The Effect of Liquidity on Governance

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Abstract

This paper studies the effect of stock liquidity on blockholder governance. Conditional upon acquiring a stake, liquidity reduces the likelihood that a blockholder governs through voice (intervention) – as shown by the greater propensity to file Schedule 13Gs (passive investment) than 13Ds (active investment). The lower frequency of activism does not reflect the abandonment of governance, but governance through the alternative channel of exit (trading): a 13G filing leads to positive announcement returns and improvements in operating performance, especially in liquid firms. Moreover, liquidity increases the likelihood of block formation to begin with. Taking this into account, liquidity leads to an overall increase in both voice and exit, and is thus beneficial for governance. We use decimalization as an exogenous shock to liquidity to identify causal effects.

Keywords: Stock Liquidity, Corporate Governance, Hedge Fund Activism, Blockholders, Exit, Voice

JEL Classifications: G12, G19, G23, G34, G38

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Abstract

This paper studies the effect of stock liquidity on blockholder governance. Conditional upon acquiring a stake, liquidity reduces the likelihood that a blockholder governs through voice (intervention) – as shown by the greater propensity to file Schedule 13Gs (passive investment) than 13Ds (active investment). The lower frequency of activism does not reflect the abandonment of governance, but governance through the alternative channel of exit (trading): a 13G filing leads to positive announcement returns and improvements in operating performance, especially in liquid firms. Moreover, liquidity increases the likelihood of block formation to begin with. Taking this into account, liquidity leads to an overall increase in both voice and exit, and is thus beneficial for governance. We use decimalization as an exogenous shock to liquidity to identify causal effects.

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This paper empirically studies the effect of stock liquidity on blockholder governance. The theoretical literature yields conflicting predictions on the desirability of liquidity for governance. The traditional view is that investors govern through intervening in a firm (also known as "voice"), such as by firing a shirking manager. Under this view, liquidity weakens governance because it allows the blockholder to sell her stake in a troubled firm rather than bear the cost of intervening to fix it (Coffee (1991); Bhide (1993)). This view has been challenged along two fronts. First, liquidity can encourage a block to form in the first place (Kyle and Vila (1991); Kahn and Winton (1998); Maug (1998)). Second, Admati and Pfleiderer (2009), Edmans (2009), and Edmans and Manso (2011) show that the act of selling one's shares (engaging in "exit"), far from being the antithesis of governance, can be a governance mechanism in itself. Such sales drive down the stock price, hurting the manager ex-post if he is equity-aligned. Ex-ante, the threat of exit induces him to maximize value. Liquidity strengthens this threat as it induces initial block formation (Edmans (2009)), the acquisition of information once the block has been formed, and greater trading once information has been acquired (both Edmans (2009); Edmans and Manso (2011)).

Despite the rich theoretical literature analyzing the effect of liquidity on governance, few papers address this debate empirically. This likely results from a number of challenges. First, many blockholders face significant barriers to voice. Diversification requirements prevent mutual funds from acquiring the large positions needed to exercise control,[1] and "prudent man" rules hinder pension funds from acquiring stakes in troubled firms in need of intervention (Del Guercio (1996)). Even if not legally restricted, a blockholder may choose not to engage in activism due to a lack of expertise or a conflict of interest: a fund may lose its contract to manage the firm's pension plan if it opposes management, or the fund manager may have weak financial incentives to intervene as he is

[1] Under the Investment Company Act of 1940, a "diversified" mutual fund can, with respect to 75% of its portfolio, have no more than 5% invested in any one security and own no more than 10% of the voting rights in one company.

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paid according to assets under management rather than performance.[2] Liquidity will not affect the choice between exit and voice if the blockholder does not engage in voice. Indeed, Del Guercio and Hawkins (1999) find that pension fund activism has little effect on stock or accounting performance; Yermack's (2010) survey concludes that "the success of institutional investor activism to date appears limited." Second, while existing papers study actual exit (e.g., Parrino, Sias, and Starks (2003)) or actual voice (e.g., Norli, Ostergaard and Schindele (2009)), the *threat* of exit or voice also exerts governance. The absence of instances of exit or voice need not imply poor governance – the threat may be sufficiently strong that its execution is not needed (Fos (2011)). Third, liquidity and governance may be jointly determined by a firm's unobservable characteristics, or the causality may run from governance to liquidity.

This paper aims to study the effect of liquidity on governance while addressing the above challenges. We address the first challenge by focusing on activist hedge funds. Hedge funds have few business ties or regulatory constraints that hinder voice: they have the full "menu" of governance mechanisms to choose from, and high performance-based fees which induce them to choose optimally from this menu.[3] McCahery, Sautner, and Starks (2011) find that hedge funds are more willing to engage in activism than other institutions. Brav et al. (2008), Klein and Zur (2009), Boyson and Mooradian (2011, 2012), and Clifford and Lindsey (2011) document significant gains to hedge fund activism. While all hedge funds have the option of engaging in voice, several never do so – some focus entirely on trading as this is their core skill. We thus focus on activist hedge funds as they have both the ability and willingness to engage in intervention.[4]

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[2] Davis and Kim (2007) show that mutual funds with more business ties in aggregate are more likely to vote with management in general. Agrawal (2012) also documents conflicts of interest in proxy voting.

[3] Clifford and Lindsey (2011) show that blockholders with greater incentive pay, such as hedge funds, are more likely to choose voice and their activism is more effective. The model of Dasgupta and Piacentino (2011) shows that incentive pay increases the effectiveness of governance through exit.

[4] Activist hedge funds, unlike other hedge funds, also rarely short. For example, Briggs (2007) concludes that "despite some claims that [activist] hedge funds often hold short positions or are otherwise dangerously conflicted, the survey

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We find that activist hedge funds are more likely to acquire a block (a stake of at least 5%) in liquid firms. A one standard-deviation increase in liquidity raises the probability of a hedge fund block acquisition by 0.2-0.5%, versus the unconditional probability of 1.3%. This result supports the voice theories of Kyle and Vila (1991), Kahn and Winton (1998), and Maug (1998), and the exit theory of Edmans (2009), all of which consider blockholders as endogenous. Consistent with the exit mechanism in particular, the effect of liquidity is stronger where the manager's wealth is more closely tied to the stock price, i.e. the manager is more sensitive to the threat of exit.

Having established that liquidity facilitates the entry of activist hedge funds, we next examine how it affects their choice of governance mechanism. We address the second challenge – to study the threat of governance rather than only actual governance – by using the blockholder's choice of Schedule 13 filing to measure her governance intent. All blockholders must file form 13D or 13G upon acquiring a 5% stake in a public firm. Blockholders who intend to engage in activism must file a 13D, as 13G filings legally prevent subsequent activism. Those who intend to remain passive have the option of filing 13G, and will likely do so due to the benefits described in Section 1.[5]

We find, among the targeted firms, a negative relation between liquidity and the likelihood of a 13D filing. A one standard deviation increase in liquidity reduces the probability of a 13D by 5-7%, compared to the 43% unconditional probability. This finding is consistent with the view that liquidity weakens governance as it discourages voice. However, it is also consistent with the view that liquidity merely causes a blockholder to adopt a different form of governance – exit rather than voice. To support the view that a 13G filing indicates governance through exit, rather than the

found very limited evidence for this." The blockholder in Edmans (2009) faces short-sales constraints or non-trivial short-sales costs.

[5] A separate advantage of using 13D filings is that they are not limited to a specific type of activism. Norli, Ostergaard and Schindele (2009) examine contested proxy solicitations and shareholder proposals. While these are important instances of actual activism, relying on two specific vehicles could potentially omit other channels.

abandonment of governance, we undertake two additional tests. First, we show that liquidity has a particularly large effect in inducing a 13G for firms with high managerial sensitivity to the stock price. Second, a 13G filing leads to a positive market reaction, a positive holding-period return, and an improvement in operating performance; all these effects are stronger in more liquid firms.

Turning back to activism, the above results show that, while liquidity increases the likelihood of block acquisition, it decreases the likelihood that a 13D is filed, conditional upon block acquisition. We find that the first effect outweighs the second. Since liquidity increases the unconditional incidence of voice as well as exit, it has an overall positive effect on governance.

Finally, we address the third empirical challenge – that liquidity is endogenous – in two ways. First, since we study an unexpected governance *event* (a Schedule 13 filing) rather than a persistent governance characteristic, it is unlikely that there is reverse causality from the unexpected future filing to current liquidity. Second, we use decimalization as a natural experiment to provide an exogenous shock to liquidity. Between August 2000 and April 2001, U.S. stock markets reduced the minimum tick size from 1/16 dollar to one cent, lowering bid-ask spreads substantially (Bessembinder (2003); Furfine (2003)). All of our results remain robust to using this instrument. Moreover, decimalization has a stronger effect on governance in firms with low stock prices, for which a change in tick size has a greater impact on liquidity.

This study contributes to three main literatures. First, we build on recent research studying the effect of liquidity on firm outcomes. Fang, Noe, and Tice (2009) identify a causal impact of liquidity on firm value. Bharath, Jayaraman, and Nagar (2012) show that this effect is stronger for firms with higher block ownership, supporting the exit channel.[6] Norli, Ostergaard, and Schindele

[6] Dass, Nanda, and Xiao (2012) show the effect of liquidity on firm value is stronger for equity-dependent firms, consistent with the idea that liquidity facilitates equity issuance. Fang, Tian, and Tice (2011) study the effect of

(2009) document a positive correlation between liquidity and actual voice. Gerken (2009) finds that liquidity has no effect on governance choices, contrary to our findings. Our focus on activist hedge funds, which have both governance mechanisms at their disposal, accounts for the different results: when we extend our sample to all activists, liquidity continues to have a positive effect on block formation, but an insignificant effect on the governance mechanism. The second literature is the role of hedge funds in governance. While Brav et al. (2008), Clifford (2008), Greenwood and Schor (2009), Klein and Zur (2009, 2011), Clifford and Lindsey (2011), and Boyson and Mooradian (2011, 2012) focus on activism, we examine the choice between exit and voice. Third, by linking stock liquidity (traditionally an asset pricing concept) to corporate governance (a corporate finance variable), the paper contributes to a newer literature on the real effects of financial markets (see Bond, Edmans, and Goldstein (2012) for a survey).

1. Hypothesis development and theoretical framework

This section lays out our empirical hypotheses and the theoretical framework that underpins them. We test three sets of governance theories. The first set ("voice-G") predicts that liquidity is good for voice, while "voice-B" theories predict the opposite. All "exit" theories predict that liquidity is desirable for governance through exit. Figure 1 summarizes the predictions of these three theories for the five hypotheses that we study. Our first hypothesis is as follows.

H1: Liquidity increases the likelihood that a hedge fund acquires a block.

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liquidity on innovation, Roosenboom, Schlingemann, and Vasconcelos (2012) examine its impact on M&A outcomes, and Kelly and Ljungqvist (2012) investigate its effect on a stock's required returns and thus its price.

This hypothesis is predicted by both "voice-G" and "exit" theories. Starting with the former, Kyle and Vila (1991) and Kahn and Winton (1998) show that liquidity allows the blockholder to acquire her stake with smaller price impact. Maug (1998) demonstrates that liquidity encourages blockholders to subsequently intervene as they can buy additional shares at a price that does not incorporate the gains from intervention; this expectation induces the block to form in the first place. In the exit theory of Edmans (2009), liquidity facilitates governance through trading, and thus encourages initial block formation. "Voice-B" theories, such as Coffee (1991) and Bhide (1993), treat blockholders as exogenous and thus have no prediction for *H1*. Other theories than the three sets above, unrelated to governance, do not clearly predict a positive relationship. Block acquisition may be instead motivated by undervaluation. On the one hand, liquidity makes it easier to buy an undervalued block, just as it facilitates buying a block for governance purposes. On the other hand, Chordia, Roll, and Subrahmanyam (2008) find that liquidity increases price efficiency (measured by the lower predictability of returns from order flow) and so liquid stocks are less likely to be undervalued and attract block formation. Similarly, if hedge funds act as liquidity providers when buying blocks (consistent with evidence that they exploit fire sales, e.g. Coval and Stafford (2007)), they will be more likely to buy illiquid blocks to earn the illiquidity premium (Amihud (2002)).

The next hypothesis concerns the schedule filed upon block acquisition.

H2: Conditional upon acquiring a block, liquidity increases the likelihood that the blockholder files 13G rather than 13D.

Blockholders acquire stakes for two main reasons: to engage in subsequent activism, or to remain passive and earn a return through informed trading.[7] The motivation in turn drives her filing choice. An activist blockholder will file a 13D as it legally allows her to pursue the specific form of activism stated in Item 4 of the 13D.[8] Even if a 13G filer subsequently amends the filing to a 13D before engaging in activism, she might still be sued for fraudulently stating her intentions in the initial filing, as per the case of NACCO Industries v. Applica.[9] Conversely, it is unlikely that a blockholder who intends to remain passive will file a 13D. First, a 13D hinders her ability to subsequently trade. A 13D filer must re-file within 10 days upon a change in stake of 1%, which alerts the market to changes in her position and moves the price against her.[10] In contrast, a 13G filer only needs to re-file for a change in stake of 5%, and the re-filing deadline is 45 days after the end of the calendar year (for qualified investors listed under Rule 13d-1(b)(1)). Similarly, the initial filing of a 13D must occur within 10 days of crossing the 5% threshold, whereas it can be 45 days after the end of the year for a 13G. Second, a 13D filing causes the target firm to become hostile to the blockholder and restrict access to management, and thus a source of information. Third, it is typically accompanied by credit downgrades (Klein and Zur (2011)), higher bank loan spreads, and shorter bank loan maturities (both Li and Xu (2009)). These effects harm the firm and thus the value of the blockholder's stake. Fourth, filing a 13D signals that the blockholder believes that the target is underperforming and intervention is warranted. Thus, if she subsequently fails to intervene and firm performance does not improve, she loses reputation among her own investors. Appendix A provides further detail on legal issues surrounding 13D and 13G filings.

[7] Even if the acquisition was initially motivated by undervaluation, to earn a return, the blockholder will need to time her exit accordingly. Thus, she will wish to gather information.
[8] Examples of activists' stated intentions filed in a 13D include: change the CEO or board, pursue strategic alternatives, oppose or induce a merger, propose a spin-off, increase the dividend, cut executive pay, and restructure debt.
[9] NACCO Industries, Inc. v. Applica Inc., C.A. No. 2541-VCL (Delaware Chancery Court, 10/22/09), settled for $60m.
[10] For example, if a 13D filer wishes to sell her entire block of 5%, it is unlikely that she will be able to do so within 10 days, due to price impact. (The median daily trading volume in our sample is 0.35%). After she has sold the first 1%, she must file a 13D within 10 days. Such a filing will lower the price at which she can sell her remaining 4%.

"Voice-G" theories argue that, taking blockholdings as given, liquidity encourages voice and thus a 13D filing. In addition to the Maug (1998) model described above, Faure-Grimaud and Gromb (2004) show that liquidity encourages intervention as it increases price informativeness. Thus, if the activist is forced to sell prematurely due to a liquidity shock, the price she receives will partially reflect the gains from intervention. Both "exit" and "voice-B" theories predict that liquidity will encourage a 13G. The "voice-B" theories of Coffee (1991), Bhide (1993), and Maug (2002), and the "exit" theories of Edmans (2009) and Edmans and Manso (2011) argue that liquidity makes it easier for the blockholder to sell her shares subsequently. They will file a 13G to take advantage of this higher liquidity. Where these theories differ is their predictions for the effect of a 13G on governance and thus firm value. This leads to our next hypothesis.

H3: A 13G filing leads to a positive event-study return (H3a), a positive holding-period return (H3b), and an increase in operating performance (H3c), particularly among liquid firms.

"Voice-B" theories implicitly assume that voice is the only channel through which a blockholder can exert governance. Thus, a 13G filing should have no effect on the stock price or operating performance, since the blockholder cannot engage in voice.[11] In contrast, "exit" theories argue that the informed trading that a 13G filer can engage in is a governance mechanism in itself. Note that exit theories do not require the blockholder to be cognizant of the impact of her trading on the manager's behavior for it to be effective. The blockholder could be motivated purely by the private desire to maximize her trading profits at the expense of liquidity investors, but such self-interested actions have a social benefit by disciplining the manager. Thus, even if the blockholder's

[11] While "voice-B" theories do recognize that a 13G filing does not prevent trading, they implicitly assume that such trading has no effect on the manager's behavior, perhaps because the manager is insensitive to the stock price, or the 13G filer will not be subsequently trading based on information (but other factors such as her own liquidity shock).

choice to file a 13G is motivated purely by the fact that a 13G filing facilitates informed trading, "exit" theories argue that such a filing still exerts governance. Thus, the stock price should rise upon a 13G as the market anticipates the governance benefits, and this increase should be subsequently borne out by an improvement in operating performance. In addition, the blockholder should capture part of the benefits in the form of positive holding-period returns.

One might argue that such findings may still be consistent with "voice-B" – that a 13G filing has no governance implications – as the filing could signal that the new blockholder has private information that the stock is undervalued. The positive market reaction arises as the market infers the undervaluation, and the improvement in operating performance is predicted by the blockholder rather than caused by her. Thus, we test whether the above effects are stronger in liquid firms. If liquidity is high, the blockholder will gather more information, strengthening the threat of exit (Edmans (2009); Edmans and Manso (2011)).[12] Under the undervaluation story, two forces reduce the announcement return in more liquid stocks. First, liquidity increases price efficiency and reduces undervaluation. Thus the market should attribute the purchase less to undervaluation, reducing the return. Second, since illiquidity increases the cost of both acquiring a block and selling it after the undervaluation is corrected, a hedge fund will only acquire a block if the undervaluation is so large that it outweighs the cost. Hence, the acquisition of a block in an illiquid firm is a stronger sign of undervaluation, and the announcement return should be higher.[13]

[12] The positive effect of liquidity on the firm value impact of a 13G filing (*H3*) is for different reasons to the positive effect of liquidity on the blockholder's preference for a 13G (vs. a 13D) (*H2*). The latter arises because liquidity increases the blockholder's profits from informed trading. However, while the blockholder's filing decision depends on trading profits, the impact on governance and firm value instead depends on price informativeness, as this determines the extent to which managerial actions are reflected in the price. While liquidity allows a blockholder to trade more aggressively, there is a counteracting effect: a given blockholder trade has less effect on the price since it is camouflaged by liquidity traders. Indeed, Kyle (1985) shows that, when information acquisition is exogenous, price informativeness is independent of liquidity. However, Edmans (2009) shows that, when information acquisition is endogenous, liquidity strengthens governance through exit as it encourages the blockholder to gather more information.

[13] A potential force offsetting the second effect is that, in more liquid stocks, the price impact is lower when the block is acquired, and so there is more information to come out when the 13G filing is made some time after. For example, assume that undervaluation ranges from 0-5%, and that it costs 1% to buy and 1% to sell a block in a liquid firm, and

A second test to distinguish between "voice-B" and "exit" involves managerial incentives. As noted earlier, "exit" theories do not *require* the blockholder to be cognizant of her governance effect when filing a 13G. However, some blockholders may take into account these effects when making their filing decision. The threat of exit is stronger if the manager is more sensitive to the stock price. Thus, such investors are more likely to form blocks, and more likely to file a 13G upon block formation, if the manager is sensitive to the stock price. In voice theories, managerial incentives have no effect on the role of liquidity.[14] This leads to our fourth hypothesis.

H4: The effect of liquidity on the probability of block acquisition (H4a), and the probability of a 13G filing conditional upon block acquisition (H4b), is stronger in firms with higher managerial sensitivity to the stock price.

If *H1* and *H2* are supported, then liquidity has two conflicting effects on voice: the hedge fund is more likely to acquire a block, but less likely to choose voice conditional upon holding a block. *H5* below studies whether the first effect outweighs the second, i.e. whether liquidity increases activism unconditionally. This question is of interest for drawing conclusions about the overall effect of liquidity on governance. Support for *H1* and *H2* shows that liquidity encourages exit, but the effect on governance overall would be ambiguous if it lowered the unconditional probability of voice. Support for *H5* would show that liquidity also encourages voice, and thus an overall beneficial effect on governance. Such a finding would also support "voice-G" theories.

2% in an illiquid firm. Thus, blockholders will buy liquid firms which are 2-5% undervalued, and illiquid stocks which are 4-5% undervalued. The undervaluation after the purchase is 1-4% for liquid stocks (average of 2.5%) and 2-3% for illiquid stocks (average of 2.5%). This force cancels out the second effect: in both cases, the reaction to a 13G filing motivated by undervaluation should be 2.5%. However, the first effect remains – liquidity reduces undervaluation – and so an undervaluation explanation does not predict that announcement returns are more positive in liquid stocks.

[14] Voice theories typically do not consider managerial incentives. An extension of these theories to incorporate managerial incentives would predict that high managerial sensitivity to the stock price reduces agency problems and thus the need for blockholder governance in general, but have no effect on how governance depends on liquidity.

H5: Liquidity increases the unconditional likelihood that a hedge fund files Schedule 13D.

2. Sample construction, variable measurement, and descriptive statistics

2.1. Sample construction and variable measurement

We assemble a comprehensive list of activist hedge funds that engaged in block acquisitions between 1995 and 2010. Similar to Brav et al. (2008), Clifford (2008), and Klein and Zur (2009), we conduct an exhaustive search on Factiva. We first search using the key words "activism" and "activist", and then within this sample search for "hedge fund" and "hedge", to yield 223 funds. We collect all 13D and 13G filings of each fund using the SEC's EDGAR database. We then manually retrieve the filing date and the target company's PERMNO; the latter leads to a loss of 96 observations for small firms not covered by CRSP. For each firm, we only retain the first Schedule 13 filing by an activist hedge fund, since subsequent filings could be influenced by the initial filing (e.g. be a "copycat") rather than liquidity, or the first filing could jointly drive both liquidity and a subsequent filing. We remove 12 subsequent filings. These steps lead to a dataset of 709 initial Schedule 13Ds and 1,112 initial Schedule 13Gs filed by 101 funds.

We merge this hedge fund dataset with the universe of Compustat firms and define a dummy variable *BLOCK*, which equals one if a hedge fund files an initial 13D or 13G for a firm-year observation and zero otherwise (Appendix B defines all variables used in the analysis). The dummy variable *13DFILING* indicates activism, and equals one if a hedge fund files an initial 13D for a firm-year observation and zero otherwise. We then, within the hedge fund dataset, construct a dummy variable *13Dvs13G* to denote a hedge fund blockholder's choice of governance mechanism. This variable equals one if a hedge fund blockholder files an initial 13D for a firm-year observation, and zero if a 13G is filed instead.

Next, we obtain daily trading information from the Center for Research in Security Prices (CRSP) to compute the liquidity measures. Given our large sample size (all firms in the intersection of Compustat and CRSP), computational feasibility requires us to use liquidity measures based on daily, rather than intra-day, data. Conceptually, liquidity measures the cost of trading. This cost can be calculated relative to either the volume being traded or the price of the stock being traded. There are thus two categories of liquidity measures; for each category, we choose the liquidity measure that prior literature has shown to be the most accurate. Our cost-per-volume measure is the Amihud (2002) illiquidity ratio. Goyenko, Holden, and Trzcinka (2009) evaluate 12 proxies that use daily data and find that this measure most accurately captures price impact. We compute the Amihud illiquidity ratio, $AMRATIO_{i,t}$, as the daily ratio of absolute value of stock returns divided by dollar volume, averaged over firm *i*'s fiscal year *t*:

$$AMRATIO_{i,t} = \frac{1}{D_{i,t}} \times \sum_{d=1}^{D} \frac{|RET_{i,d}|}{|VOLUME_{i.d}|}$$

where $RET_{i,d}$ and $VOLUME_{i,d}$ are, respectively, the returns and dollar trading volume on day *d* for firm *i,* and $D_{i,t}$ is the number of trading days in fiscal year *t*.[15]

Our percent-cost (i.e. cost-per-price) measure stems from Fong, Holden, and Trzcinka (2011, "FHT"). Similar to the LOT measure in Lesmond, Ogden, and Trzcinka (1999) and the LOT Y-split measure in Goyenko, Holden, and Trzcinka (2009), the FHT measure combines two features of transaction costs: return volatility and the proportion of zero returns. Specifically, it is calculated as:

$$FHT_{i,t} = 2 \times Sigma \times \Phi^{-1}(\frac{1 + Zeros\%}{2})$$

[15] We test the robustness of our results by requiring a firm to have at least 200 trading days available and an end-of-year stock price greater than $5 in fiscal year *t-1* to be included in the sample as in Amihud (2002). Our results are virtually the same, albeit resulting in a smaller sample.

where *Sigma* is the standard deviation of daily returns calculated over firm *i*'s fiscal year *t* and *Zeros%* is the proportion of zero returns, calculated as the number of zero-return days divided by the number of total trading days for fiscal year *t*. The use of *Zeros%* is based on the idea that a zero return arises because transactions costs deter marginal investors from trading and thus the frequency of zero returns signals illiquidity. Fong, Holden, and Trzcinka (2011) show that their measure outperforms both LOT measures and is highly correlated with percent-cost benchmarks computed from intraday data such as percent effective spread and percent quoted spread. The distributions of $AMRATIO_{i,t}$ and $FHT_{i,t}$ are highly positively skewed so we take the natural logarithm of (one plus) each measure, and multiply it by -1 to facilitate interpretation: a high value corresponds to high liquidity. We define $LIQAM_{i,t} = -\ln(AMRATIO_{i,t})$ and $LIQFHT_{i,t} = -\ln(FHT_{i,t})$.

We measure the manager's sensitivity to the stock price using the scaled wealth-performance sensitivity measure of Edmans, Gabaix, and Landier (2009) (*WPS*): the dollar change in the CEO's wealth for a 100 percentage point change in the stock price, scaled by annual pay. This measure is independent of firm size and thus comparable across firms of different size.[16] We use Eventus to calculate market-adjusted abnormal returns to 13G filings (*CAR_VW (-1, +1)*), with date 0 being the filing date. The market adjustment is relative to the CRSP value-weighted index, and market model parameters are estimated over (-255,-46). As a robustness check, we also calculate the abnormal returns relative to the CRSP equal-weighted index, denoted as *CAR_EW (-1, +1)*).

Finally, to identify control variables that may jointly affect both liquidity and governance, we follow Brav, Jiang, and Kim (2009) and control for the target's log market value of equity (*MV*), market-to-book (*Q*), one year sales growth (*SGR*), return-on-assets (*ROA*), book debt-to-assets (*LEV*), dividend yield (*DIVYIELD*), R&D divided by total assets (*RDTA*), Herfindahl index of sales

[16] Even if the CEO has large equity holdings, he will not be sensitive to the current stock price if his securities have very long vesting periods. However, vesting periods are typically short in practice (see, e.g., Kole (1997)).

in different business segments (*HINDEX*), and the log of one plus the number of analysts covering the firm (*NANALYST*).[17] Financial information is from Compustat and analyst coverage data is from the Institutional Brokers' Estimate System (I/B/E/S). We winsorize all continuous variables at the 1% and the 99% level. We add year fixed effects and Fama-French 12 industry fixed effects to control for inter-temporal and industry variation in stock liquidity and hedge fund targeting. For example, the 2008 financial crisis reduced stock liquidity and imposed financial constraints on hedge funds, hindering them from acquiring blocks.

One remaining concern is that liquidity is endogenous due to reverse causality or omitted variables.[18] Reverse causality is a particular concern when studying governance *characteristics*, because it cannot be addressed by simply lagging the independent variable. Even if governance is regressed on lagged liquidity, it may be that lagged governance causes lagged liquidity, and also causes current governance since governance is persistent. In contrast, we study an unexpected governance *event* (a 13D/G filing). Such events are non-persistent: since we only consider the first filing in a firm, it cannot be caused by a past filing, and so lagging liquidity addresses reverse causality. To address concerns that omitted variables drive both past liquidity and the current filing, we include the long list of controls and fixed effects described above.

We also re-run our results using decimalization as an exogenous shock to liquidity. This event led to an increase in liquidity, but was unlikely to affect a hedge fund's governance strategy other than through liquidity. We define a dummy variable *DECIMAL* to indicate whether a block

[17] As a robustness check, we also include the Gompers, Ishii, and Metrick (2003) governance index as an additional control variable. This leads to approximately a 75% reduction in sample size in Tables 2, 3, and 8, and a 28% reduction in sample size in Tables 6 and 7. However, our inferences remain intact, with the results remaining significant using at least one liquidity measure in every table.

[18] Chung, Elder, and Kim (2010) show that superior governance (measured by an index based on Institutional Shareholder Services data) is correlated with higher liquidity. Gallagher, Gardner, and Swan (2012) correlate blockholder trading with stock liquidity. In contrast, Cohen (2011) shows that block acquisition by corporate activists, particularly those geographically close to the target company, leads to a decrease in liquidity, potentially because investors fear trading against an informed investor.

acquisition takes place post-decimalization. Specifically, when examining a block acquisition decision in fiscal year *t+1* (*H1*, *H4a*, and *H5*), *DECIMAL* equals one if fiscal year *t* ends after January 31, 2001 for firms traded on the NYSE and AMEX or after April 9, 2001 for firms traded on Nasdaq, and zero otherwise. When studying the choice between 13D and 13G (*H2* and *H4b*), we have a specific filing date which allows us to define *DECIMAL* more finely. It equals one if the filing occurs after January 31, 2001 or April 9, 2001 (depending on the exchange) and zero otherwise. Thus, the coefficient on *DECIMAL* compares hedge fund activity pre- and post-decimalization. The advantage of retaining all years is that we have more observations to estimate pre- and post-decimalization hedge fund activity, and thus allow for a more powerful comparison between them. The potential disadvantage is that hedge fund activity in years far from the decimalization date may have been affected by confounding events. We thus include year fixed effects from 1996-2000 and 2003-2010 to control for time trends in those years that are likely driven by factors other than decimalization, but omit them for 2001 and 2002 (as well as 1995, which we also drop in the *LIQAM* and *LIQFHT* specifications to avoid multicollinearity) to reflect the exogenous increase in liquidity surrounding decimalization.[19] Relatedly, the inclusion of all year fixed effects for our specifications with *LIQAM* and *LIQFHT* is conservative as it means that we are identifying only on the variation on liquidity not driven by decimalization.

2.2. Descriptive statistics

Panel A of Table 1 provides summary statistics. Of the 88,742 firm-year observations we use to investigate the effect of liquidity on block acquisition (*H1*, *H4a*, and *H5*), 490 (645) firm-year observations contain an initial 13D (13G) filing by 95 hedge funds. (This compares to the 709

[19] A second approach, where sample size permits, is to narrow down the measurement window and focus only on the years immediately before and after decimalization, to reduce the risk of confounding events. We employ this approach in robustness checks (e.g. Table 2, Panel C) and the inferences remain valid.

(1,112) filings by 101 hedge funds before merging with the liquidity measures and controls). Panel B provides summary statistics for the 1,135 firm-year observations that correspond to a hedge fund filing, and Panel C shows the frequency of 13D and 13G filings by fiscal year.

Our interest is whether stock liquidity plays a role in governance. Panel D of Table 1 presents correlations between the block acquisition dummy *BLOCK*, the choice of filing dummy *13Dvs13G*, and two liquidity measures *LIQAM* and *LIQFHT*. The two liquidity measures are highly correlated with each other. Moreover, *BLOCK* has significantly positive Pearson and Spearman correlations with both liquidity measures, suggesting that liquidity facilitates block formation. In addition, *13Dvs13G* has significantly negative Pearson correlations with both liquidity measures, suggesting that liquidity deters governance through voice, conditional upon block acquisition.

We also calculate the correlation coefficients between liquidity in year *t* and *t-1*. It is important that liquidity be persistent so that stock liquidity at the time a hedge fund acquires a block (and thus makes her filing choice) is a good predictor of liquidity in the future, when the hedge fund may end up engaging in exit and voice. Panel E shows that both liquidity measures are highly autocorrelated with Pearson and Spearman correlations between 0.85-0.94, significant at the 1% level.[20]

To give a rough estimate of the economic significance of liquidity for the ability to exit, we estimate the price impact of selling 1% of a firm's shares by calculating an Amihud (2002)-type measure. We split the entire universe of CRSP stocks into quartiles based on the average *AMRATIO* and *FHT* measures over the previous calendar year, and calculate the absolute value of the average returns to stocks in each quartile on days where 0.9-1.1% of the shares outstanding are traded. Table OA2, Panel A shows that firms in the third quartile by *AMRATIO* experience a 4.2% return on such days, whereas firms in the fourth quartile (the most illiquid firms) experience a 7.0% return. The corresponding figures for *FHT* are 3.9% for the third quartile and 6.9-7.0% for the

[20] Table OA1 in the Online Appendix shows that liquidity remains persistent when conditioning upon a 13D/G filing.

fourth quartile. The price impact across liquidity quartiles on days where 0.4-0.6% of the shares outstanding are traded (Panel B) and on days where 0.1-0.3% of the shares outstanding are traded (Panel C) exhibits similar patterns. Thus, illiquidity increases the cost of exit and so reduces the attraction of a 13G filing.

We next turn to multivariate analyses to further examine how stock liquidity affects hedge funds' block acquisition and monitoring strategies.

3. Empirical results

3.1. Does stock liquidity affect hedge funds' block acquisition decisions?

To test our first hypothesis (*H1*) that liquidity increases the likelihood of a firm being targeted by a hedge fund, we run the following probit regression:

$$BLOCK_{i,t+1} = \alpha_0 + \alpha_1 LIQUIDITY_{i,t} + \alpha_2 CONTROL_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where *BLOCK* is the likelihood of a hedge fund acquiring a block in fiscal year *t+1*, and *LIQUIDITY* is measured by *LIQAM*, *LIQFHT*, or *DECIMAL*. *CONTROL* is a vector of the control variables described in Section 2.1; we run the regression with and without controls. In all specifications we add industry and fiscal-year dummies. Standard errors are adjusted for heteroskedasticity and clustered at the firm level.

Table 2, Panel A shows that for all three measures of liquidity, both with and without controls, the coefficient on liquidity is positive and significant at the 1% level. This finding supports *H1* and is consistent with both "voice-G" and "exit" theories; we will later test *H4a*, a cross-sectional refinement of *H1*, to distinguish between them. The positive effect of liquidity on block formation is consistent with Brav, Jiang, and Kim (2009), Gerken (2009), and Clifford and Lindsey (2011). A

one standard-deviation increase in liquidity as measured by *LIQAM* (*LIQFHT*) increases the probability of block acquisition by 0.47 (0.20) percentage points. This is economically significant compared with the unconditional probability of a hedge fund block acquisition of 1.3%. All control variables have the expected sign, and are consistent with Brav, Jiang, and Kim (2009). Hedge funds are more likely to target firms with smaller size (MV_t), lower market-to-book (Q_t), higher sales growth (SGR_t), higher leverage (LEV_t), and more analyst coverage ($NANALYST_t$).

A potential concern with the *DECIMAL* specification is that other events happened around 2001, and *DECIMAL* could be capturing these other changes rather than decimalization. To provide further evidence that *DECIMAL* is capturing decimalization in particular, we perform two further tests. First, a change in tick size from 1/16 to 1/100 should have a greater effect on liquidity for firms with low stock prices. We thus create a dummy variable, *LOWPRC*, which equals one if a firm's closing price at the end of fiscal year *t* is below the median closing price for that year, and zero otherwise. We indeed find that the *LOWPRC=1* subsample experiences a significantly higher increase in liquidity upon decimalization: *LIQAM* (*LIQFHT*) increases by 0.37 (0.02) compared to 0.08 (0.01) in the *LOWPRC*=0 subsample; both differences are significant at the 1% level. Panel B re-runs the regressions of Panel A splitting the sample by *LOWPRC*. The *DECIMAL* coefficient is significant only in the *LOWPRC=1* subsample, and the difference in coefficients across the two subsamples is significant at the 1% level.[21]

[21] An alternative explanation is that *LOWPRC* may be capturing a size effect. It may be that hedge funds only acquire blocks in small firms in the first place, and thus *any* determinant of block acquisition will have a larger effect in a smaller firm. Thus, the result in Panel B that *DECIMAL* has a greater effect on firms with *LOWPRC=1* is not definitive proof that *DECIMAL* is capturing liquidity, as the result would hold if *DECIMAL* proxied for another determinant of block acquisition. We re-run the analysis splitting the sample by *MV*, and find no significant difference in the coefficients on *DECIMAL*. Thus, the difference in results across the two subsamples does not arise because *LOWPRC* proxies for size. Yet another interpretation for the insignificance of *DECIMAL* in the *LOWPRC=0* subsample is that hedge funds do not target firms with high stock prices (for whatever reason). We run the results of Panel A (using *LIQAM* and *LIQFHT* to measure liquidity) within the two *LOWPRC* groups and find that both liquidity measures are significantly positive in both subsamples, contrary to this interpretation.

Second, in Panel C we re-run Panel A replacing *DECIMAL* with the actual change in liquidity. We measure the change from the fiscal year before decimalization (year *t-1*) to the fiscal year after (year *t+1*), and drop all other years to hone in on the decimalization period. This specification follows Fang, Noe, and Tice (2009) and Fang, Tian, and Tice (2011). The implicit assumption is either that the change in liquidity between these years was driven entirely by decimalization, or that even if part of the change was due to non-decimalization factors, these factors are also uncorrelated with governance. Despite the much smaller sample, the results remain significant for both measures of liquidity: the change in liquidity from *t-1* to *t+1* is significantly associated with the probability of block acquisition in *t+2*.

3.2. Does stock liquidity affect hedge funds' governance decisions?

We now investigate *H2* regarding the hedge fund's governance intent conditional upon acquiring a block. We run the following probit regression:

$$13Dvs13G_{i,t+1} = \alpha_0 + \alpha_1 LIQUIDITY_{i,t} + \alpha_2 CONTROL_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Table 3, Panel A presents the results. In all six specifications, liquidity is associated with a significantly lower probability of the hedge fund filing 13D (rather than 13G). A one standard deviation increase in *LIQAM* (*LIQFHT*) is associated with a 6.9 (5.0) percentage point decrease in the likelihood of filing 13D, compared to the 43.2% probability of such a filing conditional upon acquiring a block. As with Table 2, we re-run the *DECIMAL* specification stratifying the sample by *LOWPRC*. Panel B shows that the coefficient on *DECIMAL* is only significant in the subsample

with *LOWPRC=1*, and that the difference between the two subsamples is statistically significant.[22] These results support *H2*, that liquidity causes the blockholder to file a 13G rather than 13D. They contradict "voice-G" theories but are consistent with both "voice-B" and "exit" theories.

3.3. Is a 13G filing a governance event?

The results of Table 3 do not distinguish between "voice-B" and "exit" theories: the preference for 13Gs may arise because liquidity hinders voice, or because it encourages exit. "Voice-B" theories argue that a 13G filing is not a governance event, and thus, by encouraging a blockholder to file 13G rather than 13D, liquidity weakens governance. "Exit" theories argue that a 13G filer does exert governance through the alternative mechanism of trading.

Table 2's evidence in favor of *H1* supports "exit" theories and is not predicted by "voice-B". In addition, existing findings that liquidity has a positive causal effect on firm value (Fang, Noe, and Tice (2009)), particularly for firms with blockholders (Bharath, Jayaraman, and Nagar (2012)), also support the "exit" channel. We now conduct two additional sets of tests to support "exit" theories in particular. First, we study whether 13G filings lead to a positive event-study return (*H3a*), positive holding-period return (*H3b*), and an improvement in operating performance (*H3c*), particularly among liquid stocks. Table 4 Panel A shows that firms experience a 0.8% (0.7%) average 3-day value-(equally-) weighted abnormal return *CAR_VW (-1,+1)* (*CAR_EW (-1, +1)*) to a 13G filing. This positive market reaction is consistent with Clifford (2008). Further, *CAR_VW (-1,+1)* (*CAR_EW (-1, +1)*) is three (two) times as high for firms with above-median liquidity as in

[22] We are unable to run the analog of Table 2, Panel C, focusing only on the years surrounding decimalization and dropping all other years, due to low sample size. In Table 2, the sample includes all firms; in Table 4, the sample includes firms in which an activist hedge fund has acquired a block.

the below-median subsample, i.e., 1.2% versus 0.4% (0.9-1.0% versus 0.4-0.5%), and significant only in the former.[23]

We next test whether these results are robust to including the size and value characteristics of Fama and French (1992). We define the dummy variable *HIGHLIQAM* (*HIGHLIQFHT*) to denote whether an observation has *LIQAM* (*LIQFHT*) equal to or above the median *LIQAM* (*LIQFHT*) within each year, and run the following regression:

$$CAR\ (-1,+1) = \alpha_0 + \alpha_1\ HIGHLIQAM_{i,t}(HIGHLIQFHT_{i,t}) + \alpha_2 CONTROL2_{i,t} + \varepsilon_{i,t} \quad (3)$$

where *CAR (-1, +1)* stands for *CAR_VW (-1, +1)* or *CAR_EW (-1,+1). CONTROL2* includes the log of the target's market value of equity (*MV2*), measured on the latest trading day at least two days prior to the filing date of the 13G and the target's market-to-book (*Q2*), calculated as *MV2* divided by the book value of total assets measured at the end of the fiscal quarter immediately preceding the filing. Panel B shows that the coefficient estimate on $HIGHLIQAM_{i,t}$ ($HIGHLIQFHT_{i,t}$) in columns (1)-(2) is positive and significant at the 5% level using *CAR_VW (-1, +1)*. Switching from the below-liquidity-median subsample to above-liquidity-median subsample, with liquidity measured using $LIQAM_{i,t}$ ($LIQFHT_{i,t}$) increases the average 3-day abnormal return by 1.7% (1.4%). The results are similar using *CAR_EW (-1,+1)*, as shown in columns (3)-(4) of Panel B.

To study holding-period returns (*H3b*), we first identify the exit date of the 13G filer, which we define as the date of actual exit if specified in a successive 13G filing in which the holding drops below 5%, and the filing date of the successive 13G filing if the actual date of exit is not specified. When a successive 13G filing is not available, we check successive 13F filings for the size of the holdings. The latter will be a less precise estimate of the exit date, since 13F filings are only

[23] Results are very similar using the alternative windows of (0, +1), (0, +2), and (0, +3).

available quarterly. We delete a 13G filing if the firm is acquired before the hedge fund's exit. The mean raw holding-period return is 23.2% for the sample of 13G filings; the mean abnormal return relative to the value-weighted index (*HOLDINGRET_VW*) and equal-weighted index (*HOLDINGRET_EW*) is 5.3% and 5.0%, respectively. Panel C shows that the mean value-weighted returns are 9.2% (8.8%) in stocks with above-median *LIQAM* (*LIQFHT*) and the corresponding mean equal-weighted returns are 8.4% (8.2%) , but insignificantly positive in stocks with below-median liquidity.

We next study whether the positive market reaction to 13G filings is justified by future improvements in operating performance (*H3c*). For each of the 645 firms targeted by a 13G filer, we identify a control firm using propensity score matching. We use the same *CONTROL* vector as in the regressions, as well as Fama-French (1997) 12 industry and year dummies. Each firm can serve at most once as a control. Starting from the 645 13G filings, we end up with 500 unique 13G firm-control pairs with close propensity scores[24] and financials available in both fiscal year *t-1* and year *t+1*. Panel A of Table 5 shows that the difference in propensity scores of the targeted firms and the control firms is very small, and Panel B shows no significant differences in the pre-event observables used to match.

We undertake a difference-in-difference analysis to compare the improvement in operating performance of targeted firms to the controls. Note that there are many channels through which blockholders may improve firm value other than operating performance. For example, they may prevent investment in bad projects and encourage good projects. However, since standard investment measures (such as CAPEX or R&D) are uninformative about the quality of investment, this channel is difficult to detect empirically. We thus study operating performance, measured by

[24] We only keep a targeted firm if we are able to find a control firm with available financials where the absolute difference in propensity scores between the targeted firm and control firm is sufficiently small so that none of the observable firm characteristics exhibit a significant difference across the two groups of firms.

EBITDA/ASSET and *CFO/ASSET*. Panel C illustrates the results, and demonstrates that targeted firms enjoy an improvement in *EBITDA/ASSET* (*CFO/ASSET)* of 1.5% (1.4%) higher than control firms, from *t-1* to *t+1*. Both results are significant at the 10% level. Panel D shows that the improvements in operating performance are confined to the subsample of firms with above-median liquidity. For example, in the high-*LIQFHT* subsample, the increase in *EBITDA/ASSET* (*CFO/ASSET*) is 3.3% (2.9%) higher in treated firms than control firms, which is significant at the 5% level, whereas there is no difference for the low-*LIQFHT* subsample.

Overall, the results of Table 5 reinforce those of Table 4, Panel A. The stock price increase upon a 13G filing, particularly among liquid firms, is justified by the subsequent improvement in operating performance, particularly among liquid firms. Taken together, the findings in Tables 4 and 5 suggest that a 13G filer is governing through exit, rather than failing to govern, in turn supporting "exit" theories but not "voice-B" theories.

In the Online Appendix (Table OA3), we study the long-term stock returns to a 13G filing, both before and after the event, using a calendar-time portfolio analysis similar to Brav et al. (2008) for 13D filings. Consistent with Panel A of Table 4, we find positive returns in the event month, but no abnormal returns in any of the pre- or post-event windows. The finding of a positive event-study return but no long-run drift for 13Gs is consistent with market efficiency and also with the results of Brav et al. (2008) for 13Ds (which we confirm for our 13Ds in unreported results). Moreover, the absence of pre-event abnormal returns is evidence of the 13G filing being unpredictable, mitigating concerns of reverse causality from the filing to prior liquidity (see also the discussion on p4). There are two reasons why positive holding-period returns can coincide with insignificant long-run drift. First, the former includes the positive event-study returns. Second, the former takes into account superior timing ability of 13G filers when exiting. If 13G filers have private information, they will sell stocks that subsequently underperform (thus mitigating their losses) but hold onto stocks that

subsequently outperform (thus enjoying the full gains). The difference between holding-period returns and long-run drift provides further evidence that 13G filers sell on information, and thus their selling impounds information into the stock price: the very mechanism of governance through trading.

The second set of tests to provide further evidence in favor of "exit" involves managerial incentives. As stated previously, the results of Table 2 – that liquidity encourages block formation – are consistent with both "voice-G" and "exit". To support "exit" in particular, we study the hypothesis (*H4a*) that the effect of liquidity on block acquisition is stronger in firms with high managerial incentives. This test is a cross-sectional refinement of *H1*; we thus augment equation (1) by adding managerial incentives (*WPS)* and an interaction term between *LIQUIDITY* and *WPS*:

$$BLOCK_{i,t+1} = \alpha_0 + \alpha_1 LIQUIDITY_{i,t} + \alpha_2 LIQUIDITY_{i,t} \times WPS_{i,t} + \alpha_3 WPS_{i,t} + \alpha_4 CONTROL_{i,t} + \varepsilon_{i,t} \quad (4)$$

Table 6 shows that the interaction term is positive and significant in all specifications, consistent with "exit" theories. The significant result is despite the reduced sample size, due to Execucomp covering S&P 1500.[25] To estimate economic significance, we re-run Eq. (4) with *LIQUIDITY* and *WPS* de-meaned in the interaction term, which only affects the estimates on the two standalone variables. If a firm's *WPS* is at the sample mean, a one standard-deviation increase in liquidity as

[25] Ai and Norton (2003) argue that the coefficient on the interaction term in a nonlinear regression is not an accurate measure of the interaction effect, and propose their own measure of the interaction effect. However, there remains significant debate on this issue. Le (1998) and Kolasinski and Siegel (2010) argue that the coefficient on the interaction term is relevant even in a nonlinear regression: in particular, it is especially relevant to measure proportional rather than absolute marginal effects (e.g. if a marginal effect of 1% when the base probability is 1% is considered economically more significant than a marginal effect of 2% when the base probability is 50%). Nevertheless, we calculate the Ai and Norton (2003) interaction measure and find that it is also significant in both specifications. In addition, we run a linear probability model (as suggested by Angrist and Pischke (2008) for binary response models), and the interaction term is slightly stronger than in Table 6.

measured by *LIQAM* (*LIQFHT*) increases the probability of a block acquisition by 0.37 (0.47) percentage points. If the firm's *WPS* is one standard deviation above the sample mean, these increases are 0.49 (0.58) percentage points, which are 32% (23%) greater.

The results of Table 3 contradict "voice-G" but support both "voice-B" and "exit". To support "exit" in particular, we study the hypothesis (*H4b*) that the effect of liquidity on the decision to file 13G is stronger in firms with high managerial incentives. While *H4a* considered all firms, *H4b* considers only firms targeted by hedge funds. Given the substantially reduced sample size, to reduce the effect of outliers we stratify firms into halves based on *WPS* and define a dummy variable *HIGHWPS* to denote whether a sample observation has an above-median *WPS* within each year. We then run the following cross-sectional refinement of *H2*:

$$13Dvs13G_{i,t+1} = \alpha_0 + \alpha_1 LIQUIDITY_{i,t} + \alpha_2 LIQUIDITY_{i,t} \times HIGHWPS_{i,t} + \alpha_3 HIGHWPS_{i,t} + \alpha_4 CONTROL_{i,t} + \varepsilon_{i,t} \quad (5)$$

Table 7 demonstrates that the coefficients on the interaction term are negative and significant, but the coefficient on *LIQUIDITY* alone is insignificant. Liquidity encourages the filing of a 13G rather than 13D only in firms with high managerial incentives, consistent with "exit" theories. Despite the smaller sample (there are only 322 filings for which we can calculate *WPS*), our results remain statistically significant, albeit at the 10% level. Clifford and Lindsey (2011) find that passive governance has a more positive effect on value in companies with high incentives, but do not investigate liquidity.

3.4. Does stock liquidity affect hedge fund activism?

While Table 2 provides support for *H1*, that liquidity increases the likelihood that a hedge fund acquires a block, Table 3 supports *H2*, that liquidity reduces the likelihood that the hedge fund has an activist intent, conditional upon acquiring a block. We now study which of these effects dominates – i.e., the unconditional effect of liquidity on the likelihood that a firm is targeted by an activist blockholder (*H5*). We run the following probit regression:

$$13DFILING_{i,t+1} = \alpha_0 + \alpha_1 LIQUIDITY_{i,t} + \alpha_2 CONTROL_{i,t} + \varepsilon_{i,t} \quad (6)$$

Table 8 demonstrates that the unconditional effect is positive using all three measures of liquidity and significant at the 1% level. A one standard-deviation increase in liquidity as measured by *LIQAM* (*LIQFHT*) increases the probability of a 13D filing by 0.14 (0.09) percentage points. This is economically significant compared with the unconditional probability of a hedge fund block acquisition of 0.6%. The results are consistent with Norli, Ostergaard and Schindele's (2009) finding that liquidity encourages actual voice. This result shows that liquidity encourages voice, in addition to its positive unconditional effect on exit resulting from combining the results of *H1* (liquidity encourages block acquisition) and *H2* (liquidity encourages exit, conditional on block acquisition.) Since there are positive market reactions to both 13D filings (Brav et al. (2008)) and 13G filings (Table 4, Panel A), liquidity has an overall positive effect on blockholder governance.

4. Additional Analyses and Robustness Checks

This section describes some additional analyses and robustness checks, the results of which are presented in the Online Appendix.

4.1. Non-hedge fund activists

This paper has focused on activist hedge fund blockholders for the reasons stated in the Introduction: activist hedge funds have the full "menu" of governance options at their disposal, and strong financial incentives to make optimal choices. However, it is interesting to study which results continue to hold when considering all activists, which include non-hedge fund institutions. We identify activist institutions using a similar method to the core analysis: we engage in a Factiva search for the key words "activism" and "activist", but do not then conduct a sub-search for "hedge" and "hedge funds". As before, we retain only the first filing in each firm. After merging this sample with liquidity measures and control variables, we have 1,636 events by 91[26] unique hedge funds and 120 unique other institutions, which comprise 1,005 13G filings and 631 13D filings.

There are a number of reasons for why activist non-hedge funds may be less likely to respond to liquidity in the same way as hedge funds, as discussed in the Introduction. First, activists may not have both governance mechanisms available for all firms they acquire a block in. Consider a pension fund that does not manage the pension plan of firm X. It is willing to intervene in this firm, and so will be classified as an activist. However, it does manage the pension plan of firm Y, and so is unwilling to intervene in this firm, regardless of liquidity. Second, due to their flatter compensation structures, they may have weaker incentives to make the correct choice. These differences apply primarily to the choice of governance mechanism, i.e. the choice between exit and voice should be less sensitive to liquidity than for activist hedge funds. However, these differences should not affect the impact of liquidity on block acquisition. It remains the case, for other institutions as well as hedge funds, that liquidity allows a shareholder to acquire a block without excessive price impact. Thus, while one might expect *H2* and *H4b* to be weaker among all activists than the subsample of activist hedge funds, *H1*, *H4a*, and *H5* should be just as strong.

[26] The number of hedge funds is lower than the 95 in the main paper because some hedge fund block acquisitions were preceded by a block acquisition by another activist, and so it is dropped since only the first filing is retained.

Tables OA4-OA11 repeats Tables 1-8 for all activists. As predicted, Panel A of Table OA5 shows that *H1* continues to hold for the full sample of all activists. All three measures of liquidity, both with and without controls, have a positive effect on block formation that is significant at 1%. A one standard deviation increase in *LIQAM* (*LIQFHT*) is associated with a 0.56 (0.32) percentage point increase in the probability of block acquisition, compared with the unconditional probability of block acquisition by all activist institutions of 1.8%. Panel B shows that the effect of decimalization is stronger among low-priced stocks, and Panel C shows that the actual change in liquidity around decimalization is positively correlated with block formation.

Table OA6 studies *H2*: the effect of liquidity on the choice between 13D and 13G filings. Columns (1), (3) and (5) show that, without controls, higher liquidity is associated with a greater propensity to file 13G, and the coefficients are significant at the 1% level. With controls, the coefficient retains its sign, but loses significance for all three liquidity measures. As hypothesized, the effect of liquidity on the choice of governance mechanism is weaker for the full sample of all institutions. These findings are consistent with Gerken (2009), who shows that liquidity has no effect on the choice of governance mechanism for all blockholders in general.

Table OA7 studies *H3a* (the effect of liquidity on the announcement returns to 13G filings) and *H3b* (the effect of liquidity on holding-period returns). Panel A shows that the mean announcement return for the full sample of all activists is significantly positive (as with the subsample of hedge fund activists); however, the returns are similar across both high and low liquidity subsamples. To investigate the cause of this result, we repeat Panel A for the subsample of non-hedge fund activists. Panel B shows that the announcement returns are insignificant for such activists to begin with (for the pooled sample, before stratifying by liquidity). Thus, 13G filings by non-hedge fund activists do not seem to be viewed by the market as governance events, which explains why liquidity has little effect on market reactions for the full sample of all activists. Panel C shows that the market-

adjusted holding-period returns are significantly positive, but not different across liquidity subsamples. Table OA8 (which studies *H3c*) shows that the change in operating performance of firms targeted by all activists is not significantly different from that of control firms. Note that the threat of exit may improve firm value through channels other than operating performance; indeed, Bharath, Jayaraman, and Nagar (2012) find that blockholders in general (rather than just activist hedge funds) improve firm value through governance through exit.[27] Taken together, Tables OA7 and OA8 suggest that hedge funds are more effective at governance through exit than other institutions. This result is consistent with the idea that hedge funds have particular expertise in stock picking. Simply by pursuing the private goal of maximizing their own informed trading profits, hedge funds can exert positive externalities on the firm by imposing discipline on managers.

Table OA9 confirm *H4a* for the full sample: the effect of liquidity on *BLOCK* is stronger for stocks with higher *WPS*. The coefficient on *LIQUIDITY*×*WPS* is significant at the 1% level in all specifications. The statistical significance is stronger than in the main paper due to the greater sample size. Table OA10 (which studies *H4b*) shows that the effect of liquidity on *13Dvs13G* is stronger in firms with high managerial incentives, but insignificant as with Table OA6. Finally, Table OA11 confirms *H5*: liquidity is positively correlated with 13D filings for all activist institutions. In sum, Tables OA5, OA9, and OA11 show that, as predicted, the effect of liquidity on block formation is just as strong in the full sample of all activist institutions.

Overall, the results for the full sample of all activists justify our research design of focusing on activist hedge funds, since they have both governance mechanisms at their disposal and strong incentives to make the optimal governance choice. However, several of our results do extend to

[27] Blockholders can improve firm value through many channels other than accounting profits: indeed, LeRoy and Porter (1981) find that earnings have very low explanatory power for stock returns. Superior governance may manifest in other outcomes that improve firm value, such as superior R&D and CAPEX (as discussed on p22, this is difficult to test as we can only observe the level of R&D and CAPEX, not its quality), patents, new products or contracts, or positive equity analyst reports on dimensions other than current earnings (e.g. the firm's business strategy).

activists in general: in particular, the positive effect of liquidity on block formation, particularly for firms with high managerial incentives, and the positive effect of liquidity on investor activism.

4.2. Robustness checks

This subsection describes the results of some robustness checks to our main specifications. They are divided into individual sub-sections.

4.2.1. Multinomial logit

The main analysis considers the decision to acquire a block (Table 2) separately from the decision of which governance mechanism to employ, conditional upon block acquisition (Table 3). In an alternative specification, we consider both decisions together using a multinomial logit analysis.[28] Unlike a regular probit model, a multinomial logit allows us to assess the impact of liquidity on the relative probabilities of different outcomes in a single model. We create a dummy variable *TARGETSTYLE* which equals zero if a firm is not targeted by a blockholder, one if it is targeted by a 13G filer, and two if it is targeted by a 13D filer. The results are presented in Table OA12. Panel A shows that, for activist hedge funds, all three measures of liquidity are significantly positively correlated with the decision to file 13G compared to not acquiring a block, and also with the decision to file 13D compared to not acquiring a block. These results support both *H1* (that liquidity encourages block acquisition), and thus both "voice-G" and "exit", and *H5* (that liquidity encourages block acquisition with the intent to intervene), and thus "voice-G". We also compare the coefficients on liquidity measures across the 13D and 13G specifications to see how liquidity

[28] We do not conduct a Heckman selection or a nested logit as all the explanatory variables in our regressions affect both the first stage (decision to acquire a block) and the second stage (choice of governance mechanism conditional upon block acquisition). We have not been able to come up with a valid instrument that convincingly affects only the first stage decision, but not the second stage decision.

affects the decision to govern through exit as opposed to voice (*H2*). We find that both *LIQAM* and *DECIMAL* are significantly more likely to lead to a 13G filing than a 13D filing, supporting *H2* and thus "voice-B" and "exit". For the *LIQFHT* measure, the difference in coefficients is marginally insignificant (p-value of 0.11).

Panel B presents the results for the full sample of all activists. The results are consistent with Tables OA5 and OA6. All three measures of liquidity are significantly positively correlated with the decision to file 13G, and the decision to file 13D (compared to no block acquisition), supporting *H1* and *H5*. Turning to *H2*, the effect of *LIQAM* and *LIQFHT* on the decision to file 13G as opposed to 13D is marginally insignificant, with p-values of 0.12 and 0.13 respectively, although *DECIMAL* is significantly associated with a 13G filing at the 1% level.

4.2.2. Stratification by WPS

A second set of robustness checks concerns the stratifications by *WPS*. Since *WPS* measures the manager's sensitivity to the stock price, we argue that *WPS* captures the effectiveness of the threat of exit and thus allows us to test *H4*. However, a concern is that *WPS* is endogenous and so its explanatory power may arise simply because it proxies for other variables. Note that, since our coefficient of interest is not *WPS* alone but the *LIQUIDITY*×*WPS* interaction term, such concerns do not arise if *WPS* is simply correlated with an omitted variable that affects governance, but only if *WPS* is correlated with an omitted variable that affects the sensitivity of governance to liquidity.

One such variable may be risk. It may be that *WPS* captures not only the manager's sensitivity to the stock price, but also the manager's incentives to take risk. On the one hand, managers with high incentives may reduce risk to preserve the value of their incentives (e.g. Coles, Daniel, and Naveen (2006); Gormley, Matsa, and Milbourn (2012)). On the other hand, high incentives may arise from large option holdings, which induce risk-taking. In turn, risk may affect shareholders'

incentives to acquire blocks as blockholders are undiversified. If risk also affects not only the incentives to acquire blocks, but also the sensitivity of block acquisition or filing choice to liquidity, then this is a potential concern. We address this issue in two ways. First, in Table OA13, we repeat the analyses of Tables 6 and 7 adding *VEGA* and *LIQUIDITY×VEGA* as additional controls, where *VEGA* is calculated as the dollar change in CEO wealth for a one percentage point change in stock price volatility. These additional controls are insignificant, and the significance of *LIQUIDITY×WPS* is unaffected. Thus, the stronger results for high-*WPS* firms do not appear to arise simply because such firms have different risk profiles. Second, we add *STDROA* as an additional regressor in all tables, to control for risk. *STDROA* is the standard deviation of quarterly return-on-assets ratios estimated over the two-year period prior to the year during which we measure block acquisition and governance decisions; a minimum of four quarters is required to calculate *STDROA*. In unreported results, we find that *STDROA* is insignificant in all tables, and the coefficients on the variables of interest are barely affected.

Another variable that *WPS* may be proxying for is liquidity itself. For example, Jayaraman and Milbourn (2012) find that liquidity positively affects managerial incentives. Thus, the explanatory power of *LIQUIDITY×WPS* may arise because it proxies for *LIQUIDITY2* (the square of *LIQUIDITY*) and liquidity has a non-linear effect on governance. Table OA14 repeats the analyses of Tables 6 and 7 adding *LIQUIDITY2* (i.e., *LIQAM×LIQAM* or *LIQFHT× LIQFHT*) as an additional control. It is insignificant and its inclusion does not affect the coefficients of interest. Both these findings suggest that the evidence for *H4a* and *H4b* is robust.

A further interpretation is that high *WPS* proxies for fewer agency problems and thus less need for governance. This explanation would imply a lower sensitivity of *BLOCK* to *WPS*, but does not have clear implications for the coefficient on *LIQUIDITY×WPS*. Moreover, the coefficient on *WPS* in Table 6 is positive, contradicting the notion that high *WPS* firms have less need for governance.

Under "voice-B" theories, the same explanation would imply a more negative coefficient of *13Dvs13G* to *WPS*, since firms with high *WPS* are less in need from governance through voice and so a 13G filing is more likely, but again does not have clear implications for the coefficient on *LIQUIDITY×WPS*. The coefficient on *WPS* in Table 7 is insignificant.

4.2.3. Classification of filings

A third set of robustness checks concerns our classification of filings into 13D and 13G. A passive blockholder has the option of filing a 13D and stating its purpose as "investment only." Out of our 490 13D filings, 53 are marked as such. For the core analysis, we classify these blockholders as intending to engage in voice, since it is easier to change the stated purpose of a 13D from investment to activism than to switch from a 13G to a 13D: the former requires changing a single line, the latter requires a complete re-filing. If we reclassify these 53 as 13Gs, our results for Tables 3, 5, 7, and 8 are unchanged and the results for Table 4 become stronger.

Another classification issue is that any investor who holds 20% or more needs to file a 13D even if she intends to remain passive. Therefore, for Schedule 13D filers with 20% or more ownership, we carefully check the Item 4 "Purpose of the Transaction" of the filing to properly classify it as active (and thus include it within the 13D filers) or passive (and thus include it within the 13G filers). There are only 10 passive hedge funds that acquire a stake of 20% or more; re-classifying these as 13Ds does not affect any results.

4.2.4. Additional robustness checks

Table 3 shows that, conditional upon block acquisition, liquidity increases the likelihood of a 13G filing as opposed to a 13D. Our interpretation, consistent with *H2*, is that activist hedge funds have the choice between a 13D and a 13G filing, and liquidity drives this choice. However, an alternative explanation is that there are some activist hedge funds which only file 13Ds, and others

who only file 13Gs in our sample[29]. Liquidity affects the type of fund attracted (deterring 13D-only funds and attracting 13G-only funds), rather than the fund's choice of governance mechanism (inducing funds that use both strategies to choose exit over voice). Another alternative explanation is that the sensitivity to liquidity is driven entirely by 13G-only funds, and that liquidity does not matter for other activist hedge funds. We address both concerns re-running Table 3 focusing only on the 69 hedge funds that file both 13Ds and 13Gs in our sample. The results are in Table OA15 and are stronger than for the full sample. In addition, the finding of Table 8, that liquidity has an unconditional positive effect on 13D filings, suggests that liquidity is important for 13D-only funds.

While all of our analyses contain year and industry fixed effects, another robustness test is to add firm fixed effects to control for unobserved heterogeneity across firms that is not captured by our control variables. In Table OA16, we re-run the analysis of Table 2, regressing $BLOCK_{t+1}$ on $LIQUIDITY_t$ to test *H1*, adding firm fixed effects. We run a linear probability model, since adding firm fixed effects in a probit regression leads to loss of firms that show up only in one year of the sample. The results are significant at the 5% level for both liquidity measures, suggesting that time-series increases in liquidity within a firm augment the likelihood of hedge fund block acquisition. We are unable to re-run the analysis of Table 3, which tests *H2* (the choice of a 13D or 13G filing) with firm fixed effects, as there is only one observation per firm. In Table OA17, we re-run the analysis of Table 8, regressing $13DFILING_{t+1}$ on $LIQUIDITY_t$ to test *H5*, adding firm fixed effects. The results are significant at the 5% level for both liquidity measures.

5. Conclusions

[29] A hedge fund may be classified as "activist", but only file 13Gs in our sample, because its 13D filings are not the first filings in target firms or its 13D filings are in firms that do not have a PERMNO or control variables

This study investigates the effect of stock liquidity on a hedge fund's decision to acquire a block and her choice of governance mechanism once she becomes a blockholder. Stock liquidity increases the likelihood that a hedge fund acquires a block, particularly for firms with high managerial incentives. Conditional upon acquiring the block, liquidity deters the investor from engaging in active monitoring, especially for firms with high managerial incentives. However, this reduction in "voice" is not because the blockholder is withdrawing from governance altogether, but instead employing the alternative governance mechanism of "exit". This is shown by the positive announcement returns, holding period returns, and operating performance improvements associated with a 13G filing, particularly for firms with higher liquidity, and the greater effect of liquidity on filing choices for firms with high managerial incentives. Moreover, even though liquidity deters active monitoring conditional upon a block being formed, this effect is outweighed by the greater probability of block formation in the first place, and so the unconditional effect of liquidity on active intervention is positive. Thus, liquidity increases the frequency of both voice and exit, and so improves blockholder governance overall.

More broadly, our findings provide evidence consistent with recent "exit" theories suggesting that trading by institutions, far from being the antithesis of governance, is a governance mechanism in itself. They also have implications for the public policy debate on the desirability of liquidity for governance. While the classical view argues that liquidity is harmful and advocates restrictions on liquidity, this paper shows that liquidity can be beneficial in attracting large shareholders to a firm and facilitating governance through exit once they have acquired their stake.

Appendix A
Legal Issues Surrounding 13D and 13G Filings

Section 13(d)(1) of the Securities Exchange Act (the "Act") of 1934 requires an investor that acquires a stake exceeding 5% to file a 13D form with the SEC, within 10 days of crossing the 5% threshold. The 13D filing contains detailed information such as the identity and background of the purchaser, its interest in such securities, and the source and amount of funds. In particular, Item 4 requires the investor to state the "Purpose of the Transaction", including any activist intent. If the investor intends to exercise control (e.g. launch a proxy fight or try to acquire a board seat), it has to stipulate precisely in Item 4 the mechanism through which it intends to do so. Exercising control in ways other than those stipulated in Item 4 can lead to lawsuits.

Upon a material change to any of the items in a 13D, such as a change in the "Purpose of the Transaction" or a change in the ownership stake exceeding 1%, must be reported in an amended 13D, which must be filed within 10 days of the change.

Violations of Section 13(d), such as a failure to file timely amendments, or filing false information (such as a misleading "Purpose of the Transaction") can lead to civil lawsuits initiated either by firm management, or by other shareholders (e.g. a class action on behalf of selling shareholders who would not have sold if they had known that the blockholder was intending intervention). Moreover, the SEC and the Department of Justice can impose civil and criminal penalties, such as prohibiting the blockholder from voting, imposing criminal sanctions, or forcing the disgorgement of any profits arising from the position.

Regulation 13G was adopted to ease the disclosure requirements for passive investors. Any investor who crosses the 5% threshold but does not intend to engage in intervention, i.e. "can certify that they did not purchase or do not hold the securities for the purpose of changing or influencing control over the issuer", may file a 13G. A 13G is a shorter form which requires less information. In addition, the filing deadlines may be laxer. For standard investors, the 13G must be filed within 10 days of crossing the 5% threshold. However, "Qualified Institutional Investors" may file within 45 days after the end of the calendar year, unless their stake crosses 10% in which case they must file within 10 days of the end of the month. Such investors are defined by Rule 13d-1(b)(1) and include a broker or dealer registered under section 15 of the Act, a bank as defined in section 3(a)(6) of the Act, an insurance company as defined in section 3(a)(19) of the Act, an investment company registered under section 8 of the Investment Company Act of 1940, and certain other investors. In particular, a hedge fund that is registered as an investment adviser with either the SEC or under the laws of any state is hedge funds are "Qualified Institutional Investors", but otherwise is not. Unlike Schedule 13D which requires an amendment to be filed upon every one (1%) percent change in ownership, Schedule 13G requires amendments to be filed promptly after more than five (5%) percent changes in position.

Note that an investor who intends to remain passive only has the option to file a 13G, not the obligation. It can choose to file a 13D and state its "Purpose of the Transaction" as "investment only" (see p33.) An investor who crosses a 20% threshold must file a 13D regardless of its governance intent; if it intends to remain passive, it states its purpose as "investment only" (see p33.)

Appendix B
Definition of Variables

Variable	Definition
BLOCK	An indicator variable that equals one if hedge fund *j* files either 13D or 13G for its block holdings in target firm *i* and zero otherwise;
13Dvs13G	An indicator variable that equals one if hedge fund *j* files 13D for its block holdings in target firm *i* and zero if hedge fund *j* files 13G;
LIQAM	-1× (the natural logarithm of one plus target firm *i*'s Amihud (2002) illiquidity ratio), where the Amihud illiquidity ratio is calculated as the daily price response associated with one dollar of trading volume and averaged over the fiscal year immediately preceding the initial 13D/13G filing date;
LIQFHT	-1× (the natural logarithm of one plus target firm *i*'s FHT measure), where the FHT measure is calculated over the fiscal year immediately preceding the initial 13D/13G filing date. See Fong, Holden, and Trzcinka (2011);
MV	The natural logarithm of target firm *i*'s market value of equity (CSHO×PRCC_F) measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date;
Q	Target firm *i*'s market-to-book ratio measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, calculated as [market value of equity plus book value of debt (AT-CEQ)] divided by book value of total assets (AT);
SGR	Target firm *i*'s one year sales growth rate measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, calculated as [sales (SALE) minus lagged sales] divided by lagged sales;
ROA	Target firm *i*'s return-on-assets ratio measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, calculated as operating income before depreciation (OIBDP) divided by lagged book value of total assets (AT);
LEV	Target firm *i*'s debt-to-assets ratio measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, defined as book value of debt (AT-CEQ) divided by book value of total assets (AT);
DIVYIELD	Target firm *i*'s dividend yield measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, calculated as [common dividend (DVC) plus preferred dividend (DVP)] divided by [market value of equity plus book value of preferred stock], where book value of preferred stock is defined as the first non-missing value of its redemption value (PSTKRV), or its liquidating value (PSTKL), or its carrying value (PSTK);
RDTA	Target firm *i*'s R&D intensity measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date, calculated as research and development expenditure (XRD) divided by lagged book value of total assets (AT) and set to zero if missing;

HINDEX	Herfindahl index of the Fama-French 12 industry to which target firm *i* belongs, measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date;
NANALYST	The natural logarithm of one plus the number of analysts following target firm *i*, measured over the fiscal year immediately preceding the initial 13D/13G filing date;
DECIMAL	An indicator variable that equals one if an event occurs after decimalization went into effect and zero otherwise, where an event is defined as the lagged fiscal year end in Table 2 and the Schedule 13 filing date in Table 4;
WPS	Scaled wealth-performance sensitivity, calculated as the dollar change in CEO wealth for a 100 percentage point change in firm value, divided by annual flow compensation and measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date. See Edmans, Gabaix, and Landier (2009);
13DFILING	An indicator variable that equals one if hedge fund *j* files 13D for its block holdings in target firm *i* and zero if hedge fund *j* files 13G or there is no filing;
CAR_VW(-1,+1) *(CAR_EW(-1,+1))*	3-day market-adjusted abnormal announcement return surrounding a 13G filing, where date 0 is the filing date of a Schedule 13G. The daily abnormal return is calculated as the raw return minus the corresponding return on the CRSP value-weighted (equal-weighted) index multiplied by a beta estimated over (-255,-46);
HOLDINGRET_VW *(HOLDINGRET_EW)*	Market-adjusted abnormal holding-period return to a 13G hedge fund filing from the initial filing date of the 13G to the exit date, calculated as the target firm's compounded daily raw returns minus the corresponding return on the CRSP value-weighted (equal-weighted) index multiplied by a beta estimated over (-255,-46), where date 0 is the initial filing date. The exit date is the actual date of exit reported in a successive 13G filing in which the holding by the hedge fund drops below 5%, or the filing date of the successive 13G filing if the actual date of exit is not specified. When a successive 13G filing is not available, we check the successive 13F filings for the size of the holdings. We delete a 13G filing is the firm is acquired before the hedge fund exits.

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Figure 1

Summary of Hypotheses

The table below summarizes the predictions of the three different theories for the five hypotheses in the paper. ✓ (✗) indicates that a theory predicts support (rejection) of the hypothesis. – indicates that the theory has no prediction for the hypothesis.

	Voice-G	Voice-B	Exit
H1: Liquidity increases block formation	✓	–	✓
H2: Conditional on block formation, liquidity increases the frequency of filing of 13G rather than 13D	✗	✓	✓
H3: 13Gs lead to a positive stock price reaction (H3a), positive holding-period return (H3b), and a subsequent increase in operating performance (H3c), particularly in liquid firms	–	–	✓
H4: The effects of liquidity on block formation (H4a) and on the filing of a 13G, conditional on block formation (H4b), are stronger for firms with higher managerial sensitivity to the stock price	–	–	✓
H5: Unconditionally, liquidity increases the frequency of filing 13D	✓	✗	–

Table 1: Summary statistics, sample distribution, and correlations

Panel A: Summary statistics for full sample
This panel reports the summary statistics of the main variables used in our multivariate analysis for full sample of firms.

Variable	N	Mean	SD	5%	25%	Median	75%	95%
BLOCK	88,742	0.013	0.112	0.000	0.000	0.000	0.000	0.000
13Dvs13G	1,135	0.432	0.496	0.000	0.000	0.000	1.000	1.000
LIQAM	88,742	-0.618	1.040	-3.074	-0.776	-0.080	-0.006	0.000
LIQFHT	88,742	-0.014	0.019	-0.053	-0.018	-0.006	-0.002	0.000
MV	88,742	5.402	2.202	1.958	3.800	5.288	6.873	9.335
Q	88,742	2.007	1.822	0.806	1.048	1.360	2.162	5.442
SGR	88,742	0.255	0.779	-0.343	-0.022	0.100	0.279	1.187
ROA	88,742	0.059	0.266	-0.412	0.019	0.093	0.179	0.362
LEV	88,742	0.561	0.299	0.118	0.326	0.550	0.776	0.962
DIVYIELD	88,742	0.013	0.025	0.000	0.000	0.000	0.018	0.058
RDTA	88,742	0.055	0.127	0.000	0.000	0.000	0.048	0.296
HINDEX	88,742	0.022	0.014	0.009	0.012	0.019	0.026	0.053
NANALYST	88,742	1.327	1.073	0.000	0.000	1.386	2.197	3.091
DECIMAL	88,742	0.499	0.500	0.000	0.000	0.000	1.000	1.000
WPS	24,645	38.34	134.6	0.609	3.036	6.860	16.51	145.7
13DFILING	88,742	0.006	0.074	0.000	0.000	0.000	0.000	0.000

Panel B: Summary statistics for subsample of firms targeted by activist hedge funds
This panel reports the summary statistics of the firm characteristics for the subsample of firms targeted by hedge funds.

Variable	N	Mean	SD	5%	25%	Median	75%	95%
LIQAM	1,135	-0.436	0.838	-2.374	-0.404	-0.056	-0.007	-0.001
LIQFHT	1,135	-0.011	0.016	-0.038	-0.014	-0.005	-0.002	0.000
MV	1,135	5.186	1.701	2.417	3.993	5.109	6.427	7.999
Q	1,135	1.868	1.604	0.735	1.032	1.344	2.036	5.089
SGR	1,135	0.276	0.935	-0.392	-0.045	0.078	0.256	1.528
ROA	1,135	0.047	0.264	-0.478	0.010	0.085	0.167	0.339
LEV	1,135	0.563	0.318	0.118	0.311	0.535	0.761	1.093
DIVYIELD	1,135	0.011	0.026	0.000	0.000	0.000	0.008	0.063
RDTA	1,135	0.058	0.125	0.000	0.000	0.000	0.066	0.269
HINDEX	1,135	0.023	0.014	0.011	0.014	0.020	0.026	0.059
NANALYST	1,135	1.350	0.979	0.000	0.693	1.386	2.197	2.890

Table 1 (Cont'd)

Panel C: Frequency of block acquisitions by fiscal year

This panel reports the distribution of 13Ds and 13Gs by fiscal year for the subsample of firms targeted by hedge funds.

Fiscal year	13D	13G	Total	13D% in a year	13G% in a year
1995	16	6	22	72.7%	27.3%
1996	22	11	33	66.7%	33.3%
1997	41	9	50	82.0%	18.0%
1998	29	23	52	55.8%	44.2%
1999	27	44	71	38.0%	62.0%
2000	22	49	71	31.0%	69.0%
2001	24	39	63	38.1%	61.9%
2002	31	54	85	36.5%	63.5%
2003	37	62	99	37.4%	62.6%
2004	44	79	123	35.8%	64.2%
2005	67	106	173	38.7%	61.3%
2006	46	26	72	63.9%	36.1%
2007	46	66	112	41.1%	58.9%
2008	19	39	58	32.8%	67.2%
2009	12	18	30	40.0%	60.0%
2010	7	14	21	33.3%	66.7%
Total	**490**	**645**	**1,135**	**43.2%**	**56.8%**

Panel D: Pearson and Spearman correlations between hedge funds' decisions and liquidity for full sample

This panel reports Pearson and Spearman correlations between hedge funds' block acquisition decision ($BLOCK_{t+1}$), monitoring decision ($13Dvs13G_{t+1}$), and stock liquidity ($LIQAM_t$ and $LIQFHT_t$). Pearson (Spearman) correlations are reported above (below) the main diagonal. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

Pearson / Spearman	$BLOCK_{t+1}$	$13Dvs13G_{t+1}$	$LIQAM_t$	$LIQFHT_t$
$BLOCK_{t+1}$			0.021***	0.022***
$13Dvs13G_{t+1}$			-0.102***	-0.049*
$LIQAM_t$	0.013***	-0.042		0.750***
$LIQFHT_t$	0.021***	-0.022	0.788***	

Table 1 (Cont'd)

Panel E: Pearson and Spearman correlations between liquidity and lagged liquidity

This panel reports Pearson and Spearman correlations between stock liquidity ($LIQAM_t$ and $LIQFHT_t$) and lagged stock liquidity ($LIQAM_{t-1}$ and $LIQFHT_{t-1}$). Pearson (Spearman) correlations are reported above (below) the main diagonal. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

Pearson / Spearman	$LIQAM_t$	$LIQFHT_t$	$LIQAM_{t-1}$	$LIQFHT_{t-1}$
$LIQAM_t$		0.750***	0.859***	0.684***
$LIQFHT_t$	0.788***		0.661***	0.846***
$LIQAM_{t-1}$	0.944***	0.746***		0.760***
$LIQFHT_{t-1}$	0.759***	0.905***	0.786***	

Table 2: Does stock liquidity affect activist hedge funds' block acquisition decisions?

Panel A: The effect of liquidity on the likelihood of a 13D or 13G filing by hedge funds

This panel reports the probit regression results on the relation between a firm's stock liquidity and the probability of a hedge fund acquiring a block in the firm. Variable definitions are listed in Appendix B. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. For $LIQAM_t$, $LIQFHT_t$, and *DECIMAL,* the marginal effects (dF/dx) are displayed below the standard errors. Year fixed effects and Fama-French 12 industry effects are included in columns (2), (4), and (6) but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables	**BLOCK$_{t+1}$** *(=1 if 13D Filing or 13G Filing; 0 if no block acquisition)*					
LIQAM$_t$	**0.079*****	**0.171*****				
	(0.013)	(0.021)				
	[0.0026***]	[0.0045***]				
LIQFHT$_t$			**3.975*****	**3.902*****		
			(0.747)	(1.064)		
			[0.1295***]	[0.1062***]		
DECIMAL					**0.299*****	**0.544*****
					(0.024)	(0.064)
					[0.0094***]	[0.0158***]
MV$_t$		**-0.111*****		**-0.087*****		**-0.070*****
		(0.010)		(0.009)		(0.008)
Q$_t$		**-0.022****		**-0.020****		**-0.023*****
		(0.009)		(0.009)		(0.009)
SGR$_t$		**0.030***		**0.034****		**0.037****
		(0.016)		(0.016)		(0.016)
ROA$_t$		**0.038**		**0.011**		**0.028**
		(0.060)		(0.061)		(0.061)
LEV$_t$		**0.111*****		**0.102****		**0.082***
		(0.043)		(0.044)		(0.043)
DIVYIELD$_t$		**-0.608**		**-0.443**		**-0.396**
		(0.593)		(0.604)		(0.598)
RDTA$_t$		**-0.063**		**-0.038**		**-0.000**
		(0.132)		(0.132)		(0.131)
HINDEX$_t$		**1.208**		**2.032**		**1.576**
		(4.070)		(4.053)		(3.937)
NANALYST$_t$		**0.066*****		**0.092*****		**0.096*****
		(0.017)		(0.017)		(0.017)
INTERCEPT	**-2.190*****	**-2.197*****	**-2.184*****	**-2.414*****	**-2.406*****	**-2.512*****
	(0.012)	(0.147)	(0.014)	(0.149)	(0.019)	(0.131)
Year Fixed Effects		*Included*		*Included*		*Included*
Industry Fixed Effects		*Included*		*Included*		*Included*
Number of Obs. Used	88,742	88,742	88,742	88,742	88,742	88,742
Pseudo R^2	0.003	0.052	0.003	0.046	0.013	0.044

Table 2 (Cont'd)

Panel B: The effect of decimalization on the likelihood of a 13D or 13G filing by hedge funds, stratified by firms' stock price

This panel reports the probit regression results on the effect of decimalization on the probability of a hedge fund acquiring a block in a firm, conditional on the level of the firm's stock price. Variable definitions are listed in Appendix B. $LOWPRC_t$ is an indicator variable that equals one if a firm's closing price at the end of fiscal year t is below the median closing price for that year and zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. Year fixed effects and Fama-French 12 industry effects are included in both columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)
Dependent Variables	**$BLOCK_{t+1}$** *(=1 if 13D Filing or 13G Filing; 0 if no block acquisition)*	
	LOWPRC=1	**LOWPRC=0**
DECIMAL	**0.551*****	**0.360**
	(0.083)	(0.281)
Coefficient Difference in DECIMAL between LOWPRC=1 and LOWPRICE=0		**0.191*****
[Two-tailed p-value]		[0.000]
MV_t	**0.006**	**-0.113*****
	(0.012)	(0.015)
Q_t	**-0.038*****	**-0.009**
	(0.014)	(0.014)
SGR_t	**0.013**	**0.070****
	(0.021)	(0.028)
ROA_t	**0.018**	**-0.101**
	(0.075)	(0.115)
LEV_t	**0.151*****	**0.058**
	(0.050)	(0.092)
$DIVYIELD_t$	**0.574**	**-3.270****
	(0.597)	(1.403)
$RDTA_t$	**0.006**	**-0.128**
	(0.157)	(0.245)
$HINDEX_t$	**1.574**	**-0.022**
	(5.059)	(5.962)
$NANALYST_t$	**0.099*****	**0.073*****
	(0.021)	(0.026)
INTERCEPT	**-2.723*****	**-2.035*****
	(0.170)	(0.200)
Year Fixed Effects	*Included*	*Included*
Industry Fixed Effects	*Included*	*Included*
Number of Obs. Used	44,454	44,288
Pseudo R^2	0.045	0.059

Table 2 (Cont'd)

Panel C: The effect of changes in liquidity surrounding decimalization on the likelihood of a 13D or 13G filing by hedge funds

This panel reports the probit regression results on the relation between a firm's change in stock liquidity surrounding decimalization and the probability of a hedge fund acquiring a block in the firm immediately post decimalization. Variable definitions are listed in Appendix B. Δ denotes the change in each variable from the fiscal year before decimalization (year *t-1*) to the fiscal year after decimalization (year *t+1*) with *t* indicating the year during which decimalization went into effect for the firm. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity. Fama-French 12 industry effects are included in both columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)
Dependent Variables	**BLOCK$_{t+2}$** *(=1 if 13D Filing or 13G Filing; 0 if no block acquisition)*	
ΔLIQAM	**0.128****	
	(0.055)	
ΔLIQFHT		**9.228*****
		(2.782)
ΔMV	**-0.151****	**-0.157****
	(0.068)	(0.066)
ΔQ	**-0.002**	**-0.009**
	(0.029)	(0.029)
ΔSGR	**0.011**	**0.002**
	(0.046)	(0.045)
ΔROA	**0.143**	**0.071**
	(0.172)	(0.168)
ΔLEV	**-0.011**	**-0.003**
	(0.246)	(0.238)
ΔDIVYIELD	**-3.016***	**-2.821**
	(1.740)	(1.717)
ΔRDTA	**0.229**	**0.143**
	(0.452)	(0.444)
ΔHINDEX	**11.616**	**11.667**
	(12.745)	(12.684)
ΔNANALYST	**-0.019**	**-0.012**
	(0.090)	(0.090)
INTERCEPT	**-1.935*****	**-2.042*****
	(0.171)	(0.176)
Industry Fixed Effects	*Included*	*Included*
Number of Obs. Used	4,576	4,576
Pseudo R^2	0.033	0.036

Table 3: Does stock liquidity affect hedge funds' governance decisions?

Panel A: The effect of liquidity on the likelihood of a 13D filing (as opposed to a 13G filing) by hedge funds

This panel reports the probit regression results on the relation between a firm's stock liquidity and its probability of being targeted by a hedge fund 13D filer as opposed to being targeted by a hedge fund 13G filer. Variable definitions are listed in Appendix B. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. For $LIQAM_t$, $LIQFHT_t$, and *DECIMAL,* the marginal effects (dF/dx) are displayed below the standard errors. Year fixed effects and Fama-French 12 industry effects are included in columns (2), (4) and (6) but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables	**13Dvs13G$_{t+1}$** *(=1 if 13D Filing; 0 if 13G Filing)*					
LIQAM$_t$	**-0.152*****	**-0.169*****				
	(0.046)	(0.064)				
	[-0.0598***]	[-0.0662***]				
LIQFHT$_t$			**-4.047***	**-6.662****		
			(2.456)	(3.260)		
			[-1.5907*]	[-2.6138**]		
DECIMAL					**-0.295*****	**-0.492****
					(0.084)	(0.236)
					[-0.1164***]	[-0.1936**]
MV$_t$		**0.051**		**0.035**		**0.009**
		(0.039)		(0.037)		(0.036)
Q$_t$		**-0.099*****		**-0.087*****		**-0.093*****
		(0.036)		(0.032)		(0.036)
SGR$_t$		**-0.025**		**0.011**		**-0.032**
		(0.045)		(0.044)		(0.045)
ROA$_t$		**-0.207**		**-0.027**		**-0.153**
		(0.197)		(0.181)		(0.196)
LEV$_t$		**-0.290****		**-0.294****		**-0.277****
		(0.142)		(0.138)		(0.141)
DIVYIELD$_t$		**-0.766**		**-0.403**		**-0.879**
		(1.481)		(1.482)		(1.462)
RDTA$_t$		**-1.045****		**-0.729**		**-1.030****
		(0.466)		(0.453)		(0.465)
HINDEX$_t$		**-2.054**		**2.677**		**0.088**
		(14.704)		(14.195)		(14.327)
NANALYST$_t$		**-0.006**		**-0.055**		**-0.031**
		(0.058)		(0.056)		(0.057)
INTERCEPT	**-0.239*****	**1.102****	**-0.215*****	**0.274**	**0.040**	**0.952****
	(0.043)	(0.535)	(0.046)	(0.412)	(0.071)	(0.477)
Year Fixed Effects		*Included*		*Included*		*Included*
Industry Fixed Effects		*Included*		*Included*		*Included*
Number of Obs. Used	1,135	1,135	1,135	1,135	1,135	1,135
Pseudo R^2	0.007	0.096	0.002	0.092	0.008	0.087

Table 3 (Cont'd)

Panel B: The effect of decimalization on the likelihood of a 13D filing (as opposed to a 13G filing) by hedge funds, stratified by target firms' stock price

This panel reports the probit regression results on the effect of decimalization on a firm's probability of being targeted by a hedge fund 13D filer as opposed to being targeted by a hedge fund 13G filer, conditional on the level of the firm's stock price. Variable definitions are listed in Appendix B. $LOWPRC_t$ is an indicator variable that equals one if a firm's closing price at the end of fiscal year t is below the median closing price for that year and zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. Year fixed effects and Fama-French 12 industry effects are included in both columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)
Dependent Variables	**$13Dvs13G_{t+1}$** *(=1 if 13D Filing; 0 if 13G Filing)*	
	LOWPRC=1	**LOWPRC=0**
DECIMAL	**-1.213*****	**-0.165**
	(0.351)	(0.329)
Coefficient difference in DECIMAL between LOWPRC=1 and LOWPRICE=0		**-1.048*****
[Two-tailed p-value]		[0.002]
MV_t	**-0.034**	**-0.020**
	(0.060)	(0.058)
Q_t	**-0.095***	**-0.110****
	(0.054)	(0.051)
SGR_t	**0.012**	**-0.130**
	(0.063)	(0.094)
ROA_t	**-0.246**	**0.008**
	(0.305)	(0.295)
LEV_t	**-0.511*****	**0.121**
	(0.179)	(0.255)
$DIVYIELD_t$	**-2.320**	**0.076**
	(1.897)	(2.705)
$RDTA_t$	**-0.346**	**-1.787****
	(0.650)	(0.779)
$HINDEX_t$	**27.465**	**-19.618**
	(21.709)	(21.314)
$NANALYST_t$	**-0.018**	**0.012**
	(0.084)	(0.084)
INTERCEPT	**1.057**	**1.166**
	(0.702)	(0.747)
Year Fixed Effects	*Included*	*Included*
Industry Fixed Effects	*Included*	*Included*
Number of Obs. Used	567	568
Pseudo R^2	0.140	0.101

Table 4: Event-study and holding-period returns to 13G filings by hedge fund activists

Panel A: Announcement returns to 13Gs filed by hedge funds, stratified by target firms' liquidity

This panel reports the mean 3-day market-adjusted abnormal announcement returns surrounding 13G filings, conditional on the level of stock liquidity. Each column tests whether the 3-day market-adjusted abnormal announcement returns are greater than zero, with the mean *CAR (-1, +1)* shown in bold and the standard errors displayed in parentheses below. Variable definitions are listed in Appendix B. The subsample *Low LIQAM* (*High LIQAM*) includes sample observations with *LIQAM* below (equal to or above) median *LIQAM* within each year. The subsample *Low LIQFHT* (*High LIQFHT*) includes sample observations with *LIQFHT* below (equal to or above) median *LIQFHT* within each year.

	(1) *Pooling*	**(2)** *Low LIQAM*	**(3)** *High LIQAM*	**(4)** *Low LIQFHT*	**(5)** *High LIQFHT*
Testing *CAR_VW(-1, +1)*>0	**0.008*****	**0.004**	**0.012*****	**0.004**	**0.012*****
	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)
Testing *CAR_EW(-1, +1)*>0	**0.007*****	**0.004**	**0.010*****	**0.005**	**0.009*****
	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)
Number of Obs. Used	630	315	315	315	315

Panel B: The effect of liquidity on market-adjusted abnormal announcement returns to 13Gs filed by hedge funds: multivariate analysis

This panel reports the ordinary least squares (OLS) regressions of the 3-day market-adjusted abnormal announcement returns surrounding 13G filings on target firms' stock liquidity. Variable definitions are listed in Appendix B. $HIGHLIQAM_t$ ($HIGHLIQFHT_t$) is an indicator variable that equals one if $LIQAM_t$ ($LIQFHT_t$) is equal to or above the median $LIQAM_t$ ($LIQFHT_t$) within each year and zero otherwise. *MV2* is the natural logarithm of the market value of equity, measured on the latest trading day at least two days prior to the filing date of a 13G filing. *Q2* is the market-to-book ratio, calculated as *MV2* divided by the book value of total assets measured at the end of the fiscal quarter immediately preceding the filing date of a 13G filing. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	**(2)**	**(3)**	**(4)**
Dependent Variables	**CAR_VW(-1, +1)**		**CAR_EW(-1, +1)**	
$HIGHLIQAM_t$	**0.017****		**0.015****	
	(0.007)		(0.007)	
$HIGHLIQFHT_t$		**0.014****		**0.010***
		(0.006)		(0.006)
MV2	**-0.005***	**-0.004**	**-0.005***	**-0.004**
	(0.003)	(0.003)	(0.003)	(0.003)
Q2	**0.002**	**0.002**	**0.002**	**0.002**
	(0.002)	(0.002)	(0.002)	(0.002)
INTERCEPT	**0.057***	**0.051**	**0.057***	**0.046**
	(0.033)	(0.032)	(0.031)	(0.029)
Number of Obs. Used	630	630	630	630
Adjusted R^2	0.014	0.012	0.014	0.010

Table 4 (Cont'd)

Panel C: Holding-period returns to 13Gs filed by hedge funds, stratified by target firms' liquidity

This panel reports the holding-period return to 13G hedge fund filings from the initial filing date to the exit date. The exit date is the actual date of exit reported in a successive 13G filing in which the holding by the hedge fund drops below 5%, or the filing date of the successive 13G filing if the actual date of exit is not specified. When a successive 13G filing is not available, we check the successive 13F filings for the size of the holdings. *HOLDINGRET_VW* (*HOLDINGRET_EW*) is calculated as the target firm's compounded daily raw returns minus the corresponding value-weighted (equal-weighted) market returns over the holding period. Each column tests whether the abnormal holding-period returns are greater than zero, with the mean shown in bold and the standard errors displayed in parentheses below. $HIGHLIQAM_t$ ($HIGHLIQFHT_t$) is an indicator variable that equals one if $LIQAM_t$ ($LIQFHT_t$) is equal to or above the median $LIQAM_t$ ($LIQFHT_t$) within each year and zero otherwise.

	(1) *Pooling*	**(2)** *Low LIQAM*	**(3)** *High LIQAM*	**(4)** *Low LIQFHT*	**(5)** *High LIQFHT*
Testing *HOLDINGRET_VW*>0	**0.053*****	**0.015**	**0.092*****	**0.019**	**0.088*****
	(0.017)	(0.026)	(0.022)	(0.025)	(0.023)
Testing *HOLDINGRET_EW*>0	**0.050*****	**0.016**	**0.084*****	**0.018**	**0.082*****
	(0.017)	(0.025)	(0.022)	(0.024)	(0.022)
Number of Obs. Used	523	262	261	262	261

Table 5: Operating performance consequences of 13G filings by hedge fund activists

This table studies the operating performance consequences of a 13G filing. We first match each recipient of a 13G filing with a control firm using propensity score matching. As in the regressions, the control variables are *MV*, *Q*, *SGR*, *ROA*, *LEV*, *DIVYIELD*, *RDTA*, *HINDEX*, *NANALYST*, as well as FF 12 industry and year dummies. Each firm can serve at most once as a control firm. We retain the observation only if the absolute difference in propensity scores between the target and control is sufficiently small so that none of the observable firm characteristics exhibit significant difference across the two groups of firms. Panel A presents the estimated propensity score distributions. Panel B presents differences in pre-event observable characteristics. Panel C is a difference-in-differences test of the change in *EBITDA/ASSET* and *CFO/ASSET* from year *t-1* to year *t+1*. *EBITDA/ASSET* is earnings before interest, taxes, depreciation and amortization, deflated by the average of total assets at the beginning and at the end of the year. *CFO/ASSET* is cash flow from operations deflated by the average of total assets at the beginning and at the end of the year. Panel D is a difference-in-differences test stratified by liquidity subsamples.

Panel A: Estimated propensity score distributions

Propensity Scores	No. of obs.	SD	Min	P25	P50	Mean	P75	Max
13G firms	500	0.008	0.947	0.982	0.989	0.987	0.993	0.999
Control firms	500	0.008	0.947	0.982	0.989	0.987	0.993	0.999
Difference	500	0.000	-0.001	0.000	0.000	0.000	0.000	0.000

Panel B: Differences in pre-event observables

	Treatment	Control	Differences	T-statistics
MV_{t-1}	2.074	1.974	0.100	0.89
Q_{t-1}	0.285	0.323	-0.038	-0.74
SGR_{t-1}	0.044	0.032	0.013	0.75
ROA_{t-1}	0.012	0.011	0.001	0.42
LEV_{t-1}	0.573	0.551	0.022	1.11
$DIVYIELD_{t-1}$	0.012	0.011	0.001	0.42
$RDTA_{t-1}$	0.069	0.067	0.002	0.29
$HINDEX_{t-1}$	0.023	0.023	0.000	-0.11
$NANALYST_{t-1}$	1.387	1.414	-0.027	-0.42

Panel C: Difference-in-differences test

	13G firms	Control firms	DiD estimator (13G - control)	T-statistics of DiD estimator
Δ*EBITDA/ASSET*	-0.005	-0.020	**0.015***	1.78
Δ*CFO/ASSET*	-0.005	-0.019	**0.014***	1.67

Table 5 (Cont'd)

Panel D: Difference-in-differences test, stratified by firms' liquidity

	13G firms	Control firms	DiD estimator (13G - control)	T-statistics of DiD estimator
Low LIQAM Subsample				
Δ*EBITDA/ASSET*	-0.021	-0.017	-0.004	-0.35
Δ*CFO/ASSET*	-0.007	-0.019	0.012	1.08
High LIQAM Subsample				
Δ*EBITDA/ASSET*	0.011	-0.022	0.033**	2.55
Δ*CFO/ASSET*	-0.003	-0.019	0.016	1.33
Low LIQFHT Subsample				
Δ*EBITDA/ASSET*	-0.025	-0.021	-0.004	-0.38
Δ*CFO/ASSET*	-0.021	-0.020	0.000	-0.02
High LIQFHT Subsample				
Δ*EBITDA/ASSET*	0.015	-0.018	0.033***	2.67
Δ*CFO/ASSET*	0.011	-0.018	0.029**	2.43

Table 6: Does stock liquidity affect hedge funds' block acquisition decisions? The effect of wealth-performance sensitivity

This table reports the probit regression results on the relation between a firm's stock liquidity and the probability of a hedge fund acquiring a block in the firm and the effect of *WPS* on this relation. Variable definitions are listed in Appendix B. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. The coefficient estimates on WPS_t are multiplied by 1,000 for ease of presentation. Control variables, year fixed effects, and Fama-French 12 industry effects are included in all columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)	(3)
Dependent Variables	**$BLOCK_{t+1}$** *(=1 if 13D Filing or 13G Filing; 0 if no block acquisition)*		
$LIQAM_t$	**0.180***		
	(0.101)		
$LIQAM_t \times WPS_t$	**0.019***		
	(0.010)		
$LIQFHT_t$		**8.326***	
		(5.042)	
$LIQFHT_t \times WPS_t$		**0.049****	
		(0.021)	
DECIMAL			**0.508*****
			(0.079)
$DECIMAL \times WPS_t$			**1.480***
			(0.816)
WPS_t	**0.002***	**0.020****	**-0.534**
	(0.001)	(0.009)	(0.588)
Controls	*Included*	*Included*	*Included*
Year Fixed Effects	*Included*	*Included*	*Included*
Industry Fixed Effects	*Included*	*Included*	*Included*
Number of Obs. Used	24,645	24,645	24,645
Pseudo R^2	0.087	0.086	0.086

Table 7: Does stock liquidity affect hedge funds' monitoring decisions? The effect of wealth-performance sensitivity

This table reports the probit regression results on the relation between a firm's stock liquidity and its probability of being targeted by a hedge fund 13D filer as opposed to being targeted by a hedge fund 13G filer and the effect of *WPS* on this relation. Variable definitions are listed in Appendix B. $HIGHWPS_t$ is an indicator variable that equals one if WPS_t is equal to or above the median *WPS* within each year and zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. Control variables, year fixed effects, and Fama-French 12 industry effects are included in all columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)	(3)
Dependent Variables	**$13Dvs13G_{t+1}$** *(=1 if 13D Filing; 0 if 13G Filing)*		
$LIQAM_t$	**0.722**		
	(0.927)		
$LIQAM_t \times HIGHWPS_t$	**-2.390***		
	(1.298)		
$LIQFHT_t$		**7.337**	
		(11.494)	
$LIQFHT_t \times HIGHWPS_t$		**-38.281***	
		(22.928)	
DECIMAL			**0.852**
			(0.751)
$DECIMAL \times HIGHWPS_t$			**-0.854***
			(0.463)
$HIGHWPS_t$	**0.017**	**-0.009**	**0.373**
	(0.171)	(0.188)	(0.509)
Controls	*Included*	*Included*	*Included*
Year Fixed Effects	*Included*	*Included*	*Included*
Industry Fixed Effects	*Included*	*Included*	*Included*
Number of Obs. Used	322	322	322
Pseudo R^2	0.161	0.157	0.156

Table 8: Does stock liquidity affect targeting by hedge fund activists?

This table reports the probit regression results on the relation between a firm's stock liquidity and its unconditional probability of being targeted by a hedge fund 13D filer as opposed to being targeted by a hedge fund 13G filer or not being targeted by hedge fund blockholders. Variable definitions are listed in Appendix B. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroskedasticity and clustered by firm. For $LIQAM_t$, $LIQFHT_t$, and *DECIMAL,* the marginal effects (dF/dx) are displayed below the standard errors. Year fixed effects and Fama-French 12 industry effects are included in all columns but the coefficient estimates are not reported. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

	(1)	(2)	(3)
Dependent Variables	**$13DFILING_{t+1}$** *(=1 if 13D Filing; 0 if 13G Filing or no block acquisition)*		
$LIQAM_t$	**0.103*****		
	(0.026)		
	[0.0013***]		
$LIQFHT_t$		**3.851*****	
		(1.435)	
		[0.0493***]	
DECIMAL			**0.309*****
			(0.088)
			[0.0041***]
MV_t	**-0.078*****	**-0.068*****	**-0.051*****
	(0.013)	(0.013)	(0.011)
Q_t	**-0.064*****	**-0.062*****	**-0.064*****
	(0.018)	(0.017)	(0.017)
SGR_t	**0.027**	**0.030**	**0.033**
	(0.024)	(0.024)	(0.024)
ROA_t	**-0.004**	**-0.033**	**-0.007**
	(0.088)	(0.089)	(0.089)
LEV_t	**0.010**	**0.008**	**-0.010**
	(0.063)	(0.064)	(0.063)
$DIVYIELD_t$	**-0.730**	**-0.663**	**-0.593**
	(0.830)	(0.851)	(0.837)
$RDTA_t$	**-0.340***	**-0.334***	**-0.292**
	(0.191)	(0.191)	(0.190)
$HINDEX_t$	**1.141**	**1.513**	**1.142**
	(5.586)	(5.574)	(5.481)
$NANALYST_t$	**0.043***	**0.057****	**0.060*****
	(0.022)	(0.022)	(0.022)
INTERCEPT	**-2.254*****	**-2.325*****	**-2.464*****
	(0.194)	(0.196)	(0.177)
Year Fixed Effects	*Included*	*Included*	*Included*
Industry Fixed Effects	*Included*	*Included*	*Included*
Number of Obs. Used	88,742	88,742	88,742
Pseudo R^2	0.040	0.038	0.036

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