Liquidity and Shareholder Activism

Øyvind Norli, Charlotte Ostergaard, and Ibolya Schindele*

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Abstract

Blockholders' incentives to intervene in corporate governance are weakened by free-rider problems and high costs of activism. Theory suggests activists may recoup expenses through informed trading of target firms' stock when stocks are liquid. We show that stock liquidity increases the probability of activism, but less so for potentially overvalued firms where privately informed blockholders may have greater incentives to sell their stake than to intervene. We also document that activists accumulate more stocks in targets the more liquid is the stock. We conclude that liquidity helps overcome the free-rider problem and induces activism via pre-activism accumulation of target firms' shares.

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1 Introduction

Through their voting rights, shareholders have the formal power to affect the governance of public companies. But shareholder activism is a rare event, a fact often attributed to its considerable costs.[1] Election contests demonstrate how costs can be substantial. A shareholder seeking to replace existing board members in a proxy contest must run a public campaign, hire legal expertise, and pay for producing and distributing his own slate of directors to the company's other shareholders.[2] Even if the overall value added exceeds the costs, a large shareholder's incentives to monitor and intervene are hampered by free-riding minority shareholders who reap the benefit of increased value, but do not bear any of the costs.

Theory suggests that liquidity may help to overcome the free-rider problem and strengthen the incentive of large shareholders to engage in costly activism (voice). If a firm's stock is liquid enough, a shareholder planning an intervention can profit from informed trading and recoup the cost of activism by purchasing shares at a price that does not yet reflect the future increase in company value created by his privately known actions (Maug, 1998; Kahn and Winton, 1998; Winton and Li, 2006).[3] In contrast, Coffee (1991) and Bhide (1993) view liquidity as an impediment to intervention because it allows blockholders to sell their shares without incurring large trading costs. Liquidity, in this case, makes exit more attractive than voice.

In this paper, we investigate empirically whether liquidity induces shareholder activism in the form of voice through informed trading as proposed by Maug (1998), Kahn and Winton (1998), and Winton and Li (2006). For brevity, henceforth we will refer to this hypothesis as "voice" or "the voice mechanism". The mechanism of voice rests on the assumption that voice is costly. We therefore hand-collect data on contested proxy solicitations in connection with shareholder meetings. These are activist events that involve considerable costs as documented by Gantchev (2013).

[1] See e.g. the evidence provided in Gillan and Starks (1998), Karpoff (2001), and Bebchuck (2007).

[2] The biggest European pension funds have been lobbying for proxy access in U.S. companies and have pointed to the high costs of nominating individuals for election to the board as a factor behind their growing focus on non-U.S. stocks, cf. "Plea for democracy in corporations", *The Financial Times*, January 22, 2007.

[3] Faure-Grimaud and Gromb (2004) propose that liquidity may mitigate the blockholder's free-rider problem and provide incentives for voice through improved price informativeness.

Our analysis is based on a sample of firms listed on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and Nasdaq. Activist events are collected from the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) of the U.S. Securities and Exchange Commission (SEC). We record information from all filings made by non-management and filings relating to contested proxy solicitations during the years 1994 through 2007. We identify 385 shareholder activist events, for which the majority (87 percent) are filings concerning proxy contests and the rest are related to shareholder proposals or other types of disputes.

We start by documenting that at the time their intervention becomes publicly known, activists own sizeable blocks of equity in the target firms, on average 9%. Activist shareholders therefore tend to be blockholders and the free-rider problem is likely to be relevant in our sample, leaving a role for liquidity. Our paper contributes by providing four pieces of evidence on the role of liquidity that all are consistent with the mechanism in the theories of Maug (1998), Kahn and Winton (1998), and Winton and Li (2006).

First, we investigate the effect of liquidity on the likelihood of shareholder activism. We run probit regressions and find a statistically and economically significant positive effect of stock liquidity on the probability of activism. The results imply that a discrete increase in liquidity from the 10th to the 90th percentile more than doubles the likelihood of activism. Importantly, the positive effect of liquidity that we estimate is purely driven by cross-sectional differences in liquidity since we carefully control for its time-variation in our regression specifications. In addition, we show that our results are robust to various ways of handling the potential endogeneity of liquidity, including instrumental variable regressions.

Second, Kahn and Winton (1998) and Winton and Li (2006) point out that private information sometimes gives incentives for exit rather than voice: When a blockholder privately observes a managerial problem and the stock is overvalued, his profit may be higher if he sells his stake rather than intervenes to improve firm value. The higher liquidity, the stronger is the incentive for blockholders to unwind their positions. To test this hypothesis, we interact liquidity with a proxy for overvaluation. For firms with a high probability of being overvalued, high liquidity will be associated with a higher prevalence of exit than for the average firm and the effect of liquidity

on activism should be diminished. Our estimates show that the effect on activism of a discrete increase in liquidity from the 10th to the 90th percentile is around 50% lower for the decile of firms most likely to be overvalued compared to the decile of firms least likely to be overvalued.

Third, we directly examine shareholder activists' pre-event trading of target firms' stocks. We hand-collect transactions data from activists' 13D filings made with the SEC and record transactions up to one year prior to the announcement date of activism. Our evidence shows that activists trade extensively prior to activism: 76% of activists trade and almost all trades (95%) are purchases. On average, activists that trade accumulate 54% of their stock holdings during the 12 months period prior to the announcement day. The trading profits earned are substantial, on average, activists earn a return of 8.5% on the capital invested.

Finally, we document a link between the liquidity of a stock and the extent of activists' trading. Because the ability to trade without affecting the price is the source of the activists' trading profits, the voice mechanism implies that activists will accumulate more shares the more liquid is the target firm's stock. This is exactly what we find. Regressing the fraction of the target firm's shares acquired by activists on liquidity and control variables, we show that liquidity has a direct positive effect on the pre-event accumulation of target stocks.

Overall, our results suggest that informed trading is a substantive driver behind the positive effect of liquidity on activism. The ability to trade in target firms' stocks appears to be an integral part of many shareholders' intervention strategies and our results highlight the importance of being able to recoup the costs of activism in order for intervention to be worthwhile. The SEC has not succeeded in its recent attempts to provide shareholders easier access to proxy solicitations of their alternative plans for a company such as nominating directors.[4] This suggests that stock liquidity will continue to be a determining factor of activism and that shareholders of less liquid firms may be hesitant to intervene in governance because of their inability to reclaim their outlays.

[4]The SEC proposal of a new rule, Rule 14a-11, allowing shareholders to use company management proxy statement to nominate directors and solicit votes for their election (under certain conditions), was vacated by the U.S. Court of Appeals for D.C. in July 2011.

2 Relation to existing literature

Liquidity may affect corporate governance through several channels. The theories discussed in the previous section focus on how liquidity and informed trading affect blockholders' incentives for voice. A recent group of theories have pointed to the *threat* of exit as an alternative mechanism through which liquidity may affect governance (Edmans, 2009; Admati and Pfleiderer, 2009; Edmans and Manso, 2011). When managerial compensation is tied to the stock price, the threat that informed blockholders may sell their shares and exit improves managerial incentives. Because the threat is more credible when the cost of selling shares is lower, liquidity enhances the credibility of exit threat. Edmans, Fang, and Zur (2013) and Bharath, Jayaraman, and Nagar (2013) study this governance channel empirically and find evidence that threat of exit is a potent governance mechanism. Although these authors focus on threat of exit while we study the voice mechanism, they test voice as an alternative to exit, and we discuss the relationship between these papers and ours in the following.

Edmans, Fang, and Zur (2013) (EFZ) identify investors' preferences for voice versus threat of exit from their filings of 13D and 13G forms with the SEC. The filing of one of these forms is compulsory for shareholders crossing the 5% ownership threshold. Blockholders who intend to influence the control of the firm must file a 13D, whereas blockholders without such intent may file the less comprehensive 13G form. They argue that because 13G-filers relinquish the option to exercise voice, the threat of exit channel may be identified by studying how liquidity affects the choice between 13G and 13D filings. Using a sample of activist hedge funds that have filed either a 13D or a 13G form, EFZ find that higher liquidity is negatively associated with the probability of filing the 13D form. They conclude: "Conditional upon acquiring a stake, liquidity reduces the likelihood that the blockholder governs through voice (...)." The apparent contradiction of this result with our findings is due to differences in empirical design.

EFZ's empirical specification assumes that blocks are accumulated with the intention of affecting governance and that blockholders choose between the strategies of voice and threat of exit. If the two strategies are substitutes, their result indeed implies that higher liquidity decreases activists'

preferences for voice. But if the strategies are not substitutes, investors selection of one does not imply rejection of the other. Because their specification examines liquidity's effect on the filing of one form as opposed to the other, their result says that liquidity increases the *relative* attractiveness of acquiring a 5%-block without the option of voice (13G) compared to acquiring a 5%-block with the voice option (13D), and therefore does not necessarily contrast with ours. For example, if some governance problems can best be handled by voice and others by threat of exit, the EFZ finding simply implies that liquidity has a relatively stronger effect on exit threat but the effect of liquidity on voice could still be positive.[5] Alternatively, if investors accumulate blocks for reasons unrelated to governance but rather to trade on their perception of undervaluation, the EFZ result implies that liquidity has a relatively stronger effect on investment in undervalued firms than it has on the likelihood of voice.

The empirical specification in our paper tests how liquidity affects the choice between voice and no-governance using a sample of investors identified by their observed election of voice. To the extent that 13D filings signify activist intent, our approach and results are consistent with a second result provided by EFZ, which shows that higher liquidity increases the (unconditional) probability that hedge funds file a 13D against the alternative of not filing. However, Gantchev (2013) documents that two-thirds of 13D-filing blockholders never go on to make any formal demands to their target. Thus, the filing of a 13D form does not imply that the filer has paid or will pay the costs of an actual intervention. A 13D filing is therefore a less suitable definition of an activist event for our purposes because the mechanism that we test in this paper necessitates a high cost of activism.

Bharath, Jayaraman, and Nagar (2013) (BJN) takes a different approach to test the threat of exit theory, focusing on the relationship between firm value and liquidity without reliance on actual events of activism. They document that exogenous liquidity shocks have a larger effect on the value of firms with blockholders. Recognizing that this is consistent both with threat of exit and the mechanism of voice, they show that the accentuating effect of blockholders is stronger in firms where managerial compensation is more sensitive to firm value. The identification strategy of BJN validates threat of exit by showing that liquidity's impact is stronger in subsamples where threat

[5] Admati and Pfleiderer (2009) demonstrate that some types of agency problems cannot be remedied through threat of exit suggesting that investors would prefer voice for certain governance problems.

of exit would be expected to be present. This, however, does not rule out that voice is operative in other subsamples. Nor does it imply that investors prefer one governance strategy over the other. Indeed, BJN conclude that threat of exit and voice are distinct and concomitant governance mechanisms. This is also consistent with survey evidence presented in McCahery, Sautner, and Starks (2011), showing that dissatisfied institutional investors frequently make use of both exit and voice. Compared to BJN, our paper contributes by distinctly focusing on the effect of liquidity on voice and by studying actual events of activism.

Our paper is also related to a large empirical literature on the effects of shareholder activism. Early papers on activism, surveyed in Gillan and Starks (1998) and Karpoff (2001), provide little evidence that activism by institutional investors is able to impact the performance of targeted firms. A more recent group of papers collect data on hedge fund activism from 13D filings to identify hedge funds' targeting strategies and assess the value created by their activism (Brav, Jiang, Partnoy, and Thomas, 2008; Clifford, 2008; Greenwood and Schor, 2009; Klein and Zur, 2009; Brav, Jiang, and Kim, 2010). One insight from these studies is that hedge funds successfully target undervalued companies with stable cash flows and bring about improvements in target firms' performance. Although Brav et al. (2008) report that hedge funds tend to target more liquid firms, they do not consider how liquidity impacts their incentive to undertake activism. Becht, Franks, Mayer, and Rossi (2009) also show that hedge fund activism may increase firm value, using detailed data on activist engagements by the Hermes U.K. Focus Fund. Gantchev and Jotikasthira (2013) study how 13D-filing hedge funds are able to quickly accumulate concentrated stakes in target firms. They find that activist hedge funds acquire target firms' stock in response to price pressure generated by institutional investors that are selling the stock in response to outflow shocks. The early contribution by Fang, Noe, and Tice (2009), documents a positive effect of liquidity on company performance, but focuses on other mechanisms than voice. Rather than focusing on the effectiveness of activism and its effect on firm valuation, we investigate the impact of stock liquidity on shareholders' incentives to take an active role in the first place.

3 Data and sample selection

We use a sample of firms listed on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and Nasdaq. Data on shareholder activism and pre-activism trading are collected from the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) of the U.S. Securities and Exchange Commission. Stock returns, prices, and data on volume traded are from the Center for Research in Security Prices (CRSP). Data on effective trading costs (Hasbrouck, 2009) is from Joel Hasbrouck's web site. Accounting variables are from Compustat. Data on analyst following is from I/B/E/S. We use Thomson Financial Ownership data (CDA/Spectrum s34) to collect information on institutional investors' ownership. The following section describes our data selection procedure and explains how we define and measure shareholder activism and stock liquidity.

3.1 Shareholder activism

In the context of this paper, a firm is said to experience "shareholder activism" in year t if a shareholder files material that contests the proxy solicitations of the firm's management.

At shareholder meetings, registered shareholders vote using proxy cards. Issues to be voted on are decided by management and the board of directors and are included in a company's proxy material mailed to its shareholders. Proxy contests are situations where a group of shareholders disagree with the policies proposed by management and the dissident shareholders solicit proxies from other shareholders by filing their own proxy material with the SEC. Shareholders return the proxy cards of the company or the dissident shareholders depending on which campaign they support. Dissidents' distribution of alternative proxy material to shareholders is time-consuming and costly, and typically requires legal advice. Proxy solicitations by dissident shareholders commonly include an alternative slate of nominee candidates to the board, but may also include proposals to sell the company, approve or vote against a merger, increase the size of the board, or replace management.

Alternatively, shareholders may include "shareholder proposals" directly in the company's proxy

material permitting a vote on the proposal at the shareholder meeting. This right is provided by Rule 14a-8 of the Securities Exchange Act of 1934, but company's management may refuse to include proposals that nominate candidates to the board of directors or directly conflict with policies proposed by management. Shareholder proposals are almost always only advisory to the board according to state laws. Recent changes in Rule 14-a8 made by the SEC has empowered shareholders to implement proxy access by specifying *procedures* by which shareholders may nominate directors. These rules came into effect from 2012 and therefore did not apply to the events of activism in our sample. In our sample, proxy contests are the only means of nominating alternative directors.

As of May 6, 1996 all public domestic companies in the U.S. are required to file material corporate information on EDGAR. We use EDGAR to identify firms that experience shareholder activism and manually retrieve forms filed in connection with shareholder meetings by non-management and filings relating to contested proxy solicitations. Specifically, we define an activist as a shareholder that filed one or more of the following SEC forms: forms PREC14A, PREN14A, PRRN14A, DEFC14A, DEFN14A, DFRN14A, DFAN14A, and DEFC14C up to the third quarter of 2007. We do not collect separate information about shareholder proposals from other sources than these forms. Sponsors of shareholder proposals sometimes file materials or statements under Rule 14a-12.[6] Also, proxy statements sometimes mention that the sponsor of a contested solicitation is also behind one or several shareholder proposals. Some of our activist events, therefore, will consist of shareholder proposals, either alone or in combination with proxy contests.

Some investors filed voluntarily on EDGAR between the third quarter of 1993 and May 1996 and are included in our sample to the extent that these voluntary filings represent contested proxy material. For the sample period starting with the third quarter of 1993 through the third quarter of 2007, we identify 8,783 unique forms filed by non-management. It is common for a filer to file a sequence of forms concerning the same issue for the same firm, especially in relation to contested solicitations where both management and non-management typically file interchangeably with the SEC a number of times. We adopt the rule that the first date of a filing sequence defines the year

[6]Rule 14a-12 of the 1934 Securities Exchange Act permits a party that is required to file a proxy statement to commence a proxy solicitation before the time of filing the proxy statement with the SEC. The rule enables dissident shareholders to communicate their position to other shareholders.

in which the firm in question experiences shareholder activism. If there is a period of more than one year of no filings in a sequence of filings, the first filing after the gap is defined as the first filing in a new intervention. A gap of more than one year in a sequence of filings occurs in 20 cases, representing about 2 percent of our filing sequences.

Following these procedures, we are able to collect 998 such shareholder activism firm-year observations from the years 1994 up to and including the third quarter of 2007 (the sample, thus, is not confounded by the events of the Lehman default and the following financial crisis). The sample is reduced by 174 observations because we cannot find the event firm in CRSP and by an additional 135 observations because we require the event firm to be listed on NYSE, AMEX or Nasdaq with common equity. In all the analysis that follows, we require information both from CRSP and Compustat. Restricting the sample firms to have information on market capitalization and book-to-market ratio in the year prior to the activism-year, reduces the sample by another 98 observations. A closer inspection of the remaining observations reveals that 88 cases are filings that follow a friendly negotiated merger agreement between the filer and the subject firm. These observations are removed from the sample, leaving us with 503 cases of shareholder activism.

Finally, we eliminate filings where the shareholder activist has made a formal tender offer or a more informal expression of interest in the subject firm ("bear hug"). In these cases, the sponsor of the solicitation intends to acquire all the shares in the target and is taking steps towards initiating an election contest, for example, with the purpose of electing new directors willing to redeem bylaws that impede a takeover. Proxy solicitations in acquisition related cases are essentially a referendum on the sponsor's offer for the company (Bebchuck, 2007). We identify 118 such events, leaving us with 385 activist events.[7]

The data we collect differ from the recent studies of hedge fund activism by Brav, Jiang, Partnoy, and Thomas (2008), Klein and Zur (2009), and Edmans, Fang, and Zur (2013), as the activists in our sample are not limited to hedge funds and our events are not collected from 13D filings. However, many of the shareholder activists in our sample file a 13D form prior to engaging in a

[7]Friendly negotiated mergers, tender offers, and "bear hugs" are kept in the sample as non-activism events. Under our null-hypothesis, liquidity has no effect on activism and it would, in principle, favor the alternative to remove these cases. In practical terms, removing these cases from our analysis altogether has no effects on the results.

proxy fight with the management. Some overlap with hedge fund data collected from 13D filings is therefore natural. Our data is more similar to that of Greenwood and Schor (2009) who collect both 13D and DFAN filings from a period similar to ours (1993–2006). Their focus, however, is on how hedge fund activists create value, whereas we use all types of activists and study how liquidity influence the decision to become a shareholder activist.

Moreover, investors may acquire blocks of shares and file the 13D form for reasons unrelated to the target firm's governance. For example, many hedge funds pursue event driven strategies attempting to profit from the mispricing of companies around major events such as mergers or restructurings, so-called risk or merger arbitrage. The SEC has established that risk arbitrageurs who acquire target shares following announcement of a tender offer for the purpose of tendering or exchanging the stocks in the merger are not eligible to file form 13G but must file the 13D form.[8] Thus, the identification of hedge fund activism by their 13D-filings encompasses actions that do not necessarily constitute the kind of activism envisioned in the theoretical models discussed above.[9] If voice-related filings constitute only a part of the 13D filings made by hedge funds, the covariation of 13D-filings with liquidity will also reflect the reaction of these non-voice filings to changes in liquidity.[10]

Figure 1 shows the prevalence of shareholder activism over the years in our sample. Each bar in the figure represents the fraction of firms that experience shareholder activism in a given year. The fraction varies from 0.11% to 0.83%. This represents an average of about 28 shareholder activism cases per year. The first two years in the sample show a number of activism cases that are below average. This is most likely driven by the fact that fewer firms filed through EDGAR when filing was not required by the SEC. The occurrence of shareholder activism was relatively stable during the ten year period 1996 through 2005. Assuming that the fourth quarter of 2007 (outside the

[8]The reason being that the transaction changes the control of the issuer. Faith Colish, SEC No-Action Letter, March 24, 1980.

[9]Greenwood and Schor (2009) argue that documented positive returns from hedge funds' activism are driven by their profits from takeover-related strategies. Hence, we should expect a non-negligible fraction of hedge funds' 13D filings to relate to such investments and we exclude from our sample all events related to (friendly or hostile) mergers.

[10]On the other hand, 13D filings may indirectly pick up informal intervention strategies such as private engagement with management while such actions will not be included in our data. The documentation in Becht, Franks, Mayer, and Rossi (2009) indicate that private intervention may be important but because little data on private intervention is available, it is difficult to gauge the importance of liquidity for such types of activism.

sample period) displays the same activism intensity as the first three quarters of 2007, activism activity in both 2006 and 2007 is noticeably higher than in the previous years of the sample.

Table 1 reports descriptive statistics for our sample of activism events. Panel A shows the type of activism. The bulk of our events involve proxy contests (331+3). Shareholder proposals are a means of activism in 12 percent of our events (43+3). Proxy contests and proposals may both be used in the same event, although this is not common and occurs in only 3 instances. The "Other"-type of activism is, for example, a request by the filer asking other shareholders to write to the target firm's management to express dissatisfaction about a particular issue.

Panel B categorizes events according to activist identity and stock ownership. The categories are overlapping. If, for example, a hedge fund and a pension fund file jointly, we register the identity of the filer both as a pension fund and a hedge fund. Filings by two different activist types are quite common. Appendix A explains the categories of activists' types.

Hedge funds are involved in almost half of the filings in our sample. Shareholder committees are the second most active type of activist and are involved in 29 percent of our sample events,[11] whereas individual investors are behind 13 percent of the events. The remaining activist types make up less than 10 percent of our events. The low involvement of institutional investors may reflect that institutional investors prefer to exert influence on management through more informal channels or that institutional investors display a certain reluctance to get involved in activism.

For hedge funds, shareholder committees and individual investors, the average ownership stake at the time of activism is between 9 and 11 percent. Thus, the average shareholder activist in our sample is a relatively large blockholder. The industrial shareholder activists' holdings are the largest at more than 15 percent on average. Workers unions are at the other end of the scale, they own close to zero percent in target firms. The overall average holding for shareholder activists is about 9 percent.

Panel C of Table 1 shows the distribution of the stated purposes of activism. The far most prevalent cause of activist campaigns is a conflict over directors. As many as 83 percent of our activist shareholders propose alternative director nominees. Other common conflicts arise over

[11] A shareholder committee is a coordinated group of shareholders joining forces in their attempt to influence the target company's governance. It can comprise both institutional and individual shareholders.

corporate governance policies and voting procedures (43%), the company's business strategy (42%), initiatives to sell off part of the firms (34%), and other measures to improve efficiency (26%).

3.2 Pre-activism trading in target firms by shareholder activists

To investigate the voice hypothesis, we hand-collect data on how shareholder activists trade in target firms prior to the activism announcement date. Rule 13D-1(a) of the Securities and Exchange Act requires active investors to file with the SEC to disclose the acquisition of more than 5% of any class of securities of a publicly traded company. The Schedule 13D filing includes trading dates, prices and quantities traded during the 60 day period before the filing date.

For each target firm, we search back in time for the 13D filing that is closest to the activism announcement date. If the filing date of this 13D filing is no more than one year prior to the announcement date, we record activists' trades as reported in the 13D filing. In addition, we search in subsequently filed amendments (SC 13D/A) to the original 13D filing as these amendments often contain information about additional trades. Hence, if an activist's 13D filing coincides with the activism announcement date, we have information about his trades 60 days back in time. If an activist's most recent 13D-filing occurs 6 months prior to the announcement date, we have information about his trades for a period of 8 months back from the announcement date. Thus, when considering the one year period prior to the activism announcement, our procedure for collecting trades will potentially ignore early trades if the activist files more than one 13D during the period. The motivation for the selected procedure is to focus on the trades that are closest to the activism announcement day.

Although we have 385 activist events in our sample as described in Table 1, we lose some events in the regression analysis below because of missing observations associated with the regressions' control variables. We therefore collect data on trades for a sample of 354 activist events, which are the events included in our main empirical specification, to be presented in Table 3, column 2 below. For this core sample, we are able to find trades by the shareholder activist in the target firm in 197 cases. There are 157 cases where we have no information about trading. In 88 of the no-trade cases, the activist owned less than 5% of the target firm's shares at the announcement and was therefore

not required to report his trades. In these instances we do not know if the activist actually did not trade or just did not report the trades. There are another 7 cases where we do not know the ownership of the activist at the time of the announcement. Removing the 95 cases with unknown ownership or ownership less than 5% leaves us with a sample of 259 event firms for which we have information about trading—197 with trades and 62 with no trades. For the 197 event firms with trades, we have registered 11,518 trades during the period that starts on day -252 relative to the activism announcement and ends on day $+40$.

Figure 2 shows the average net fraction of outstanding shares traded by activists on event days -252 through $+40$ relative to the announcement day. The Figure shows that shareholder activists purchase a significant fraction of the target firm's stock prior to the announcement. Notice that almost all trades of the target firm's stock are purchases. We will return to more descriptive statistics on activists' trading in section 4.4.

4 Empirical evidence

4.1 The probability of shareholder activism

In our basic specification we examine the relationship between shareholder activism and liquidity using the following probit model:

$$\text{Prob}\left(\text{ACT}_{it} = 1 \mid \text{L}_{it-s}, \text{X}_{it-1}\right) = \Phi\left(\gamma_t + \gamma_1 \text{L}_{it-s} + \gamma_2' \text{X}_{it-1}\right) . \tag{1}$$

The dependent variable, ACT_{it}, equals one if firm i experiences shareholder activism in year t and is zero otherwise, $\Phi(\cdot)$ is the normal cumulative distribution function and L_{it} is a continuous measure of firm i's stock liquidity defined such that L_{it} is increasing in liquidity. Our main measure of liquidity is the effective trading cost measure of Hasbrouck (2009) multiplied by -1. The parameter γ_t denotes year fixed effects and X_{it} is a $(k \times 1)$ vector of control variables to be explained in what follows.

Control variables are measured in the year prior to the year of activism, while liquidity is

lagged s additional years. This is to guard against a potential endogeneity problem caused by unobservable omitted variables correlated with both liquidity and activism. If the vector of control variables omits such variables, the estimated coefficient on liquidity will be biased.

For example, more liquid firms are likely to have more diffuse ownership structures with smaller shareholders. Small shareholders may have few other means of intervention than proxy solicitations. Conversely, less liquid firms with more concentrated ownership structure may have large shareholders that can influence management through both formal and informal channels. If we do not control for ownership dispersion, the correlation between stock liquidity and the incidence of proxy solicitations could be spurious—driven by ownership structure rather than liquidity. We include three variables that control for ownership structure: "Herfindahl index of institutional ownership," measured as the sum of squared ownership fractions for shareholders making 13F filings with the SEC; "Institutional holding," measured as the aggregate stockholdings of shareholders making 13F filings to the SEC; "Institutional breadth," measured as the number of institutional investors that have reported ownership through 13F filings normalized with the total number of institutional owners reporting in a given year (Chen, Hong, and Stein, 2002).

Similarly, momentum may be correlated both with the incidence of activism and with liquidity. Momentum losers may have higher liquidity and subsequent poor returns may foster activism in future periods, causing the estimated effect of liquidity to be biased for stocks with negative momentum. To prevent momentum from biasing our results, we include "Abnormal performance" lagged one and two periods. "Abnormal performance" is measured as the arithmetic average monthly abnormal performance for firm i over January through December. Abnormal monthly performance for firm i in month s is computed as follows: Using a minimum of 12 monthly returns and a maximum of 60 monthly returns for the period $s-60$ through $s-1$, we regress excess returns for stock i on the three Fama and French (1993) factors and a momentum factor. If less than 12 monthly returns are available when estimating factor coefficients for firm i, the returns on stock i are replaced by the returns on stock i's industry portfolio. The industry portfolio is one of the Fama-French 12 industry portfolios. The coefficients from this regression are multiplied with the corresponding factor realizations for month s and summed up to get the benchmark return for

month s. The abnormal return for month s is the difference between the return on stock i and the benchmark return. All factors and industry portfolio returns are downloaded from Ken French's web site.

The visibility of a targeted firm may be correlated both with the incidence of activism and with liquidity. Stocks that are followed by many analysts may both be more liquid and more subjected to shareholder activism because of greater media coverage. To prevent visibility from biasing our results, we include "Analyst coverage," measured as the number of analysts that report earnings estimates to I/B/E/S, as a control variable in the regressions.

In addition, we include a number of other control variables intended to pick up individual firm characteristics: "Volatility" is the standard deviation of monthly returns during year $t-1$. "Nasdaq" is a dummy variable that takes the value one if the stock is listed on Nasdaq and zero otherwise. "Log(Market cap)" is measured as the natural logarithm of the end-of-December market capitalization. "Book-to-market ratio" is measured as the book value of equity divided by the market value of equity at the end of the calendar year. "Log(Sales)" is measured as the natural logarithm of the dollar value of sales. "Cash" is measured as cash and marketable securities divided by total assets. "Dividend yield" is measured as the total dividend (common dividend plus preferred dividend) divided by market value of common equity plus book value of preferred equity. Book value of preferred equity is the first non-missing value when using redemption value, liquidating value, and the carrying value in that order. "R&D" is measured as research and development expenses divided by total assets. If R&D expenses are missing from Compustat they are assumed to be zero. All variables constructed as ratios and using data from Compustat (book-to-market ratio, Cash, dividend yield) are trimmed by removing the lower and upper 0.005 percentile. R&D has a minimum value of zero and is trimmed only on the right tail.

Finally, our specification includes year fixed effects. Both shareholder activism and stock market liquidity have risen during the last couple of decades. A regression of the incidence of activism on liquidity may therefore show a positive effect of liquidity on activism, even if the trends in the two variables occur for unrelated reasons. Our hypotheses, however, concern cross-sectional differences between stocks. If the time trend is not controlled for, the estimated coefficient of liquidity may

pick up the time-variation as opposed to the cross-sectional relationships we are interested in. This is akin to the omitted variable bias discussed above. The positive trends in activism and stock market liquidity induce a co-movement that may be alleviated if we include a control for time in the regression.

Table 2 provides descriptive statistics for the right hand side variables in model (1). The first four numerical columns report number of non-missing firm-years and averages for firm-years with activism and for firm-years without activism. As reported in Panel A of Table 1, there are a total of 385 events in our sample. The second column shows that there are missing observations for some of the control variables. Thus, when all variables are used in a regression, our sample will generally include less than 385 event firms. The table presents initial evidence of a relationship between shareholder activism and liquidity. Firms that experience shareholder activism have significantly higher liquidity than firms that do not experience activism. Target firms also underperform the Fama and French (1993) plus momentum benchmark on average, indicating that the occurrence of shareholder activism is negatively related to the target firm's stock market performance. Among the remaining control variables, target firms have more institutional shareholders, lower volatility, lower book-to-market ratio, and spend less on R&D.

Moving on to the probit regressions, Table 3 presents the results from the estimation of equation (1). We present results for two different lags of liquidity. In column (1), liquidity is measured contemporaneously with the other covariates. This specification assumes that liquidity is an exogenous variable. It is possible, however, that changes in ownership in year t-1 affect liquidity in year t, and that those ownership changes give rise to subsequent shareholder activism. Although we include measures of ownership structure as control variables, they may not capture all patterns of changes equally well and there may be an omitted variable problem. For this reason, our preferred specification lags liquidity one additional year, to year $(t-2)$. The results estimated using this latter specification are presented in column (2) of the table. All regressions include year fixed effects (not shown). The estimated coefficients for the year fixed effects are generally highly significant.

The probit regression in column (1) shows a statistically significant and positive effect of liquidity on the probability of activism. When measuring liquidity in year $t-2$ relative to the activism year

(column (2)), the effect of liquidity remains positive and statistically significant. Thus, firms with more liquid stocks are more likely to be targeted by shareholder activists. The economic effect corresponding to the estimated coefficients is also large. The bottom part of the Table reports the effect on the probability of activism for an increase in stock liquidity from the 10th to the 90th percentile, holding other variables at their sample means. For the specification in column (2), such an increase in liquidity generates a statistically significant 0.40 percentage points increase in the likelihood of activism.[12] Despite the small absolute value of this change, there are at least two reasons why this is an economically important finding. First, the unconditional probability of activism in the sample is only 0.56%. Thus, the estimated increase from the 10 to the 90th percentile is 71.2% of the sample probability of activism. In other words, holding everything else constant, the difference in liquidity when comparing the most liquid to the least liquid stocks accounts for a difference in activism almost two-thirds as large as the overall chance of experiencing activism. Second, shareholder activism in the form of voice is not always observable to outsiders. The events used to identify shareholder activism in this paper are rare. This does not mean that voice is an unimportant form of activism. Survey evidence by McCahery, Sautner, and Starks (2011) shows that more than 50% of institutional investors are willing to employ voice by engaging management in discussions.

Turning to the coefficient estimates of the control variables in column (2) of Table 3, we see that the probability of activism is negatively related to past stock market performance, that is, underperforming firms are more likely to be targets of activism.[13] Both institutional ownership and breath are positively related to shareholder activism. This is consistent with the findings of Gantchev and Jotikasthira (2013) who show that institutional selling pressure arising from liquidity shocks facilitates activist hedge funds' acquisition of target firms' stock.

In sum, the results presented in Table 3 show that liquidity, on average, has a positive effect on the probability of activism. Thus, our findings support the notion that liquidity improves corporate

[12]The likelihood increases from 0.33 to 0.73 percent points for the 10th and the 90th percentile respectively. A Wald test of the null hypothesis that the change in the probability of activism is equal to zero has a p-value of 0.000 (standard errors are estimated with the delta method).

[13]Other papers also find that poor past market-adjusted stock performance increases the probability of activism. See for example Gordon and Pound (1993), Karpoff, Malatesta, and Walkling (1996), and Del Guercio and Hawkins (1999) who study shareholder proposals and Faleye (2004) who study proxy contests.

governance by facilitating shareholder activism. The next section investigates the robustness of this conclusion.

4.2 Robustness checks

Table 4 reports probit regressions as specified in equation (1), but with alternative ways of measuring liquidity. In column (1), we lag liquidity even further, measuring it over the years $t-4$ and $t-3$ relative to the year of activism. The results are qualitatively similar to our earlier results. The effect of a discrete increase in liquidity from the bottom to the top decile continues to generate a sizeable increase in the likelihood of activism.

Even though the probit regression includes carefully selected control variables, one may nevertheless worry that some unobservable firm-specific characteristic correlated with both liquidity and activism is biasing our results. We therefore also present results from an instrumental variable probit regression. Valid instruments must be correlated with stock liquidity but uncorrelated with any unobservable variables that may exert an independent effect on activism. We use two instruments for liquidity. First, we construct an instrument that exploits the introduction of decimalization on NYSE, AMEX, and Nasdaq in 2001. The introduction of decimalization constitutes an exogenous shock to liquidity that is uncorrelated with shareholder activism as required for an instrument. To create cross-sectional variation in the instrument, we interact a dummy for decimalization with the average firm size over the years prior to decimalization.[14] We prefer to measure firm size by Ln(sales) because sales are unaffected by movements in stock prices as opposed to, say, market capitalization. The interacted variable equals zero prior to decimalization and attains a constant value in the years afterwards, such that the constant magnitude is larger for larger firms. The second instrument is created from the average liquidity of stocks in industries other than the industry of the stock in question. We use average liquidity of firms in other industries in year $t-2$ as an instrument for the liquidity of stock i in year $t-2$. The construction and further justification of instruments are explained in detail in Appendix B.

Column (2) shows results from an instrumental variable probit regression using the two instru-

[14] Furfine (2003) and Chakravarty, Wood, and van Hess (2004) document that the impact of decimalization was larger for stocks traded more actively, and we use size as a proxy for more actively traded stocks.

ments described above. The results are qualitatively unchanged compared to the previous results. The effect of liquidity is statistically significant although somewhat larger and estimated with less precision as would be expected. The estimated effect of a discrete increase in liquidity from the 10th to the 90th percentile also appears to be somewhat large when compared to our other estimates, but the estimate is statistically significant at a level below 5%. The corresponding first stage regressions, a Wald test of exogeneity, and an overidentification test of instrument validity are enclosed as Table B.1 in Appendix B.

The remaining two columns show results from regressions using, respectively, a measure of liquidity orthogonalized with respect to ownership, and a zero-one dummy representation of liquidity. In column (3), liquidity is measured using the residual from the regression:

$$\mathrm{L}_{t-2} = \gamma_0 + \gamma_1 \mathrm{Herf}_{t-2} + \gamma_2 \mathrm{InstH}_{t-2} + \gamma_3 \mathrm{InstB}_{t-2} + \gamma_4 \mathrm{AvgL}_{t-2} + \epsilon_{t-2}\,,$$

where L is the Hasbrouck (2009) measure multiplied by -1, Herf is the Herfindahl index of institutional ownership, InstH is Institutional holdings, InstB is Institutional breadth, and AvgL is the average Hasbrouck (2009) illiquidity in the cross-section of firms in year $t-2$. We bootstrap the standard errors to make them robust to non-normalities in the data. In column (4), liquidity is measured as a dummy variable that equals one in year t if the stock's liquidity is greater than the cross-sectional median in year t and zero otherwise.

In both specifications documented in the last columns of Table 4, the effect of liquidity is clearly significant and economically large. The increase in the probability of activism when liquidity goes from the bottom to the top decile is of similar size as in the model in column (1) and continues to be economically sizable.

In the next set of robustness checks, documented in Table 5, we replace the Hasbrouck (2009) effective cost measure with the trade impact measure of Amihud (2002). To ensure that higher values of the liquidity variable correspond to higher liquidity the Amihud trade impact measure is also multiplied by -1. The measure is also winsorized at the 1st and 99th percentile. This removes some big outliers, caused by stocks with very large stock returns and low volume, that are

close to 500 times larger than the average liquidity. Columns (1) through (4) in the Table report the results from estimating model (1) using four different measures of Amihud liquidity: Liquidity measured one year prior to the year of activism, liquidity measured two years prior to the year of activism, liquidity measured over years $t-4$ and $t-3$ relative to the year of activism, and liquidity instrumented in the same way as described in connection with column (2) of Table 4. The Amihud measure produces qualitatively similar results to the Hasbrouck measure. The effect of liquidity is positive and statistically significant. Looking at the bottom part of Table 5 where we estimate the change in the probability of activism when liquidity is changed from the 10th to the 90th percentile, the estimated impact of liquidity on activism is smaller than the previously estimated effect. The magnitude is, however, still economically significant, constituting an increase in the probability of activism that is approximately 20% higher than the frequency of activism in the regression sample.

Overall, the results presented in this robustness section show that the findings in Table 3 are robust to how liquidity is defined and to the period over which liquidity is measured. Thus, we retain our conclusion that liquidity, on average, increases the probability of activism. However, the average effect of liquidity in our sample of event firms, could potentially conceal interesting cross-sectional variations in the effect of liquidity. The next section investigates such cross-sectional variations.

4.3 Activism in overvalued firms

Our results so far indicate that the average effect of liquidity on the probability of activism is positive. However, the effect of liquidity may, for some firms, work in the opposite direction. As pointed out by Kahn and Winton (1998) and Winton and Li (2006), a blockholder who privately observes that a firm is overvalued may find it optimal to sell rather than initiate a value improving but costly intervention. Winton and Li (2006) show theoretically that the more liquid the stock, the larger is the incentive to exit in this case. Conversely, when the stock is illiquid, the costs of selling out may exceed the costs of intervention. This argument implies that for overvalued firms, the effect of liquidity on the likelihood of activism is negative.

By nature, it is impossible to identify the firms where blockholders have private information

about overvaluation. The theory can, however, be tested using empirical proxies for overvaluation. We draw on different strands of the literature to construct such proxies. First, there is an extensive literature investigating the theories of Miller (1977) and Harrison and Kreps (1978) which shows that stocks subject to short sales constraints and differences of opinion can be overvalued in equilibrium. We follow Nagel (2005) and measure short sale constraints by institutional ownership. Nagel argues that stocks with low institutional ownership tend to have sparse stock loan supply. Consequently, short sale constraints can be proxied by Ln(1/Institutional Holding), where Institutional Holding is the fraction of outstanding shares held by institutions filing 13F forms with the SEC. To proxy for differences in opinion about the valuation of a given stock, we follow Baker and Wurgler (2007) and use return volatility. Return volatility is measured as the standard deviation of monthly stock returns over a period of one year.[15] We combine the two proxies for differences of opinion and short sale constraints in the measure Ln(Volatility/Institutional Holding). Holding Volatility fixed, the likelihood of the stock being short sale constrained is increasing in this measure. Fixing Institutional Holding, differences of opinion is also increasing in the measure. Thus, the likelihood of overvaluation is increasing in Ln(Volatility/Institutional Holding). As robustness, we also use Ln(1/Institutional Holding) and Volatility as separate measures of overvaluation.

Second, we adopt the idea that prolonged stock price pressure may result from institutional trading due to the inflows and outflows they face from investors (Sias, Starks, and Titman, 2006; Coval and Stafford, 2007). A mutual fund experiencing large inflows would tend to increase its existing positions inducing positive price pressure in the stocks it already holds. Stocks with high price pressure are more likely to be overvalued. We follow Edmans, Goldstein, and Jiang (2012) and create a measure of price pressure caused by mutual fund inflows. We get mutual fund holdings from Thomson Reuters and mutual fund flows from CRSP and consider equity funds only but omit sector specific funds. The inflow-induced price pressure on stock i in quarter j is constructed as

$$Price\ Pressure_{it} = \sum_{j=1}^{M} \frac{F_{jt} \times s_{ijt-1}}{VOL_{it}}, \tag{2}$$

[15] Berkman, Dimitrov, Jain, Koch, and Tice (2009) also use institutional ownership to measure short sale constraints and return volatility to proxy for differences of opinion.

where F_{jt} is the dollar value of inflows experienced by mutual fund j in quarter t, s_{ijt-1} is the proportion of mutual fund j's total assets accounted for by stock i at the end of the previous quarter, and VOL_{it} is the dollar trading volume of stock i in quarter t.[16] In (2), the summation is only done for mutual funds for which F_{jt} scaled by total assets exceeds 5%. In the analysis below, $Price\ Pressure_{it}$ is summed over the four quarters in a calendar year. Notice that the price pressure variable is not computed from mutual funds' actual purchases of stock i, but instead assumes that mutual funds experiencing inflows of significant size purchase additional stocks in proportion to their existing holdings. This reduces that likelihood that the price pressure variable is capturing mutual funds' information-based trading.

The theories of Kahn and Winton (1998) and Winton and Li (2006) suggest that the effect of liquidity on activism is negative for overvalued firms. In the data we do not, however, expect to find a negative relationship for two reasons: First, by their nature, our proxies for overvaluation are noisy. Thus, some of the firms that we classify as overvalued may be correctly priced or even undervalued. Second, our overvaluation measures do not incorporate the potential firm-specific value-improvements generated by activism. Thus, certain firms classified as overvalued by our proxies, may be undervalued when the value improvement resulting from the activists' actions are also taken into account. For such firms, there should be a positive relationship between liquidity and the probability of activism. In line with this, rather than expecting to find a negative relationship between liquidity and the probability of activism, we hypothesize that the previously documented positive effect of liquidity on activism is likely to be diminished for overvalued firms. In what follows, we test this hypothesis.

We specify a probit regression that allows us to test if the effect of liquidity on the probability of activism changes with overvaluation. Using price pressure to illustrate, we are interested in examining whether the effect of liquidity on the probability of activism is different among firms

[16]The proportion of mutual fund j's total assets accounted for by stock i is given by

$$s_{ijt} = \frac{N_{ijt} \times P_{it}}{TA_{jt}},$$

where N_{ijt} is the number of shares in stock i held by mutual fund j in quarter t, P_{it} is the market price of stock i at the end of quarter t, and TA_{jt} is total assets held by the fund in quarter t.

with low price pressure (less likely to be overvalued) and firms with high price pressure (more likely to be overvalued). We investigate this by adding an interaction term to the probit model presented in equation (1):

$$\text{Prob}\left(\text{ACT}_{it}=1|\ .\ \right)=\Phi\left(\gamma_t+\gamma_1\text{L}_{it-2}+\gamma_2\text{Z}_{it-1}+\gamma_3\text{Z}_{it-1}\times\text{L}_{it-2}+\gamma_4{}'\,\text{X}_{it-1}\right), \tag{3}$$

where Z is our proxy for the likelihood of the firm being overvalued. The other variables are defined in connection with equation (1).

In equation (3), we are interested in how Z moderates the effect of liquidity on activism, that is, how the marginal effect of liquidity changes in Z. This effect is given by the cross-derivative of $\Phi(\cdot)$ with respect to L and Z, which in our specification is:

$$\frac{\partial\left(\dfrac{\partial\Phi(u)}{\partial\text{L}}\right)}{\partial\text{Z}}=\gamma_3\Phi'\left(u\right)+\left(\gamma_1+\gamma_3\text{Z}_{it-1}\right)\left(\gamma_2+\gamma_3 L_{it-2}\right)\Phi''\left(u\right). \tag{4}$$

Norton, Wang, and Ai (2004) provide a Stata procedure "inteff" that estimates this marginal effect as well as the standard errors of the effect computed with the delta method (see also Ai and Norton, 2003). We report the estimated marginal interaction effect from (4) as the average value across all the observations in the sample.

Table 6 presents results from estimating the model in equation (3) when liquidity is measured using the effective trading cost measure of Hasbrouck (2009). Focusing first on column (1) where overvaluation is measured by Ln(Volatility/Institutional Holding), the first row shows that the coefficient estimate on the interaction term is negative and statistically significant. More importantly, the second segment of the Table shows that the average liquidity-overvaluation interaction effect is negative (-0.06). The associated average z-value, -2.2, indicates statistical significance at conventional levels. Thus, the marginal effect of liquidity on the probability of activism is smaller when the firm is more likely to be overvalued. Results presented in the last three rows of column (1) reinforce this conclusion. Here we compare the effect on the probability of activism of a discrete change in liquidity from the 10th to the 90th percentile when the overvaluation proxy is held at the

10th percentile with the corresponding change in liquidity when the overvaluation proxy is held at the 90th percentile. With overvaluation at the 10th decile, a discrete change in liquidity increases the probability of activism with 0.68 percentage points. The corresponding change in liquidity for the most overvalued firms (the 90th decile) increases the probability of activism by 0.33 percentage points, that is, the effect is approximately halved. The last row of the Table shows that the difference of 0.36 percentage points is statistically significant with a p-value of 0.035.

Columns (2) and (3) of Table 6 estimates the effect of overvaluation using Volatility and Ln(1/Institutional Holding) as separate overvaluation proxies. The results are very similar to the results when Ln(Volatility/Institutional Holding) is the overvaluation proxy. Column (4) of Table 6 shows how overvaluation moderates the effect of liquidity on the likelihood of activism when overvaluation is proxied by price pressure from mutual fund inflows. Focusing on the second segment of the Table, the average liquidity-overvaluation interaction effect is negative and statistically significant. When investigating large changes in liquidity (last three rows of the Table) we again see that the effect of liquidity on the likelihood of activism is significantly smaller when the firm is more likely to be overvalued.

Notice that column (3) of Table 6 shows that the effect of liquidity on voice is smaller for firms more likely to be short sale constrained (i.e., firms with low institutional ownership.) By itself, this results is also consistent with Edmans' (2009) theoretical result that greater short sale constraints enhances threat of exit. However, all our other proxies for overvaluation have similar effects as the proxy for short sale constraints. That is consistent with Kahn and Winton (1998) and Winton and Li (2006) but not with Edmans (2009), and suggest that our results are indeed driven by a diminished incentive for voice rather than threat of exit.

Table 7 presents the same analysis as in Table 6, except that the effective trading cost measure of Hasbrouck (2009) is replaced by the trade impact measure of Amihud (2002). The results are qualitatively similar.

In sum, the evidence documented in Table 6 and Table 7 is consistent with our earlier findings that liquidity increases the probability of activism for the average firm. However, the effect of liquidity is considerably smaller for firms that are more likely to be overvalued. These findings

imply that liquidity decreases the probability of activism in overvalued firms, consistent with the proposition of Kahn and Winton (1998) and Winton and Li (2006).

In the next section we attempt to uncover the mechanism through which liquidity impacts activism by documenting the importance of activists' pre-event trading in the target firm's stock.

4.4 Evidence on pre-activism trading in target firms

So far we have documented an economically and statistically strong positive relationship between liquidity and the probability of activism. This finding is consistent with the view that high liquidity facilitates pre-activism trading in target firms. When the expected profit (price appreciation) from existing holdings and pre-activism trading outweighs the expected cost of activism, shareholder activism will occur, creating a positive relationship between liquidity and the probability of activism. This section documents that pre-activism trading is common and that shareholder activists on average purchase a significant fraction of their holdings at announcement during a short period just prior to the announcement of activism.

Table 8 presents descriptive statistics on pre-activism trading. As discussed in subsection 3.2, we are able to extract trading data for a sample of 259 target firms. The first column in Table 8 shows that in 143 of these firms, hedge fund activists are involved. For the majority of the remaining 116 cases, the shareholder activist is a shareholder committee, an individual investor and/or an investment company. The second column shows that shareholder activists trade in the target firm prior to the activism announcement in 76% of the 259 cases. The next two columns show that there are 11,518 trades reported and that 95% of these trades are purchases. Thus, pre-activism buying of target shares occurs in two-thirds of our events, suggesting that pre-event accumulation of stock does not occur in ad-hoc manner but is an integral part of many activists' intervention strategies.

The last six columns of Table 8 report descriptive statistics on trade size, the fraction of outstanding shares acquired during the 252 day trading period prior to the activism announcement, and a measure of the profit from pre-activism trading. Focusing on the first row, the average trade size is $346,000. The medium trade size is only $16,000, implying that the average trade size is driven up by some very large trades. Activist shareholders acquire a significant portion of

their ownership during the 252-day period leading up to the activism announcement. The two columns entitled "Acquired ownership" show that activist shareholders that trade in the target firm, on average acquire a total of 4.25% of the target firm's outstanding shares during the 252-day period prior to the announcement. This makes up 54% of the activist's holdings at the time of the announcement. Turning to the profit from trading, the average activist earns $1.56 million on the trades made prior to activism. This profit is computed as the difference between the shares acquired, valued at the activism announcement day price, and the actual acquisition price of the same shares. The last column shows that the profit is 8.5% of the announcement date value of the acquired shares. Given that most of the trades are done close to the announcement (see Figure 2), the profit is economically large. Moving to the other rows of the Table, we see that hedge funds and investment companies acquire a larger than average fraction of the outstanding shares. They also earn larger profits in absolute terms.

Table 9 investigates the relationship between our liquidity measures and the amount of pre-activism trading. If liquidity positively affects the probability of activism because it allows activists to profit from pre-activism trading in the target firm, the amount of trading should increase in liquidity. To test this, we regress the fraction of the target firm's outstanding shares acquired by the activist during the 252-day period prior to the announcement on liquidity and a set of control variables. To ensure that the period over which we measure liquidity and control variables do not overlap with the period over which we record trading, liquidity is measured in year $t-3$ relative to the activism year while the control variables are measure in year $t-2$. Measuring liquidity using the effective trading cost measure of Hasbrouck (2009), we find that liquidity has a positive impact on the amount of trading. The effect is statistically significant with a t-value of 2.52 when using all available data (column (1)) and with a t-value of 2.07 when dropping observations with zero trade and ownership below 5 percent (column (2)). Measuring liquidity with the Amihud (2002) measure leaves us with the same conclusion.

Overall, this section shows that pre-activism trading is very common in our sample of shareholder activism events. Shareholder activists purchase a significant fraction of their holdings of target shares in the 252-day period ending with the announcement day. The amount of trading is

also increasing in the liquidity of the target. The existence of systematic pre-event trading provides additional evidence in favor of the view that liquidity increases the probability of activism because it allows a potential activist to trade on the private information that value will be improved through his forthcoming activism.

5 Conclusion

This paper examines empirically the effect of stock liquidity on shareholders' incentives to engage in activism. Theory proposes that liquidity may help to overcome the costs of activism because it allows the activist to purchase shares in the target at a price that does not reflect the (higher) post-activism value of the firm. However, liquidity may also discourage activism. In cases where the shareholder has private information that the firm is overvalued, he is likely to profit more from exit as opposed to activist voice.

Using a sample of 385 shareholder activist events collected for the 1994–2007 period, we provide four pieces of evidence that shed new light on the relationship between liquidity and shareholder voice. Our findings support the view that liquidity increases the probability of activism because it allows a potential activist to trade on his private information that the target firm's value will be improved through activism.

First, we show that that liquidity, on average, has a positive effect on the likelihood of shareholder activism. Second, we uncover cross-sectional heterogeneity in the effect of liquidity on activism. Theory suggests the effect will be diminished for overvalued firms and we interact liquidity with proxies for overvaluation in our regressions. The results show that the effect on activism of an increase in liquidity is significantly lower for the decile of firms most likely to be overvalued compared to the decile of firms least likely to be overvalued. Third, we document that pre-activism trading is very common in our sample of activism events. Shareholder activists purchase a significant fraction of their holdings of target shares in a short period leading up to the announcement of activism announcement. Fourth, the extent of activists' trading is increasing in the liquidity of the target firms' stocks.

We conclude that liquidity has a significant impact on shareholders' incentives to intervene in corporate governance through its effect on the value of shareholders' private information. As an increasing fraction of equity trading is moving from traditional exchanges to new trading venues and shareholder activism has become an increasingly important way of affecting the governance of public companies, our paper highlights another reason to discuss and study whether these dramatic changes in how equities are traded influence liquidity.

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Figure 1
Fraction of firms that experience shareholder activism: 1994–2007

The Figure shows how shareholder activism varies across sample years: 1994 through the third quarter of 2007. For each year we identify all firms that satisfy non-activism related sampling criteria. Each bar in the figure represents the fraction of firms experiencing shareholder activism in a given year. A firm experiences shareholder activism if a non-management shareholder or group of shareholders file a shareholder proposal or a contested solicitation through EDGAR. The light area of the 2007-bar is the proportionally projected number of activism cases in the fourth quarter of 2007 (which is outside our sample).

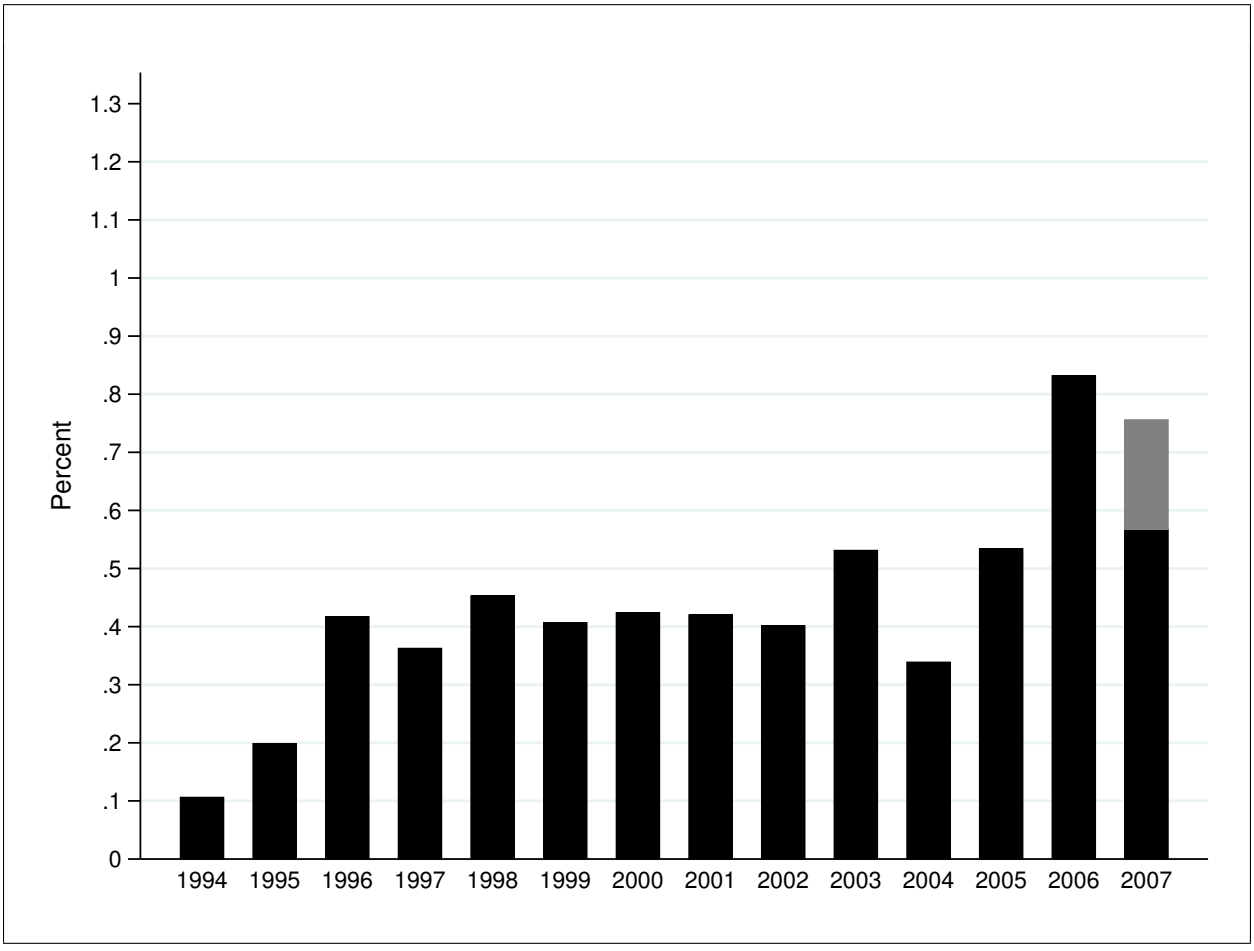

Figure 2
Average net fraction of target firms' outstanding shares traded by shareholder activists

The figure shows the average net fraction of outstanding shares traded by activists on event days −252 through +40 days relative to the announcement day. The average net fraction of outstanding shares is negative on a given event day when shareholder activists on average have sold shares in the target firms. Trading data are collected from the last 13D (form SC 13D on EDGAR) filed by the activist prior to the activism announcement and all amendments to this filing filed before day +40 relative to the announcement day (form SC 13D/A on EDGAR). Firms where the activist did not report any trades, but where such reporting would not be required because ownership in the target firm is less than 5%, are excluded from the analysis. Altogether, the sample includes 259 event firms. After trimming the sample for outliers by dropping the 10 largest trades, the total number of trades used to construct the graphical representation of trading in the Figure is 11,508.

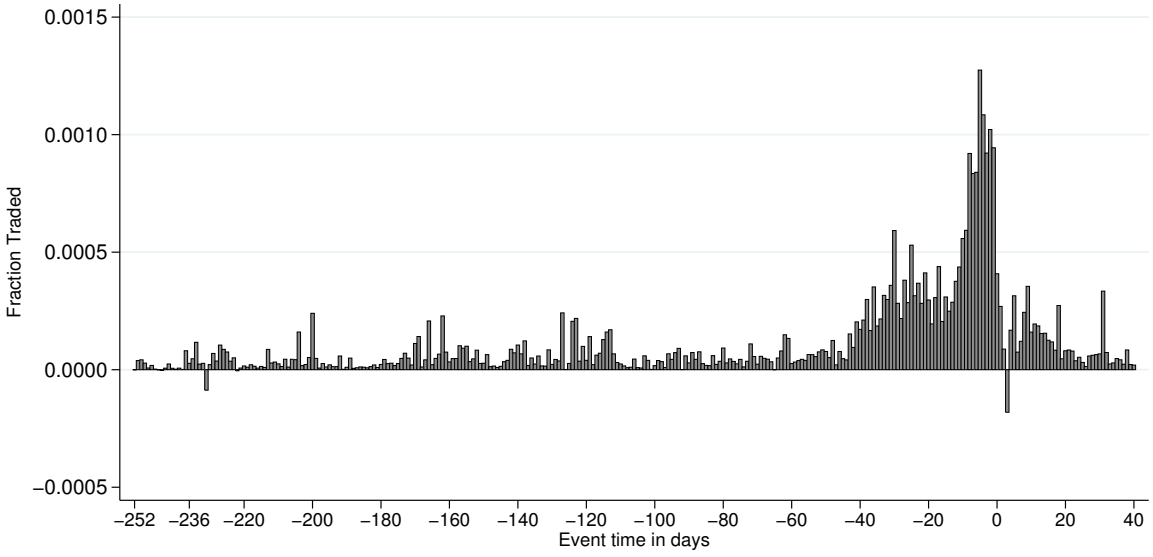

Table 1
Activist shareholder type and purpose of shareholder activism

The table categorizes activist events in the sample according to type of activism (Panel A), dissident shareholder identity (Panel B), and the stated purpose of the activism (Panel C). The categories in Panels B and C may overlap. Information on activism type, dissident shareholder identity, and stock ownership are from SEC filings and Factiva news searches. Stock ownership is recorded at the date of the SEC filing. The classification of the purpose of activism is based on the statements made by the activist in the SEC filing. The sample period is 1994 through the third quarter of 2007. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares and is restricted to firms that have information on market capitalization and book-to-market ratio in the year prior to the year of activism.

	Average activist ownership	Number of cases	Proportion of events (percent)
A. Type of activism			
Proxy contest	10.0	331	86.0
Shareholder proposal	1.3	43	11.2
Proxy contest and shareholder proposal	4.9	3	0.8
Other	6.8	8	2.0
Total	9.0	385	100.0
B. Activist shareholder identity and stock ownership			
Hedge funds	9.1	182	47.3
Shareholder committees	10.9	111	28.8
Individual investors	9.1	51	13.2
Workers unions	0.0	32	8.3
Investment companies	8.9	30	7.8
Industrial owners	15.4	12	3.1
Financial institutions	5.8	8	2.1
Pension funds	2.1	8	2.1
Investment managers	5.9	8	2.1
Private equity companies	6.3	4	1.0
Unknown	8.8	2	0.5
C. Stated purpose of activism			
Change in the board of directors	10.0	318	82.6
Change in corporate governance, including voting procedures	8.0	164	42.6
Change in business strategy	9.5	163	42.3
Sale of target assets or sale of target company	8.7	132	34.3
Improvement in operating efficiency	9.4	100	26.0
Change in the compensation of the CEO or directors	9.3	87	22.6
Removal of takeover defense	8.1	71	18.4
Change in payout policy (dividend or stock repurchase)	7.6	63	16.4
Replacement of the CEO	11.6	60	15.6
Change in capital structure (debt-equity ratio)	8.9	30	7.8
Prevention of acquisition or merger with another company	7.6	14	3.6
Prevention of take-over	8.1	14	3.6
Suggestion of a specific means of financing	11.1	10	2.6

Table 2
Characteristics of firms targeted by a shareholder activist and of firms not targeted by an activist

The table compares characteristics of firms that experience shareholder activism in a given year with the characteristics of firms that do not experience shareholder activism. A firm experiences shareholder activism in year t if a non-management shareholder or group of shareholders file a shareholder proposal or a contested solicitation through EDGAR some time during year t. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. Abnormal performance$_{(t-1)}$ is measured as the average monthly abnormal performance for year $t-1$. Abnormal monthly performance for month s is computed as follows: Using a minimum of 12 monthly returns and a maximum of 60 monthly returns for the period $s-60$ through $s-1$, we regress excess returns for stock i on the three Fama and French (1993) factors and a momentum factor. Benchmark return is computed as the sum of regression coefficients times corresponding factor realizations for month s. The abnormal return for month s is the difference between the return on stock i and the benchmark return. Herfindahl, institutional ownership is the Herfindahl index of institutional ownership and is computed as the sum of squared ownership fractions for shareholders making 13F filings with the SEC. Institutional holding is the aggregate stock-holding of shareholders making 13F filings to the SEC. Institutional breadth is the number of institutional investors that have reported ownership through 13F filings normalized with the total number of institutional owners reporting in a given year. Volatility is the standard deviation of monthly returns during year t. Analyst coverage is the number of earnings estimates found in I/B/E/S. Log(Market cap) is the natural logarithm of the end-of-December market capitalization. Book-to-market ratio is the book value of equity divided by the market value of equity. Log(Sales) is the natural logarithm of the dollar value of sales. Cash is cash and marketable securities divided by total assets. Dividend yield is total dividend (common dividend plus preferred dividend) divided by market value of common equity plus book value of preferred equity. Book value of preferred equity is the first non-missing value when using redemption value, liquidating value, and the carrying value in that order. R&D is research and development expenses divided by total assets. If R&D expenses are missing from Compustat, they are assumed to be zero. All variables are measured one year prior to the year of activism except where indicated. All variables that are ratios based on Compustat data (book-to-market ratio, Cash, dividend yield, and R&D) are trimmed by removing the lower and higher 0.005 percentile of the distribution (i.e, removing 0.5% of the observations in each tail), except R&D which is trimmed only at the upper tail. T-test of differences is two-sided and allows for unequal variances. The sample period is 1994 through the third quarter of 2007. The sample only includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample is also restricted to firms that have information on market capitalization and book-to-market ratio in the year prior to the activism-year.

	Firm-years with activism		Firm-years without activism		Difference	
Variable	N	Mean	N	Mean	Mean	t-value
Liquidity$_{(t-1)}$	383	−0.010	75,999	−0.013	−0.003	-5.8
Liquidity$_{(t-2)}$	372	−0.010	69,861	−0.013	−0.003	-6.4
Abnormal Performance$_{(t-1)}$	381	−0.010	85,299	0.004	0.013	5.5
Abnormal Performance$_{(t-2)}$	365	−0.005	77,417	0.006	0.009	3.8
Herfindahl, institutional ownership$_{(t-1)}$	382	0.021	88,474	0.023	0.002	1.1
Institutional holding$_{(t-1)}$	379	0.422	88,224	0.374	−0.048	-3.3
Institutional breadth$_{(t-1)}$	382	0.050	88,589	0.042	−0.008	-1.8
Volatility$_{(t-1)}$	381	0.130	86,332	0.145	0.014	3.0
Analyst coverage$_{(t-1)}$	385	4.961	91,501	4.121	−0.839	-2.4
Nasdaq	385	0.623	91,501	0.552	−0.071	-2.9
Log(Market cap)$_{(t-1)}$	385	5.148	91,501	5.150	0.002	0.0
Book-to-market ratio$_{(t-1)}$	385	0.998	91,501	1.771	0.773	12.4
Log(Sales)$_{(t-1)}$	384	5.110	90,910	4.848	−0.262	-1.9
Dividend yield$_{(t-1)}$	384	0.011	90,374	0.057	0.046	17.6
Cash$_{(t-1)}$	381	0.171	89,982	0.172	0.001	0.0
R&D$_{(t-1)}$	382	0.034	87,325	0.040	0.007	1.9

Table 3
Probit models of shareholder activism using the Hasbrouck (2009) effective trading cost measure to form liquidity variables

The table documents the effects of independent variables on the probability of experiencing shareholder activism. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. In Model (1) liquidity is measured one year prior to the year of activism (Liquidity$_{(t-1)}$). In Model (2) liquidity is measured two years prior to the year of activism (Liquidity$_{(t-2)}$). The other explanatory variables are defined in Table 2. When computing change in probability for a given change in liquidity, other explanatory variables are held at their means. Parentheses in the first segment of the table contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. Parentheses in the second segment of the table contain p-values from a Wald-test of the significance of the change in probability when liquidity is increased from the 10th to the 90th percentile. The corresponding change in percent relative to the unconditional probability of activism in the regression sample is given in the bottom line of the table. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

Model	(1)	(2)
Liquidity$_{(t-1)}$	12.77 (4.81)	
Liquidity$_{(t-2)}$		10.27 (3.30)
Abnormal performance$_{(t-1)}$	−0.96 (−2.27)	−0.62 (−1.42)
Abnormal performance$_{(t-2)}$	−1.38 (−3.46)	−1.13 (−2.92)
Herfindahl, institutional ownership$_{(t-1)}$	−0.60 (−0.89)	−0.57 (−0.88)
Institutional holding$_{(t-1)}$	0.26 (2.55)	0.26 (2.54)
Institutional breadth$_{(t-1)}$	1.67 (4.02)	1.49 (3.51)
Volatility$_{(t-1)}$	−0.59 (−2.02)	−0.63 (−2.16)
Analyst coverage$_{(t-1)}$	0.00 (0.81)	0.00 (0.72)
Nasdaq	0.06 (1.32)	0.06 (1.20)
Log(Market cap)$_{(t-1)}$	−0.14 (−5.45)	−0.13 (−4.83)
Book-to-market ratio$_{(t-1)}$	0.01 (0.82)	0.00 (0.40)
Log(Sales)$_{(t-1)}$	0.01 (0.59)	0.01 (0.62)
Dividend yield$_{(t-1)}$	−0.58 (−0.88)	−0.57 (−0.90)
Cash$_{(t-1)}$	0.27 (2.14)	0.27 (2.15)
R&D$_{(t-1)}$	−0.67 (−2.37)	−0.66 (−2.36)
Year-dummies	Yes	Yes
Number of observations	63,555	63,396
Number of activism events	355	354
Pseudo R^2	0.029	0.027
Change in probability of activism when liquidity is increased from the 10th to the 90th percentile (p-value)	0.47 (0.000)	0.40 (0.000)
Change relative to sample probability of activism	84.9%	71.2%

Table 4
Probit models of shareholder activism using alternative liquidity variables based on the Hasbrouck (2009) effective trading cost measure

The table documents the effects of independent variables on the probability of experiencing shareholder activism. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. In Model (1) liquidity is measured over years $t-4$ and $t-3$ relative to the year of activism. Model (2) is an iv-probit model where liquidity in year $t-2$ is instrumented using: (i) The average liquidity of firms in industries outside of firm i's industry, measured two years prior to the year of activism and (ii) a decimal dummy that equals one for the years following 2001 multiplied by the average sales of the firm in the period 1994-2001. In Model (3) liquidity is measured using the residual from the following regression:

$$\mathrm{L}_{t-2} = \gamma_0 + \gamma_1 \mathrm{Herf}_{t-2} + \gamma_2 \mathrm{InstH}_{t-2} + \gamma_3 \mathrm{InstB}_{t-2} + \gamma_4 \mathrm{AvgL}_{t-2} + \epsilon_{t-2}\,,$$

where L_{t-2} is the Hasbrouck (2009) measure multiplied by -1, Herf is the Herfindahl index of institutional ownership, InstH is Institutional holdings, InstB is Institutional breadth, and AvgL_t is the average Hasbrouck (2009) illiquidity in the cross-section of firms in year t. In Model (4) liquidity is measured as a dummy variable that equals one in year t if the Hasbrouck (2009) effective cost is greater than the cross-sectional median in year t. In all models, the control variables are the same as in Table 3. When computing the change in probability for a given change in liquidity, other variables enter with the values they have in our sample. Parentheses in the first segment of the table contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. For model (3) the standard errors are bootstrapped. Parentheses in the second segment of the table contain p-values from a Wald-test of the significance of the change in probability when liquidity is increased from the 10th to the 90th percentile. The corresponding change in percent relative to the unconditional probability of activism in the regression sample is given in the bottom line of the table. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

Model	(1)	(2)	(3)	(4)
$\mathrm{Liquidity}_{(t-4,t-3)}$	5.9 (2.3)			
IV $\mathrm{Liquidity}_{(t-2)}$		19.2 (2.5)		
Orthogonalized $\mathrm{liquidity}_{(t-2)}$			8.1 (3.2)	
Liquidity $\mathrm{dummy}_{(t-2)}$				0.2 (3.4)
Control variables	Yes	Yes	Yes	Yes
Year-dummies	Yes	Yes	Yes	Yes
Number of observations	60,892	62,025	63,109	63,396
Number of activism events	347	349	353	354
Change in probability when liquidity is increased from the 10th to the 90th percentile (p-value)	0.25 (0.018)	0.79 (0.043)	0.28 (0.002)	0.28 (0.000)
Change relative to sample probability of activism	44.2%	142.3%	49.6%	50.1%

Table 5
Probit models of shareholder activism using the Amihud (2002) trade impact measure to form liquidity variables

The table documents the effects of independent variables on the probability of experiencing shareholder activism. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the trade impact measure of Amihud (2002) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. The liquidity measure is winsorized at the 1st and 99th percentile. In Model (1) liquidity is measured one year prior to the year of activism (Liquidity$_{(t-1)}$). In Model (2) liquidity is measured two years prior to the year of activism (Liquidity$_{(t-2)}$). In Model (3) liquidity is measured over years $t-4$ and $t-3$ relative to the year of activism. Model (4) is an iv-probit model where liquidity in year $t-2$ is instrumented using: (i) The average liquidity of firms in industries outside of firm i's industry, measured two years prior to the year of activism and (ii) a decimal dummy that equals one for the years following 2001 multiplied by the average sales of the firm in the period 1994-2001. In all models, the control variables are the same as in Table 3. When computing the change in probability for a given change in liquidity, other variables are held at their means. Parentheses in the first segment of the table contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. Parentheses in the second segment of the table contain p-values from a Wald-test of the significance of the change in probability when liquidity is increased from the 10th to the 90th percentile. The corresponding change in percent relative to the unconditional probability of activism in the regression sample is given in the bottom line of the table. The sample only includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

Model	(1)	(2)	(3)	(4)
Amihud Liquidity$_{(t-1)}$	0.9 (2.2)			
Amihud Liquidity$_{(t-2)}$		1.2 (2.4)		
Amihud Liquidity$_{(t-4,t-3)}$			0.7 (1.7)	
IV Amihud Liquidity$_{(t-2)}$				4.6 (4.9)
Control variables	Yes	Yes	Yes	Yes
Year-dummies	Yes	Yes	Yes	Yes
Number of observations	60,690	60,279	55,351	57,689
Number of activism events	345	346	326	346
Change in probability when liquidity is increased from the 10th to the 90th percentile (p-value)	0.13 (0.023)	0.15 (0.012)	0.10 (0.079)	1.36 (0.084)
Change relative to sample probability of activism	22.1%	26.4%	17.3%	237.2%

Table 6
The impact of overvaluation on the effect of liquidity on shareholder activism, measuring liquidity using the effective trading cost measure of Hasbrouck (2009)

The table documents the effects of independent variables on the probability of experiencing shareholder activism using a probit regression. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. In columns (1) through (3), overvaluation proxies are constructed using the variables Volatility_{t-1} and $\text{Institutional Holding}_{t-1}$. Volatility_{t-1} is the standard deviation of monthly stock returns for year $t-1$ relative to the activism year. $\text{Institutional holding}_{t-1}$ is the aggregate stock-holding of shareholders making 13F filings to the SEC at the end of year $t-1$ relative to the activism year. In column (4), the overvaluation proxy is mutual fund inflow induced price pressure, computed under the assumption that all mutual funds that experience inflow exceeding 5% of their total assets purchase additional stocks in proportion to their existing holdings. All regressions include the same set of control variables as in Table 3, except that $\text{Volatility}_{(t-1)}$ is not a control variable in (2) and $\text{Institutional holding}_{(t-1)}$ is not a control variable in (3). Computation of the average interaction effect and the associated z-value follows Ai and Norton (2003). When fixing overvaluation at a given percentile and computing the change in probability for a given change in liquidity, variables other than overvaluation and liquidity enter with their sample values. Parentheses in the first segment of the table contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. In the second segment of the table, parentheses in the first row contain average z-values and parentheses in the last three rows contains p-values from a Wald-test of statistical significance. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

	Overvaluation proxy			
	$\text{Ln}\left(\frac{\text{Volatility}_{t-1}}{\text{Inst Hold}_{t-1}}\right)$	$\text{Volatility}_{(t-1)}$	$\text{Ln}\left(\frac{1}{\text{Inst Hold}_{t-1}}\right)$	$Price\ Pressure_{it-1}$
Model	(1)	(2)	(3)	(4)
$\text{Liquidity}_{(t-2)} \times \text{Overval. proxy}_{(t-1)}$	−1.86 (−3.6)	−15.73 (−2.7)	−2.18 (−3.9)	−1.57 (−3.8)
$\text{Liquidity}_{(t-2)}$	11.82 (3.9)	13.33 (4.0)	16.25 (4.2)	11.21 (3.5)
$\text{Overvaluation proxy}_{(t-1)}$	−0.08 (−2.7)	−0.88 (−2.6)	−0.09 (−3.6)	−0.07 (−2.9)
Other control variables	Yes	Yes	Yes	Yes
Year-dummies	Yes	Yes	Yes	Yes
Number of observations	63,396	63,396	63,396	63,396
Number of activism events	354	354	354	354
Average Liquidity-Overvaluation interaction effect (average z-value)	−0.06 (−2.2)	−0.57 (−2.2)	−0.07 (−2.5)	−0.45 (−2.3)
Overvaluation at percentile 10. Liquidity changed from 10th to 90th percentile	0.68 (0.001)	0.64 (0.000)	0.94 (0.001)	0.51 (0.000)
Overvaluation at percentile 90. Liquidity changed from 10th to 90th percentile	0.33 (0.001)	0.41 (0.000)	0.49 (0.000)	0.31 (0.000)
Difference in probability change	0.36 (0.035)	0.23 (0.030)	0.45 (0.013)	0.20 (0.020)

Table 7
The impact of overvaluation on the effect of liquidity on shareholder activism, measuring liquidity using the effective trading cost measure of Amihud (2002)

The table documents the effects of independent variables on the probability of experiencing shareholder activism using a probit regression. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the trade impact measure of Amihud (2002) multiplied by -1. Thus, higher values of the liquidity variable correspond to higher liquidity. The liquidity measure is winsorized at the 1st and 99th percentile. In columns (1) through (3), overvaluation proxies are constructed using the variables Volatility_{t-1} and $\text{Institutional Holding}_{t-1}$. Volatility_{t-1} is the standard deviation of monthly stock returns for year $t-1$ relative to the activism year. $\text{Institutional holding}_{t-1}$ is the aggregate stock-holding of shareholders making 13F filings to the SEC at the end of year $t-1$ relative to the activism year. In column (4), the overvaluation proxy is mutual fund inflow induced price pressure, computed under the assumption that all mutual funds that experience inflow exceeding 5% of their total assets purchase additional stocks in proportion to their existing holdings. All regressions include the same set of control variables as in Table 3, except that $\text{Volatility}_{(t-1)}$ is not a control variable in (2) and $\text{Institutional holding}_{(t-1)}$ is not a control variable in (3). Computation of the average interaction effect and the associated z-value follows Ai and Norton (2003). When fixing overvaluation at a given percentile and computing the change in probability for a given change in liquidity, variables other than overvaluation and liquidity enter with their sample values. Parentheses in the first segment of the table contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. In the second segment of the table, parentheses in the first row contain average z-values and parentheses in the last three rows contains p-values from a Wald-test of statistical significance. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

	Overvaluation proxy			
	$\text{Ln}\left(\frac{\text{Volatility}_{t-1}}{\text{Inst Hold}_{t-1}}\right)$	$\text{Volatility}_{(t-1)}$	$\text{Ln}\left(\frac{1}{\text{Inst Hold}_{t-1}}\right)$	*Price Pressure*$_{it-1}$
Model	(1)	(2)	(3)	(4)
$\text{Liquidity}_{(t-2)} \times \text{Overval. proxy}_{(t-1)}$	−0.22 (−3.0)	−1.83 (−4.1)	−0.22 (−2.7)	−0.49 (−2.0)
$\text{Liquidity}_{(t-2)}$	1.60 (2.8)	1.64 (2.9)	1.93 (2.8)	1.20 (2.4)
$\text{Overvaluation proxy}_{(t-1)}$	−0.05 (−1.7)	−0.93 (−2.9)	−0.05 (−2.2)	−0.07 (−3.2)
Other control variables	Yes	Yes	Yes	Yes
Year-dummies	Yes	Yes	Yes	Yes
Number of observations	60,279	60,279	60,279	60,279
Number of activism events	346	346	346	346
Average Liquidity-Overvaluation interaction effect (average z-value)	−0.01 (−1.8)	−0.08 (−2.1)	−0.01 (−1.9)	−0.01 (−1.9)
Overvaluation at percentile 10. Liquidity changed from 10th to 90th percentile	0.27 (0.011)	0.27 (0.005)	0.32 (0.012)	0.19 (0.012)
Overvaluation at percentile 90. Liquidity changed from 10th to 90th percentile	0.17 (0.010)	0.17 (0.003)	0.22 (0.011)	0.11 (0.015)
Difference in probability change	0.10 (0.146)	0.10 (0.048)	0.10 (0.095)	0.08 (0.043)

Table 8
Trading in target firms by shareholder activists prior to the activism announcement

The table reports descriptive statistics on trading by shareholder activists over the one-year period ending with the activism announcement. Trading data is collected from the last 13D (form SC 13D on EDGAR) filed by the activist prior to the activism announcement and all amendments to this filing filed before the day of activism announcement (form SC 13D/A on EDGAR). Firms where the activist did not report any trades, but where such reporting would not be required because ownership in the target firm is less than 5%, are excluded from the analysis. The Hedge fund, Shareholder committees, and Investment companies are not mutually exclusive categories (i.e., a trade can occur in more than one category.) The first column ("Target firms") reports the number of firms for which we can observe activist trades. The second column ("Percent w/trade") reports the percentage of firms where the activist traded prior to the activism announcement. Column three ("N") reports the number of trades. Column four ("Percent buys") reports the percentage of trades where the activist bought shares. Column five ("Mean $1000s") reports the mean size of the activist trade in $1000s. Column six ("Median $1000s") reports the median size of the activist trade in $1000s. Column seven ("Percentage points") reports the ownership, in percentage points, the activist acquired over the 252 trading dates prior to the announcement. Column eight ("Percent of own block") reports the ownership the activist acquired over the 252 trading days prior to the announcement, in percent of his ownership in the target at announcement. Column nine ("Mean $1000s") reports the dollar difference, in $1000s, between the announcement day value of the stocks acquired over the last 252 trading days and the amount spent to acquire those stocks. The last column ("Percent") reports the dollar profit in percent of the value of the stocks acquired by the activist over the last 252 trading days, valued on the announcement date. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

			Descriptive statistics using the sample of trades							
	Sample		Trades		Trade size		Acquired Ownership		Profit	
	Target firms	Percent w/trade	N	Percent buys	Mean $1000s	Median $1000s	Perc-entage points	Percent of own block	Mean $1000s	Percent
All	259	76%	11,518	95%	346	16	4.25	54%	1,563	8.5%
Hedge funds	143	88	7,753	93	457	39	4.89	61	2,117	9.9
Shareholder committees	85	74	3,445	90	108	19	3.09	37	413	6.1
Investment companies	22	77	456	97	587	31	4.71	39	2,103	11.8

Table 9
Liquidity and pre-activism trading by shareholder activists

The table reports results from a regression of pre-activism trading on liquidity and a set of control variables. The dependent variable is the fraction of the target firm's shares acquired by the shareholder activist over the year ending on the day prior to the activism announcement. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) and the trade impact measure of Amihud (2002), both multiplied with −1. Thus, higher values of the liquidity variables correspond to higher liquidity. Amihud liquidity is winsorized at the 1st and 99th percentiles. Liquidity is measured, in event time, during the year prior to the year over which trading is recorded. Control variables are defined in Table 2. Trading data are collected from the last 13D (form SC 13D on EDGAR) filed by the activist prior to the activism announcement and all amendments to this filing filed before the announcement date (filed on form SC 13D/A on EDGAR). In Models (1) and (3), cases where the activist did not report any trades assumes trading is zero. In Models (2) and (4), cases where the activist did not report any trades, but where such reporting would not be required because ownership in the target firm is less than 5%, are excluded from the analysis. Parentheses contain t-values from robust standard errors estimated with the Huber-White sandwich estimator. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

	Hasbrouck		Amihud	
Sample	(1)	(2)	(3)	(4)
Liquidity$_{(t-3)}$	40.98 (2.52)	40.97 (2.07)	3.75 (2.38)	3.93 (1.94)
Abnormal performance$_{(t-2)}$	2.10 (0.32)	4.64 (0.66)	1.36 (0.20)	3.68 (0.52)
Abnormal performance$_{(t-3)}$	−9.48 (−1.40)	−9.64 (−1.51)	−10.21 (−1.51)	−10.20 (−1.63)
Herfindahl, institutional ownership$_{(t-2)}$	−4.89 (−0.63)	−12.92 (−1.10)	−5.93 (−0.95)	−15.34 (−1.56)
Institutional holding$_{(t-2)}$	4.05 (2.96)	6.16 (3.28)	4.18 (3.01)	6.43 (3.39)
Institutional breadth$_{(t-2)}$	0.00 (1.20)	0.14 (1.89)	0.00 (1.22)	0.16 (2.21)
Volatility$_{(t-2)}$	−3.50 (−1.16)	−3.51 (−1.01)	−5.42 (−1.75)	−5.54 (−1.57)
Analyst coverage$_{(t-2)}$	0.07 (1.40)	0.11 (1.24)	0.08 (1.48)	0.11 (1.28)
Nasdaq	−0.08 (−0.17)	0.02 (0.03)	−0.22 (−0.44)	−0.11 (−0.17)
Log(Market cap)$_{(t-2)}$	−1.20 (−4.29)	−1.43 (−3.38)	−1.20 (−4.33)	−1.45 (−3.37)
Book-to-market ratio$_{(t-2)}$	−0.11 (−0.19)	0.15 (0.19)	−0.04 (−0.06)	0.27 (0.36)
Log(Sales)$_{(t-2)}$	0.14 (1.29)	0.21 (1.53)	0.13 (1.17)	0.19 (1.32)
Dividend yield$_{(t-2)}$	2.86 (0.20)	74.95 (1.55)	3.12 (0.21)	75.51 (1.51)
Cash$_{(t-2)}$	−0.67 (−0.35)	0.81 (0.37)	−0.25 (−0.13)	1.32 (0.60)
R&D$_{(t-2)}$	7.54 (2.38)	7.32 (1.90)	7.83 (2.53)	7.62 (2.03)
Year-dummies	Yes	Yes	Yes	Yes
Number of observations	311	232	298	221
R^2	0.175	0.197	0.186	0.208

A Shareholder activist types

Shareholder activist types in Table 1 are classified according to the definitions below. In general, the categories are overlapping such that if different dissenting shareholder types file jointly, we register both types.

Hedge funds: Private investment partnership, a private investment fund, or a hedge fund manager or sponsor.

Financial institutions: Broker-dealers, commercial, and savings banks, etc.

Private equity companies: Private equity investors and funds.

Investment managers: Managers of private clients' assets portfolios and include financial advisors and consultants.

Investment companies: Closed-end funds and open-end mutual funds.

Pensions funds: Retirement systems such as CalPERS.

Industrial owners: Non-financial corporations, typically such firms own an equity stake in the target firm.

Individual investors: Filer is a single individual, most often a shareholder of the target company.

Shareholder committee: More than one individual registrant is specified in the filing which often occurs under a name of the form "*TargetCompany* Shareholder Committee". Shareholder committees typically consist of several individual shareholders and may include company directors, and it is not unusual to observe a committee cooperating with hedge funds, investment companies and managers, or workers unions.

Workers unions: Union filers.

Unknown: Categories where we are unable to identify the type of filer.

B Instrumental variable probit

We use two instruments for stock liquidity. The first exploits the introduction of decimalization on NYSE, AMEX, and Nasdaq in 2001. Evidence presented in Bessembinder (2003) and Furfine (2003) suggests that decimalization had a significant positive effect on liquidity. The event has also been employed as an instrument for liquidity by Fang, Noe, and Tice (2009), Bharath, Jayaraman, and Nagar (2013), and Edmans, Fang, and Zur (2013). The introduction of decimalization constitutes an exogenous shock to liquidity that is uncorrelated with shareholder activism as required for an instrument.

A dummy variable for the event of decimalization may be an instrument for stock liquidity in its own right. However, decimalization affects all stocks the same way and only picks up variation over time. Instead we create an instrument with cross-sectional variation by interacting a dummy variable for decimalization that equals one from 2001 and onwards (and otherwise zero) with a variable that varies across individual stocks. Furfine (2003) and Chakravarty, Wood, and van Hess (2004) document that the impact of decimalization was larger for stocks traded more actively and for stocks with relatively wider quoted spreads.

Data on the average time between trades used by Furfine (2003) are not available to us, but we exploit the fact that larger firms are generally traded more actively. We construct an instrument by interacting a dummy for decimalization by the average firm size over the years prior to decimalization. We prefer to measure firm size by Ln(sales) because sales are unaffected by movements in stock prices as opposed to, say, market capitalization. The interacted variable equals zero prior to decimalization and attains a constant value in the years afterwards, such that the constant magnitude is larger for larger firms. The interacted variable thus captures a change in the cross-sectional distribution in the year of 2001 and there is little reason to believe that the magnitude of this "shift" is correlated with activism. For that to be the case, the cross-sectional pattern of the shift would have to be correlated with a similar cross-sectional shift in activism in 2001.

The second instrument is created from the average liquidity of stocks in industries other than the industry of the stock in question. We use average liquidity of firms in other industries in year

$t-2$ as an instrument for the liquidity of stock i in year $t-2$. Industry membership is determined using SIC codes and the Fama and French 49 industry definition.

The correlation between the Hasbrouck-liquidity measure and the average liquidity of stocks in other industries are 0.26. For the decimalization$\times$average sales instrument, the correlation is 0.27. Correlations with the Amihud measure of liquidity are 0.05 and 0.10, respectively.

The coefficients are estimated simultaneously by maximum likelihood, but we present the results from a "first stage" regression where the endogenous variable, liquidity, is regressed on the instruments and all other exogenous variables in Table B.1. The instruments are all strongly significant as required. The Amemiya-Lee-Newey test of overidentifying restrictions shows that we cannot reject the null that our set of instruments for liquidity is valid. Using the Hasbrouck (2009) measure of liquidity, we cannot reject the null that liquidity is exogenous (p-value of 0.214). However, using the Amihud (2002) measure, this null is rejected (p-value of 0.04).

Table B.1
First stage regressions for instrumental variable probit models of shareholder activism

The table documents the first stage regression results from an instrumental variable probit model of independent variables on the probability of experiencing shareholder activism when stock liquidity is instrumented. The dependent variable equals one if firm i experiences shareholder activism in year t and is zero otherwise. Liquidity is measured using the effective trading cost measure of Hasbrouck (2009) or the Amihud (2002) trade impact measure, both multiplied by -1 so that higher values of the liquidity variable correspond to higher liquidity. The instruments are the following: The average liquidity of firms in industries outside of firm i's industry, measured two years prior to the year of activism; a decimal dummy that equals one for the years following 2001 multiplied by the average sales of the firm in the period 1994-2001 (divided by 100 for scaling). The other explanatory variables are defined in Table 2. Parentheses contain z-values from robust standard errors estimated with the Huber-White sandwich estimator. The null hypothesis for the Wald test of exogeneity is that liquidity is exogenous. The null hypothesis for the Amemiya-Lee-Newey test of overidentifying restrictions is that the instruments are valid. The sample includes firms listed on NYSE, AMEX, or Nasdaq with common shares. The sample period is 1994 through the third quarter of 2007.

Model	Hasbrouck (2009)	Amihud (2002)
Average liquidity in other industries than stock i's$_{(t-2)}$	−7.50 (−18.90)	−6.17 (−12.56)
Decimalization dummy × avg. Log(Sales) prior to 2001	−0.17 (−35.54)	−0.71 (−15.64)
Abnormal performance$_{(t-1)}$	−0.04 (−29.69)	−0.45 (−24.19)
Abnormal performance$_{(t-2)}$	−0.01 (−9.22)	−0.22 (−13.00)
Herfindahl index of ownership$_{(t-1)}$	−0.02 (−11.40)	−0.10 (−9.53)
Institutional holding$_{(t-1)}$	0.01 (32.79)	0.04 (22.18)
Institutional breadth$_{(t-1)}$	−0.06 (−53.65)	−0.48 (−43.51)
Volatility$_{(t-1)}$	−0.01 (−8.17)	−0.09 (−5.44)
Analyst coverage$_{(t-1)}$	−0.00 (−17.98)	−0.00 (−24.40)
Nasdaq	−0.00 (−41.95)	0.01 (7.18)
Log(Market cap)$_{(t-1)}$	0.00 (59.05)	0.04 (42.00)
Book-to-market ratio$_{(t-1)}$	0.00 (5.21)	0.00 (2.87)
Log(Sales)$_{(t-1)}$	0.00 (12.21)	0.01 (7.44)
Dividend yield$_{(t-1)}$	0.00 (3.72)	0.02 (4.96)
Cash$_{(t-1)}$	0.00 (8.06)	0.03 (7.51)
R&D$_{(t-1)}$	0.01 (9.56)	0.09 (11.09)
Year-dummies	Yes	Yes
Wald test of exogeneity (p-value)	0.214	0.040
Amemiya-Lee-Newey test of overidentifying restrictions (p-value)	0.430	0.841
Number of observations	60,728	58,957
Number of activism events	354	346