Institutional Investors and Post-Litigation Security Returns

Using changes and levels of institutional ownership and its composition, we find evidence supporting possible predictability of long-term stock returns following shareholder class-action litigation. Announcements of shareholder class-action litigation represent a unique research opportunity. On one hand, such events are not entirely unexpected especially by the parties who closely monitor the firm, on the other hand, they still carry a large surprise component (e.g., stocks drop on average 4%-6% on the day of the litigation announcement). While empirical results suggests that institutions are generally "smarter" than individuals, institutions with short-term performance focus (i.e., independent investment advisors and to a lesser extent mutual funds) are better at capitalizing on information contained in litigation announcements than institutions with long-term performance focus. It appears that institutional investors are able to identify future winners and losers.

Recent evidence suggests that institutional trades are at least partially motivated by information. Institutions may benefit through informed trading at the expense of less sophisticated individual investors. For example, individual investors may be exploited by institutional investors in capturing post-announcement drift (Cohen, Gompers, and Vuolteenaho (2002)), participate more frequently in lower-quality seasoned equity offerings (Gibson, Safieddine, and Sonti (2004)), select weaker initial public offerings (Field and Lowry (2005)), do a poor job interpreting both analyst recommendations (Mikhail, Walther, and Willis (2005)) and earnings announcements (Ali, Durtschi, Lev, and Trombley (2004)), exhibit trading behavior consistent with accruals-related mispricing (Collins, Gong, and Hribar (2003)), and frequently trade on misleading 'pro forma' earnings (Bhattacharya, Black, Christensen, and Mergenthaler (2005)).

It is not entirely clear how institutional investors derive their information advantage. Institutions likely possess better resources to access, collect and analyze information. They are more sophisticated in utilizing quantitative models, understanding fundamental values and risks, and employing trading rules, which prevent emotions from influencing institutional trading and investing decisions. Similarly, relationships with corporate managers may allow institutions to better understand various risks, including those that may not be present in business fundamentals, analyst reports or other corporate disclosures. We find that institutions add value by foreseeing litigation events. This ability varies across institutional types as evidenced by differences in percentage changes in institutional holdings prior to litigation events.

Our empirical analysis employs a sample of 999 securities class action lawsuits filed between January 1996 and December 2003. The announcement of a securities class action lawsuit may differ from other corporate events. Securities class actions result in a large negative

surprise component reflected in abnormal returns following the announcement date. These events may at least be partially foreseen by parties who closely monitor a firm. Thus, lawsuit announcements present an opportunity for informed investors to benefit from their informational advantage and predictive abilities. In our sample, we find an approximate five percent price reduction during a period of three days around the litigation announcement. Furthermore, in the 250 trading days before the announcement, sued firms suffer a price decline in excess of 45 percent. Clearly, there is a strong economic incentive for informed parties to act on their information advantage and to adjust their portfolios prior to a litigation event.

The difficulty in predicting lawsuits may present an opportunity for institutional managers to create value. The ability to predict and avoid a potentially value-destroying event may serve as a source of positive alphas and may justify active management fees.

Institutional money managers are frequently referred to as "smart money" because they can afford to monitor large investment positions, have the requisite skills to judge the efficacy of observed market prices, and may benefit from having personal insights into a firm through frequent contacts with the firm's managers or its board of directors. As a result, we hypothesize that institutions are in an excellent position to observe and judge the risk of fraudulent firm behavior and potential shareholder litigation. Consequently, we expect institutions to decrease their holdings in companies that they view as potential litigation targets.

Our tests of institutional trading prior to lawsuit announcements are based on an industry and return momentum matched sample of sued and non-sued firms. This approach allows us to examine whether institutions exhibit trading patterns that are consistent with an informational advantage regarding potential litigation targets relative to other investors.

We contrast the differences between five major types of institutions (i.e., banks, insurance companies, mutual funds, independent investment advisors, and other unclassified institutions).[1] The recent literature (e.g., Ali, Durtschi, Lev, and Trombley (2004), Almazan, Hartzell, and Starks (2005), Ashraf and Jayaraman (2005), and Chen, Harford, and Li (2005)) classifies institutions into active monitors (primarily institutions with a short-term performance focus, i.e., independent investment advisors and mutual funds) and passive monitors (banks, insurance companies, and foundations, which tend to concentrate on long-term performance goals). Ashraf and Jayaraman (2005) argue that both mutual funds and independent investment advisors outperform passive monitors by reacting faster to merger and acquisition announcements. Ke and Ramalingegowda (2004) show that unlike institutions with a long-term focus, short-horizon institutions possess private information about long-term earnings, which is reflected in short-term prices. We hypothesize that active monitors possess a superior ability to predict negative events and therefore are more proactive than passive monitors in acting in their shareholders' interests and are able to avoid potential litigation targets prior to actual litigation announcements.

Bearing most of the losses in sued firms and lacking institutional skills and resources, individual investors may resort to shareholder litigation as a substitute for corporate governance. Our results are complementary to the findings of Parrino, Sias, and Starks (2002) who examine institutional selling before forced CEO turnovers. Our findings underscore the institutional monitoring and analytic abilities in their fiduciary functions.

Our empirical analysis addresses several important economic issues. First, we investigate whether institutions exploit other shareholders by selling their shares prior to litigation

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[1] Other unclassified institutions consist primarily of endowments, foundations, and self-managed pension funds.

announcements. Second, we test if differences in institutional preferences result in differences in information processing abilities. We hypothesize that active institutional monitors with strong relative performance preferences are better motivated to exhibit good stock picking abilities and avoid shareholder litigation targets relative to passive monitors. Third, we examine how institutions change portfolio positions in response to potential litigation risk factors and the extent to which they are able to forecast litigation risks as predicted by publicly available quantitative information. Finally, we assess if changes in institutional ownership are related to litigation risk shocks from our predictive model. The lack of significance of litigation risk shocks in our second stage regression to describe percentage changes in institutional ownership may be viewed as an indirect economic test of our litigation risk model.

Our findings consistently suggest that institutions adjust their portfolio composition in anticipation of and in reaction to lawsuit filings. Both mean and median institutional holdings changes are negative and significantly larger for sued versus non-sued firms prior to and immediately following lawsuit filings. We hypothesize that mutual funds and independent advisors will primarily be governed by the goal of achieving a strong performance relative to their peers. We further hypothesize that banks will monitor their investments with a strong desire to achieve capital preservation and to maintain a prudent appearance of their portfolios. Insurance companies and other unclassified institutions are hypothesized to be more passive as monitors with a focus on capital preservation and prudent portfolio management. We document significant differences in portfolio adjustments across the five major types of institutional investors. Mutual funds, independent investment advisors, and, to a lesser extent, banks adjust their portfolio composition in a manner consistent with our litigation risk prediction model. We also find that mutual funds and independent investment advisors are the most proactive

institutional types in adjusting their portfolio composition in eventual litigation targets. Banks show some reaction, while insurance companies and unclassified institutions appear to be unresponsive to potential signs of litigation risk.

The remainder of the paper is organized as follows. Section I describes our data sources and selected variables. Section II presents our methodology and provides empirical results regarding trends in aggregate institutional ownership and ownership by different types of institutions around litigation announcements. In Section III, we explore changes in institutional holdings in response to predicted litigation risk. We provide concluding remarks in Section IV.

I.   Data Description and Preliminary Empirical Analysis

Institutional Ownership Data

We obtain information on quarterly 13F holdings for all US registered money managers from the CDA Spectrum database currently maintained by Thomson Financial (previously CDA Investment Technologies). Each institution with discretionary control over more than $100 million worth of equity is required to file form 13F with the Securities and Exchange Commission and disclose all holdings of at least $200,000 or 10,000 shares of stock. Our data includes 40 quarters of recorded ownership data starting with the first quarter of 1994 (eight quarters prior to the beginning of our litigation data set) and ending in December 2003. The proportion of any given firm's outstanding shares held by all institutional owners in a given quarter is defined as,

$$Aggregate\ Institutional\ Ownership_{jt} = \sum_{i=1}^{N} \frac{s_{ijt}}{S_{jt}} \qquad (1)$$

where N is the number of institutional managers reporting their positions in firm j, s_{ijt} is the number of firm j's shares owned by institutional manager i in period t, and S_{jt} is the total number of firm j's shares outstanding in period t.

The fraction of shares outstanding owned by each of the five major types of institutions – mutual funds, independent investment advisors, insurance companies, banks, and other unclassified institutions (consisting primarily of endowments, foundations, and several self-managed pension funds) – may be defined by partitioning N into five groups according to ownership. For example, the percentage of company j owned by all banks in period t is,

$$Bank\ Holdings_{jt} = \sum_{i=1}^{N_b} \frac{s_{ijt}}{S_{jt}}, \tag{2}$$

where N_b defines the number of banks with positions in this security in this quarter.[2]

We match sued and non-sued firms based on their characteristics eight quarters prior to the lawsuit announcement. We define the date of the lawsuit announcement as T. The last day of the quarter prior to the event and the last day of the quarter immediately after the event are defined as $T-1$ and $T+1$, respectively.[3] We examine changes in institutional ownership for two years before and after the filing date.

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[2] During the 1983-1997 period CDA Spectrum classified institutions into the five major groups based on their primary asset management function. Under Thomson Financial ownership the classification system changed and during the last six years of the data set (1998-2003) there are multiple types, which were primarily self-assigned by institutions. We thank Rick Sias for provision of 13F data according to the original taxonomy of groups. New institutions are assigned to one of the five major groups.

[3] That is, only three months elapse between quarter $T-1$ and $T+1$. The lawsuit announcement may occur on any day during the quarter between $T-1$ and $T+1$.

Litigation Data

Our litigation data set contains information on securities class action lawsuits filed between January 1996 and December 2003. Lawsuit data are collected from Stanford's *Securities Class Action Clearinghouse* and are cross-referenced with data collected from the *Securities Class Action Alert* (SCAA), a monthly newsletter published by the Securities Class Action Services Division of Institutional Shareholder Services (ISS), the Delaware Corporate Law Clearinghouse, and Milberg Weiss' Securities Class Action Designated Internet Site (http://securities.milberg.com). For each lawsuit, we retrieve detailed case information from the Department of Justice *Public Access to Court Electronic Records* (PACER) database.

We do not consider lawsuits against foreign firms with American depository receipts (ADRs) listed on a U.S. exchange, non-publicly traded firms such as partnerships and sole-proprietorships, mutual funds, unit trusts and other investment organizations, real estate investment trusts (REITs), municipalities and any state or federal government entities, or individuals and other entities. We also exclude lawsuits against firms that are not contained in the CDA Spectrum database and lawsuits against firms that we could not identify in the Center for Research in Securities Prices (CRSP) database. Due to their distinct nature and lack of institutional trading history in the underlying firms, we exclude IPO-related lawsuits from our sample. Moreover, we exclude lawsuits that are brought against third parties, i.e. lawsuits in which investment banks or auditors are named as lead defendants. These lawsuits generally do not allege any direct wrongdoing by the firm itself and are therefore distinguishable from lawsuits in which the firm or its officers are named as lead defendants.[4] Furthermore, consistent

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[4] Most of the lawsuits we thereby exclude are part of the recent class actions filed against leading investment banks in connection with the misallocation and laddering of IPO shares, and tainted analyst recommendations (see http://securities.stanford.edu for more details).

with Simmons and Ryan (2005), we only consider shareholder lawsuits. Lawsuits by bondholders or other stakeholders are excluded. Finally, we only consider lawsuits alleging fraudulent stock price inflation and exclude cases alleging fraudulent stock price depression.

The resultant data set contains detailed information on 999 securities class action cases. We define the variable *Sued* as equal to one if a firm was sued during the sample period, and zero otherwise.

To ensure that the anticipation of an impending securities class action lawsuit represents valuable information for an investor, we perform an event-study to examine return patterns around lawsuit announcement dates. We find the average and median wealth loss for a defendant firm to be 4.7 and 2.1 percent, respectively, over a 3-day event window following litigation. Both values are highly significant based on both a *t*-test and a Wilcoxon signed-rank test (*p*-values<0.001). We also observe that during the 250 trading days prior to a lawsuit, the mean (median) sued firm loses more than 45 (50) percent of its equity value. Again, both values are highly significant.[5] Given these large negative pre-litigation returns, we analyze percentage changes in ownership after matching sued and non-sued firms based on industry classification and return momentum.

We collect daily returns for all firms in our lawsuit/settlement and institutional ownership data sets from CRSP. In addition, we retrieve information about the firm's SIC code, the exchange on which the company traded, when it was sued, trading volume, the number of outstanding shares and the firm's market capitalization from CRSP. In Table 1 we provide summary statistics for our institutional ownership and litigation samples.

*** Insert Table 1 about here ***

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[5] For brevity we do not report these results herein. Our results are qualitatively and quantitatively robust to different estimation approaches and alternative definitions of the estimation period.

Table 1 reports summary data on aggregate institutional ownership, market capitalization, and security class action complaints. To consider how sued firms differ from other firms we present results for firms that are available in both CRSP and the CDA Spectrum database (typical firms), as well as for the subset of sued firms. The upper panel reports sample means, medians, and lawsuit frequencies for each year of the sample. Consistent with the extant institutional literature (e.g., Bennett, Sias, and Starks (2003), and Sias, Starks, and Titman (2006)) we observe a clear increase in the proportion of shares held by institutions over time. Of all the firms listed in the CDA Spectrum database in 1994, institutions owned an average of 27.4 percent of outstanding shares. By 2003 that figure grew to nearly 40.3 percent.[6] Sued firms also experienced a significant increase in average institutional ownership levels from 37.9 to 55.5 percent during the same time period. Higher levels of institutional ownership in sued firms are consistent with plaintiffs filing more lawsuits against large firms with "deep pockets" (Alexander (1991) and an institutional propensity to invest in higher capitalization stocks (Gompers and Metrick (2001), and Bennett, Sias, and Starks (2003)). Likewise, the median market capitalization of sued firms is almost three times greater than that of a typical firm. The lower panel of the table reports sample statistics after pooling across all sample years.

II.   Methodology and Results

Matching Procedure

To control for changes in institutional holding patterns over time and across firms for reasons other than impending litigation, we create a matching sample of non-sued firms (cf.,

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[6] Note that the total proportion of institutional holdings may be slightly greater than the reported number, because only those institutions with holdings greater than $200,000 or 10,000 shares of stock are required to report their positions on the 13F form. Most institutions, however, report all of their positions. At the same time, some publicly traded firms may not have institutional owners and therefore would not be included in the CDA Spectrum database.

Barber and Lyon (1996)). To be included as a non-sued match, the matched firm must not have

been involved in any securities litigation during our sample period, must belong to the same

industry (based on two-digit SIC codes), and must have the closest return momentum, as

measured by total return over a period from eight quarters to one quarter prior to the lawsuit

(from T-8 to T-1).

Matching by pre-litigation return momentum allows us to control for the possibility that

disgruntled shareholders and/or attorneys may resort to opportunistic class action litigation

against companies experiencing poor returns on their stocks. Each stock in the non-sued sample

had returns similar to its comparable sued firm, but, of course, was not targeted by litigation.

This approach also allows us to distinguish between reductions in institutional ownership due to

perceived litigation risk as opposed to institutional exit from poorly performing firms. Matching

by industry controls for possible differences in institutional trading and for variations in litigation

risk across industrial sectors.[7]

Changes in Aggregate Institutional Ownership

There is substantial evidence of the positive correlation between changes in institutional

ownership and returns over the same period (e.g., Grinblatt, Titman, and Wermers (1995),

Nofsinger and Sias (1999), and Sias, Starks, and Titman (2006)). Although some institutions are

well-known momentum traders (e.g., Grinblatt, Titman, and Wermers (1995) find that 77 percent

of mutual funds are positive-feedback traders), most of the institutional herding can be attributed

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[7] In addition to the analyses described in the paper, we also performed robustness checks using different matching criteria. In particular, we also considered matching based on comparable institutional ownership levels at time T-8, to control for the importance of different ownership structures. We also confirmed that our litigation results were not based solely on firm size (Alexander (1991)) by using market capitalization matching. In all cases, our findings were qualitatively similar to the reported results.

to informed trading (Sias and Starks (1997)).[8] Arguably, institutional investors with relatively large ownership positions have the information, the expertise, and the monitoring incentives (Hartzell and Starks (2003)) to decrease their ownership position in firms with large potential future litigation risks. Taken with the observed average 45 percent price reduction in our pre-litigation period, institutional investors have a strong motivation to accurately predict and modify equity holdings in these firms. In a similar context, Hedge, Malone, and Finnerty (2003) document an average loss of two-thirds of a firm's equity value in the 200-day period following class action litigation and fraud disclosures.

To examine whether institutions are able to decrease or liquidate their positions in firms that are likely to be sued, we compare percentage changes in the proportion of shares owned by all institutions during a period of eight quarters before and after the litigation announcement for sued and matched non-sued firms. Barber and Lyon (1996) provide strong evidence that empirical tests based on changes in variables of interest, rather than on variable levels, will be better specified in most empirical contexts. For this reason, we examine percentage changes in institutional ownership in relation to various economic variables of interest.[9] In Table 2, Panel A, we report mean and median quarterly percentage changes in ownership levels. Cumulative changes relative to dates T-1 and T+1 are reported in Panel B. The last two columns contain p-values for the equality of means (t-tests) and the equality of medians (Wilcoxon tests) between sued and matched non-sued firms.

*** Insert Table 2 about here ***

We observe that within a period of two quarters prior to the lawsuit announcement, sued firms display a marked reduction in aggregate institutional holdings. For instance, in the quarter

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[8] Chiang and Venkatesh (1988), however, argue that market-makers do not regard institutions as informed traders.
[9] Our post lawsuit sample size is reduced for lawsuits that occur late in the sample period (without two years of post-event institutional ownership data).

from T-2 to T-1 the mean (median) percentage change in sued firm holdings is -1.03 (-0.28). The corresponding mean (median) percentage change in matched non-sued firm holdings is -0.19 (0.02), respectively.[10] This difference in coefficients is highly significant and shows a general reduction in institutional holdings as much as six months in advance of the lawsuit. The economic interpretation of the results is even more significant when considered in the context of the overall increasing trend of general levels of institutional ownership. Institutions appear to be able to correctly detect rising risks of litigation as early as four quarters prior to the litigation announcement. We also observe a highly significant difference between sued and non-sued firm holdings in the quarter from T-1 to T+1, reflecting how institutions reacted to the lawsuit during the quarter in which it was announced. The average (median) percentage change in holdings during the quarter from T-1 to T+1 is -3.25 (-1.22) with comparable non-sued firm holding percentage changes of -0.15 (0.02). These differences are again highly significant.

The significant decline in aggregate institutional ownership in sued firms continues for one more quarter after the litigation announcement. The economic impact of this decline is perhaps more significant when compared with the overall trend of increasing institutional ownership over the last 25 years (e.g., Gompers and Metrick (2001)). In our sample of sued firms it takes more than a year for institutional ownership to significantly increase after a litigation announcement. This effect is economically important given the large reduction in holdings in the two quarters prior to the litigation announcement. An interesting corollary to our findings is that individual ownership must actually increase prior to litigation events as long as insider holdings do not increase.

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[10] The tendency for institutional holdings in non-sued firms to increase in almost every quarter is consistent with the general rise in institutional ownership during our sample period as observed in Table 1 and documented by Gompers and Metrick (2001) and Bennett, Sias, and Starks (2003).

In Table 3 we report percentage changes in the aggregate number of institutional investors around lawsuit filings. Panel A contains percentage changes in invested institutions between consecutive quarters. We observe a general upward trend in the number of institutions holding non-sued firms for pre-event quarters. In contrast, we observe a marked reduction in the number of invested institutions in the pre-event quarter and for the next three quarters. For example, in the event quarter we observe a ten (eight) percent reduction in the average (median) number of institutions owning sued firms. Non-sued firms, on the other hand, show insignificant mean and median changes in the number of institutional owners over the same event window. The reported p-values for tests of mean and median changes in the number of institutional owners show that these effects are all significant at the five percent level. Interestingly, we observe a significant increase in the mean and median number of institutional owners in the year beginning two years prior to the lawsuit that reverse as the event date approaches.

*** Insert Table 3 about here ***

Panel B confirms that these effects are highly significant when measured over the three quarters prior to the event and up to five quarters after the event. The reduction in the number of invested institutions does not revert to pre-event levels even two years after the lawsuit announcement. For example, the median percentage increase in the number of invested institutions is approximately nine percent for non-sued firms in the two years after the lawsuit. In contrast, sued firms show zero median increase in the number of invested institutions in the two years after a lawsuit filing.

The results support our hypothesis that institutions have an ability to identify firms that will be targeted by shareholder litigation in advance and to shift some of the loss in wealth associated with litigation to individual investors. This ability may be important given the

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multitude of factors that may predict litigation risk. Whether or not lawsuit filings can be explained by observed factors is an unresolved empirical question. For example, Francis, Philbrick, and Schipper (1994) investigate a sample of 43 sued firms and 51 "at risk" companies (that actually had larger earnings reductions than sued firms) and find that only one of the "at risk" companies was sued. Our initial empirical findings suggest that institutional managers in aggregate may be able to successfully predict future litigation.

The predictive ability of institutional investors may be attributed to the professional skills of institutional traders. In Alevy, Haige, and List's (2004) field experiment, the authors show that unlike a control group of students, market professionals are able to distinguish the quality of information signals and base their investment decisions on high quality signals and disregard poor quality information. Individual investors may have both weaker monitoring tools and weaker analytical abilities relative to institutional investors. They may therefore revert to litigation as a substitute for monitoring, corporate governance, ownership structure, and executive compensation (Vafeas (2000), and Talley and Johnsen (2004)). Institutional trading and information acquisition activities may indeed increase the speed of adjustment to new information (Sias and Starks (1997)), reduce information asymmetries between insiders and capital markets (Szewczyk, Tsetsekos, and Varma (1992)), and provide monitoring functions (Hartzell and Starks (2003)); nonetheless, our results indicate that individual investors may still absorb a disproportionate share of the economic losses in litigation targets. Therefore, class-action litigation seems to be a natural reaction to the apparent information disadvantage of individual investors.

In the next section we consider differences between institutional types around lawsuit filings. We find substantive differences in ownership holding changes over time and across institutions.

Differences Between Institutional Types

Institutional investors differ. Mutual funds and independent investment advisors, for example, are typically more aggressive than banks, insurance companies, and other unclassified institutions (such as endowments, foundations, and self-managed pension funds). Mutual fund managers may have a payoff structure similar to that of a call option (Falkenstein (1996)) and tend to focus on performance relative to their benchmarks. Consequently, mutual fund managers often choose to invest in relatively risky securities with high levels of ownership turnover (Bennett, Sias, and Starks (2003)). While 77 percent of mutual funds have been found to be momentum traders (Grinblatt, Titman, and Wermers (1995)), bank managed trusts and pension funds, in contrast, are typically more conservative in their investment policies (e.g., Lakonishok, Shleifer, and Vishny (1992)). Because they are subject to the American Bankers' Association's "Model Prudent Man Investment Act" and the American Law Institute's "Restatement of Trusts," managers of bank trusts and bank-managed pension funds are personally liable and aim to ensure that their investments are considered as prudent by courts should any litigation arise (see Del Guercio (1996), and Longstreth (1986)). Pension fund clients who hold assets in self-managed pension funds (that fall under the unclassified institutions category) tend to withdraw funds from poor recent performers, but do not flock to recent winners as is common in the mutual fund industry (Del Guercio and Tkac (2002)). Insurance companies invest a small portion of their assets in equities with low volatility (Badrinath, Kale, and Ryan (1996)) but are often primarily concerned with matching the maturities of their investment portfolios with the

maturities of their obligations. Endowment managers display conservative behavior as they typically do not have performance incentives for high relative returns, but are extremely concerned with negative publicity associated with poor performance (Brown (1999)).

We differentiate between different types of institutional owners and hypothesize that, *ceteris paribus*, active monitors (mutual funds and independent investment advisors) should be the most proactive groups of institutional investors and should be most likely to display trading behavior consistent with the avoidance of potential litigation-related losses.[11] Passive monitors (insurance companies, banks, and other unclassified institutions) may not display the same level of responsiveness to increases in litigation risk. Nonetheless, during the litigation event quarter and after the event, we expect to observe reductions in institutional holdings as 'prudent' investors and even unclassified institutions mitigate their litigation risk.

In Table 4 we present quarterly percentage changes in mean and median ownership levels of both sued and matched non-sued firms categorized by five types of institutions. The last two columns contain p-values for the equality of means (t-tests) and the equality of medians (Wilcoxon tests) between sued and matched non-sued firms.

*** Insert Table 4 about here ***

As hypothesized, both mutual funds and independent investment advisors exhibit the most aggressive and informed trading behavior prior to a lawsuit event. Both types of institutional investors begin trimming their positions significantly beginning at *T-2* and continue selling up to three quarters after the litigation date. For example, the difference between percentage mean (median) holdings for mutual funds in sued firms versus matched non-sued

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[11] This behavior is similar to the institutional ability to identify and avoid poorly performing IPOs (e.g., Field and Lowry (2005)), which may explain why IPOs with high institutional ownership perform better than those with low levels of institutional ownership.

firms over $T+2$ to $T+3$ are significant at the 1.9 percent (5.4 percent) level. Baker, Litov, Wachter, and Wurgler (2005) find similar stock-picking abilities for mutual fund managers before earnings announcements. Independent investment advisors display similar trading behavior around these litigation events. Banks and insurance companies exhibit a smaller decrease in their holdings before the lawsuit announcements and primarily react to class action litigation by significantly decreasing their positions during and after the announcement quarter. Other unclassified institutions do not exhibit any significant trading behavior around litigation events.

The biggest decline in ownership occurs during the announcement quarter for all types of institutions (except for the group of unclassified institutions, which exhibits almost no perceptible response). Three quarters after the litigation announcement ($T+3$ to $T+4$), some of the independent investment advisors appear to be acquiring positions in previously sued companies. This timing corresponds with positive abnormal returns for these companies and may be indicative of some institutions capitalizing more than once on their information advantage. Brunnermeier (2005) describes an informed investor, who obtains information prior to its public announcement and benefits from it twice: first, by trading aggressively on the information advantage prior to the public announcement, and then by unwinding part of the prior trade once the information becomes public and is partially (or fully) reflected in the stock price. Some of the institutions in our sample may be able to exercise similar trading strategies around litigation announcements.

In contrast to sued firms, median percentage ownership changes for matched non-sued companies are always non-negative. Mean ownership changes in non-sued firms display negative values slightly more frequently; although not a single negative change in mean or

median values is significant (at even the ten percent level). The existence of positive portfolio revisions in matched non-sued firms is likely a result of the general trend towards increasing institutional ownership over the sample period. In sum, there is strong evidence of a negative effect on portfolio revisions that varies by institutional type in response to litigation announcements.

In Table 5 we present mean and median cumulative changes in holdings relative to the quarter before the litigation announcement (T-1) and the quarter after the litigation announcement (T+1). For each institutional type, we present tests of all possible pair-wise comparisons between the five institutional types. Relative to other institutional types, we find that mutual funds and independent investment advisors have substantially greater negative revisions in ownership levels both prior to and after litigation filings.

*** Insert Table 5 about here ***

In each panel of Table 5, we present cumulative percentage portfolio revisions around the litigation announcement for each type of institution. The initial three panels compare changes in holdings prior to the announcement (T-4 to T-1, T-3 to T-1, and T-2 to T-1), the fourth panel compares changes around the litigation announcement (T-1 to T+1), and the final three panels compare changes after the announcement (T+1 to T+2, T+1 to T+3, and T+1 to T+4). Each row of the table compares cumulative changes in portfolio holdings between pairs of institutional types for a given period. For example, the first row of the second panel compares the observed mean and median percentage ownership changes for mutual funds (over the T-3 to T-1 period) of -0.92 and -0.06 percent, respectively, to the comparable changes in ownership levels for all other types of institutions. The mean and median changes in bank ownership are -0.11 and 0.00

percent, respectively. These differences in means and medians are both highly significant as indicated by the reported p-values in parentheses.

Comparing changes in ownership across institutions for various periods, we observe a consistent pattern of mutual funds and independent investment advisors selling portfolio holdings most aggressively in anticipation of, and in reaction to, litigation filings. For example, the first two rows of the third panel (*T-2* to *T-1*) demonstrate that all potential pairwise comparisons in portfolio revisions are significant at the five percent level, except the comparison between mutual funds and independent investment advisors. The first and second panels (*T-4* to *T-1* and *T-3* to *T-1*) show a similar pattern suggesting a stronger reaction in the portfolio revisions of mutual funds and independent investment advisors. The evidence suggests that mutual funds and independent investment advisors are significantly more responsive than other types of institutions.

As we move into the announcement period (*T-1* to *T+1*) we observe other differences between types. In particular, we now find evidence that all institutions respond significantly to these announcements with the exception of unclassified investors who display only an insignificant decline in their positions. Confirming our earlier analysis, both mutual funds and independent investment advisors exhibit the greatest selling of all institutions during these three months around the litigation event.

The periods after the litigation announcement present similar but less consistent evidence regarding differences across institutional types. We continue to find strong evidence that mutual funds are more responsive in ownership changes than insurance companies, banks, and unclassified institutions (over the periods from *T+1* to *T+2* and from *T+1* to *T+3*). Another

important observation over the post-announcement period is that unclassified institutions are the least responsive to litigation announcements.

The final panel of the table presents an interesting reversal in changes in holdings for independent investment advisors during the last cumulative period ($T+1$ to $T+4$). We hypothesize that some independent investment advisors may change their positions in response to an overreaction by other market participants and therefore may possibly benefit more than once by trading around litigation events. Some institutions are more informed than others and are more likely to benefit from their information advantage. While trading of better informed institutions may reveal information to other professional investors and traders, an information leakage may actually improve the gains to informed strategic investors by allowing a quicker adjustment or overreaction to superior information. For example, Sias, Starks, and Titman (2006) suggest that institutional price pressure can be explained by the information revealed through their trades. Similarly, Sias (2004) shows that institutional ability to infer information from each other's trades explains the well-documented herding behavior among institutional investors (e.g., Lakonishok, Shleifer, and Vishny (1992), Nofsinger and Sias (1999), and Wermers (1999)). Our results are consistent with an informed trading hypothesis.

III.   Institutional Trading and Litigation Risk

Our prior examination of information asymmetries and differences in institutional trading is based on actual lawsuit announcements. To better understand institutional trading behavior, we now seek to examine how institutions respond to potential warning signs that may precede a litigation announcement. To accomplish this, we develop a model of institutional trading that is conditioned on a variety of factors that are known to be related to a firm's likelihood of being

sued. By analyzing how institutions react to litigation risk, rather than the occurrence of litigation, we gain important insights into institutional trading behavior. Alexander (1991) convincingly argues that a plaintiffs' decision to sue a firm depends on a variety of factors in addition to (or even without) the actual occurrence of a crime or a securities law violation.

We explore institutional ability to forecast a value-destroying event using the ex-ante prediction of a litigation risk model. Litigation risk is modeled as a function of a number of pre-determined variables prior to the litigation date to assess both the likelihood of litigation and the likelihood of pre-litigation institutional sell-offs. We also admit the potential of our model to be underspecified with respect to institutional investment decisions by considering the importance of the residuals from our litigation risk model in affecting portfolio revisions.

Our variable set includes a variety of factors hypothesized to predict litigation risk prior to the lawsuit filing at the pre-event date *T-2*. Consistent with Alexander (1991), we hypothesize that larger firms are more likely to be sued as they provide a greater potential settlement amount to litigants.[12] We use the natural logarithm of the firm's lagged market capitalization, $\ln(Size_{T-2})$, as our measure of pre-event firm size. The firm's returns during the preceding period, $Return_{T-5,T-2}$, are also used as a potential predictor of litigation – substantial price declines provide a litigatable loss that the plaintiff class may claim. Similarly, we include share turnover in the previous quarter, $Turnover_{T-3,T-2}$, in our set of regressors. As noted by Lowry and Shu (2002), turnover is directly related to plaintiffs' incentives to file a lawsuit. This is because shareholder damages are generally increasing in the number of shares traded at the allegedly misleading prices.

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[12] Note that securities class actions are very rarely decided in court. Lawsuits that pass the defendants' motions to dismiss are almost all eventually settled.

Due to increased business risk, we expect technology firms to be subject to greater litigation risk. We include a technology dummy, $Tech_i$, that differentiates between high-tech and low-tech firms.[13] Similarly, intermarket differences, smaller size, and a generally higher level of risk in over-the-counter (OTC) firms may result in higher litigation risk for non-exchange traded firms. To accommodate this potential effect we include a secondary market dummy, $NonExchangeTraded_i$, that equals one if a firm is not traded on a major exchange (NYSE and AMEX).

Our final dummy variable, $SLUSA_{iT-2}$, controls for a legislative reform enacted on May 13, 1998. The *Securities Litigation Uniform Standards Act* (SLUSA) strengthens the plaintiff requirements to file suit in state courts (where they could avoid the strict provisions of the 1995 *Private Securities Litigation Reform Act* (PSLRA) passed earlier. Congress' stated intent was to reduce unmerited litigation activity.

Given these variables, we model the litigation risk for firm *i* in quarter *T-2* as a logistic function of the control variables,

$$Litigation\,Risk_{iT-2} = Pr_{T-2}[Sued_i = 1] = \Lambda(\mu_{iT-2}, \varepsilon_{iT-2}) \tag{3}$$

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[13] We follow Loughran and Ritter (2004) and Cliff and Denis (2004) who categorize firms with the following SIC codes as technology firms: 2833, 2834, 2835, 2836, 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7377, 7378, 7379.

where $\Lambda(\cdot)$ denotes the logistic cumulative distribution function with conditional mean μ_{iT-2} and

generalized error ε_{iT-2}.[14] The expected litigation risk is given by the conditional mean

component, μ_{iT-2}, which is described as a linear function of the regressors,

$$\mu_{iT-2} = \alpha_0 + \alpha_1 \ln(Size_{iT-2}) + \alpha_2 SLUSA_{iT-2} + \alpha_3 Tech_i + \alpha_4 NonExchangeTraded_i \\ + \alpha_5 Return_{iT-5,T-2} + \alpha_6 \Delta Turnover_{iT-3,T-2} \tag{4}$$

The generalized residual from our first step logistic regression is then used as a litigation

risk shock variable, $\hat{\varepsilon}_{iT-2}$, to determine institutional sell-offs.

Our second empirical equation is an OLS regression to examine the magnitude of

institutional sell-offs. In particular, we consider the change in institutional holdings as,

$$\%\Delta InstitutionalHoldings_{iT-2,T-1} = \beta_0 + \beta_1 \hat{\mu}_{iT-2} + \beta_2 \hat{\varepsilon}_{iT-2} + \beta_3 Return_{iT-3,T-2} \\ + \beta_4 Return_{iT-5,T-3} + \beta_5 \Delta\hat{\sigma}_{iT-3,T-2} + \eta_{iT-1} \tag{5}$$

where $\%\Delta Institutional\ Holdings_{iT-2,T-1}$ represents the percentage change in aggregate

institutional holdings in firm i between quarter T-2 and T-1, $Return_{iT-3,T-2}$ represents short-term

price momentum and is defined as the natural logarithm of the price in quarter T-2 divided by the

price in quarter T-3. $Return_{iT-5,T-3}$ represents long-term momentum and is defined as the natural

logarithm of the price in quarter T-3 divided by the price in quarter T-5, $\Delta\sigma_{iT-3,T-2}$ is the

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[14] For the logit model, the necessary conditions for maximum likelihood estimation require that

$\dfrac{\partial \log L(\beta)}{\partial \beta} = \sum_{i,t} \left[Sued_{it} - \dfrac{\exp(x'_{it}\beta)}{1 + \exp(x'_{it}\beta)} \right] x_{it} = 0$ for given regressors x_{it}, and coefficient vector β, for all

firms i =1, 2, … N and times t = 1, 2, … T. The generalized error is given by the term in square brackets above
(for further details, see Verbeek (2000)).

quarterly change in the standard deviation of daily returns during the previous two quarters, [15]

and η_{iT-1} is the random disturbance for the system.[16, 17]

We consider equation (5) for changes in institutional ownership in the aggregate as well as by type of institution. This allows us to examine aggregate institutional behavior as well as potential differences across institutional types to greater litigation risk shocks. Our primary interest is in the coefficient β_1, representing the responsiveness of percentage changes in institutional holdings to predicted litigation risk. As predicted litigation risk increases, we expect a negative percentage change in institutional holdings. Thus, we anticipate a negative coefficient on litigation risk. We also expect to observe greater responsiveness to litigation risk for institutions which are concerned about the prudent appearance of their quarterly holdings statements as well as institutions engaging in active monitoring (i.e., banks, mutual funds, and independent investment advisors). In contrast, we expect less responsiveness to litigation risk for institutions that are focused on preserving capital or matching the cash flows of their assets and liabilities (i.e., insurance companies and unclassified institutions such as foundations and endowments).

Table 6 presents the results for our two-stage estimation. Panel A reports our first stage litigation risk model output. Similar to Alexander (1991), we observe that large firms incur a higher likelihood of being sued. Moreover, the larger the price drop and the higher the turnover that a firm experiences prior to the lawsuit, the larger is its likelihood of being sued (as reflected

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[15] Daily returns are obtained from CRSP.

[16] Similar factors have been used in the extant institutional ownership literature (e.g., Gompers and Metrick (2001), and Bennett, Sias, and Starks (2003)). We choose not to include variables such as S&P500 membership, firm age, dividend yield, number of shares outstanding, and book value per share as they are not likely to experience significant changes during our relatively narrow sample period.

[17] In unreported robustness tests we also included change in quarterly turnover (trading volume / number of shares outstanding) as one of the independent variables in equation (5). The results were qualitatively similar to those reported in Table 6 and the coefficients on the change in turnover variable were not significant.

in the significant negative and positive coefficients on our return and turnover variables, respectively). We also observe a significant positive relationship between a firm's exchange listing and its litigation risk. Firms that trade in the less regulated over-the-counter market incur a higher risk of being sued. The SLUSA and tech dummies are insignificant.

*** Insert Table 6 about here ***

Panel B reports second-stage OLS regression results for the relationship between percentage changes in institutional ownership and various economic regressors for all institutions in aggregate. We observe a significant negative relationship between changes in institutional ownership and predicted litigation risk (as estimated during the first stage regression), indicating a negative percentage change in institutional holdings of firms with high litigation risk. The relationship suggests that after controlling for a variety of other factors, institutions possess an ability to predict impeding litigation by correctly analyzing quantitative public information prior to litigation. The lack of significance in our litigation risk shock variable (the generalized residual from the first stage), suggests that our first stage regression adequately captures litigation risk prediction as it relates to aggregate percentage changes in institutional holdings.[18] Negative prior returns and prior increases in turnover are also associated with reductions in institutional holdings. For robustness and to confirm that our results are not driven by regressor correlations, we report results for a variety of different model specifications in Panel B. We find very consistent signs and significance across the various rows of Panel B.

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[18] We have also performed similar estimations for each of the five major types of institutions. The results are very similar to those reported in Table 6 for overall institutional ownership. There is no evidence of institutional responsiveness to "non-obvious market signals" as measured by the litigation risk shock variable.

Panel C reports second stage regression results for each type of institution without the generalized residual as a regressor.[19] As expected, we find that mutual funds and independent investment advisors are the most responsive to litigation risk and significantly reduce their holdings in response to increases in litigation risk. Banks, insurance companies, and unclassified institutions (foundations and endowments) do not react to increased litigation risk.

As anticipated, changes in ownership by banks and mutual funds are significantly positively related to both long-term and short-term momentum. Not surprisingly, insurance companies and unclassified institutions react only to long-term momentum, indicating that they may be slower than other institutions in adjusting to new information in feedback trading. Both groups may be primarily concerned with capital preservation rather than achieving superior performance relative to their peers and benchmarks. Consistent with greater turnover in independent investment advisor positions relative to other types of institutions (e.g., Bennett, Sias, and Starks (2003)), independent investment advisors increase their holdings in response to short-term momentum only. Similar to Bennett, Sias, and Starks (2003) we find that changes in ownership by independent investment advisors are related negatively to contemporaneous increases in turnover (relative to the prior quarter).

The empirical results support the notion that mutual funds and independent investment advisors are most proactive in their research and trading and are able to meaningfully avoid litigation targets. Both groups seem to respond quickly to new information and adjust their positions at the beginning of a price trend, as indicated by the economically large and highly significant coefficients on the short-term momentum variable. When comparing all estimated coefficients we find that these two types of institutions are most responsive to changes in various

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[19] In unreported regressions we also included the generalized residual. In no cases is this regressor significant at even a 50 percent significance level.

risk factors, followed by banks. Institutional money managers seem to provide added value in avoiding stocks with negative developments such as class-action litigation.

IV.   Conclusions

Securities class-action litigation announcements and institutional investment decisions represent an opportunity to examine potentially informed trading behavior in response to an important negative event. Using a momentum-matched sample of sued and comparable non-sued firms, we document the informed exit of institutional shareholders before public litigation announcements as well as considerable differences among five major types of institutions. Mutual funds and independent investment advisors appear to be the most responsive groups of institutional investors. Professional managers add value for their clients through litigation risk avoidance. We find that institutions possess an ability to identify and avoid eventual litigation targets. There are large differences in response to litigation risk between the various types of institutions with mutual funds and independent investment advisors being the most adept at avoiding eventual litigation targets.

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Table 1: Summary Statistics

We present yearly summary statistics for our institutional ownership and litigation data sets. Our institutional ownership data set covers all quarterly 13F filings filed by institutional money managers with the Securities and Exchange Commission and is based on information provided by CDA Spectrum (1994-1997) and Thomson Financial (1998-2003). Our litigation data set contains information on 999 securities class actions for the period between January 1996 and December 2003. Information on these lawsuits was collected from *Stanford's Securities Class Action Clearinghouse*, the *Securities Class Action Alert (SCAA)*, a monthly newsletter published by Institutional Shareholder Services (ISS), the *Delaware Corporate Law Clearinghouse*, and *Milberg Weiss' Securities Class Action Designated Internet Site* (http://securities.milberg.com). For each lawsuit, we retrieve detailed case information from the Department of Justice *Public Access to Court Electronic Records* (PACER) database. Lawsuits against foreign firms with ADRs listed on a U.S. exchange, non-publicly traded firms such as partnerships and sole-proprietorships, mutual funds, unit trusts and other investment organizations, real estate investment trusts (REITs), municipalities and any state or federal government entities, and individuals and other entities are excluded. In addition, we exclude IPO-related lawsuits, lawsuits against firms that are not contained in the CDA Spectrum database and lawsuits against firms that we could not identify in the Center for Research in Securities Prices (CRSP) database. A "typical" firm is defined as any firm that is listed both in CRSP and the CDA Spectrum database in a given year.

Year	Aggregate Institutional Ownership				Market Capitalization (thousand, $)				Number of Securities Class Action Complaints Filed
	Mean		Median		Mean		Median		
	Typical Firm	Sued Firms	Typical Firm	Sued Firms	Typical Firm	Sued Firm	Typical Firm	Sued Firm	
1994	27.41%	37.87%	22.28%	37.31%	760	1,165	81	237	-
1995	29.55%	41.60%	24.32%	41.47%	927	1,463	95	298	-
1996	28.91%	41.02%	24.09%	40.49%	1,115	1,715	115	370	72
1997	28.82%	40.13%	23.27%	41.27%	1,371	2,005	124	359	117
1998	29.71%	41.27%	24.33%	42.66%	1,724	2,479	127	361	142
1999	31.18%	43.10%	26.25%	42.33%	2,163	3,064	121	337	140
2000	31.91%	46.42%	26.68%	46.56%	2,534	4,363	134	457	143
2001	34.09%	50.15%	29.20%	52.19%	2,253	3,068	134	418	153
2002	36.90%	52.38%	33.71%	56.70%	2,118	2,702	146	351	123
2003	40.29%	55.47%	38.42%	60.27%	2,384	3,455	203	419	109
Pooled Results	31.88%	44.94%	27.26%	46.12%	1,735	2,548	128	361	999

Table 2: Changes in Aggregate Institutional Holdings around Lawsuit Announcements

We examine changes in the holdings of institutional investors for various time periods before and after lawsuit announcements. We present changes in institutional investor positions in both sued firms and matched non-sued firms. Matched firms have not been involved in any securities litigation during our sample period, belong to the same industry (based on two-digit SIC codes), and have the closest total return to that of the sued firm over a period from eight quarters to one quarter prior to the lawsuit (from T-8 to T-1). In Panel A, we report percentage changes in mean and median holdings between consecutive quarters. In Panel B, we report percentage changes in mean and median holdings relative to the end-of-quarter holdings immediately preceding the lawsuit (time *T-1*) and the end-of-quarter holdings immediately following the lawsuit announcement (time *T+1*). In the last two columns, we provide p-values for a t-test for the significance of differences in means and a Wilcoxon test for the significance of differences in medians.

	Sued Firms				Matched Non-Sued Firms				Tests for Equality of Means and Medians Across Groups	
Panel A: Percentage Changes in of Institutional Holdings in Consecutive Quarters										
Time Period	% Change in Mean		% Change in Median		% Change in Mean		% Change in Median		t-Test p-value	Wilcoxon Test p-value
T-8 to *T-7*	1.07	(<0.001)	0.36	(<0.001)	0.20	(0.325)	0.06	(0.157)	0.003	0.013
T-7 to *T-6*	0.70	(0.003)	0.41	(<0.001)	0.10	(0.635)	0.03	(0.560)	0.041	0.008
T-6 to *T-5*	1.08	(<0.001)	0.40	(<0.001)	0.28	(0.168)	0.05	(0.093)	0.006	0.002
T-5 to *T-4*	0.41	(0.117)	0.27	(0.020)	0.11	(0.605)	0.02	(0.672)	0.246	0.220
T-4 to *T-3*	-0.05	(0.864)	0.18	(0.423)	0.04	(0.804)	0.01	(0.525)	0.902	0.609
T-3 to *T-2*	-0.25	(0.333)	0.15	(0.686)	0.06	(0.740)	0.02	(0.721)	0.227	0.838
T-2 to *T-1*	-1.03	(<0.001)	-0.28	(<0.001)	-0.19	(0.263)	0.02	(0.879)	0.006	0.002
T-1 to *T+1*	-3.25	(<0.001)	-1.22	(<0.001)	-0.15	(0.496)	0.02	(0.691)	<0.001	<0.001
T+1 to *T+2*	-0.84	(<0.001)	-0.45	(<0.001)	-0.10	(0.659)	0.02	(0.936)	0.025	0.025
T+2 to *T+3*	-0.25	(0.452)	0.01	(0.403)	0.77	(0.001)	0.33	(<0.001)	0.008	<0.001
T+3 to *T+4*	0.49	(0.058)	0.27	(0.013)	-0.18	(0.510)	0.15	(0.171)	0.122	0.344
T+4 to *T+5*	0.65	(0.011)	0.50	(<0.001)	0.08	(0.855)	0.09	(0.032)	0.239	0.278
T+5 to *T+6*	0.55	(0.042)	0.55	(<0.001)	0.57	(0.019)	0.17	(0.006)	0.799	0.520
T+6 to *T+7*	0.52	(0.079)	0.30	(0.017)	0.53	(0.028)	0.06	(0.007)	0.447	0.717
T+7 to *T+8*	-0.14	(0.599)	0.00	(0.587)	0.47	(0.042)	0.08	(0.038)	0.025	0.035
Panel B: Percentage Cumulative Changes Relative to *T-1* and *T+1*										
T-8 to *T-1*	1.86	(0.001)	1.26	(0.001)	0.49	(0.234)	0.27	(0.182)	0.022	0.046
T-7 to *T-1*	0.65	(0.211)	0.73	(0.083)	0.28	(0.457)	0.24	(0.237)	0.450	0.305
T-6 to *T-1*	-0.05	(0.924)	0.45	(0.483)	0.26	(0.431)	0.06	(0.380)	0.679	0.966
T-5 to *T-1*	-0.93	(0.043)	-0.22	(0.111)	0.02	(0.951)	0.02	(0.710)	0.115	0.214
T-4 to *T-1*	-1.42	(0.003)	-0.04	(0.084)	-0.14	(0.606)	-0.03	(0.880)	0.024	0.107
T-3 to *T-1*	-1.31	(<0.001)	-0.26	(0.013)	-0.16	(0.494)	-0.05	(0.612)	0.006	0.050
T+1 to *T+3*	-1.02	(0.014)	-0.77	(0.004)	0.76	(0.022)	0.36	(0.003)	0.001	<0.001
T+1 to *T+4*	-0.42	(0.370)	0.18	(0.644)	0.49	(0.196)	0.50	(0.013)	0.045	0.019
T+1 to *T+5*	0.37	(0.502)	0.69	(0.195)	1.01	(0.011)	1.11	(0.001)	0.118	0.128
T+1 to *T+6*	1.38	(0.018)	1.30	(0.002)	1.58	(0.001)	1.19	(<0.001)	0.282	0.554
T+1 to *T+7*	1.54	(0.016)	1.78	(<0.001)	2.17	(<0.001)	1.60	(<0.001)	0.270	0.496
T+1 to *T+8*	1.60	(0.025)	1.60	(0.007)	2.76	(<0.001)	2.02	(<0.001)	0.115	0.198

Table 3: Changes in the Number of Institutional Investors around Lawsuit Announcements

We examine changes in the number of institutional investors for various time periods before and after lawsuit announcements. We present changes in the number of institutional investors holding the stock of both sued firms and matched non-sued firms. Matched firms have not been involved in any securities litigation during our sample period, belong to the same industry (based on two-digit SIC codes), and have the closest total return to that of the sued firm over a period from eight quarters to one quarter prior to the lawsuit (from T-8 to T-1). In Panel A, we report percentage changes in the mean and median number of institutional investors between consecutive quarters. In Panel B, we report percentage changes in the mean and median number of invested institutions relative to the end-of-quarter holdings immediately preceding the lawsuit (time $T-1$) and the end-of-quarter holdings immediately following the lawsuit announcement (time $T+1$). In the last two columns, we provide p-values for a t-test for the significance of differences in means and a Wilcoxon test for the significance of differences in medians.

	Sued Firms				Matched Non-Sued Firms				Tests for Equality of Means and Medians Across Groups	
Time Period	% Change in Mean		% Change in Median		% Change in Mean		% Change in Median		t-Test (p-value)	Wilcoxon Test (p-value)
Panel A: Percentage Changes in Invested Institutions in Consecutive Quarters										
$T-8$ to $T-7$	7.18	(<0.001)	3.34	(<0.001)	2.50	(0.002)	0.00	(0.001)	<0.001	0.002
$T-7$ to $T-6$	6.25	(<0.001)	3.91	(<0.001)	-0.40	(0.621)	0.00	(0.597)	<0.001	<0.001
$T-6$ to $T-5$	4.59	(<0.001)	2.16	(<0.001)	0.80	(0.363)	0.00	(0.946)	0.001	<0.001
$T-5$ to $T-4$	4.80	(<0.001)	2.54	(<0.001)	1.40	(0.079)	0.00	(0.182)	0.001	<0.001
$T-4$ to $T-3$	1.27	(0.115)	0.00	(0.170)	0.17	(0.825)	0.00	(0.793)	0.308	0.039
$T-3$ to $T-2$	0.35	(0.662)	0.00	(0.815)	0.76	(0.338)	0.00	(0.360)	0.965	0.648
$T-2$ to $T-1$	-2.60	(0.016)	-0.57	(0.005)	0.47	(0.560)	0.00	(0.424)	0.013	0.003
$T-1$ to $T+1$	-10.30	(<0.001)	-8.36	(<0.001)	-0.27	(0.786)	0.00	(0.696)	<0.001	<0.001
$T+1$ to $T+2$	-4.52	(<0.001)	-3.75	(<0.001)	2.93	(0.005)	0.00	(0.011)	<0.001	<0.001
$T+2$ to $T+3$	-1.80	(0.094)	-0.49	(0.179)	0.52	(0.612)	0.00	(0.317)	0.061	0.032
$T+3$ to $T+4$	-0.65	(0.432)	0.00	(0.784)	1.77	(0.047)	0.00	(0.057)	0.060	0.069
$T+4$ to $T+5$	1.44	(0.119)	0.00	(0.315)	1.41	(0.131)	0.00	(0.099)	0.887	0.719
$T+5$ to $T+6$	2.08	(0.022)	1.99	(0.008)	2.11	(0.109)	0.00	(0.010)	0.985	0.476
$T+6$ to $T+7$	0.26	(0.792)	0.00	(0.844)	1.62	(0.149)	0.00	(0.117)	0.108	0.057
$T+7$ to $T+8$	0.74	(0.515)	0.00	(0.453)	2.47	(0.021)	0.00	(0.085)	0.136	0.359
Panel B: Percentage Cumulative Changes Relative to $T-1$ and $T+1$										
$T-8$ to $T-1$	22.84	(<0.001)	14.01	(<0.001)	5.57	(0.007)	0.00	(0.036)	<0.001	<0.001
$T-7$ to $T-1$	14.64	(<0.001)	7.91	(<0.001)	2.24	(0.227)	0.00	(0.391)	<0.001	<0.001
$T-6$ to $T-1$	8.41	(<0.001)	4.55	(<0.001)	3.37	(0.061)	0.00	(0.227)	0.016	0.008
$T-5$ to $T-1$	3.68	(0.070)	2.11	(0.090)	2.76	(0.086)	0.00	(0.208)	0.463	0.403
$T-4$ to $T-1$	-1.43	(0.408)	-0.71	(0.395)	1.32	(0.334)	0.00	(0.853)	0.181	0.263
$T-3$ to $T-1$	-2.72	(0.050)	-0.90	(0.016)	1.47	(0.214)	0.00	(0.239)	0.017	0.005
$T+1$ to $T+3$	-5.86	(<0.001)	-3.74	(<0.001)	4.08	(0.003)	1.27	(0.004)	<0.001	<0.001
$T+1$ to $T+4$	-6.15	(<0.001)	-4.40	(<0.001)	4.70	(0.008)	6.15	(0.004)	<0.001	<0.001
$T+1$ to $T+5$	-4.59	(0.020)	-4.58	(0.008)	5.64	(0.004)	6.98	(0.002)	<0.001	<0.001
$T+1$ to $T+6$	-1.08	(0.631)	-0.31	(0.666)	7.27	(0.003)	5.15	(<0.001)	0.005	0.002
$T+1$ to $T+7$	-3.53	(0.164)	0.00	(0.310)	9.86	(<0.001)	8.23	(<0.001)	0.001	0.001
$T+1$ to $T+8$	-2.53	(0.396)	0.00	(0.349)	12.76	(<0.001)	8.96	(<0.001)	0.002	<0.001

Table 4: Changes in Institutional Holdings Around Lawsuit Announcements by Type of Institution

We examine percentage changes in mean and median holdings of mutual funds, independent investment advisors, insurance companies, banks, and other institutions during various periods before and after a lawsuit announcement. We present percentage changes in positions held both in sued firms and matched non-sued firms. Matched firms have not been involved in any securities litigation during our sample period, belong to the same industry (based on two-digit SIC codes), and have the closest total return to that of the sued firm over a period from eight quarters to one quarter prior to the lawsuit (from T-8 to T-1). In the last two columns, we provide p-values for a t-test for the significance of differences in means and a Wilcoxon test for the significance of differences in medians.

Time Period	Sued Firms % Change in Mean		Sued Firms % Change in Median		Matched Non-Sued Firms % Change in Mean		Matched Non-Sued Firms % Change in Median		t-Test p-value	Wilcoxon Test p-value
Mutual Fund Holdings										
T-4 to T-3	-0.22	(0.230)	0.00	(0.506)	0.00	(0.969)	0.00	(0.524)	0.551	0.804
T-3 to T-2	-0.20	(0.200)	0.00	(0.803)	-0.09	(0.309)	0.00	(0.868)	0.492	0.908
T-2 to T-1	-0.70	(<0.001)	-0.06	(<0.001)	-0.13	(0.164)	0.00	(0.287)	0.002	0.003
T-1 to T+1	-1.27	(<0.001)	-0.18	(<0.001)	-0.20	(0.261)	0.00	(0.417)	<0.001	<0.001
T+1 to T+2	-0.56	(<0.001)	0.00	(0.001)	-0.14	(0.221)	0.00	(0.765)	0.107	0.133
T+2 to T+3	-0.27	(0.138)	0.00	(0.332)	0.26	(0.103)	0.00	(0.110)	0.019	0.054
T+3 to T+4	-0.01	(0.972)	0.00	(0.417)	-0.17	(0.412)	0.00	(0.664)	0.240	0.484
Independent Investment Advisor Holdings										
T-4 to T-3	-0.01	(0.961)	0.05	(0.514)	0.14	(0.335)	0.01	(0.186)	0.800	0.870
T-3 to T-2	-0.07	(0.726)	0.07	(0.467)	0.00	(0.985)	0.00	(0.680)	0.625	0.958
T-2 to T-1	-0.55	(0.004)	-0.15	(0.008)	0.00	(0.999)	0.00	(0.587)	0.019	0.007
T-1 to T+1	-1.62	(<0.001)	-0.39	(<0.001)	0.18	(0.259)	0.01	(0.175)	<0.001	<0.001
T+1 to T+2	-0.25	(0.225)	-0.23	(0.203)	0.17	(0.328)	0.04	(0.242)	0.073	0.195
T+2 to T+3	-0.12	(0.591)	0.00	(0.436)	0.36	(0.062)	0.07	(0.043)	0.029	0.059
T+3 to T+4	0.55	(0.017)	0.00	(0.006)	-0.11	(0.550)	0.00	(0.887)	0.103	0.107
Insurance Company Holdings										
T-4 to T-3	0.02	(0.757)	0.00	(0.962)	-0.11	(0.147)	0.00	(0.017)	0.204	0.398
T-3 to T-2	-0.05	(0.382)	0.00	(0.460)	0.04	(0.462)	0.00	(0.934)	0.198	0.430
T-2 to T-1	-0.09	(0.169)	0.00	(0.122)	-0.06	(0.316)	0.00	(0.282)	0.685	0.556
T-1 to T+1	-0.34	(<0.001)	-0.05	(<0.001)	-0.07	(0.212)	0.00	(0.495)	0.015	0.007
T+1 to T+2	-0.17	(0.040)	-0.04	(<0.001)	-0.06	(0.333)	0.00	(0.088)	0.604	0.080
T+2 to T+3	-0.13	(0.109)	-0.01	(0.004)	0.09	(0.257)	0.00	(0.283)	0.127	0.019
T+3 to T+4	0.08	(0.403)	0.00	(0.719)	0.16	(0.018)	0.00	(0.055)	0.357	0.247
Bank Holdings										
T-4 to T-3	-0.01	(0.905)	0.00	(0.644)	-0.01	(0.929)	0.00	(0.578)	0.974	0.257
T-3 to T-2	-0.11	(0.181)	0.00	(0.419)	0.07	(0.364)	0.00	(0.634)	0.114	0.193
T-2 to T-1	-0.01	(0.898)	0.00	(0.820)	-0.08	(0.257)	0.00	(0.801)	0.482	0.792
T-1 to T+1	-0.58	(<0.001)	-0.18	(<0.001)	-0.06	(0.371)	0.00	(0.558)	<0.001	<0.001
T+1 to T+2	-0.11	(0.166)	-0.08	(0.005)	-0.03	(0.762)	0.00	(0.393)	0.357	0.067
T+2 to T+3	-0.16	(0.044)	-0.04	(0.025)	0.07	(0.272)	0.00	(0.595)	0.012	0.008
T+3 to T+4	-0.10	(0.232)	0.00	(0.540)	-0.10	(0.203)	0.00	(0.608)	0.371	0.652
Unclassified Institution Holdings										
T-4 to T-3	0.08	(0.085)	0.00	(0.019)	0.06	(0.150)	0.00	(0.439)	0.673	0.098
T-3 to T-2	0.10	(0.057)	0.00	(0.041)	0.06	(0.101)	0.00	(0.303)	0.653	0.394
T-2 to T-1	0.08	(0.227)	0.00	(0.743)	0.05	(0.143)	0.00	(0.646)	0.725	0.585
T-1 to T+1	-0.23	(0.226)	0.00	(0.259)	-0.04	(0.227)	0.00	(0.142)	0.354	0.898
T+1 to T+2	0.13	(0.153)	0.00	(0.557)	-0.07	(0.160)	0.00	(0.258)	0.059	0.632
T+2 to T+3	0.35	(0.078)	0.00	(0.005)	0.19	(<0.001)	0.00	(0.005)	0.322	0.420
T+3 to T+4	0.04	(0.613)	0.00	(0.455)	0.13	(0.014)	0.00	(0.016)	0.277	0.247

Table 5: Tests of Differences in Holdings by Institutional Types around Lawsuit Announcements

We report mean and median cumulative percentage changes in holdings relative to the end-of-quarter ownership preceding the lawsuit (time $T-1$) and the end-of-quarter holdings following the lawsuit (time $T+1$). We also perform pairwise comparisons of the changes in holdings by different types of institutions. For each pairwise comparison, we compare the leftmost mean and median with means and medians for all other institutional types. We report p-values for a t-test for the significance of differences in means and a Wilcoxon test for the significance of differences in medians in parentheses.

Time Period	Mutual Funds		Independent Investment Advisors		Insurance Companies		Banks		Unclassified Institutions	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
T-4 to *T-1*	-1.18	-0.10	-0.67	0.04	-0.13	-0.04	-0.14	0.00	0.24	0.03
			(0.182)	(0.140)	(<0.001)	(0.004)	(<0.001)	(0.001)	(<0.001)	(<0.001)
T-4 to *T-1*			-0.67	0.04	-0.13	-0.04	-0.14	0.00	0.24	0.03
					(0.136)	(0.577)	(0.117)	(0.357)	(0.012)	(0.096)
T-4 to *T-1*					-0.13	-0.04	-0.14	0.00	0.24	0.03
							(0.977)	(0.098)	(0.011)	(<0.001)
T-4 to *T-1*							-0.14	0.00	0.24	0.03
									(0.017)	(0.055)
T-3 to *T-1*	-0.92	-0.06	-0.64	-0.15	-0.14	-0.01	-0.11	0.00	0.17	0.00
			(0.395)	(0.429)	(0.001)	(0.006)	(0.001)	(0.003)	(<0.001)	(<0.001)
T-3 to *T-1*			-0.64	-0.15	-0.14	-0.01	-0.11	0.00	0.17	0.00
					(0.078)	(0.259)	(0.055)	(0.153)	(0.004)	(0.036)
T-3 to *T-1*					-0.14	-0.01	-0.11	0.00	0.17	0.00
							(0.784)	(0.536)	(0.013)	(0.041)
T-3 to *T-1*							-0.11	0.00	0.17	0.00
									(0.042)	(0.053)
T-2 to *T-1*	-0.70	-0.06	-0.55	-0.15	-0.09	0.00	-0.01	0.00	0.08	0.00
			(0.516)	(0.385)	(<0.001)	(0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
T-2 to *T-1*			-0.55	-0.15	-0.09	0.00	-0.01	0.00	0.08	0.00
					(0.018)	(0.030)	(0.006)	(0.006)	(0.001)	(0.005)
T-2 to *T-1*					-0.09	0.00	-0.01	0.00	0.08	0.00
							(0.485)	(0.601)	(0.079)	(0.199)
T-2 to *T-1*							-0.01	0.00	0.08	0.00
									(0.423)	(0.588)
T-1 to *T+1*	-1.27	-0.18	-1.62	-0.39	-0.34	-0.05	-0.58	-0.18	-0.23	0.00
			(0.322)	(0.272)	(<0.001)	(0.004)	(0.003)	(0.079)	(0.001)	(<0.001)
T-1 to *T+1*			-1.62	-0.39	-0.34	-0.05	-0.58	-0.18	-0.23	0.00
					(<0.001)	(0.001)	(0.001)	(0.007)	(<0.001)	(<0.001)
T-1 to *T+1*					-0.34	-0.05	-0.58	-0.18	-0.23	0.00
							(0.056)	(0.085)	(0.665)	(0.020)
T-1 to *T+1*							-0.58	-0.18	-0.23	0.00
									(0.120)	(<0.001)
T+1 to *T+2*	-0.56	0.00	-0.25	-0.23	-0.17	-0.04	-0.11	-0.08	0.13	0.00
			(0.282)	(0.366)	(0.043)	(0.138)	(0.020)	(0.099)	(0.001)	(0.002)
T+1 to *T+2*			-0.25	-0.23	-0.17	-0.04	-0.11	-0.08	0.13	0.00
					(0.718)	(0.754)	(0.526)	(0.739)	(0.079)	(0.060)
T+1 to *T+2*					-0.17	-0.04	-0.11	-0.08	0.13	0.00
							(0.567)	(0.883)	(0.024)	(0.002)
T+1 to *T+2*							-0.11	-0.08	0.13	0.00
									(0.044)	(0.076)
T+1 to *T+3*	-0.85	-0.09	-0.30	-0.36	-0.30	-0.07	-0.28	-0.19	0.50	0.00
			(0.176)	(0.322)	(0.083)	(0.326)	(0.055)	(0.472)	(<0.001)	(<0.001)
T+1 to *T+3*			-0.30	-0.36	-0.30	-0.07	-0.28	-0.19	0.50	0.00
					(0.915)	(0.896)	(0.987)	(0.931)	(0.037)	(0.019)
T+1 to *T+3*					-0.30	-0.07	-0.28	-0.19	0.50	0.00
							(0.857)	(0.798)	(0.001)	(<0.001)
T+1 to *T+3*							-0.28	-0.19	0.50	0.00
									(0.001)	(<0.001)
T+1 to T+4	-0.90	-0.04	0.32	0.25	-0.22	-0.09	-0.39	-0.28	0.55	0.00
			(0.010)	(0.023)	(0.080)	(0.190)	(0.226)	(0.670)	(0.001)	(<0.001)
T+1 to T+4			0.32	0.25	-0.22	-0.09	-0.39	-0.28	0.55	0.00
					(0.166)	(0.043)	(0.049)	(0.025)	(0.721)	(0.905)
T+1 to T+4					-0.22	-0.09	-0.39	-0.28	0.55	0.00
							(0.233)	(0.103)	(0.009)	(<0.001)
T+1 to T+4							-0.39	-0.28	0.55	0.00
									(<0.001)	(<0.001)

Table 6: Institutional Holding Revisions in Reaction to Predicted Litigation Risk

We perform a two-stage estimation to determine percentage changes in institutional holdings in reaction to predicted litigation risk. In the first stage, presented in Panel A, we employ a logit regression to predict a firm's litigation risk as a function of its logged market capitalization at time $T\text{-}2$, a post-SLUSA dummy, a technology dummy, a non-exchange traded dummy, the annualized return between time $T\text{-}5$ and $T\text{-}2$, and quarterly turnover between time $T\text{-}3$ and $T\text{-}2$. In the second stage, presented in Panel B, we perform a series of OLS regressions in which we regress percentage changes in institutional holdings against the predicted litigation risk (measured as the fitted probability from the first stage logit regression), the litigation risk shock (the generalized residual (GR) from the first stage logit regression), the annualized return between time $T\text{-}5$ and $T\text{-}3$, the annualized return between time $T\text{-}3$ and $T\text{-}2$, and the quarterly change in the standard deviation of daily returns between time $T\text{-}3$ and $T\text{-}2$. In Panel C, we present second stage regression result in which we regress holdings by type of institution. For each regressor, we present coefficient estimates with p-values in parentheses below. In the last column, we present the pseudo or adjusted R^2 for each regression.

Panel A: First Stage Litigation Risk Logit

Variable	Intercept	$\ln(\text{Size}_{T\text{-}2})$	SLUSA-Dummy$_{T\text{-}2}$	Tech Dummy	Non-exchange-traded Dummy	Return$_{T\text{-}5,T\text{-}2}$	Turnover$_{T\text{-}3,T\text{-}2}$	Pseudo R^2
Coefficient	-6.6453	0.4771	-0.0654	0.0661	0.1247	-0.8215	38.6625	0.2201
(p-value)	(<0.001)	(<0.001)	(0.677)	(0.712)	(0.044)	(<0.001)	(<0.001)	

Panel B: Second Stage OLS: Aggregate Institutional Holdings Regressions

Variable	Intercept	$\hat{\mu}_{T\text{-}2}$ (Predicted Litigation Risk)	$\hat{\varepsilon}_{T\text{-}2}$ (Litigation Risk Shock)	Return$_{T\text{-}5,T\text{-}3}$	Return$_{T\text{-}3,T\text{-}2}$	$\Delta s_{T\text{-}3,T\text{-}2}$	Adjusted R^2
Coefficient	-0.0011	-0.0023	0.0005	0.0106	0.0330	-0.1257	0.1129
(p-value)	(0.496)	(0.054)	(0.889)	(<0.001)	(<0.001)	(0.093)	
Coefficient	-0.0011		0.0005	0.0113	0.0354	-0.1316	0.1098
(p-value)	(0.510)		(0.878)	(<0.001)	(<0.001)	(0.074)	
Coefficient	-0.0011	-0.0023		0.0106	0.0330	-0.1260	0.1129
(p-value)	(0.496)	(0.054)		(<0.001)	(<0.001)	(0.090)	
Coefficient	-0.0055	-0.0061					0.0386
(p-value)	(<0.001)	(<0.001)					
Coefficient	-0.0062		0.0002				0.0133
(p-value)	(<0.001)		(0.950)				
Coefficient	-0.0042	-0.0054		0.0104			0.0550
(p-value)	(0.010)	(<0.001)		(<0.001)			
Coefficient	-0.0012	-0.0024		0.0110	0.0328		0.1103
(p-value)	(0.442)	(0.044)		(<0.001)	(<0.001)		
Coefficient	-0.0053	-0.0060				-0.1460	0.0421
(p-value)	(<0.001)	(<0.001)				(0.057)	
Coefficient	-0.0024	-0.0031			0.0324	-0.1620	0.0965
(p-value)	(0.112)	(0.009)			(<0.001)	(0.035)	
Coefficient	-0.0011			0.0113	0.0354	-0.1319	0.1098
(p-value)	(0.510)			(<0.001)	(<0.001)	(0.072)	
Coefficient	-0.0011		0.0005	0.0113	0.0354	-0.1316	0.1098
(p-value)	(0.510)		(0.878)	(<0.001)	(<0.001)	(0.074)	

Panel C: Second Stage OLS: Institutional Holdings Regressions by Type of Institution

	Intercept	$\hat{\mu}_{T\text{-}2}$	$\hat{\varepsilon}_{T\text{-}2}$	Return$_{T\text{-}5,T\text{-}3}$	Return$_{T\text{-}3,T\text{-}2}$	$\Delta s_{T\text{-}3,T\text{-}2}$	Adjusted R^2
Mutual Funds	-0.0020 (0.032)	-0.0023 (0.010)		0.0057 (0.002)	0.0128 (<0.001)	0.0158 (0.641)	0.0818
Independent Investment Advisors	-0.0001 (0.922)	-0.0017 (0.043)		0.0023 (0.298)	0.0206 (<0.001)	-0.1201 (0.060)	0.0627
Insurance Companies	-0.0004 (0.326)	0.0003 (0.424)		0.0013 (0.042)	0.0007 (0.501)	-0.0189 (0.391)	0.0070
Banks	0.0003 (0.632)	0.0006 (0.128)		0.0017 (0.049)	0.0056 (<0.001)	-0.0019 (0.928)	0.0144
Other (Unclassified) Institutions	0.0010 (0.018)	-0.0001 (0.821)		0.0021 (<0.001)	0.0001 (0.929)	-0.0170 (0.216)	0.0163