subject to securities class action lawsuits from 08/2009 to 06/2019:

$$ABRET(2,6)_i = \beta_0 + \beta_1 ABSS(0,1)_i + \beta_2 ABRET(0,1)_i + CONTROLS_i + \varepsilon_i$$

where $ABSS(0,1)_i$ is the average daily abnormal short-selling in a two-day window upon the filing of a security class action lawsuits for case i ; $ABRET(2,6)_i$ and $ABRET(0,1)_i$ denote the abnormal return (in percentage) measured during the post-event and event windows, respectively; $CONTROLS_i$ is a set of control variables that include a defendant firm's momentum, book-to-market ratio, firm size, bid-ask spread, as well as month and court dummy variables; the β s are coefficients to be estimated; and ε_i is the residual. Detailed descriptions of all variables are provided in Appendix B. Panels A and B report results for the two filing date (FD) samples without and with pre-announcement of law firm investigations, respectively. Newey-West (1994) Heteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: FD Sample without Pre-filing Announcements of Investigations by Law Firms | | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.1993*** (-4.32) | -0.2176*** (-4.74) | -2.0272*** (-4.76) | -2.0727*** (-4.69) | -1.5635*** (-3.12) |
| ABSS(0,1) | -0.0281*** (-3.91) | -0.0268*** (-4.70) | -0.0254*** (-4.40) | -0.0278*** (-4.50) | -0.0280*** (-4.33) |
| ABRET(0,1) | | -0.0439*** (-4.06) | -0.0474*** (-4.41) | -0.0465*** (-4.17) | -0.0474*** (-4.30) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.020 | 0.037 | 0.061 | 0.084 | 0.112 |

Table 5: (continued)

| Panel B: FD Sample with Pre-filing Announcements of Investigations by Law Firms | | | | | |
|---|----------------------|----------------------|--------------------|--------------------|--------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.1212** (-2.41) | -0.1213** (-2.42) | -0.3815 (-0.75) | -0.4808 (-0.95) | -0.1880 (-0.36) |
| ABSS(0,1) | -0.0150 (-1.62) | -0.0131 (-1.42) | -0.0107 (-1.13) | -0.0071 (-0.72) | -0.0075 (-0.79) |
| ABRET(0,1) | | 0.0216 (0.97) | 0.0201 (0.91) | 0.0259 (1.17) | 0.0201 (0.92) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.006 | 0.008 | 0.020 | 0.055 | 0.071 |

Table 6: Event-window Short-selling and Post-Event Returns, for ID-based Windows

This table reports the regression results of the above equation as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX from 08/2009 to 06/2019, with announcements of law-firm investigations prior to the official filing of a security class action lawsuit.

$$ABRET(2,6)_i = \beta_0 + \beta_1 ABSS(0,1)_i + \beta_2 ABRET(0,1)_i + CONTROLS_i + \varepsilon_i$$

where $ABSS(0,1)_i$ is the average daily abnormal short-selling in a two-day window where day-0 is the day of the investigation-news release that precedes the lawsuit filing for case i ; $ABRET(2,6)_i$ and $ABRET(0,1)_i$ denote the abnormal return (in percentage) measured during the post-event and event windows, respectively; $CONTROLS_i$ is a set of control variables that include a defendant firm's momentum, book-to-market ratio, firm size, bid-ask spread, as well as month and court dummy variables; the β s are coefficients to be estimated; and ε_i is the residual. Detailed descriptions of all variables are provided in Appendix B. Newey-West (1994) heteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: Full Sample | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.2829*** (-5.30) | -0.2697*** (-5.25) | -0.8384** (-1.98) | -0.9138** (-2.15) | -0.6117 (-1.15) |
| ABSS(0,1) | -0.0135*** (-4.43) | -0.0127*** (-3.77) | -0.0125*** (-3.93) | -0.0125*** (-3.75) | -0.0124*** (-3.69) |
| ABRET(0,1) | | 0.0068 (1.17) | 0.0078 (1.35) | 0.0068 (1.17) | 0.0056 (0.99) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.031 | 0.033 | 0.047 | 0.068 | 0.087 |

Table 6: (continued)

| Panel B: ID Sample where $ID - FD \leq 8$ days | | | | | |
|--|------------|------------|------------|------------|------------|
| Intercept | -0.4470*** | -0.5376*** | -1.7651** | -1.8905** | -1.5339* |
| | (-5.10) | (-4.90) | (-2.36) | (-2.37) | (-1.67) |
| ABSS(0,1) | -0.0132*** | -0.0160*** | -0.0152*** | -0.0157*** | -0.0153*** |
| | (-3.28) | (-3.20) | (-3.25) | (-3.33) | (-3.22) |
| ABRET(0,1) | | -0.0197 | -0.0194 | -0.0226 | -0.0282* |
| | | (-1.14) | (-1.14) | (-1.32) | (-1.70) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.029 | 0.035 | 0.062 | 0.076 | 0.113 |
| Panel C: ID Sample where $ID - FD > 8$ days | | | | | |
| Intercept | -0.1263** | -0.1334** | 0.5700 | 0.1868 | 0.0465 |
| | (-2.15) | (-2.26) | (1.18) | (0.40) | (0.08) |
| ABSS(0,1) | -0.0102*** | -0.0107*** | -0.0116*** | -0.0149*** | -0.0132*** |
| | (-3.04) | (-3.48) | (-3.79) | (-5.13) | (-4.57) |
| ABRET(0,1) | | 0.0130** | 0.0130* | 0.0104* | 0.0113** |
| | | (1.97) | (1.88) | (1.87) | (2.04) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | No | Yes | Yes |
| Month Dummies | No | No | No | No | Yes |
| Adjusted R^2 | 0.019 | 0.037 | 0.054 | 0.188 | 0.207 |

Table 7: Extended Regression Models

This table reports the results from estimating equations (3), and (4) as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX over 08/2009 to 06/2019, that had a security class-action lawsuits filed against them. The variable ABSS(m,n) measures average daily abnormal short-selling from day m to day n relative to a news event, which can be either an announcement of investigation by law firms or the filing of a lawsuit. ABRET(m,n) denotes the the average daily abnormal return (in percentages) during a window and is similarly defined. SETTLED, DISMISSED, SEC, IPO, and M&A are dummy variables that indicate if a case is settled, dismissed, under SEC investigation, related to an IPO, or merger and acquisition. The regressions also include the following set of control variables (unreported): momentum, book-to-market ratio, firm size, bid-ask spread, as well as month and court dummy variables. Panel A.1 (A.2) reports results for the filing-date sample with (without) a pre-announcement of a law-firm investigation; see columns 1 and 2 (3 and 4). Panel B presents results for the investigation-date sample. Detailed descriptions of all variables are provided in Appendix B. Newey-West (1994) heteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: Filing-Date (FD) Samples | | | | |
|--|-------------------------------|---------------------|----------------------------------|-----------------------|
| Dep. Var. | Panel A.1: With Investigation | | Panel A.2: Without Investigation | |
| | 1. Equation (3) | 2. Equation (4) | 3. Equation (3) | 4. Equation (4) |
| | ABRET(0,1) | ABRET(2,6) | ABRET(0,1) | ABRET(2,6) |
| Intercept | -0.2731 (-0.22) | -0.0589 (-0.10) | -1.0653 (0.77) | -1.0612** (-2.34) |
| ABSS(-5,-1) | -0.0393** (-2.22) | | -0.0326** (-2.34) | |
| ABRET(-5,-1) | -0.0375 (-0.77) | | -0.4089*** (-3.40) | |
| ABSS(0,1) | | -0.0065 (-0.69) | | -0.0254*** (-3.89) |
| ABRET(0,1) | | 0.0178 (0.85) | -0.0489*** (-4.31) | -0.0492*** (-4.59) |
| SETTLED | -0.5138 (-1.31) | -0.4150* (-1.88) | 0.0094 (0.03) | -0.3679** (-2.37) |
| DISMISSED | -0.1059 (-0.33) | -0.0440 (-0.22) | -0.2921 (-0.87) | 0.0130 (0.10) |
| SEC | 2.3890*** (4.23) | -0.1833 (-0.55) | -2.6080*** (-3.60) | -4.6704*** (-9.78) |
| IPO | 0.5734 (0.91) | 2.1454*** (2.88) | -0.0994 (-0.12) | 0.3656 (0.94) |
| M&A | 0.1900 (1.13) | 0.0496 (0.53) | 0.5172*** (2.67) | 0.1483* (1.71) |
| Unreported: log(BM), log(SIZE), MOM, SPREAD, COURT and MONTH dummies | | | | |
| Adjusted R^2 | 0.055 | 0.091 | 0.137 | 0.171 |

Table 7: (continued)

| Panel B: Investigation-Date (ID) Sample | | |
|--|-------------------------------|-------------------------------|
| Dependent Variable | 1, Equation (3) ABRET(0,1) | 2. Equation (4) ABRET(2,6) |
| Intercept | -8.9410*** (-2.71) | -0.9517 (-1.63) |
| ABSS(-5,-1) | -0.0672* (-1.73) | |
| ABRET(-5,-1) | -0.1955** (-2.26) | |
| ABSS(0,1) | | -0.0111*** (-3.31) |
| ABRET(0,1) | | 0.0000 (0.00) |
| SETTLED | -2.8644*** (-3.02) | -0.1653 (-0.72) |
| DISMISSED | 2.6370*** (3.11) | 0.1354 (0.64) |
| SEC | -5.1484** (2.14) | 0.7532** (2.02) |
| IPO | -1.7686 (-0.49) | -0.0531 (-0.11) |
| M&A | 5.5508*** (6.47) | 0.3767*** (3.14) |
| Unreported: log(BM), log(SIZE), MOM, SPREAD, COURT and MONTH dummies | | |
| Adjusted R^2 | 0.172 | 0.102 |

Figure 1: Screenshot of Law Firm News Search Results from FACTIVA

This figure shows the screenshot of search results for law firm investigation news related to Natural Health Trends Corporation (ticker: NHTC) from 12/21/2015 to 01/11/2016. The lawsuit filing date for this firm is on 01/12/2016.

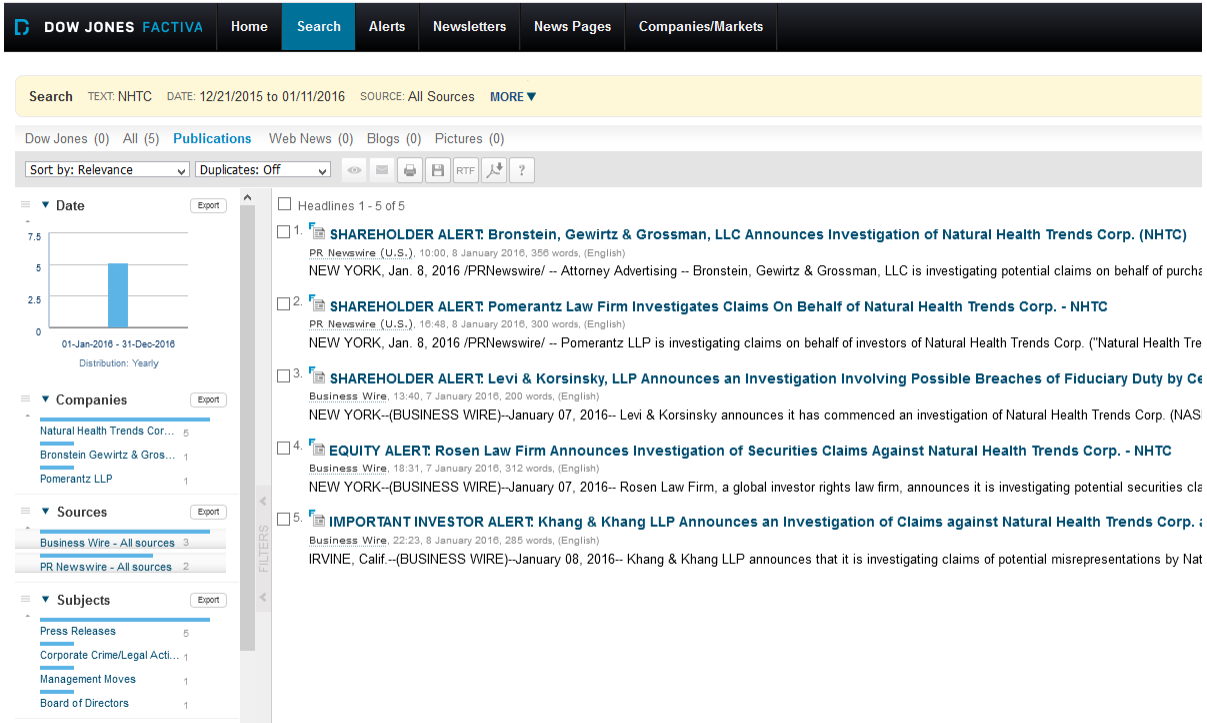


Figure 2: Abnormal daily short-selling and returns around securities class action lawsuits and law firm investigation announcements

This plots show the daily average abnormal short selling (top panel) and abnormal returns (bottom panel) from 10 days before to 10 days after the filing day (FD) and investigation announcement day (ID) in securities class action lawsuits. We include plots for three samples: FD sample with prior investigation announcements by law firms, FD sample without prior investigation announcements by law firms, and the ID sample. The abnormal short selling and abnormal returns are computed using the matching sample approach. The sample period is from 08/2009 to 06/2019.

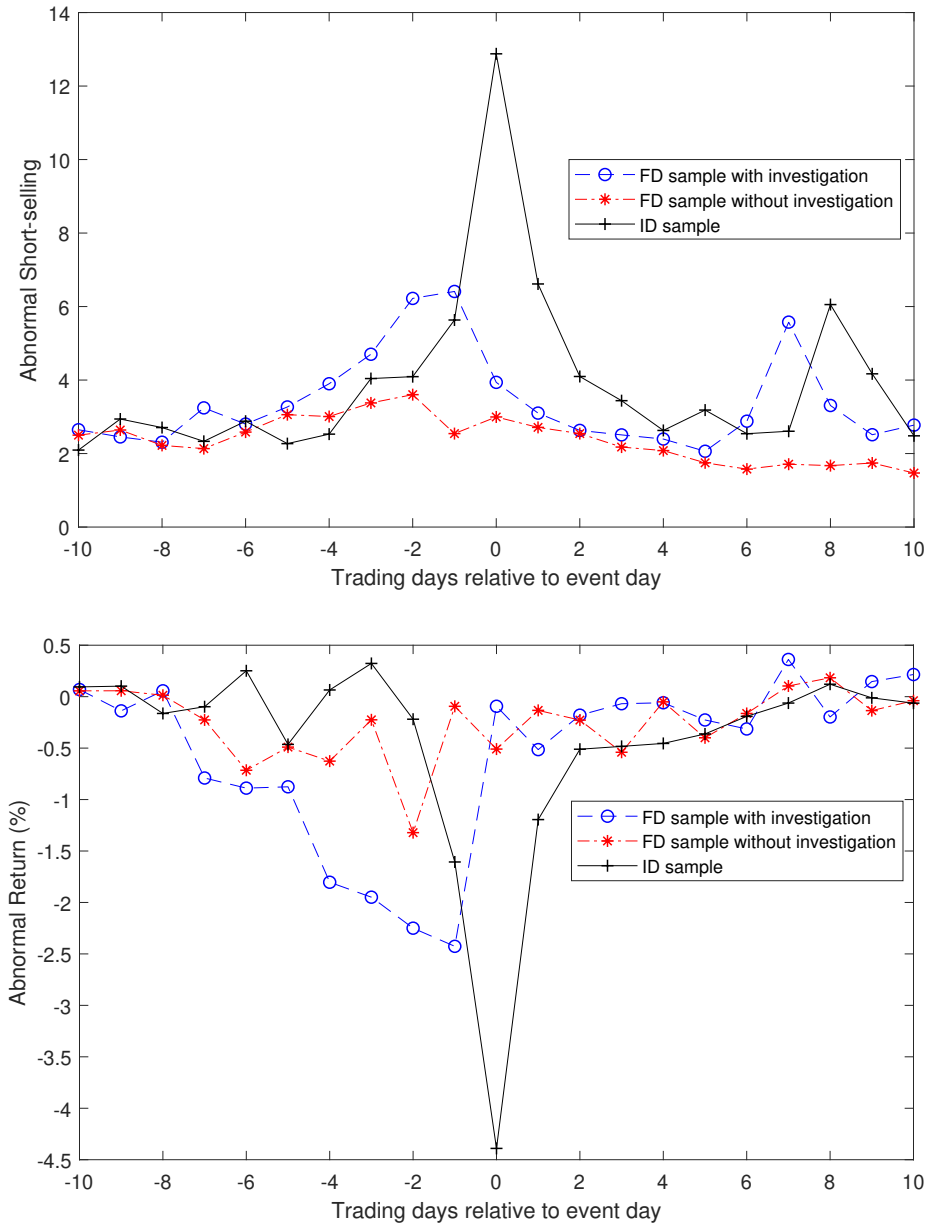
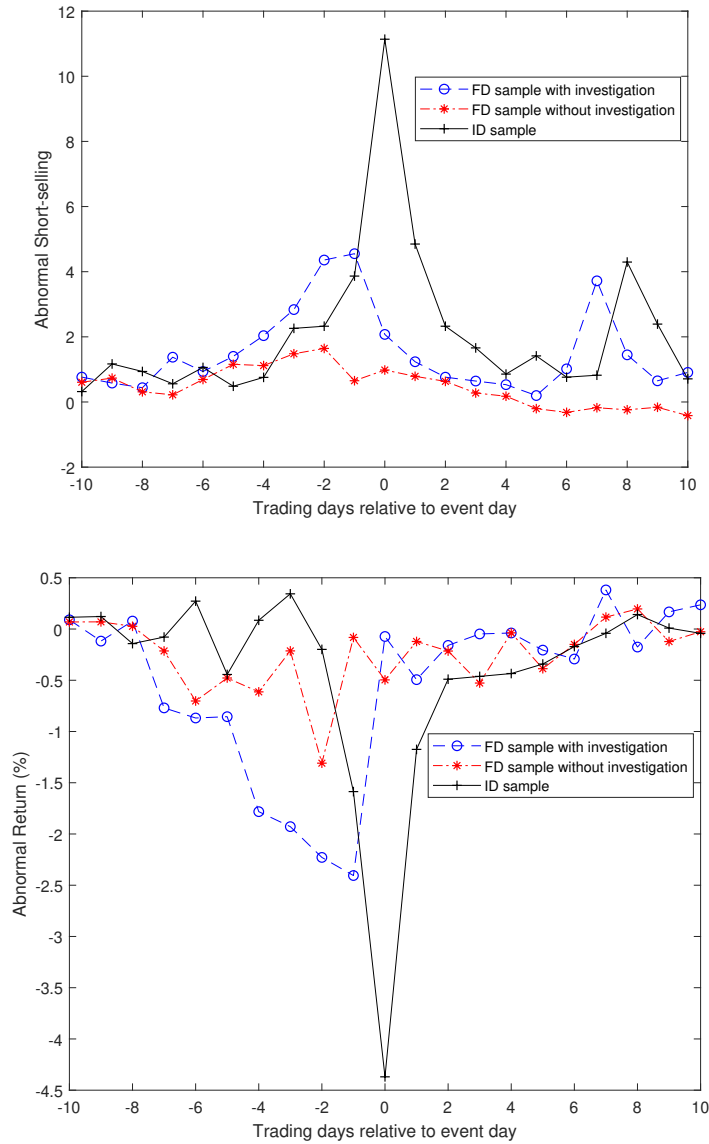


Figure 3: Abnormal daily short-selling and returns around securities class action lawsuits and law firm investigation announcements: Alternative Benchmarks

This plots show the daily average abnormal short selling (top panel) and abnormal returns (bottom panel) based on alternative benchmarks from 10 days before to 10 days after the filing day (FD) and investigation announcement day (ID) in securities class action lawsuits. We compute abnormal returns by subtracting CRSP value-weighted index returns. For abnormal short selling, we subtract the sample mean of short selling in a pre-event window from 66 to 22 trading days before the filing dates. We include plots for three samples: FD sample with prior investigation announcements by law firms, FD sample without prior investigation announcements by law firms, and the ID sample. The sample period is from 08/2009 to 06/2019.



Appendix A: Searching for Law Firm News in FACTIVA

In this appendix, we provide more detailed description about our search procedure for law firms investigation news, and offer a specific example to demonstrate the search procedure.

As described in section 4, we rely on search results from the FACTIVA database, which is a leading business information monitoring and research platform owned by Dow Jones. More specifically, we use the ticker symbol and filing date information from Standard securities class-action lawsuits database, and conduct a comprehensive search in FACTIVA. We restrict our search setting to the news items from the U.S. and in English. Initially, we also confine our search to within three weeks before the lawsuit filing day. During our search, we find that in some cases, law firms send reminders to investors about their ongoing investigations. In such cases, we trace back to the initial announcement of such investigations. In many instances, there are multiple investigation announcements by various law firms. We use the earliest announcement date as our investigation news date.

As an illustrative example, we random select a firm from our sample, and the company is Natural Health Trends Corporation (ticker:NHTC). The class action lawsuit against this firm was filed on January 12, 2016. To search for related law firm investigation news, we first enter the company's ticker symbol, and then specify the range of search dates to be three weeks prior to the filing date, which in this case is from 12/21/2015 to 01/11/2016. Figure 1 provides a screenshot of the search results. FACTIVA returns five news headlines for this firm during the specified period. Fortunately in this particular case, all of them are related to law firm investigations. Two law firms (Levi & Korsinsky, LLP and Rosen Law Firm) announced their investigations on January 7, 2016. The other three law firms made their announcements on the next day. So in this case, we decide that the law firm investigation date is 01/07/2016, which is 5 days before the official filing date.

We can also click on the news headlines to view the full length news article. For example, the following is the news article about the investigation launched by Levi & Korsinsky.

NEW YORK-(BUSINESS WIRE)-January 07, 2016- Levi & Korsinsky announces it has commenced an investigation of Natural Health Trends Corp. (NASDAQ: NHTC) concerning possible breaches of fiduciary duty and securities fraud violations by the board of directors of the company. To obtain additional information, go to: [1](http://zlk.9nl.com/natural-</i></p></div><div data-bbox=)

health-nhtc or contact Joseph E. Levi, Esq. either via email at jlevi@zlk.com or by telephone at (212) 363-7500, toll-free: (877) 363-5972. Levi & Korsinsky is a national firm with offices in New York, New Jersey, California, Connecticut and Washington D.C. The firm's attorneys have extensive expertise in prosecuting securities litigation involving financial fraud, representing investors throughout the nation in securities and shareholder lawsuits. Attorney advertising. Prior results do not guarantee similar outcomes.

Appendix B: Description of Variables

In this appendix, we provide details on all variables that we use in our analysis.

1. $ABSS(m, n)$ measures the amount of average daily abnormal short-selling in a window from day m to day n relative to the main event (either the filing of a lawsuit or an investigation announcement by law firms). We use the matching portfolio approach, which measures ABSS as the difference between the defendant firm's average ratio of shorted shares to thousands of shares outstanding in an event window around the main event minus the median value for the same measure over the same days for companies in the defendant firm's matching portfolio, which is doubly sorted on size and book-to-market. Shares outstanding is from CRSP. We consider three event windows: a pre-event window that is from 5 days before the main event ($m = -5$ and $n = -1$), the event window where $m = 0$ and $n = 1$, and the post-event window where $m = 2$ and $n = 6$.
2. $ABRET(m, n)$ is the average daily abnormal return in a window from day m to day n relative to the main event (either the filing of a lawsuit or an investigation announcement by law firms). We use the matching portfolio approach, which measures the ABRET as the defendant firm's daily returns in an event window around the main event minus the median value for the same measure over the same days for companies in the defendant firm's matching portfolio, which is doubly sorted on size and book-to-market. We consider three event windows: a pre-event window that is from 5 days before the main event ($m = -5$ and $n = -1$), the event window where $m = 0$ and $n = 1$, and the post-event window where $m = 2$ and $n = 6$.
3. MOM is defined as the defendant firm's six-month average return (after skipping the most recent month) prior to the main event.
4. BM (Book-to-Market): We follow Fama and French (1993) and calculate this ratio using book common equity for the fiscal year ending in the previous calendar year, divided by market equity at the end of last December. In the regression analysis, we use the log transformed version of this variable.

5. *SIZE*: We follow Fama and French (1993) and calculate this variable using a firm's market equity at the end of last December. In the regression analysis, we use the log transformed version of this variable.
6. *SPREAD* is the average closing bid-ask spread from 66 trading days to 22 trading days prior to the event day. The closing bid-ask spread is obtained from CRSP daily stock returns file. We scale the spread by share price and multiply it by 100.
7. *COURT* is a vector of dummy variables with their values set to one if a lawsuit is filed with one of the top 10 district courts (ranked by the number of lawsuits) in our sample. These district courts include: S.D. New York, D. Delaware, N.D. California, C.D. California, D. Massachusetts, D. New Jersey, N.D. Illinois, S.D. Texas, S.D. California, and E.D. New York.
8. *MONTH* is a set of dummy variables with their values set to one if a day belongs to one of the calendar months from February to December, and zero otherwise.
9. *IPO*: The value of this dummy variable is equal to 1 if the case summary of a given lawsuit indicates that the lawsuit is related to an initial public offering, and 0 otherwise.
10. *M&A*: The value of this dummy variable is equal to 1 if the case summary of a given lawsuit indicates that the lawsuit is related to a merger and acquisition deal, and 0 otherwise.
11. *SEC*: The value of this dummy variable is equal to 1 if the case summary of a given lawsuit indicates that the defendant firm has been under an investigation by the SEC.
12. *SETTLED* The value of this dummy variable is equal to 1 if the case status of a given lawsuit indicates that the lawsuit has been settled as of December 2020, and 0 otherwise.
13. *DISMISSED* The value of this dummy variable is equal to 1 if the case status of a given lawsuit indicates that the lawsuit has been dismissed as of December 2020, and 0 otherwise.

Appendix C: Supplemental Results

This appendix provides tabular details for results only summarized in the main text.

Appendix Table C1 reports on the simple correlation between our key abnormal shorting and abnormal return variables, as mentioned in Section 5.2.

Appendix Table C2 reports on the relation between the pre-announcement shorting and the post-announcement abnormal return, for the cases of the initial public announcement about the lawsuit. This table support discussion in Section 6.3.

Appendix Table C3 reports subperiod results for the key abnormal shorting and abnormal return variables, as discussed briefly in Section 7.1.

Table C1: Correlation Matrix of Key Variables

This appendix table reports the correlation matrix for variables of interest. ABSS measures average daily abnormal short-selling in a window around the main event day. ABRET denotes the average daily abnormal returns in a window around the main event day. Panel A reports the estimates for variables from the lawsuit filing date (FD) samples, where the upper (lower) triangle contains results from the FD sample without (with) pre-announcement of investigation by law firms. Panel B shows results from the law firm investigation date (ID) sample. *P*-values are reported in square brackets.

| Panel A: FD sample | | | | | | |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | ABSS(-5,-1) | ABSS(0,1) | ABSS(2,6) | ABRET(-5,-1) | ABRET(0,1) | ABRET(2,6) |
| Upper Triangle: FD sample without investigation by law firms | | | | | | |
| ABSS(-5,-1) | 1 | 0.6493 [0.0000] | 0.6885 [0.0000] | -0.1727 [0.0000] | -0.0551 [0.0000] | -0.0794 [0.0000] |
| ABSS(0,1) | 0.7095 [0.0000] | 1 | 0.7223 [0.0000] | -0.2792 [0.0000] | 0.0498 [0.0000] | -0.1410 [0.0000] |
| ABSS(2,6) | 0.7102 [0.0000] | 0.7165 [0.0000] | 1 | -0.1244 [0.0000] | -0.0881 [0.0000] | 0.0130 [0.2130] |
| ABRET(-5,-1) | -0.3395 [0.0000] | -0.2738 [0.0000] | -0.3038 [0.0000] | 1 | -0.2314 [0.0000] | 0.0881 [0.0000] |
| ABRET(0,1) | -0.1302 [0.0000] | -0.2195 [0.0000] | -0.1422 [0.0000] | 0.0311 [0.0025] | 1 | -0.1371 [0.0000] |
| ABRET(2,6) | -0.0467 [0.0000] | -0.0766 [0.0000] | 0.0643 [0.0000] | -0.1037 [0.0000] | 0.0594 [0.0000] | 1 |
| Lower Triangle: FD sample with investigation by law firms | | | | | | |
| Panel B: ID sample | | | | | | |
| ABSS(-5,-1) | 1 | 0.3988 [0.0000] | 0.5203 [0.0000] | 0.0709 [0.0000] | -0.0981 [0.0000] | -0.0914 [0.0000] |
| ABSS(0,1) | | 1 | 0.7205 [0.0000] | -0.0464 [0.0000] | -0.2105 [0.0000] | -0.1761 [0.0000] |
| ABSS(2,6) | | | 1 | -0.0895 [0.0000] | -0.3157 [0.0000] | -0.2242 [0.0000] |
| ABRET(-5,-1) | | | | 1 | 0.0377 [0.0002] | 0.0916 [0.0000] |
| ABRET(0,1) | | | | | 1 | 0.0810 [0.0000] |
| ABRET(2,6) | | | | | | 1 |

Table C2: Short selling before the Initial Lawsuit News and Post-Announcement Returns

This appendix table reports the regression results of the below equation as fitted to daily returns of common stocks, listed on NASDAQ, NYSE and AMEX, subject to the filing of securities class action lawsuits from 08/2009 to 06/2019:

$$ABRET(2, 6)_i = \beta_0 + \beta_1 ABSS(-5, -1)_i + \beta_2 ABRET(-5, -1)_i + \beta_3 ABRET(0, 1)_i + CONTROLS_i + \varepsilon_i$$

where $ABSS(-5,-1)_i$ is the average daily abnormal short-selling in the five-day period before the initial public news announcement about lawsuit i , either the actual filing announcement of the lawsuit (for the lawsuits without a pre-filing IN release) or the pre-filing law-firm investigation announcement (for lawsuits with a preceding IN release); $ABRET(2,6)_i$, $ABRET(-5,-1)_i$, and $ABRET(0,1)_i$ are average daily abnormal returns (in percentages) during the post-event, pre-event, and event windows, respectively; $CONTROLS_i$ denotes a set of additional control variables that include momentum (MOM), log of book-to-market ratio (BM), log of firm size (SIZE), bid-ask spread (SPREAD), as well as dummy variables for district courts and calendar months (unreported). Panel A reports results for the filing date (FD) sample without a pre-filing announcement of a law-firm investigation. Panel B reports results for the investigation-day (ID) sample for the lawsuits with a pre-filing announcement of a law-firm investigation. Detailed descriptions of all variables are provided in Appendix B. Newey-West (1994) heteroskedasticity and autocorrelation consistent t -statistics with automatic lag selections are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1% levels, respectively.

| Panel A: FD Sample without a Pre-filing Announcement of Law-firm Investigations | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.2382*** (-5.13) | -2.0239*** (-4.78) | -2.0872*** (-4.74) | -1.6699*** (-3.36) | -1.7434*** (-3.55) |
| ABSS(-5,-1) | -0.0136** (-2.03) | -0.0086 (-1.44) | -0.0090 (-1.53) | -0.0081 (-1.39) | -0.0097* (-1.65) |
| ABRET(-5, -1) | | 0.0396** (2.10) | 0.0460** (2.51) | 0.0447** (2.46) | 0.0257 (1.53) |
| ABRET(0, 1) | | | | | -0.0461*** (-4.02) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | Yes | Yes | Yes |
| Month Dummies | No | No | No | Yes | Yes |
| Adjusted R^2 | 0.006 | 0.036 | 0.059 | 0.086 | 0.102 |

Table C2: (continued)

| Panel B: ID Sample | | | | | |
|---|-----------------------|-----------------------|-----------------------|----------------------|---------------------|
| | [1] | [2] | [3] | [4] | [5] |
| Intercept | -0.3321*** (-5.95) | -1.2360*** (-2.79) | -1.3205*** (-2.98) | -0.9806* (-1.80) | -0.9466* (-1.76) |
| ABSS(-5,-1) | -0.0227** (-2.53) | -0.0226** (-2.46) | -0.0223** (-2.26) | -0.0208** (-2.06) | -0.0198* (-1.90) |
| ABRET(-5, -1) | | 0.0500** (2.44) | 0.0478** (2.33) | 0.0456** (2.22) | 0.0456** (2.21) |
| ABRET(0, 1) | | | | | 0.0088 (1.57) |
| Controls (BM, SIZE, MOM, and SPREAD) | No | No | Yes | Yes | Yes |
| Court Dummies | No | No | Yes | Yes | Yes |
| Month Dummies | No | No | No | Yes | Yes |
| Adjusted R^2 | 0.008 | 0.033 | 0.055 | 0.074 | 0.077 |

Table C3: Returns and short-selling activities around lawsuit filing days: Sub-Period Results

This appendix table reports on the same variables as in main Table 2, but separately for approximate one-half sub-periods. We report on the average daily returns and short-selling activities of firms subject to securities class action lawsuits around the lawsuit filing date (FD) and law-firm investigation announcement date (ID). Our sample includes all domestic common stocks listed on NASDAQ, NYSE and AMEX that are subject to the class action lawsuits during this period. We report the average daily abnormal short selling (ABSS) and average daily abnormal return (ABRET), both adjusted by size and book-market sorted matching portfolios, during the event windows $[0,1]$, the pre-event window $[-5,-1]$, and the post-event window $[2,6]$, where $t = 0$ is the event day (for either FD or ID). Panel A reports on the earlier 8/2009 to 10/2014 period, with Panel A.1 (columns 1 and 2) reporting on the FD-window observations without prior investigation news releases, Panel A.2 (columns 3 and 4) reporting on the FD-window observations with prior investigation news releases, and Panel A.3 (columns 5 and 6) reporting on the ID-window observations. Panel B reports on the later 11/2014 to 6/2019 period, with Panel B.1 (columns 7 and 8) reporting on the FD-window observations without prior investigation news releases, Panel B.2 (columns 9 and 10) reporting on the FD-window observations with prior investigation news releases, and Panel B.3 (columns 11 and 12) reporting on the ID-window observations. Rows 4 to 6 report on the denoted difference between the statistics in rows 1 to 3. t -statistics are reported in parentheses for rows 1 to 3 and p -values are reported in square brackets for rows 4 to 6.

| Panel A: Early Part of Sample: 08/2009 to 10/2014 | | | | | | |
|---|--------------------------|---------------------|-----------------------|---------------------|--------------------|---------------------|
| | Panel A.1 | | Panel A.2 | | Panel A.3 | |
| | FD without investigation | | FD with investigation | | ID sample | |
| Window | 1. ABSS | 2. ABRET(%) | 3. ABSS | 4. ABRET(%) | 5. ABSS | 6. ABRET(%) |
| 1: $[-5,-1]$ | 3.9845 (28.90) | -0.8084 (-15.22) | 5.4960 (28.09) | -3.0494 (-32.48) | 3.9608 (29.94) | -1.1906 (-19.92) |
| 2: $[0,1]$ | 3.5534 (30.16) | -0.2860 (-3.78) | 4.7068 (27.63) | -0.7941 (-8.50) | 8.6874 (25.76) | -5.7548 (-31.70) |
| 3: $[2, 6]$ | 2.4216 (37.19) | -0.3305 (-13.38) | 3.8030 (21.54) | -0.3897 (-9.70) | 3.7389 (31.62) | -0.7571 (-18.59) |
| 4. differ. (2-1): | -0.4310 [0.0003] | 0.5224 [0.0000] | -0.7892 [0.0000] | 2.2554 [0.0000] | 4.7265 [0.0000] | -4.5642 [0.0000] |
| 5. differ. (2-3) | 1.1318 [0.0000] | 0.0444 [0.5950] | 0.9037 [0.0000] | -0.4043 [0.0000] | 4.9484 [0.0000] | -4.9977 [0.0000] |
| 6. differ. (1-3) | 1.5629 [0.0000] | -0.4780 [0.0000] | 1.6929 [0.0000] | -2.6597 [0.0000] | 0.2218 [0.0390] | -0.4335 [0.0000] |

Table C3: (continued)

| Panel B: Later Part of Sample: 11/2014 to 06/2019 | | | | | | |
|---|--------------------------|---------------------|-----------------------|---------------------|--------------------|---------------------|
| | Panel B.1 | | Panel B.2 | | Panel B.3 | |
| | FD without investigation | | FD with investigation | | ID sample | |
| Window | 7. ABSS | 8. ABRET(%) | 9. ABSS | 10. ABRET(%) | 11. ABSS | 12. ABRET(%) |
| 1: [-5,-1] | 2.1065 (21.53) | -0.3829 (-12.17) | 4.9678 (35.32) | -1.5733 (-36.79) | 3.6339 (41.64) | -0.1727 (-3.61) |
| 2: [0,1] | 2.1715 (23.48) | -0.4042 (-8.72) | 3.1689 (32.94) | -0.1122 (-3.58) | 10.4419 (34.91) | -1.9678 (-13.07) |
| 3: [2, 6] | 1.6743 (19.51) | -0.1981 (-12.14) | 2.1048 (35.37) | -0.0968 (-5.55) | 3.0298 (39.75) | -0.3037 (-15.37) |
| 4. differ. (2-1) | 0.0650 [0.2987] | -0.0213 [0.7166] | -1.7989 [0.0000] | 1.4611 [0.0000] | 6.8080 [0.0000] | -1.7951 [0.0000] |
| 5. differ. (2-3) | 0.4973 [0.0000] | -0.2061 [0.0000] | 1.0641 [0.0000] | -0.0153 [0.6667] | 7.4121 [0.0000] | -1.6641 [0.0000] |
| 6. differ. (1-3) | 0.4322 [0.0000] | -0.1848 [0.0000] | 2.8630 [0.0000] | -1.4765 [0.0000] | 0.6041 [0.0000] | 0.1310 [0.0109] |