The Effect of Liquidity on Governance

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This paper demonstrates a positive effect of stock liquidity on blockholder governance. Liquidity increases the likelihood of block formation. Conditional upon acquiring a stake, liquidity reduces the likelihood that the blockholder governs through voice (intervention)—as shown by the lower propensity for active investment (filing Schedule 13D) than passive investment (filing Schedule 13G). The lower frequency of activism does not reflect the abandonment of governance, but governance through the alternative channel of exit (selling one's shares): A 13G filing leads to positive announcement returns and improvements in operating performance, especially in liquid firms. Moreover, taking into account the increase in block formation, liquidity has an unconditional positive effect on voice as well as exit. We use decimalization as an exogenous shock to liquidity to identify causal effects. (*JEL* G12, G23, G34, G38)

This paper empirically studies the effect of stock liquidity on governance by blockholders. The theoretical literature yields conflicting predictions on the desirability of liquidity for governance. The traditional view is that blockholders govern by intervening in a firm (also known as "voice") and that liquidity is bad for voice because it allows them to sell their stake in a troubled firm rather than bear the cost of intervening to fix it (Coffee 1991; Bhide 1993). We refer to these theories as "voice-B". This view has been challenged along two

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fronts. First, even considering theories of voice alone, liquidity can be good for governance as it encourages voice, by enabling a block to form in the first place (Kyle and Vila 1991; Kahn and Winton 1998; Maug 1998) or by allowing the blockholder to earn trading gains from her intervention (Maug 1998; Faure-Grimaud and Gromb 2004). We refer to these theories as "voice-G". 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 is good for exit—and thus governance—as it induces initial block formation (Edmans 2009), information acquisition once the block has been formed, and greater trading once information has been acquired (both Edmans 2009 and Edmans and Manso 2011).

This paper tests these three sets of theories (voice-B, voice-G, and exit)—thus evaluating the overall effect of liquidity on governance—by analyzing how liquidity affects both the decision to acquire a block in the first place and the choice of governance mechanism once the block has been acquired. We study a particular type of blockholder—activist hedge funds—because they have both voice and exit at their disposal. Our results are most consistent with exit theories, but we also find some evidence in favor of voice-G theories. Overall, we demonstrate a beneficial effect of liquidity on exit and a smaller positive effect on voice.

First, we find that liquidity increases the likelihood that an activist hedge fund acquires a block (a stake of at least 5%) in a firm. 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-G theories of Kyle and Vila (1991), Kahn and Winton (1998), and Maug (1998) and the exit theory of Edmans (2009), all of which consider the decision to acquire a block 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, that is, the manager is more sensitive to the threat of exit.

Our second findings relate to a hedge fund's choice of governance mechanism once she has acquired her stake. All blockholders have to file a Schedule 13 upon obtaining a stake of at least 5% in a public firm. Blockholders who intend to engage in intervention must file a Schedule 13D, as it legally entitles them to engage in the form of activism that they specify in Item 4 of the filing. Those who intend to remain passive have the option of filing a 13G instead and will likely do so because of the benefits described in Section 1.[1] Among firms targeted by blockholders, we find a negative relation between liquidity and activism, as

[1] A separate motivation for studying 13D filings is that they are not limited to a specific type of activism. Norli, Ostergaard, and Schindele (2010) examine contested proxy solicitations and shareholder proposals. Although

measured by the likelihood of a 13D filing. A one-standard-deviation increase in liquidity reduces the probability of a 13D filing (and increases the probability of a 13G filing) by 5%–7%, compared to the 43% unconditional probability of a 13D filing. This finding is consistent with the voice-B view that liquidity weakens governance as it discourages voice. However, it is also consistent with the exit view that liquidity merely causes a blockholder to adopt a different form of governance—the threat of exit rather than voice.

Our third main finding is that a 13G filing represents a governance mechanism. 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. These results support the exit view that the 13G filings, which are encouraged by liquidity, represent governance through exit rather than the abandonment of governance altogether (as argued by the voice-B view). Also consistent with the exit view, we show that liquidity has a particularly large effect in inducing a 13G filing for firms with high managerial sensitivity to the stock price.

Our fourth and final finding concerns voice. Our first result, stated earlier, is that liquidity increases the likelihood of block acquisition, but our second result is that it decreases the likelihood that a 13D is filed, conditional upon block acquisition. We find that the first effect outweighs the second. Thus, as predicted by voice-G theories, liquidity increases the unconditional incidence of voice. Coupled with its positive effect on exit, liquidity has an overall beneficial effect on governance.

Our empirical approach addresses three important challenges that plague a study of the effect of liquidity on governance. These challenges may explain why, despite the rich theoretical literature analyzing whether liquidity is beneficial or harmful for governance, few existing papers address this debate empirically. One challenge is that many blockholders face significant barriers to voice. Diversification requirements hinder mutual funds from acquiring the large positions needed to exercise control,[2] 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 because of 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 paid according to assets under management rather than performance.[3] Indeed, Del Guercio and Hawkins (1999) find that

these are important instances of actual activism, relying on two specific vehicles could potentially omit other channels.

[2] 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.

[3] 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.

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." Liquidity will not affect the choice between exit and voice if the blockholder does not engage in voice. We address this 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.[4] 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. Although 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.[5]

A second challenge is that, while existing papers study actual exit (e.g., Parrino, Sias, and Starks 2003) or actual voice (e.g., Norli, Ostergaard, and Schindele 2010), 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 2013). We address this challenge by using the blockholder's choice of Schedule 13 filing to identify her governance intent, rather than focusing solely on actual instances of exit or voice.

Third, liquidity and governance may be jointly determined by a firm's unobservable characteristics, or the causality may run from governance to liquidity. We address this challenge in two ways. First, because 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, such as firm value

[4] 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 (2013) shows that incentive pay increases the effectiveness of governance through exit.

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

(Fang, Noe, and Tice 2009), innovation (Fang, Tian, and Tice 2012), mergers and acquisitions (Roosenboom, Schlingemann, and Vasconcelos 2012), and stock prices (Kelly and Ljungqvist 2012). Bharath, Jayaraman, and Nagar (forthcoming) show that the effect of liquidity on firm value is stronger for firms with higher block ownership, supporting a governance channel. Norli, Ostergaard, and Schindele (2010) 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), Boyson and Mooradian (2011, 2012), and Clifford and Lindsey (2011) 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), this paper contributes to a newer strand of literature on the real effects of financial markets (see Bond, Edmans, and Goldstein 2012 for a survey).

1. Hypothesis Development and Theoretical Framework

We aim to distinguish between the voice-B, voice-G, and exit theories—thus evaluating the overall effect of liquidity on governance—by testing five empirical hypotheses, each of which is predicted by some theories but not others. We now discuss each hypothesis in turn and explain whether evidence in favor of a particular hypothesis will either support, contradict, or have no implications for a given theory. The link between the three theories and the five empirical hypotheses is also summarized in Figure 1.

Our first hypothesis is as follows.

Hypothesis 1. Stock liquidity increases the likelihood that a hedge fund acquires a block in the firm (H1).

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.

This table 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-B	Voice-G	Exit
H1: Stock liquidity increases the likelihood that a hedge fund acquires a block.	–	✓	✓
H2: Conditional upon acquiring a block, stock liquidity reduces the likelihood that the hedge fund files a 13D rather than a 13G.	✓	✗	✓
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.	– / ✗*	– / ✗*	✓
H4: The effect of stock liquidity on the probability of block acquisition (H4a), and the probability of filing a 13D rather than a 13G conditional upon block acquisition (H4b), is stronger in firms with higher managerial sensitivity to the stock price.	–	–	✓
H5: Stock liquidity increases the unconditional likelihood that a hedge fund files Schedule 13D.	✗	✓	–

* Voice theories implicitly assume that voice is the only governance mechanism. They thus predict that 13Gs should not lead to any of these outcomes (hence the ✗ symbol) but also could be said to have no prediction for any of these outcomes (hence the – symbol)

Figure 1
Summary of hypotheses

Other theories than the three sets above, which are unrelated to governance, do not clearly predict a positive relationship between liquidity and the likelihood of block acquisition. 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.

Hypothesis 2. Conditional upon acquiring a block, stock liquidity reduces the likelihood that the hedge fund files a 13D rather than a 13G (H2).

Blockholders acquire stakes for two main reasons: to engage in activism or to remain passive and earn a return through informed trading.[6] 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

[6] 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.

13D,[7] whereas a 13G can only be filed if the blockholder "did not purchase or do[es] not hold the securities for the purpose of changing or influencing control over the issuer." 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*.[8] 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 refile within ten days upon a change in stake of 1%, which alerts the market to changes in her position and moves the price against her.[9] In contrast, a 13G filer only needs to refile for a change in stake of 5%, and the refiling deadline can be as late as forty-five days after the end of the calendar year (for "qualified institutional investors" listed under Rule 13d-1(b)(1)). These different filing deadlines also apply to the initial crossing of the 5% threshold. Second, a 13D filing may cause the target firm to become hostile to the blockholder and restrict access to management and thus a source of information. Third, a 13D is typically accompanied by credit downgrades (Klein and Zur 2011), higher bank loan spreads, and shorter bank loan maturities (both Li and Xu 2011). 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 end investors. Appendix A.1 provides further details on legal issues surrounding 13D and 13G filings.

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 because of 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 filing. 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. She will file a 13G to take advantage of this higher liquidity, as the 13G maximizes her ability to trade. 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.

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[7] Examples of activists' stated intentions filed in a 13D include changing the CEO or board, changing capital structure, selling assets, opposing or inducing a merger, proposing a spin-off, increasing the dividend, and cutting executive pay.

[8] *NACCO Industries, Inc., v. Applica Inc., C.A. No. 2541-VCL* (Delaware Chancery Court, 10/22/09), settled for $60 million.

[9] 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 ten 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 ten days. Such a filing will lower the price at which she can sell her remaining 4%.

Hypothesis 3. 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-G and 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, because the blockholder cannot engage in voice.[10] In contrast, exit theories argue that the informed trading, which a 13G filer can engage in, is a governance mechanism in itself. Thus, the stock price should rise upon a 13G filing as the market anticipates the governance benefits, this increase should be subsequently borne out by improved operating performance, and the blockholder should capture part of the benefits in the form of positive holding-period returns. 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 traders, but such self-interested actions have a social benefit by disciplining the manager. Thus, even if the blockholder's 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.

One may argue that a link between 13G filings and positive firm outcomes can still be consistent with voice-G and 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. Under exit theories, if liquidity is high, the blockholder will gather more information, strengthening the threat of exit (Edmans 2009; Edmans and Manso 2011) and increasing the firm value impact.[11] Under the undervaluation story, on the other hand, two forces reduce the announcement return in more liquid stocks. First, liquidity increases price efficiency and lowers undervaluation. Thus, the market should attribute the purchase less to undervaluation, reducing the return.

[10] Although 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 on other factors, such as her own liquidity shock).

[11] 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, although 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. Although liquidity allows a blockholder to trade more aggressively, there is a counteracting effect: A given blockholder trade has less effect on the price because 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.

Second, because 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 a liquid firm is a weaker sign of undervaluation, and the announcement return should be lower.[12]

A second test to distinguish between voice-B and exit involves managerial incentives.

Hypothesis 4. The effect of stock liquidity on the probability of block acquisition (H4a), and the probability of filing a 13D rather than a 13G conditional upon block acquisition (H4b), is stronger in firms with higher managerial sensitivity to the stock price.

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.[13]

Our final hypothesis involves the overall effect of liquidity on governance.

Hypothesis 5. Stock liquidity increases the unconditional likelihood that a hedge fund files Schedule 13D (H5).

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 studies whether the first effect outweighs the second, that is, 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 has an overall beneficial effect on governance. Such a finding would also support voice-G theories.

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[12] A potential force offsetting the second effect is that the price impact is lower in more liquid stocks 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 2% in an illiquid firm. Thus, blockholders will buy liquid firms that are 2%–5% undervalued and illiquid stocks that 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.

[13] 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.

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 U.S. Securities and Exchange Commission's (SEC) EDGAR database; funds without such filings thus drop out of our sample. 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 the Center for Research in Security Prices (CRSP). For each firm, we only retain the first Schedule 13 filing by an activist hedge fund, because 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 twelve subsequent filings. These steps lead to a dataset of 709 Schedule 13Ds and 1,112 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 is zero otherwise (Appendix A.2 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 is 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 13D is filed and is zero for a 13G.

Next, we obtain daily trading information from CRSP to compute the liquidity measures. Given our large sample size (all firms in the intersection of Compustat and CRSP for sixteen years), computational feasibility requires us to use liquidity measures based on daily, rather than intraday, 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. 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 twelve proxies that use daily data and find that this measure most accurately captures price impact. We compute $AMIHUD_{i,t}$ as the daily ratio of absolute value of stock returns to dollar volume, averaged over firm i's fiscal year t:

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

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.[14]

Our 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

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

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 cost-per-price benchmarks computed from intraday data, such as percent effective spread and percent quoted spread. The distributions of $AMIHUD_{i,t}$ and $FHT_{i,t}$ are highly positively skewed, so we take the natural logarithm of (one plus) each measure and multiply it by -1 so that a high value corresponds to high liquidity. We define our liquidity measures as $LIQAM_{i,t} = -\ln(1+AMIHUD_{i,t})$ and $LIQFHT_{i,t} = -\ln(1+FHT_{i,t})$.

We measure the manager's sensitivity to the stock price using the scaled wealth-performance sensitivity measure of Edmans, Gabaix, and Landier (2009): The dollar change in the CEO's wealth for a 100 percentage point change in the stock price, scaled by annual pay (*WPS*). This measure is independent of firm size and thus comparable across firms of different size.[15] 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

[14] 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.

[15] 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).

growth (*SGR*), return-on-assets (*ROA*), book debt-to-assets (*LEV*), dividend yield (*DIVYIELD*), research and development (R&D) divided by total assets (*RDTA*), Herfindahl index of sales in different business segments (*HINDEX*), and the log of one plus the number of analysts covering the firm (*NANALYST*).[16] 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 99% levels. We add year fixed effects and Fama-French 12 industry fixed effects to control for intertemporal 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.[17] 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 because governance is persistent. In contrast, we study an unexpected governance event (a 13D/G filing). Such events are non-persistent: Because we only consider the first filing in a firm, it cannot be caused by a past filing, and so lagging liquidity mitigates reverse causality concerns. 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.

Because we are unable to control for unobservable omitted variables, we also rerun 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 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 is zero otherwise. When studying the choice between filing a 13D and a 13G (H2 and H4b), we have a specific filing date that 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 is zero otherwise. Thus, the coefficient on *DECIMAL* compares hedge fund activity pre- and post-decimalization. The advantage of retaining all years is

[16] 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.

[17] 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 (forthcoming) correlate blockholder trading with stock liquidity. In contrast, Cohen (2012) 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.

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 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.[18]

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 (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 a 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.[19]

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 universe of CRSP

[18] A second approach, where sample size permits, is to narrow 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.

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

Table 1
Summary statistics, sample distribution, and correlations

Panel A: Summary statistics for full sample

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

This panel reports the summary statistics of the main variables used in our multivariate analysis for the full sample of firms. Variable definitions are listed in Appendix A.2.

Panel B: Summary statistics for subsample of firms targeted by activist 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

This panel reports the summary statistics of the firm characteristics for the subsample of firms targeted by hedge funds. Variable definitions are listed in Appendix A.2.

Panel C: Frequency of block acquisitions by fiscal year

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%**

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

(*continued*)

Table 1
Continued

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

Spearman \ Pearson	$BLOCK_{t+1}$	$13Dvs13G_{t+1}$	$LIQAM_t$	$LIQFHT_t$
$BLOCK_{t+1}$			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***	

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 $LIQFHT_t$). Variable definitions are listed in Appendix A.2. Pearson (Spearman) correlations are reported above (below) the main diagonal. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

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

Spearman \ Pearson	$LIQAM_t$	$LIQFHT_t$	$LIQAM_{t-1}$	$LIQFHT_{t-1}$
$LIQAM_t$		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***	

This panel reports Pearson and Spearman correlations between stock liquidity ($LIQAM_t$ and $LIQFHT_t$) and lagged stock liquidity ($LIQAM_{t-1}$ and $LIQFHT_{t-1}$). Variable definitions are listed in Appendix A.2. Pearson (Spearman) correlations are reported above (below) the main diagonal. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

stocks into quartiles based on the average *AMIHUD* and *FHT* measures over the previous calendar year and calculate the absolute value of the average returns to stocks in each quartile on days on which 0.9%–1.1% of the shares outstanding are traded. In the Online Appendix, Table OA2, Panel A shows that firms in the third quartile by *AMIHUD* 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 fourth quartile. The price impact across liquidity quartiles exhibits similar patterns on days on which 0.4%–0.6% of the shares outstanding are traded (Panel B) and on days on which 0.1%–0.3% of the shares outstanding are traded (Panel C). Thus, illiquidity increases the cost of exit and so reduces the attraction of a 13G filing.

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 block acquisition, 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 heteroscedasticity 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 additional 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 is 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 with 0.08 (0.01) in the $LOWPRC=0$ subsample; both differences are significant at the 1% level. Panel B reruns 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.[20]

Second, in Panel C we rerun Panel A replacing *DECIMAL* with the actual change in liquidity. Following Fang, Noe, and Tice (2009), we measure the change from the fiscal year before decimalization (year $t-1$) to the fiscal year

[20] 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 rerun 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.

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

Dependent variables	(1)	(2)	(3)	(4)	(5)	(6)
	$BLOCK_{t+1}$ (=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

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 A.2. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity 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.

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

Dependent variables	(1)	(2)
	$BLOCK_{t+1}$ (=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]
Controls	included	included
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

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 A.2. $LOWPRC_t$ 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 is zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity and clustered by firm. Control variables, 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.

(*continued*)

Table 2
Continued

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

Dependent variables	(1) **BLOCK$_{t+2}$** (=1 if 13D filing or 13G filing; 0 if no block acquisition)	(2)
Δ*LIQAM*	**0.128****	
	(0.055)	
Δ*LIQFHT*		**9.228*****
		(2.782)
Δ*MV*	**−0.151****	**−0.157****
	(0.068)	(0.066)
Δ*Q*	**−0.002**	**−0.009**
	(0.029)	(0.029)
Δ*SGR*	**0.011**	**0.002**
	(0.046)	(0.045)
Δ*ROA*	**0.143**	**0.071**
	(0.172)	(0.168)
Δ*LEV*	**−0.011**	**−0.003**
	(0.246)	(0.238)
Δ*DIVYIELD*	**−3.016***	**−2.821**
	(1.740)	(1.717)
Δ*RDTA*	**0.229**	**0.143**
	(0.452)	(0.444)
Δ*HINDEX*	**11.616**	**11.667**
	(12.745)	(12.684)
Δ*NANALYST*	**−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

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 A.2. 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 heteroscedasticity. 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.

after (year $t+1$) and drop all other years to hone in on the decimalization period. 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 a 13D (rather than a 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 a 13D, compared with the 43.2% probability of such a filing conditional upon acquiring a block. As with Table 2, we rerun the *DECIMAL* specification stratifying the sample by *LOWPRC*. Panel B shows that the coefficient on *DECIMAL* is significant only in the subsample with *LOWPRC* = 1 and that the difference between the two subsamples is statistically significant.[21] These results support H2, in that liquidity causes the blockholder to file a 13G rather than a 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 because 13G filers cannot engage in voice. Thus, by encouraging a blockholder to file a 13G rather than a 13D, liquidity weakens governance. Exit theories argue that a 13G filer does exert governance through the alternative mechanism of trading.

Table 2's evidence that liquidity increases the likelihood of block acquisition (H1) supports exit theories and is not predicted by voice-B theories, as they view blockholdings as exogenous. 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 forthcoming), also support the exit channel. We now conduct two additional sets of tests to distinguish between the theories. First, we study whether 13G filings lead to a positive event-study return (H3a), a positive holding-period return (H3b), and an improvement in operating performance (H3c), particularly among liquid stocks. Table 4, Panel A, shows that, around a 13G filing, firms experience a 0.8% (0.7%) average three-day value-(equally-)weighted abnormal return *CAR_VW* $(-1,+1)$ (*CAR_EW* $(-1,+1)$). 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 the below-median subsample, that is, 1.2% versus 0.4% (0.9%–1.0% versus 0.4%–0.5%), and significant only in the former.[22]

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

[21] 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 only includes firms in which an activist hedge fund has acquired a block.

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

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

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

Dependent variables	(1)	(2)	(3)	(4)	(5)	(6)
	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

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 versus being targeted by a hedge fund 13G filer. Variable definitions are listed in Appendix A.2. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity 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.

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

Dependent variables	(1)	(2)
	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]
Controls	included	included
Year fixed effects	included	included
Industry fixed effects	included	included
Number of obs. used	567	568
Pseudo-R^2	0.140	0.101

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 versus being targeted by a hedge fund 13G filer, conditional on the level of the firm's stock price. Variable definitions are listed in Appendix A.2. *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 is zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity and clustered by firm. Control variables, 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.

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

	(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

This panel reports the mean three-day market-adjusted abnormal announcement returns surrounding 13G filings, conditional on the level of stock liquidity. Each column tests whether the three-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 A.2. 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. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

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

	(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

This panel reports the ordinary least squares (OLS) regressions of the three-day market-adjusted abnormal announcement returns surrounding 13G filings on target firms' stock liquidity. Variable definitions are listed in Appendix A.2. $HIGHLIQAM_t$ ($HIGHLIQFHT_t$) 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 is 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 heteroscedasticity and clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

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

	(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

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 that 13G 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 is zero otherwise. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

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) and (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 three-day abnormal return by 1.7% (1.4%). The results are similar using $CAR\_EW(-1,+1)$, as shown in Columns (3) and (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% or the filing date of that 13G 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, because 13F filings are only 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 the returns are 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 without replacement. We use the same *CONTROL* vector as in the regressions, as well as Fama-French 12 industry and year dummies. Starting from the 645 13G filings, we end up with 500 unique 13G firm-control pairs with close propensity scores[23] and financials available in both fiscal year $t-1$

[23] The loss of 145 observations is due to two reasons. First, we require a targeted firm and the matched control firm to have financials available for both year $t-1$ and year $t+1$. Second, we disallow replacement during matching so if a control firm is paired up with multiple targeted firms, we only keep the pair with the smallest distance between propensity scores. This ensures that we pick the most precise matches, so that none of the observable firm characteristics exhibit a significant difference across the two groups of firms.

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-differences 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, because 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 *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 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 postevent windows. The finding of a positive event-study return but no long-run drift for 13G filings is consistent with market efficiency and also with the results of Brav et al. (2008) for 13D filings (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. 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 on to stocks that subsequently outperform (thus enjoying the full gains). The difference between holding-period returns and long-run drift provides evidence that 13G filers sell on information, and thus their selling impounds information into the stock price: the very mechanism of governance through trading.

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

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
$\Delta EBITDA/ASSET$	−0.005	−0.020	**0.015***	1.78
$\Delta CFO/ASSET$	−0.005	−0.019	**0.014***	1.67

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				
$\Delta EBITDA/ASSET$	−0.021	−0.017	**−0.004**	−0.35
$\Delta CFO/ASSET$	−0.007	−0.019	**0.012**	1.08
High LIQAM subsample				
$\Delta EBITDA/ASSET$	0.011	−0.022	**0.033****	2.55
$\Delta CFO/ASSET$	−0.003	−0.019	**0.016**	1.33
Low LIQFHT subsample				
$\Delta EBITDA/ASSET$	−0.025	−0.021	**−0.004**	−0.38
$\Delta CFO/ASSET$	−0.021	−0.020	**0.000**	−0.02
High LIQFHT subsample				
$\Delta EBITDA/ASSET$	0.015	−0.018	**0.033*****	2.67
$\Delta CFO/ASSET$	0.011	−0.018	**0.029****	2.43

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 without replacement. As in the regressions, the control variables are *MV*, *Q*, *SGR*, *ROA*, *LEV*, *DIVYIELD*, *RDTA*, *HINDEX*, and *NANALYST*, as well as FF 12 industry and year dummies. 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. *** (**) (*) indicates significance at the 1% (5%) (10%) level.

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

Dependent variables	(1) **BLOCK$_{t+1}$** (=1 if 13D filing or 13G filing; 0 if no block acquisition)	(2)	(3)
$LIQAM_t$	**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

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 A.2. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity 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.

The second set of tests to support exit theories involves managerial incentives. 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 only S&P 1500 firms.[24] To

[24] 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.

estimate economic significance, we rerun Equation (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 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—that liquidity is associated with a lower probability of filing a 13D compared with a 13G—contradict voice-G but support both voice-B and exit. To differentiate between the two theories, we study the hypothesis (H4b) that the positive effect of liquidity on a 13G filing is stronger in firms with high managerial incentives. Whereas H4a considered all firms, H4b considers only firms targeted by hedge funds. Given the substantially reduced sample size, to decrease 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 a 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?

Whereas 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, that is, 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 is 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

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

Dependent variables	(1)	(2) **13Dvs13G$_{t+1}$** (=1 if 13D filing; 0 if 13G filing)	(3)
$LIQAM_t$	**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

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 versus being targeted by a hedge fund 13G filer and the effect of *WPS* on this relation. Variable definitions are listed in Appendix A.2. $HIGHWPS_t$ is an indicator variable that equals one if WPS_t is equal to or above the median *WPS* within each year and is zero otherwise. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity 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.

hedge fund block acquisition of 0.6%. The results are consistent with Norli, Ostergaard, and Schindele's (2010) finding that liquidity encourages actual voice. This result shows that liquidity encourages voice, in addition to its positive unconditional effect on exit that results from combining the results of H1 (liquidity encourages block acquisition) and H2 (liquidity encourages exit, conditional on block acquisition.) Because 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, including non-hedge-fund institutions. We

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

Dependent variables	(1) **13DFILING$_{t+1}$** (=1 if 13D filing; 0 if 13G filing or no block acquisition)	(2)	(3)
$LIQAM_t$	**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

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 versus being targeted by a hedge fund 13G filer or not being targeted by hedge fund blockholders. Variable definitions are listed in Appendix A.2. Coefficient estimates are shown in bold and their standard errors are displayed in parentheses below, adjusted for heteroscedasticity 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.

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 limit the search to "hedge" and "hedge funds" only. 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[25] unique hedge funds and 120 unique other institutions, which comprise 1,005 13G filings and 631 13D filings.

There are a number of reasons why activist non-hedge-funds may be less likely to respond to liquidity in the same way as hedge funds, as discussed in

[25] 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 because only the first filing is retained.

the Introduction. First, non-hedge-fund 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, because of their flatter compensation structures, they may pursue objectives other than shareholder value maximization. These differences apply primarily to the choice of governance mechanism: The choice between exit and voice should be less sensitive to liquidity than for activist hedge funds. However, they 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, whereas 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.

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 lower propensity to file a 13D, 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 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 (forthcoming) find that blockholders in general (rather than just activist hedge funds) improve firm value through governance through exit.[26] 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 confirms H4a for the full sample: The effect of liquidity on *BLOCK* is stronger for stocks with higher *WPS*. The coefficient on $LIQUIDITY \times WPS$ is significant at the 1% level in all specifications. The statistical significance is stronger than in the main paper because of 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 is 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, because 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 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 activism.

4.2 Robustness checks

This subsection describes the results of some robustness checks to our main specifications.

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

[26] 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 per the discussion surrounding Table 5, Panel C, 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).

specification, we consider both decisions together using a multinomial logit analysis.[27] Unlike a probit model, a multinomial logit model 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. Table OA12, Panel A, shows that, for activist hedge funds, all three measures of liquidity are significantly positively correlated with the decision to file a 13G compared with not acquiring a block and also with the decision to file a 13D compared to not acquiring a block. These results support both H1 (liquidity encourages block acquisition), and thus both voice-G and exit, and H5 (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 affects the governance mechanism (H2). 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 a 13G and the decision to file a 13D (compared with no block acquisition), supporting H1 and H5. Turning to H2, the effect of *LIQAM* and *LIQFHT* on the decision to file a 13G as opposed to a 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* and our interpretation of the significant *LIQUIDITY* × *WPS* interaction term in Tables 6 and 7. Because *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 arises either because it proxies for omitted variables or because of reverse causality. Starting with omitted variables concerns, we note that because 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 the omitted variable affects the sensitivity of *BLOCK* (Table 6) or *13Dvs13G* (Table 7) to liquidity. Although this point certainly does not eliminate endogeneity concerns, it puts a tight restriction on the potential alternative explanations for the significance of *LIQUIDITY* × *WPS*.

[27] 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.

One potential omitted 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 2013). 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 affects not only the incentives to acquire blocks but for some reason 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* (the dollar change in CEO wealth for a one percentage point change in stock price volatility) and *LIQUIDITY* × *VEGA* as additional controls. 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 higher risk-taking incentives. Second, we add *STDROA* as an additional regressor to control for risk. This variable is the standard deviation of quarterly return-on-assets ratios estimated over the prior two years; a minimum of four quarters is required for calculation. In unreported results, we find that *STDROA* is insignificant in all tables and that 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 $LIQUIDITY^2$ (the square of *LIQUIDITY*) and liquidity has a nonlinear effect on governance. Table OA14 repeats the analyses of Tables 6 and 7 adding $LIQUIDITY^2$ (i.e., *LIQAM* × *LIQAM* or *LIQFHT* × *LIQFHT*) as an additional control. It is insignificant, and its inclusion does not affect the coefficients of interest.

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*, because firms with high *WPS* are less in need of governance through voice, and so a 13G filing is more likely. However, again does not have clear implications for the coefficient on *LIQUIDITY* × *WPS*. The coefficient on *WPS* in Table 7 is insignificant.

We note, however, that the significance of *LIQUIDITY* × *WPS* may arise because *WPS* proxies for other variables that we have failed to control for and that affect the sensitivity of *BLOCK* or *13Dvs13G* to *LIQUIDITY*. Moreover, endogeneity may arise from reverse causality from *WPS* to *BLOCK* or *13Dvs13G*, if this reverse causality is particularly strong for firms with

high *LIQUIDITY*. Thus, we interpret the significance of the *LIQUIDITY* × *WPS* interaction term as only suggestive evidence in favor of the exit theories. The stronger support comes from H1 (the positive effect of liquidity on block formation) and H3 (that 13G filings lead to positive firm outcomes).

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." Among our 490 13D filings, 53 are marked as such. For the core analysis, we classify these blockholders as intending to engage in voice, because 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 refiling. 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). A passive intent is stated in only ten acquisitions of a 20% stake or more; reclassifying these as 13Ds does not affect any results.

4.2.4 Additional robustness checks. Table 3 shows that, conditional upon block acquisition, liquidity decreases the likelihood of a 13D filing as opposed to a 13G. 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. An alternative explanation is that in our sample there are some activist hedge funds that only file 13Ds and others that only file 13Gs.[28] 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 by rerunning Equation (2) and 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.

Whereas all of our analyses contain year and industry fixed effects, another robustness test is to replace industry fixed effects with firm fixed effects to

[28] 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.

control for unobserved heterogeneity across firms that is not captured by our control variables. In Table OA16, we rerun the analysis of Table 2, regressing $BLOCK_{t+1}$ on $LIQUIDITY_t$ to test H1, using firm fixed effects.[29] We run a linear probability model, because adding firm fixed effects in a probit regression leads to a loss of firms that show up only in one year. 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 rerun 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 rerun the analysis of Table 8, which regresses $13DFILING_{t+1}$ on $LIQUIDITY_t$ to test H5, adding firm fixed effects. The results are significant at the 5% level for both liquidity measures.

5. Conclusions

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 blockholder 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 because she is 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. Thus, even if blockholders cannot engage in direct intervention, they can still exert governance through affecting stock prices—consistent with the recent literature on the real effects of financial markets. The results also have implications for the public policy debate on the desirability of liquidity for governance. Whereas the classical view argues that liquidity is harmful and advocates restrictions on liquidity,

[29] We omit industry fixed effects because very few firms change their industry classification.

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.1 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% of a voting class of shares in a public company, to file a 13D form with the SEC within ten 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.

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 ten 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 non-active investors. The law classifies three types of non-active investors: "qualified institutional investors", which 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; "exempt investors", which are defined by Rule 13d-1(d) and include rare cases, such as investors who bought the stock before December 22, 1970 or before an initial public offering; and "passive investors", which are all other non-active investors.[30] Any non-active investor who crosses the 5% threshold but does not intend to engage in intervention, that is, "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. In terms of what counts as "control", Charles Penner, in the Spring 2005 issue of Schulte, Roth, & Zabel, LLP's *Activist Investing Developments* newsletter,[31] notes that

> "The clearest example of a control purpose is when an investor intends to obtain outright control over a company or to assist others in doing so, such as planning an offer to purchase the company or an attempt to gain majority control of a company's board. However, other seemingly more benign activities, including the type of "shareholder activism" practiced by many large investors today, may also be deemed to demonstrate an intent to change or influence the control of a company."

[30] Note that the qualified institutional investors and exempt investors can also be passive investors, but the law uses the term "passive investors" to refer to non-active investors who are neither qualified institutional investors nor exempt.

[31] Available at www.srz.com/files/News/7cab5dc5-f30c-4049-b501-22df2ad219d6/Presentation/NewsAttachment/91268a74-9560-4781-94c9-8be5156de9cc/filesfilesAI_spring05_final.pdf.

Thus, filing a 13G significantly reduces the ability to engage in activism.

A 13G is a shorter form that requires less information. In addition, the filing deadlines may be laxer. For passive investors, the 13G must be filed within ten days of crossing the 5% threshold. However, qualified institutional investors may file within forty-five days after the end of the calendar year, unless their stake crosses 10%, in which case they must file within ten days of the end of the month. In particular, a hedge fund that is registered as an investment adviser with either the SEC or under the laws of any state is a qualified institutional investor, but otherwise is not and thus has to file the 13G within ten days of crossing the 5% threshold. Unlike Schedule 13D, which requires an amendment to be filed upon every 1% change in ownership, Schedule 13G requires amendments to be filed promptly after more than 5% changes in position.

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 Section 4.2.3.) A passive 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 Section 4.2.3.)

A.2 Definition of variables

Variable	Definition
BLOCK	An indicator variable that equals one if a hedge fund files either a 13D or a 13G for its blockholdings in the firm and is zero otherwise;
13Dvs13G	An indicator variable that equals one if a hedge fund files a 13D for its blockholdings in the firm and is zero if the hedge fund files a 13G;
LIQAM	$-1\times$ (the natural logarithm of one plus the firm's Amihud (2002) illiquidity ratio), where the Amihud illiquidity ratio is calculated as the daily price response associated with one dollar of trading volume, averaged over the fiscal year immediately preceding the initial 13D/13G filing date;
LIQFHT	$-1\times$ (the natural logarithm of one plus the firm'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 market value of equity (CSHO $\times$ PRCC_F) measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date;
Q	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	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	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	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	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	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 the firm belongs, measured at the end of the fiscal year immediately preceding the initial 13D/13G filing date;

(*continued*)

Variable	Definition
NANALYST	The natural logarithm of one plus the number of analysts following the firm, 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 is 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 a hedge fund files a 13D for its blockholding in the firm, and is zero if the hedge fund files a 13G or there is no filing;
CAR_VW$(-1,+1)$ (*CAR_EW*$(-1,+1)$)	Three-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 of a Schedule 13G. 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 that 13G 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 if the firm is acquired before the hedge fund exits.

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