Weak Governance by Informed Large Shareholders

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Abstract

A commonly held belief is that better informed large shareholders with greater influence improve corporate governance. We argue that this may not be true in general and demonstrate our argument in a model of corporate takeovers. We show that a large shareholder's ability to collect information and trade ex post may cause him to prefer, ex ante, managers who pursue risky takeovers, even if such takeovers generate a negative expected return. We test the model's main predictions regarding institutional investors' trading around corporate takeovers. Consistent with the model, we find that institutional investors increase their holdings in firms that subsequently pursue acquisitions with greater performance variability and that following takeover initiation, institutional trading positively correlates with long-run deal performance. We further document that these trading patterns are more pronounced when the institutional investor has larger initial holdings of acquirer shares, when the acquirer accounts for a larger fraction of the institution's portfolio, and when the institutional investor demonstrates better trading ability prior to acquisitions. Overall, our study sheds light on the limits of relying on better informed large shareholders to improve corporate governance.

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1 Introduction

Concerns about the governance of public corporations have taken center stage in recent years. Part of the debate on how to improve corporate governance has focused on policies that will give large shareholders (typically institutional investors) greater influence over corporate decisions. Indeed some theoretical and empirical papers support the governance role of large shareholders.[1] The underlying view is that large shareholders have both ability and incentive to maximize the value of all shareholders. Large shareholders may improve governance either through active monitoring or through passive selling and both activities are expected to improve governance (e.g. McCahery et al. (2015)).

In this paper, we propose a complementary view which highlights one reason why, in some settings, a large shareholder's joint ability to influence corporate policy and to trade subsequently on his private information, may actually *weaken* corporate governance. We demonstrate this idea in a model of corporate takeovers in which a self interested manager promotes a policy to actively pursue takeover targets. Even when the policy destroys firm value on average, we show that the large shareholder would support it as long as there is sufficient uncertainty about the future value of potential targets. Hence our model challenges the view that relying on large shareholders to improve corporate governance is always good for small shareholders.

The intuition is as follows: The large shareholder's ability to collect private information allows him to examine proposed takeover deals and trade on his private information before the true value of the deals becomes publicly known. Once a target is identified and the takeover is announced, the large shareholder can collect private information regarding the potential value of the deal and then purchase more shares if he receives a positive signal or sell shares if he receives a negative signal. This ability to collect private information and trade on it creates an endogenous wedge between the expected profits of the informed large

[1] See for example, Gillan and Starks (2007) and Edmans (2014) for surveys of the literature.

shareholder and those of uninformed small shareholders. Therefore, the large shareholder may find it optimal to support a more aggressive takeover policy ex ante, even if such a policy hurts small shareholders' value.

The model generates testable implications on the large shareholder's trading behavior around takeover events which we explore in the empirical section. Our tests confirm the large shareholder's ability of trading on takeover events and we find that his profits are different from those of uninformed investors. The large shareholder therefore may have misaligned governance incentives with regard to takeovers. We do not directly test the model's prediction on the large shareholder's preference over different takeover policies, because such preference is hard to measure in data. For example, voting on general takeover policies is rare for acquiring firms and most intervention, if exists, is behind the scenes. The widespread incidence of acquisitions with low or even negative acquirer announcement returns, however, is consistent with the lack of intervention from large shareholders.[2]

To test the model's implications on the large shareholder's trading, we examine mutual fund trading of acquirer stocks over different stages of the takeover process. Our focus on this subset of institutional investors is motivated by previous empirical studies that document mutual funds' ability of trading on private information. For example, Nain and Yao (2013) document that top mutual funds possess the ability in picking firms that are more likely to make good acquisitions in the future; Pástor et al. (2015) show that high-fee funds have greater skill in identifying time-varying profitable opportunities.

We construct a sample of acquirers who announced takeovers between 1980 and 2012 and explore the relation between institutional trading of acquirer shares and ex post merger performance (measured using the acquirer's post-merger buy-and-hold abnormal return). We find that institutional trading during the bid negotiation period (i.e., the period starting

[2]See for example, Bradley et al. (1988) and Eckbo (2014) for a recent survey of the value implications of corporate takeovers. Also, previous studies (e.g. Davis and Kim (2007)) document that large shareholders such as mutual fund families often side with corporate managers in their voting on general corporate policies.

from the bid announcement and ending at deal closure), is strongly and positively correlated with ex post merger performance. Specifically, we find that following the bid announcement, institutional investors increase their holdings of acquirer stocks in mergers that end up with good ex post performance and they reduce their holdings of acquirer stocks in mergers that eventually turn out bad. We also find that the positive correlation between institutional trading and deal performance is more pronounced in mergers with good ex post performance, which is consistent with the fact that most institutional investors in our sample are subject to short sale constraints. Our tests also indicate that institutional trading is not driven by the short window announcement returns but seem to reflect institutional investors' ability in collecting private information about the long-run deal performance.

The model also generates several predictions on how institutional investors trade *before* takeover announcements. We find that *before* takeover announcements, institutional investors increase their holdings of firms that subsequently pursue mergers with more dispersed performance. This finding is consistent with the model's prediction that higher ex ante uncertainty increases institutional investors' expected trading profits. We also find that institutional investors' trading of acquirer stocks *before* takeover announcements do not correlate with the ex post deal quality, which supports the model's premise that institutional investors do not possess inside information before takeover targets are identified .[3]

To further explore the underlying mechanisms of our results, we perform various subsample tests. We first document that our baseline results on the positive association between post announcement trading and deal quality are stronger for the subsample of institutions with high initial holdings of acquirer stocks. High initial holdings increase informed investors' expected trading profit by allowing them to trade more aggressively on both positive and negative news, because they are less likely to be restricted by short sale constraints.

[3]It is worth noting that our findings here do not conflict with the findings in Nain and Yao (2013) which document mutual funds with top ability can pick good acquirers before mergers, because we look at the full sample of institutional investors, not only the top performers.

Second we document that the baseline results are stronger for the subsample of institutions who invest a large fraction of their portfolio in the acquirer's stocks. For this group of investors, acquisition events have a larger effect on their portfolio returns, which motivates them to collect more information and trade more aggressively after the bids are announced. This test is motivated by the findings in Fich et al. (2015) who explore the importance of portfolio weight in shaping institutional investors' governance incentive.

Third, we examine the effect of deal size and find that our baseline results are stronger for the subsample of acquisitions with large deal size (relative to the acquirer's market value). Deals with larger relative size often have a larger effect on the combined firms' post-merger performance and hence are likely to induce institutional investors to collect more information about these deals.

Fourth, we show that our baseline results are stronger for the subsample of deals with high acquirer stock liquidity. This finding is consistent with the idea that the expected profits from private information are higher if the informed shareholder can better camouflage his trades and hide behind liquidity traders (as in Kyle (1985)). When the acquirer stock liquidity is high, the price impact of the informed trades is small and, therefore, the informed investor can trade more aggressively on his private information.

Lastly, we provide additional evidence showing that our baseline results are most pronounced for mutual funds with high pre-acquisition trading skills. We show that mutual funds that earn strongly positive abnormal returns pre-acquisitions also exhibit the highest positive correlation between their trades of acquirer shares and the ex post deal performance. In contrast we find that mutual funds with low trading skills cannot capture these opportunities.

In sum, our empirical analyses demonstrate that institutional trading following takeover announcements is consistent with the model predictions: institutional investors benefit from aggressive takeover policies that generate high short term uncertainty regarding the firm value. Our paper adds to the debate on the corporate governance role of large sharehold-

ers. More broadly, we argue that large shareholders may not always be strong advocates for limiting managerial over-investment decisions. Note that our findings do not suggest that large shareholders never improve governance: large shareholders may monitor and limit under-investment problems more effectively than they may do for over-investment problems, especially when such over-investment creates high uncertainty in firm value.

Our paper relates to previous studies that examine the governance role of large shareholders. Admati and Pfleiderer (2009) look at the governance benefit of passive large shareholders,[4] while Maug (1998), Kahn and Winton (1998), and Edmans et al. (2014) present governance models of active large shareholders. These papers consider a setting in which the large shareholder first becomes informed and then makes a governance related decision, and they all suggest that having a large shareholder is beneficial for corporate governance. In contrast, we consider a slightly different setting in which the governance decision is made before private information can be collected. In this setting, we show that the large shareholder takes into account the effect of his governance decision on his subsequent information advantage, which weakens or even compromises his incentive in corporate governance.

Our model also broadly relates to the theoretical work by Burkart et al. (1997), Goldman and Strobl (2013), and Matsusaka and Ozbas (2014) who demonstrate different settings in which large shareholders may be detrimental to firm value because their presence can negatively affect managerial actions. Finally, our model is similar in spirit to Brennan and Thakor (1990) who show that the ability of collecting information creates a different preference between informed and uninformed shareholders for dividends and share repurchases.

There is a large empirical literature documenting the governance value of institutional investors. Several studies, for example, investigate how institutional investors impact compensation (e.g. Hartzell and Starks (2003)) or anti-takeover provisions (e.g. Brickley et al. (1988)). A more closely related stream of research focuses on the effect of institutional in-

[4]Two empirical studies, Appel et al. (2015, 2016), show that even the existence of passive large shareholders may promote governance as long as they cooperate with active shareholders.

vestors on acquisition outcomes. For example, Gaspar et al. (2005) document that acquirers held by institutions with low turnover rates perform better than those held by short-term institutional investors. Qiu (2006) finds that mutual fund holdings are positively associated with firm acquisitiveness and the association is stronger among firms that have large amounts of cash and few growth opportunities. Chen et al. (2007) document that long-term independent institutional investors actively monitor corporate acquisition decisions. Matvos and Ostrovsky (2008) and Harford et al. (2011) explore whether institutional investors' cross-holdings of the acquirer and target stocks can explain their lack of opposition to mergers that generate low returns for acquirers; Nain and Yao (2013) show that mutual funds with strong stock picking ability select to hold better acquirers before takeover announcements. Finally, Bae et al. (2002) and Masulis et al. (2007) show that bad governance leads to more mergers with poor performance.

In light of this literature, our paper offers a complementary explanation for the governance role of institutional investors in corporate takeovers. Our model and empirical analysis help us understand why large shareholders sometimes support aggressive takeover policies even if such policies are motivated by managerial private benefit and may be, on average, value-destroying to the firm.

The remainder of the paper is organized as follows: Section 2 presents the model, Section 3 describes our data, Section 4 presents the main results, and Section 5 concludes.

2 Model

We model an all equity firm with two types of shareholders. The first type is a large shareholder who owns an initial stake of X_0 shares. This shareholder, due to his ownership stake and ability, can influence firm takeover policy. Specifically, we assume that the large shareholder can impact the manager's decisionon whether the firm should search for potential

targets. If the large shareholder supports the manager's takeover proposal, the manager can identify a target and the large shareholder can then collect private information about the quality of the target and the potential merger gains to the firm.

We assume that the large shareholder has the ability to collect private information regarding deal quality before the market fully realizes this information. Collecting private information is therefore valuable to the large shareholder because it creates opportunity for him to trade the acquirer's stocks after the bid is announced. The remaining shareholders are considered to be diffused and hence are unable to affect the firm's takeover decisions. These small diffused shareholders rely on market information in trading their shares.

The firm manager enjoys private benefit from acquisitions (e.g., an empire building motive). We assume that this preference is sufficiently strong so that she always prefers pursuing acquisitions even if such acquisitions may destroy firm value.

The timeline of the model is as follows: At $t = 0$, the large shareholder owns a block of X_0 shares and decides on whether or not to support the manager's proposal to pursue takeovers. If the proposal is accepted, the manager then searches for and identifies a specific takeover target at $t = 1$. The specific target is then publicly announced at $t = 2$. Following the public announcement of the bid, the large shareholder collects private information which may reveal the true value of the deal. While the market also updates its estimate of the deal quality, the true value remains unknown to the market at this stage. Hence, the large shareholder can trade shares at the prevailing market price and his private information regarding the deal quality is valuable in trading. The market price is set as in Kyle (1985) to capture the impact of informed trading. Finally, at $t = 3$, the takeover is completed and the true value of the combined firm becomes public information. Below we provide more details of the model and the actions taken by different agents.

2.1 Firm Value

We assume that if the large shareholder decides not to support the takeover proposal, then the firm remains standalone and its value is equal to V_0. On the other hand, if the large shareholder supports the takeover policy, then there is a probability of θ that the manager identifies a value increasing acquisition which results in a firm value of V_H, and there is a probability of $1-\theta$ that the manager identifies a value destroying acquisition that results in a firm value of V_L. The market initially knows the distribution of possible outcomes. We further assume the following:

Assumption 1. *The firm value satisfies the condition that:* $V_H > V_0 > V_L$ and $V_0 \geq \theta V_H + (1-\theta)V_L$.

Assumption 1 states that shareholders are better off if the manager identifies a good acquisition and are worse off if she identifies a bad one. The assumption also states that shareholders suffer a loss of value from takeovers ex ante. The assumption that takeovers are negative NPV projects is not critical to our model but is simply used to emphasize the result, as derived below, that even when the expected value of pursuing takeovers is negative to the firm, the large shareholder may still support the takeover policy.

2.2 Stock Price

Given the above assumptions, we can compute the firm's pre-acquisition stock price (assuming one share) if the market expects that the acquisition policy will be approved:

$$P_0 = \theta V_H + (1-\theta)V_L \tag{1}$$

Once the manager identifies a specific target and makes the takeover announcement, the market updates its assessment on deal quality. The updated stock price reflects a new

assessed value of θ. Thus, we let θ_1 be the updated value of θ and hence, following the announcement at $t = 1$, the stock price changes to,

$$P_1 = \theta_1 V_H + (1 - \theta_1) V_L \tag{2}$$

θ_1 might be equal to θ if the market learns no new information from the announcement. After the bid announcement, the large shareholder uses his ability to collect information regarding the deal quality. Based on his private information, he trades the acquirer stocks strategically. Specifically, we assume that during this period the stock price is determined by a market maker who derives an equilibrium price as in Kyle (1985),

$$P_2 = P_1 + \lambda \left[X + U - E(X) \right] \tag{3}$$

where X represents the endogenous (unobserved) demand of the informed large shareholder; U represents the (unobserved) demand of liquidity traders with an expected value of $E(U) = 0$, and $E(X)$ represents the market maker's assessment of the expected demand of the informed large shareholder. The market maker observes the combined order flow $X + U$ and must set the price to satisfy the equilibrium condition that $E(P_2) = P_1$. This is achieved as long as the market maker correctly anticipates the expected demand of the large shareholder. The parameter λ captures the price impact of trades and is assumed exogenous for our setting. A high value of λ represents low stock liquidity.

2.3 Manager

The manager in our model plays a minor strategic role as she is assumed to always prefer pursuing the acquisition policy. For completeness we model the manager who owns α shares and derives a private benefit of ξ from a completed acquisition. We assume that the manager's utility satisfies the following condition:

Assumption 2. *The manager's utility function is denoted by* $U(V, \xi)$ *where* $U(V_H, \xi) \geq U(V_L, \xi) > U(V_0, 0)$.

This assumption implies that the manager prefers engaging in a takeover both ex post and ex ante regardless of whether she expects to identify a target that is profitable for shareholders. Thus, the model allows for the possibility that the manager's acquisition policy is sometimes motivated by increasing shareholder value and sometimes by her private benefit of control.

2.4 Large Shareholder

Once the manager identifies a target firm and makes a public bid announcement, the large shareholder starts to collect private information on the value of the acquisition. The large shareholder can then trade on his information until the takeover is completed and the full value becomes known to the market. So the large shareholder collects private information and trades between $t = 2$ and $t = 3$.

For simplicity we assume the following information technology: the large shareholder spends a cost C and gets a signal, S, that with probability $1-k$ is uninformative and with probability k reveals the true value of the merged firm. When the signal is informative we have that $S = \theta_T$ where $\theta_T = \{0, 1\}$ and when the signal is uninformative we have that $S = \theta_1$. The parameter k reflects the large shareholder's ability to collect private information. Note that the large shareholder's information technology gives him an informational advantage relative to what the market observes.

Conditional on getting the signal S the large shareholder decides on his trading strategy. Specifically, he has to choose the quantity of shares to buy or sell, X, in order to maximize his trading profits. The large shareholder solves the following problem:

$$\underset{X}{Max}\ \Pi_{LSH} = (X + X_0) \cdot V_2(S) - X \cdot P_2(X) - C \tag{4}$$

where $V_2(S)$ represents his assessed value of the firm based on his private signal.

Using the signal structure above and the pricing Equation 3 we can obtain the following lemma.

Lemma 1. *The large shareholder's optimal trading following a signal S is given by*

$$X^* = \begin{cases} \frac{1}{2\lambda}(1-\theta_1)(V_H - V_L) & for\ S = 1 \\ \frac{1}{2\lambda}\theta_1(V_L - V_H) & for\ S = 0 \\ 0 & for\ S = \theta_1 \end{cases} \tag{5}$$

as long as short sale constraints do not bind, that is, $|\frac{1}{2\lambda}\theta_1(V_L - V_H)| \leq X_0$.

Lemma 1 provides several basic predictions. First, it shows that the large shareholder will trade in according to the eventual value of the acquisition. The large shareholder will increase his ownership stake if the takeover is expected to increase firm value and will reduce his ownership stake if the takeover is expected to decrease firm value. This is a simple manifestation of the idea that his private signal is informative. Second, the lemma shows that, when short sale constraints do not bind, the large shareholder buys on a positive signal, sells on a negative signal and does nothing with no signal. Given the trading strategy we can compute the expected profits to the large shareholder prior to the announced takeover. Assuming again an interior solution for his trading we obtain the following:

Lemma 2. *The large shareholder's expected trading profits are given by,*

$$E(\Pi_{LSH}) = X_0 E(V) + \frac{k}{4\lambda}\theta_1(1-\theta_1)(V_H - V_L)^2 - C \tag{6}$$

Lemma 2 shows that expected trading profits are larger for takeovers that have an ex ante higher expected variability in outcome ($V_H - V_L$ is large) and when the market updated price

following the announced takeover results in a high level of residual uncertainty (θ_1 is close to 0.5). The trading profits are also larger for more skilled traders, as indicated by a larger value of k. Finally, trading profits increase with the liquidity of the acquirer's stock, as measured by the inverse of the parameter λ. These results represent the implications that we explore in the empirical section.

Corollary 1. *The informed large shareholder would vote for an acquisition policy as long as the acquisition creates significant uncertainty in firm value and the expected return on that policy is not too negative to small shareholders.*

Corollary 1 suggests that the large shareholder may vote in favor of a takeover policy ex ante even if the policy has a negative net present value to small shareholders. From Equation (6) we see that the expected value to the large shareholder from approving an acquisition policy is given by, $X_0[\theta V_H + (1-\theta)V_L - V_0] + \frac{k}{4\lambda}\theta(1-\theta)(V_H - V_L)^2 - C$. The first term is negative as $\theta V_H + (1-\theta)V_L < V_0$. This represents the common losses on takeover announcement suffered by the large shareholder and small shareholders from any initial positions on acquirer stocks. However, the second term represents a positive profit that is unique to the large shareholder: he can generate the profit via his trading on the private information. As long as the second term in Equation 6 is large enough the large shareholder would support the manager to pursue acquisitions that are ex ante value-destroying to small shareholders.

Next we consider explicitly the impact of a binding short sale constraint. Specifically, we make the assumption that the large shareholder is not allowed to sell short and so the maximum he can sell is limited to his initial position. In this case we have the following lemma.

Lemma 3. *For $X_0 < \frac{\theta_1(V_H - V_L)}{2\lambda}$ the short sale constraint binds when the large shareholder gets a negative signal, S=0. In this case the large shareholder's optimal trading strategy is*

given by

$$X^* = \begin{cases} \frac{1}{2\lambda}(1-\theta_1)(V_H - V_L) + \frac{E(X)}{2} & for\ S = 1 \\ -X_0 & for\ S = 0 \\ \frac{E(X)}{2} & for\ S = \theta_1 \end{cases} \tag{7}$$

where the market maker's estimate of the expected order flow from the large shareholder is given by,

$$E(X) = \frac{2k(1-\theta_1)}{1+k(1-\theta_1)}[\frac{\theta_1}{2\lambda}(V_H - V_L) - X_0] \tag{8}$$

When the short selling constraint binds, the optimal trading by the large shareholder changes in several ways. First he is limited in his ability to sell following a negative signal. This suggests that trading on negative signals may be smaller, on average, relative to trading on positive signals.[5] Second, when his signal is uninformative or when it is positive the large shareholder will prefer to buy shares. The reason why the large shareholder would buy shares even if his signal is uninformative is because the expected informed order flow, $E(X)$, is no longer equal to zero in equilibrium. The market maker correctly anticipates that the average order flow from the informed large shareholder will be positive as calculated in Equation 8 and hence, he adjusts the order flow by subtracting $E(X)$. This implies that even when the large shareholder's signal is uninformative he will still be able to purchase some shares at a price that is discounted, on average. This is because the market maker cannot observe whether the order flow represents informed trading or uninformed trading.

Finally, note that we assume that the market maker observes directly the large shareholder's initial positions X_0. If the market maker knows that the informed trader has a large equity stake he will then anticipate that the informed order flow would be lower. The intuition is that when the signal indicates that the large shareholder should sell, he will be able to sell more shares when he starts out with a larger position.

[5]This result also relates to the work of Edmans (2009) who shows that with short sale constraints the large shareholder's initial stake positively impacts his incentive to collect private information.

With a binding short sale constraint, the initial position becomes important in determining the expected profits from trading. To analyze how trading profits are affected by the initial position, we assume, for simplicity, that $\theta_1 = \theta$ (this simplifies the calculations) and derive the following lemma.

Lemma 4. *There exists a constant X_c such that for $X_0 \leq X_c$ expected profits from approval of a takeover policy are increasing in X_0. Furthermore, $X_c > \frac{\theta_1(V_H - V_L)}{2\lambda}$ so that trading profits are increasing in X_0 as long as the short sale constraint binds.*

The Lemma above suggests that having a larger initial position increases trading profits up to a point. Once the initial position is large enough then the short sell constraint no longer binds and hence the expected trading profits become independent of the size of the large shareholder's ownership. If in addition we assume that the takeovers, on average, lower shareholder value, it would imply that the benefit to the large shareholder from takeovers is increasing in his initial position as long as $X_0 < X_c$ and then the profit starts to decrease. Thus, if the informed shareholder is very large then he would be fully aligned with small shareholders as trading profits will be small compared to the expected loss of value from the initial ownership stake on takeover announcement.

In the empirical section below, we investigate the implications on the trading direction and intensity of institutional investors who have been documented to have superior ability in collecting information and trading. We treat these institutional investors as the large shareholder in our model.

3 Sample Formation and Variable Construction

To test our model, we collect data on mergers and acquisitions and the institutional investors' holdings of acquirer stocks during different stages of the acquisitions. In what follows, we

discuss in detail the sample selection process and the construction of our dependent and independent variables.

3.1 Data

We start with a sample of merger and acquisition transactions announced between 1980 and 2012 available from the Thomson Reuters SDC Platinum database. Our sample does not include transactions announced after 2012 because we require several years of post-merger data in order to measure post merger performance. To be included in the final sample, we require that the acquirer is a publicly traded U.S. firm with non-missing stock return data during the period of interest. We also apply standard data screening criteria such that the acquiring firm must hold less than 50 percent of target shares before the acquisition and that it obtains the control of the target post merger; we require that the deal value is more than one million dollars and that it represents more than one percent of acquirer pre-merger market value. We further limit the sample to transactions in which we can clearly identify the date of deal completion or withdrawal. Following the existing literature we focus on deals classified as a merger and not a tender offer or a block trade.[6]

Finally, we restrict the sample of acquiring firms to those who do not make any preceding bids within three years of the current bid. This criterion is imposed to guarantee that no preceding mergers confound our observations. Not surprisingly, it excludes many serial acquirers from our sample. Our baseline results become slightly stronger if we include these serial acquirers, probably because their past merger and acquisition transactions provide useful information for institutional investors to better evaluate their current bids.

[6]We follow Betton et al. (2008) in classifying the deal type: If the tender flag is "no" and the deal form is a merger, then the deal is a merger. If the tender flag is "no" and the deal form is "acquisition of majority interest" and the effective date of the deal equals the announcement date, then the deal is classified as a control-block trade. If the tender flag is "yes", or if the tender flag is "no" and it is not a block trade, then the deal is a tender offer.

Stock holdings by institutional investors come from the Thomson Reuters Institutional Holdings 13F database (formerly known as CDA/Spectrum). The database includes quarterly holding data by banks, insurance companies, parents of mutual funds, pension funds, university endowments, and numerous other types of professional investment advisors. We classify institutional investors based on their CDA type codes and focus on investment companies (mainly mutual fund families). We follow Chen et al. (2007) and correct the mapping error of the post 1998 CDA type classification and drop institutions whose CDA type code cannot be accurately determined. Our focus on mutual funds builds on the large literature documenting that mutual funds are likely to have superior information collecting and processing abilities.

Our baseline analyses rely on 13F database which is widely used in previous studies (see e.g., Chen et al. (2007); Fich et al. (2015); Harford et al. (2011); Matvos and Ostrovsky (2008); Parrino et al. (2003)). The advantage of this dataset is that it reports holdings information for institutional investors at a quarterly frequency and thus can be used to estimate institutional trading around the announced mergers and acquisitions. To provide evidence at a more disaggregate level, we also complement our main analyses using data from CRSP Survivorship Bias Free Mutual Fund Database and the Thomson Reuters mutual fund holdings database (previously known as the CDA/Spectrum S12 Database) following Nain and Yao (2013). The CRSP data provide information on monthly fund net returns and total net assets, as well as annual fund characteristics.[7]

3.2 Measuring Merger Performance

To measure merger performance, we follow Lyon et al. (1999) and compute the acquirers' long-run post-merger buy-and-hold abnormal return (BHAR). As Lyon et al. (1999) suggest, this

[7]We do not rely on S12 database for our main analyses because a large number of funds covered in this database only report their holdings at semi-annual frequency before 2003 and for many funds there are significant reporting gaps. These data limitations make it more difficult to measure the funds' trading activity around acquisitions accurately.

measure controls for size, book-to-market, and pre-acquisition return. Specifically, we first sort all firms in CRSP into NYSE size deciles each month and further partition the bottom decile into quintiles. This procedure generates 14 size groups in total. We simultaneously sort firms into book-to-market (B/M) deciles. The combination of partitioning on size and on B/M creates 140 cells (14 size $\times$ 10 B/M groups) for each month.

For each acquirer in our sample, we identify the cell to which it belongs based on its size and B/M one month before the bid announcement. We then choose from that cell the control firm that is the closest match on prior year stock return and is not involved in any significant acquisition activity in the prior three years. Buy-and-hold returns (BHR) are then calculated for each acquirer and its control firm over the event window which starts from n quarters after bid completion and ends at m quarters after bid completion, $[n, m]$. Finally, an acquirer's buy-and-hold abnormal return (BHAR) in this event window is defined as the difference between the acquirer's buy-and-hold return and its control firm's contemporaneous buy-and-hold return:

$$\begin{aligned} BHR_{j;(n,m)} &= \prod_{\tau=n}^{m}(1+r_{j,\tau})-1; \quad j \in \{acq, ctrl\} \\ BHAR_{i;(n,m)} &= BHR_{acq;(n,m)} - BHR_{ctrl;(n,m)} \end{aligned}$$

where $BHR_{j;(n,m)}$ is the buy-and-hold return for acquirer, acq, or its control firm, $ctrl$; $r_{j,\tau}$ is the total return in the τth quarter after bid completions; $BHAR_{i;(n,m)}$ is acquirer i's buy-and-hold abnormal return from n quarters to m quarters after bid completion.

To capture merger performance over different horizons, we compute acquirer BHAR over a one-year and two-year period post acquisition. We further break down the one-year BHAR into the first two-quarter BHAR and the second two-quarter BHAR. Figure 1 illustrates different horizons over which BHARs are computed.

The acquirer's 3-day abnormal announcement-period return (i.e., 3-day CAR) is computed

using the market model and the value-weighted CRSP index, and the estimation window for market beta is days (-252, -46) prior to the bid announcement.

3.3 Measuring Institutional Trading

To measure institutional trading of acquirer stocks over different stages of the merger, we link institutional holdings data to the merger and acquisition transactions. Because institutional holdings are reported quarterly, we match the holdings data at the nearest date to the bid announcement or the bid closure. Thus, for each bid in our sample, we obtain the quarter-end holdings at four points of time: $Hldg_{i;-5}$ is the quarter-end holdings of acquirer i's shares five quarters before the bid announcement quarter; $Hldg_{i;-1}$ is the quarter-end holdings one quarter before the bid announcement quarter; $Hldg_{i;0}$ is the holdings at the end of bid announcement quarter; and $Hldg_{i;cls}$ is the holdings at the end of bid outcome quarter. We further normalize these holdings by the total number of acquirer shares outstanding so as to make for a meaningful cross-sectional comparison. After this normalization, our measure of holdings represents the percent of total acquirer shares held by institutional investors. We then further divide these holdings by the number of institutions holding acquirer i and obtain the average holdings. The average institutional trading of acquirer stocks in different stages of each merger is then measured as the change in holdings:

$$\begin{aligned} \Delta Hldg_{i;(-5,-1)} &= \frac{Hldg_{i;-1}}{N_{i;-1}} - \frac{Hldg_{i;-5}}{N_{i;-5}} \\ \Delta Hldg_{i;(0,cls)} &= \frac{Hldg_{i;cls}}{N_{i;cls}} - \frac{Hldg_{i;0}}{N_{i;0}} \end{aligned}$$

where $N_{i;t}$ is the number of institutions holding acquirer i shares at quarter-end t. Figure 1 illustrates the periods over which the above trading is computed.

The use of an *average* trading measure across all institutions has two empirical advantages. First, the *aggregate* trading volume is affected by the acquiring firms' institutional ownership:

acquirers held by more institutions are likely to experience larger aggregate trading volume. Using the *average* trading measure controls for this cross-sectional difference in acquirers' institutional ownership and makes the institutional trading more comparable across different acquisitions. Second, using the *average* trading measure captures the net trading across all institutions and therefore summarizes their opinions in one simple measure.

After merging the institutional holdings and trading data with the merger and acquisition data, we exclude from our sample all bids for which institutional holdings and trading data is not available. We also exclude the bids whose announcement date and closure date fall into the same quarter, because we cannot observe any trading within quarter. Our final sample includes 1,504 bids, with 1,413 completed and 91 withdrawn.

3.4 Sample Overview

Table 1 presents summary statistics of our sample of 1,504 bids with deal level characteristics and institutional holdings and trading of acquirer stocks. Panel A describes the full sample statistics while Panel B provides subsample information.

From Panel A of Table 1, we find that the post-merger performance of our sample firms, as measured by acquirer 3-day abnormal return around bid announcement and their long-run post-merger BHARs, are both slightly negative on average. This is consistent with previous studies and is indicative of the fact that a passive shareholder holding acquirer stocks suffers, on average, a loss of value around these events.

What is also interesting for our analysis is the fact that performance is also highly dispersed, as indicated by the large standard deviation of the BHAR variable. Specifically, the annualized standard deviation of BHARs over different horizons is about 50%; the top 10% of deal performance generates an annualized BHAR of about 61% while the bottom 10% of

deals lose more than 62%.[8] These large variations in BHARs provide a strong incentive for institutional investors to actively collect information regarding the quality of the acquisition and trade the acquirer stock accordingly.

In our analysis, we examine the institutional trading of acquirer stocks before bid announcement and during the bid negotiation period. Panel A of Table 1 shows that acquirers are held, on average, by 14 institutions prior to an acquisition. The average bid negotiation period, starting from the date of bid announcement and ending at the date of bid closure, lasts for 139 days.

Institutional ownership of acquirer stocks before bid announcements is, on average, 1.26 percent of the total shares outstanding of the acquiring firm for each institution. During the bid negotiation period, the average trading volume by each institution (i.e., the absolute value of its changes in holdings) is 0.33 percent. The net trading by each institution averages 0.15 percent because some institutions buy while others sell. The trading volume appears larger for the pre-acquisition period, but this is driven by the fact that the pre-acquisition period contains four quarters while the average bid negotiation period only contains 139 days. After adjusting for this difference, the institutional trading activity during bid negotiation period is larger.

Panel B of Table 1 provides more guidance to our subsample tests. In this panel, we compute summary statistics for various subsamples. We first divide the sample based on the institutions' initial holdings of acquirer stocks at the beginning of the bid negotiation period. Institutions with large initial holdings (i.e., the top half) on average hold 1.61% of acquirer stocks each. They trade more actively than institutions with small initial holdings, evident by the trading volume of 0.40 versus 0.29. It is also worth noting that the net trading by

[8]It is worth noting that BHARs measure the relative performance of an acquirer benchmarked against its stand-alone peers, so the variation of BHARs captures not only the dispersion in merger gains but also the measurement errors induced by the peer firms' idiosyncratic risks. One way to correct for the measurement errors is to subtract from the variance of BHARs the idiosyncratic variance of the peer firms. This correction reduces the variance of BHARs to 30-35%, which is still large.

institutions with large initial holdings is close to zero while the net trading by institutions with small initial holdings is more positive. These trading patterns are consistent with the idea that having a large initial position allows institutions to trade on both directions (buy or sell) depending on the private information they collect. In contrast, institutions with small initial holdings are limited in their ability to sell if they identify negative information due to the short sale constraints.

Panel B of Table 1 also shows that trading activities are much more pronounced for institutions whose holdings of acquirer stocks carry a larger weight relative to other stocks in their portfolios (see for example, Fich et al. (2015)). The panel also shows that institutional investors' trading are affected by deal and firm characteristics: trading activity is larger when the transaction value is large relative to the acquirers' size and for acquiring firms whose stocks are more liquid.

These subsample summary statistics provide some suggestive evidence that is consistent with our model's premises and predictions. In what follows we explore these predictions in more detail using multivariate regression analyses.

4 Empirical Results

In this section, we first analyze the trading activity by institutional investors during the bid negotiation period and prior to the bid announcement. We establish the baseline results that lend support to our model. We then carry out several subsample tests to examine the underlying economic mechanisms behind these trading patterns. These subsample tests explore a few of the comparative statics implied by the model. Lastly, we provide additional evidence at the disaggregate mutual fund level.

4.1 Institutional Trading and Merger Performance

The first implication of our model is that institutional investors benefit from acquisitions due to their ability to collect private information and trade the acquirer's stocks during the bid negotiation period in according to the deal quality unfolded in the long-run. Our model therefore predicts that the observed trades of institutions during the bid negotiation period is positively correlated with the ex post performance of the merger, which we measure by the BHARs of the combined entity. This implication follows directly from Lemma 1.

To test this hypothesis, we follow the empirical specification in Chen et al. (2007) and run the following regression to relate institutions' trading during the bid negotiation period to the ex post deal quality:

$$\begin{aligned} \Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i \end{aligned} \tag{9}$$

The dependent variable, $\Delta Hldg_{i;(0,cls)}$ denotes the average trading of acquire i's stocks by institutional investors during the bid negotiation period; $DealQlt_i$ denotes the ex post deal quality measured by acquirer i's BHARs measured over different horizons. Control variables follow Parrino et al. (2003) who study the determinants of changes in institutional holdings: $Return_{i;(0,cls)}$ denotes the acquirer's cumulative return during the bid negotiation period; $FirmSize_{i,-1yr}$ and $FirmMB_{i,-1yr}$ denote the acquirer's size (i.e., the logarithm of market value) and book-to-market ratio measured one year before the bid announcement; $Turnover_{i;(0,cls)}$ denotes the aggregate trading volume during the bid negotiation period and normalized by the number of shares outstanding, EOY_i denotes the year-end dummy, which takes the value of one if the bid negotiation period contains the fourth quarter.

Panel A of Table 2 presents the baseline results on how institutional trading during the bid negotiation period relates to the ex post acquisition performance. Note that deal quality is

measured by acquirers' post-merger BHARs and hence the regression specification in Equation 9 is a reverse regression, in which we explain the institutional trading with the ex post merger performance measured in a future period. Because the control variables in Equation 9 are used to explain normal changes in institutional holdings, we follow Chen et al. (2007) and interpret a significant coefficient on ex post merger performance as evidence that institutions' private information about the merger quality affects their trading decisions.

Panel A of Table 2 confirms that institutional trading during the bid negotiation period is positively correlated with acquirers' long-run BHARs up to two years after bid closure. Specifically, the coefficient on deal quality is positive and significant for both the one-year BHAR and two-year BHAR. The magnitude is economically large. For example, one standard deviation increase in the one-year BHAR predicts 28.7% increase in the institutions' purchase of acquirer stocks on average.[9]

One common concern of the reverse regression is reverse causality. For example, one may argue that a positive correlation between institutional trading and acquirers' post-merger BHARs may simply result from the impact of institutions' large trades on the market price of acquirer stocks when the market reacts slowly. One may also argue that other uninformed traders want to follow institutional investors' trades after they are publicly disclosed and that these following trades drive the market price to move towards the direction of the institutional investors' trades. To address this concern, we break down the two-year post-merger period into different subperiods and examine the correlation between institutional trading and BHARs accumulated within each subperiod. As columns 3 to 6 show, institutional trading is positively correlated with BHARs accumulated in all subperiods, however, the positive correlation is only economically large and statistically significant for BHARs accumulated from 6 months post merger to 12 months post merger. The insignificant coefficient for BHAR during the first 6 months post merger seems to suggest that reverse causality is

[9]The magnitude is computed as $\frac{Stdev(BHAR_{1yr})\times\hat{\beta_1}}{\left|\Delta Hldg_{Nego}\right|} = \frac{0.51\times0.19}{0.33} = 0.29$

unlikely, because the market reaction to the price pressure is more likely to happen within the first few months. In addition, since institutional holdings are made public every quarter, the effect from uninformed traders who follow institutional investors' trades would have implied a price effect within the first few months post merger.

The pattern of trading we document above is consistent with our model in which institutional investors are able to trade on their private information about merger performance that is revealed gradually to the market over several quarters after bid closure (e.g., the market observes the post-merger integration activities). The positive correlation between institutional trading and BHAR during the $[6m, 12m]$ period, therefore, implies that institutions are able to learn about the deal quality ahead of the market and trade in the right direction during the bid negotiation period.[10]

In Panel B of Table 2, we analyze institutional trading in mergers with good and bad long-run performance separately. Our model suggests that institutional investors profit by trading in both good and bad mergers, but they may trade more aggressively in good ones because the institutions in our sample are mostly mutual funds who are subject to the short sale constraints and thus their average trading will be less pronounced when they receive bad signals about the merger and the short sale constraints possibly bind..

To test this prediction we follow Chen et al. (2007) and define a new variable $[DealQt]^+$ ($[DealQt]^-$) which equals $DealQlt$ when $DealQlt$ is positive (negative) and zero otherwise. Replacing the regressor $DealQlt$ in Equation 9 with either $[DealQt]^+$ or $[DealQt]^-$, we repeat our analysis and report our results in Panel B of Table 2. The table shows that the coefficients on $[DealQt]^+$ and $[DealQt]^-$ are both positive and statistically significant, indicating that institutions trade in the right direction in both good and bad deals.[11] In

[10] In untabulated results we also confirm that institutional trading during the bid negotiation period do not correlate with acquirer 3-day CAR, indicating that their trading in this period is not driven by following the acquirers' abnormal announcement return in the short event window.

[11] Note that a positive coefficient on $[DealQt]^-$ means that institutions sell their holdings of the acquirer stocks if post-merger BHARs are negative.

addition, the coefficient is much larger and more statistically significant for deals with good ex post performance. This implies that institutions purchase acquirer stocks more aggressively in deals that end up being good, and are less aggressive in selling shares in cases when the acquisitions end up being bad. This is indicative of the potential short sale constraints that they face.

Our findings above lend support to the idea that institutional investors benefit from acquisitions through their ability to collect valuable information and trade *during the bid negotiation period*. We next test the model predictions regarding the institutional investors' trading *before bid announcement*. Our model assumes that institutional investors focus on collecting deal-specific information only after the target firm is identified. This implies that institutional trading prior to bid announcement should not correlate with the deal quality. However, our model also posits that more variability in deal quality increases the expected trading profits for institutional investors. Hence, we predict that they would prefer to hold more shares in firms that are expected to pursue riskier mergers.

In the test below, we examine whether institutional trading of acquirer stocks *prior to bid announcement* is uncorrelated with the realization of deal performance but is positively correlated with the dispersion of deal performance.

We take the institutional trading during the one-year period before bid announcements as the dependent variable and regress it on post-merger BHARs (in Equation 10) and the absolute value of BHARs (in Equation 11), respectively:

$$\begin{aligned} \Delta Hldg_{i;(-5,-1)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(-5,-1)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(-5,-1)} + \beta_6 EOY_i + e_i \qquad (10) \\ \Delta Hldg_{i;(-5,-1)} &= a + b_1 |DealQlt_i| + b_2 Return_{i;(-5,-1)} + b_3 FirmSize_{i,-1yr} \\ &\quad + b_4 FirmMB_{i,-1yr} + b_5 Turnover_{i;(-5,-1)} + b_6 EOY_i + e_i \qquad (11) \end{aligned}$$

Table 3 presents the results of the above regressions for the BHAR one-year and two-year after deal closure. The results in the first two columns indicate that institutional trading prior to bid announcement is uncorrelated with the ex post deal performance, which is consistent with the idea that institutions do not possess private information regarding the eventual quality of the deal prior to the bid. In contrast, the regression results in the last two columns indicate that before the bid is announced, institutional investors tend to increase their holdings of acquirers that subsequently pursue mergers with more dispersed outcomes. Our model shows that a highly dispersed deal quality allows the large shareholder to generate greater expected trading profits (Lemma 2). Note that this result can be either driven by a selection effect (i.e., institutional investors select more risk-taking acquirers without intervention) or a treatment effect (i.e., institutional investors explicitly encourage the firms they buy to pursue riskier mergers), and both effects are consistent with our model predictions.

4.2 Subsample Analysis

In this section we turn to a more detailed examination of the model's testable implications in order to provide additional evidence regarding the model mechanisms.

4.2.1 Initial Holdings

Our first subsample test builds on institutional investors' initial holdings of acquirer stocks at the beginning of the bid negotiation period. The model implies that our baseline results should be stronger for institutions with higher initial holdings because institution with a larger initial ownership are better able to profit from trading on their private information as they are less likely to be bound by the short sale constraints (Lemma 4). This implication is also consistent with the theoretical results in Edmans (2009).

To test this implication, we measure each institution's initial holdings of the acquirer's stocks

at the beginning of the bid negotiation period. We then sort all institutions based on their initial holdings and partition them into two subsamples of equal size. For each deal, we compute the average trading by institutions with high and low initial holdings and then rerun the regression in Equation 9 separately for the two subsamples. We then explore whether the coefficient on our main variable of interest varies across the two subsamples.[12]

Table 4 presents the regression results. For the subsample of institutions with high initial holdings, the coefficient on deal quality is highly significant and the magnitude is comparable with our baseline results. However, for the subsample of institutions with low initial holdings, the coefficients are statistically insignificant and very close to zero. The difference between the two subsamples is significant and economically large. This finding suggests that our baseline results are mainly driven by the trades made by institutions with high initial holdings. For institutions with low initial holdings, the results seem to suggest that they either cannot sell aggressively on negative information or that the costs of collecting information, given their small position, are too high.

4.2.2 Portfolio Weights

Our second subsample test follows the intuition in Fich et al. (2015) who show that firms whose stocks account for a large fraction of the institutions' portfolios receive more monitoring. In our context, we conjecture that if an acquirer's stocks carry a large weight in an institution's portfolio, the institution has more incentive to collect information about the deal quality and therefore its trades should be more positively correlated with the ex post performance of the merger.

[12] An alternative specification to test the subsample effect is to run the regression with a high initial holding dummy as the regression below, and it yields similar results:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 I_{Hi} + \beta_2 DealQlt_i + \beta_3 I_{Hi} \cdot DealQlt_i + \beta_4 Return_{i;(0,cls)} \\ &\quad + \beta_5 FirmSize_{i;-1yr} + \beta_6 FirmMB_{i;-1yr} + \beta_7 Turnover_{i;(0,cls)} + \beta_8 EOY_i + e_i\end{aligned}$$

where I_{Hi} indicates the subsample of institutions with above-median initial holdings.

To test this implication, we first compute the market value of the acquirer stocks in each institution's portfolio at the beginning of the bid negotiation period as well as the total market value of each institution's portfolio. The portfolio weight of the acquirer is then calculated as the total market value of the acquirer's stocks in the institution's portfolio divided by the total market value of the portfolio. Since institutions differ in size and in the number of stocks they hold, we make one additional adjustment so as to make the cross-sectional comparison more meaningful. Namely, we adjust the portfolio weight obtained above by a benchmark weight. The benchmark weight equals one over the total number of stocks in an institution's portfolio and thus represents the weight a stock will receive if the institution allocates its capital equally to each stock in its portfolio. Our measure of relative portfolio weight is therefore equal to the original portfolio weight minus this benchmark weight. A positive (negative) relative weight on a stock means that the stock receives a higher (lower) weight than the average stock in the institution's portfolio. Our relative portfolio weight is consistent with the measure used in Fich et al. (2015) in the sense that both measures adjust for the number of stocks in an institution's portfolio.[13]

After constructing the relative portfolio weight of the acquirer stocks in each institution's portfolio, we again sort all institutions based on their relative portfolio weights and partition them into two subsamples with equal size. For each deal, we compute the average trading of acquirer stocks by institutions within the two subsample and then rerun the regression in Equation 9 separately for the two subsamples. We report the results in Table 5.

Consistent with our conjecture, we find in the first two columns of the table that institutions with a larger fraction of their capital invested in acquirers are more likely to trade in accordance with the ex post quality of the acquisition. In contrast, we find in the next two columns that institutions with a smaller fraction of their capital invested in acquirer stocks do not seem to trade in the direction of deal quality. Overall, our baseline results seem to be

[13] Fich et al. (2015) define monitoring institutions of a firm as those whose holding value in the firm is in the top 10% of their portfolios. This measure effectively captures the relative importance of the firm to the institutional investors.

driven by institutions with a large stake of investment in acquirer stocks.

4.2.3 Deal Size

The above subsample tests are constructed by dividing the whole sample based on institutional investor characteristics. We now turn to subsample tests constructed based on deal characteristics. We first posit that a deal which is large relative to the acquirer's market value is likely to have a larger impact on the post-merger value (i.e., a higher value of $V_H - V_L$ in Equation 7) and hence institutions may trade more aggressively in these deals.

To test this implication, we divide the full sample of deals into two subsamples based on the relative deal size which we measure as the transaction value divided by the acquirer's market value 22 trading days before the bid announcement. We then run our baseline regression separately for the two subsamples. We report the results in Table 6. In the subsample of large deals, the coefficient of interest is statistically significant and economically large. For example, the coefficient on one-year BHAR in the large deal subsample is 0.231, which is 20% higher than that in the full sample. The coefficient on two-year BHAR is also larger than that in the full sample, though it is now less significant because of the smaller sample size. In the small deal subsample, we observe qualitatively similar results in the sense that institutional trading is positively correlated with the ex post deal quality, but the magnitude of the coefficient is much smaller and also less significant.

4.2.4 Acquirer Stock Liquidity

Our next subsample test considers the institutional investors' capacity of trading on their private information by hiding behind liquidity traders. Trading on private information is more profitable if the stock is more liquid and hence the informed trades generate less price impact. We therefore hypothesize that the correlation between institutional trading and the

ex post deal performance is more pronounced when acquirer stocks are more liquid. This hypothesis can be easily derived from the model: in Equation 7, a low value of λ (thus a high level of liquidity) implies more aggressive trades by institutional investors.

We first measure the stock liquidity for each acquirer in our sample using its bid-ask spread expressed as a percentage of the mid-price. We then sort each acquirer into either the high liquidity subsample or the low liquidity subsample based on its liquidity rank among all peers in the same year. We rerun our baseline regression and report the results for the two subsamples in Table 7. Institutions trade more aggressively in the right direction when the acquirer stocks are more liquid, as our model predicts. Specifically, the coefficient on one-year BHAR is 0.367 for the subsample of high liquidity acquirers, which almost doubles that in the full sample. This finding suggests that one standard deviation increase in the ex post merger performance increases the institutional purchase of acquirer stocks by 55% if acquirer stocks are liquid. The coefficient is much smaller for illiquid acquirers and is also less significant statistically.

4.3 Fund Level Evidence

In this section, we provide additional evidence using mutual fund holdings data. Specifically, we use the data from CRSP Survivorship Bias Free Mutual Fund Database and the Thomson Reuters mutual fund holdings database (also known as the CDA/Spectrum S12 Database). The CRSP mutual fund database allows us to compute a measure of fund ability. Following Cohen et al. (2005); Wermers et al. (2012) and Nain and Yao (2013), we measure a mutual fund's ability using its four-factor fund alpha (Carhart (1997)) one month before the bid announcement, estimated using the fund return data over the past 24-month rolling window. We then sort each mutual fund in our sample into quintiles based on their pre-acquisition ability.[14]

[14]Like in Nain and Yao (2013), we also find below that only mutual funds ranking above top 20% seem to have superior ability in trading, so we divide them into quintiles. Dividing them into two subsamples, as we

Many mutual funds covered by S12 database are non-equity funds or passive equity funds. Though we don't expect them to bias our point estimates given that their trading should not be affected by corporate takeover performance, we exclude them from our sample. Our analysis therefore focuses explicitly on domestic equity mutual funds that are likely to collect information and trade actively on corporate takeover events. We strictly follow the fund screening process used in Kacperczyk et al. (2008). Specifically, we eliminate balanced, bond, money market, sector, and international funds, as well as funds not invested primarily in equity securities.[15]

We then compute the average trading of acquirer stocks by mutual funds in our sample that fall into the same ability quintile. It is worth noting that a majority of mutual funds only report their holdings semi-annually before year 2003 and many funds have large gaps in reporting. This limitation makes it difficult to measure their trading accurately during the bid negotiation period, because the negotiation window may start or end in the non-reporting quarter for many funds. To solve this problem, we mark the reporting quarters for each mutual fund and then for each M&A bid in our sample, we only keep the trading by mutual funds that report their holdings at both the beginning and the end of the negotiation period. This requirement significantly reduces the sample size of mutual funds.

After obtaining the average trading by mutual funds in each ability quintile, we perform the baseline regression analysis and report the coefficients of interest in Table 8. Due to limited space, we omit the coefficients on other control variables in the table. Consistent with the model predictions, the coefficient decreases with fund ability. In particular, mutual funds in

do in subsample tests above, makes the difference smaller and obscures the results.

[15]We base our selection criteria on the objective codes and on the disclosed asset compositions. First, we select funds with the following ICDI objectives: AG, GI, LG, or IN. If a fund does not have any of the above ICDI objectives, we select funds with the following Strategic Insight objectives: AGG, GMC, GRI, GRO, ING, or SCG. If a fund has neither the Strategic Insight nor the ICDI objective, then we go to the Wiesenberger Fund Type Code and pick funds with the following objectives: G, G-I, AGG, GCI, GRI, GRO, LTG, MCG, and SCG. If none of these objectives is available and the fund has a CS policy (Common Stocks are the securities mainly held by the fund), then the fund is included. We exclude funds that have the following Investment Objective Codes in the Spectrum Database: International,Municipal Bonds, Bond and Preferred, and Balanced. Since the reported objectives do not always indicate whether a fund portfolio is balanced or not, we also exclude funds that, on average, hold less than 80% or more than 105% in stocks

the highest quintile of ability have a coefficient of 0.073 and funds in the bottom quintile ability have a coefficient of -0.035, both of which are statistically significant. The difference in coefficients between the top and bottom quintile is also economically large and statistically significant. The magnitude of coefficients are much smaller in this table than those in our baseline results, because individual mutual funds are usually much smaller in size than most institutional investors and therefore they hold and trade less of the acquirer's stocks.

5 Conclusion

In this paper we present a simple model of a large shareholder's ex ante preference of takeover policy and his ex post trading of acquirer stocks in corporate takeovers. We show that the informed large shareholder may benefit from supporting firm managers to pursue risky takeovers, even if such takeovers generate a negative expected return to uninformed small shareholders.

We test the model implications by examining institutional investors' trading of acquirer stocks. We find that institutional trading during the negotiation period positively correlates with the long-term deal performance. This suggests that institutional investors are able to collect private information about the deal quality and profit from trading on their information. We further document that this positive correlation is more pronounced for deals with good ex post performance, for deals with large transaction value, and for acquirers whose stocks are more liquid. The positive correlation is also stronger for the subsample of institutions that have high initial holdings of the acquirer stocks, for institutions that invest a large fraction of their portfolios in the acquirers, and for institutions that demonstrate greater trading skills prior to the acquisitions. Finally, as predicted by our model, we find that institutional investors prefer holding firms that subsequently engage in acquisitions with more dispersed performance.

Our paper highlights one important reason why large and informed shareholders may benefit from corporate policies that are not necessarily good for small and uninformed shareholders. Thus, our paper adds to the corporate governance debate on whether large shareholder empowerment always leads to better governance.

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Appendix

Proof Lemma 1: The first order condition of Equation (4) characterizes the optimal trading strategy. Taking in to account the impact of his trades on the market makers equilibrium price in equation (3) we can find that the first order condition simplifies to,

$$V_i(S) - P_1 - 2\lambda(X - E(X)) = 0$$

Using equation (2) for P_1 we have that, for $S = 1$,

$$X = \frac{1}{2\lambda}(1 - \theta_1)(V_H - V_L) + \frac{E(X)}{2} > 0$$

For $S = 0$, the optimal trade is to trade an amount equal to

$$X = \frac{1}{2\lambda}\theta_1(V_L - V_H) + \frac{E(X)}{2}$$

If the initial position is larger than this and hence the short sale constraint is not binding it is easy to show that $E(X)$ and the result follows. QED

Proof of Lemma 2: By definition the expected profit for the large shareholders is

$$E(\Pi) = X_0 E(V) + E[X^*(E(V) - P_2(X^*))]$$

When the signal is uninformative with probability $1 - k$ the profits are zero, but when the signal is informative, with probability, k we then have two possible states of nature, X^* can either be high or low as indicated by equation 1. Hence we have that,

$$E(\Pi) = X_0 E(V) + k\{\theta_1 X_H(V_H - P_2(X_H)) + (1 - \theta_1)X_L(V_L - P_2(X_L))\}$$

Rearranging terms and noting that in equilibrium $P_1 = E(P_2)$ we get the result of the lemma. QED

Proof of Lemma 3: Similar to the proof of Lemma 1 we derive the first order condition of Equation (4) to characterize the optimal trading strategy but now we add the short sale constraint. As before, the first order condition simplifies to,

$$V_i(S) - P_1 - 2\lambda(X - E(X)) = 0$$

Using Equation (2) for P_1 we have that, for $S = 1$,

$$X = \frac{1}{2\lambda}(1 - \theta_1)(V_H - V_L) + \frac{E(X)}{2} > 0$$

Since this is positive the short sale constraint does not bind. Similarly, we can use the first order condition for the case in which the informed trader does not get any information, $S = \theta_1$, and find that in that case

$$X = \frac{E(X)}{2}$$

Finally, for $S = 0$, the optimal trade is to trade an amount equal to

$$X = max\{-X_0;\ \frac{1}{2\lambda}\theta_1(V_L - V_H) + \frac{E(X)}{2}$$

For the short sale constraint to bind we have to show that,

$$X_0 < \frac{1}{2\lambda}\theta_1(V_H - V_L) - \frac{E(X)}{2}$$

To verify that this is satisfied under the condition specified in the lemma we need to calculate the equilibrium value of $E(X)$. From the above solutions we can calculate the following,

$$E(X) = k\theta_1\{\frac{1}{2\lambda}(1-\theta_1)(V_H - V_L) + \frac{E(X)}{2}\} + k(1-\theta_1)(-X_0) + (1-k)\frac{E(X)}{2}$$

rearranging terms we obtain that

$$E(X) = \frac{2k(1-\theta_1)}{1+k(1-\theta_1)}[\frac{(V_H - V_L)\theta_1}{2\lambda} - X_0]$$

Thus, the short sale constraint binds as long as $X_0 < \frac{\theta_1(V_H - V_L)}{2\lambda}$. QED

Proof of Lemma 4: As noted in the text we prove this lemma with the simplifying assumption that $\theta_1 = \theta$ and thus we do not have to keep track of an additional parameter. Using the results in Lemma 3 we can compute the expected trading profits which equal,

$$k\theta[X_H(V_H - P_2(X_H)] + k(1-\theta)[-X_0(V_L - P_2(-X_0)] + (1-k)[\frac{E(X)}{2}(\theta V_H + (1-\theta)V_L - P_2(\frac{E(X)}{2})]$$

For convenience we define parameters A and B and let $E(X) = A(B - X_0)$. Using the optimal trades and rearranging terms we get that trading profits equal to

$$\frac{1-k(1-\theta)}{4}\lambda A^2(B-X_0)^2 + k(1-\theta)\lambda AB(B-X_0) + 2\lambda k(1-\theta)BX_0 - \lambda k(1-\theta)X_0[AB + (1-A)X_0]$$

Taking the first order conditions with respect to X_0 and rearranging terms we obtain the following

$$F.O.C = \lambda A[1-k+k\theta][\frac{A}{2} - 1]X_0 + \lambda BA[1-k+k\theta][1 - \frac{A}{2}]$$

It can be easily verified that $A < 2$ and thus the first order condition is linearly decreasing in X_0 and is positive when $X_0 = 0$. In addition, the first order condition turns negative when $X_0 = \frac{B}{1-k+k\theta}$ and this happens after the short sale constraint no longer binds. QED.

Table 1: Summary Statistics

Panel A. The Full Sample

Panel A reports summary statistics of M&A deal characteristics and the institutional holdings and trading of acquirer stocks in the full sample. $Ln(MV_{Acq})$ is the logarithm of the acquirer's pre-acquisition market value measured 22 trading days before the bid announcement; Q_{Acq} is the acquirer's pre-acquisition market-to-book ratio; $Deal\,Size$ is the relative deal size measured as the transaction value divided by the acquirer's pre-acquisition market value; $Bid\,Len$ is the total number of calendar days between bid announcement and bid completion or withdrawal; CAR_{3d} is the acquirer's 3-day cumulative abnormal return around the bid announcement date computed using the market model; $BHAR_{1y}$ and $BHAR_{2y}$ are the acquirer's post-merger 1-year and 2-year buy-and-hold abnormal return; $Num\,Inst$ is the total number of institutions that hold the acquirer's stock before bid announcement; $BA\,Sprd$ is the bid-ask spread of the acquirer's stock expressed as a percentage of the mid-price; $Hldg_{PreAnn}$ is the average institutional holdings of the acquirer stock expressed as a percent of total shares outstanding; $\Delta Hldg_{PreAnn}$ is the change in institutional holdings of the acquirer's stocks during the one year period before bid announcement; $\Delta Hldg_{Nego}$ is the change in institutional holdings of the acquirer's stocks during the bid negotiation period; $|\Delta Hldg_{PreAnn}|$ and $|\Delta Hldg_{Nego}|$ are the absolute value of $\Delta Hldg_{PreAnn}$ and $\Delta Hldg_{Nego}$ respectively and capture the trading volume of acquirer stock in the corresponding periods.

Deal Characteristics					
	Mean	Stdev	P10	P50	P90
$Ln(MV_{Acq})$	20.42	1.71	18.27	20.36	22.71
Q_{Acq}	1.93	1.37	0.96	1.46	3.44
$Deal\,Size$	0.33	0.49	0.04	0.15	0.85
$Bid\,Len$	138.76	130.68	42.00	107.00	249.00
$CAR_{3d}\,(\%)$	-0.09	8.02	-8.09	-0.11	7.75
$BHAR_{1y}\,(\%)$	-1.73	50.66	-61.61	-0.78	61.48
$BHAR_{2y}\,(\%)$	-2.43	75.38	-93.38	-2.81	90.52
$Num\,Inst$	13.97	11.77	2.00	11.00	31.00
$BA\,Sprd\,(\%)$	0.97	0.84	0.07	0.94	1.91

Mutual Fund Holding and Trading					
	Mean	Stdev	P10	P50	P90
$Hldg_{PreAnn}$	1.26	1.30	0.30	0.89	2.45
$\Delta Hldg_{PreAnn}$	0.25	0.88	-0.34	0.12	1.08
$\Delta Hldg_{Nego}$	0.15	1.18	-0.27	0.04	0.58
$\lvert\Delta Hldg_{PreAnn}\rvert$	0.52	0.75	0.03	0.25	1.31
$\lvert\Delta Hldg_{Nego}\rvert$	0.33	1.15	0.01	0.13	0.73

Panel B. The Subsamples

Panel B reports summary statistics for different subsamples. Initial holding X_0 is the average institutional holdings of acquirer stocks in the subsample at the beginning of bid negotiation period, expressed as a percent of total acquirer stock outstanding. The relative portfolio weight Wts is the weight of the acquirer's stocks in the institutions' portfolios minus the benchmark weight (the benchmark weight is one over the total number of stocks an institution holds). Transaction value $Deal\,Size$ is measured as the transaction value divided by the acquirer's pre-acquisition market value. Liquidity is measured by the acquirer stock's percent bid-ask spread, and the subsample with high liquidity contains acquirers with low percent bid-ask spread.$BHAR_{1y}$ is the acquirer's post-merger 1-year buy-and-hold abnormal return. $\Delta Hldg_{Nego}$ is the average change in institutional holdings of the acquirer's stocks during the bid negotiation period;$|\Delta Hldg_{Nego}|$ is the absolute value of $\Delta Hldg_{Nego}$ and capture the trading volume of acquirer stock in the bid negotiation period.

	Mean	**Stdev**	**Mean**	**Stdev**
Initial Holdings X_0				
	High		Low	
$X_0(\%)$	1.61	2.46	0.02	0.03
$BHAR_{1y}$	-1.81	0.51	-1.72	0.49
$\Delta Hldg_{Nego}$	0.02	1.27	0.28	0.61
$\lvert\Delta Hldg_{Nego}\rvert$	0.40	1.21	0.29	0.62
Relative Portfolio Weights Wts				
	High		Low	
$Wts(\%)$	0.19	1.61	-0.17	0.23
$BHAR_{1y}$	-1.67	51.11	-1.83	51.00
$\Delta Hldg_{Nego}$	0.21	1.43	0.06	0.50
$\lvert\Delta Hldg_{Nego}\rvert$	0.50	1.36	0.20	0.46
Transaction Value				
	High		Low	
$Deal\,Size$	0.60	0.59	0.07	0.04
$BHAR_{1y}$	-1.51	0.55	-2.24	0.47
$\Delta Hldg_{Nego}$	0.24	1.63	0.05	0.58
$\lvert\Delta Hldg_{Nego}\rvert$	0.40	1.59	0.21	0.54
Liquidity				
	High		Low	
$BA\,Sprd\,(\%)$	0.56	0.58	2.10	2.09
$BHAR_{1y}$	-2.78	0.46	-1.49	59.20
$\Delta Hldg_{Nego}$	0.14	1.61	0.17	0.79
$\lvert\Delta Hldg_{Nego}\rvert$	0.35	1.59	0.19	0.73

Table 2: **Institutional Trading During the Bid Negotiation Period**

Panel A. Institutional Trading and Merger Performance

This table presents the results for the baseline analysis. Panel A presents the following regression:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

The dependent variable,$\Delta Hldg_{i;(0,cls)}$ denotes the average trading of acquire i's stocks by institutional investors during the bid negotiation period; $DealQlt_i$ denotes the ex post deal quality measured either by acquirer i's BHARs measured over different horizons. Control variables follow Parrino et al. (2003) who study the determinants of changes in institutional holdings: $Return_{i;(0,cls)}$ denotes the acquirer's cumulative return in bid negotiation period; $FirmSize_{i,-1yr}$ and $FirmMB_{i,-1yr}$ denote the acquirer's size (i.e., the logarithm of market value) and book-to-market ratio measured one year before the bid announcement; $Turnover_{i;(0,cls)}$ denotes the aggregate trading volume in bid negotiation period normalized by the shares outstanding, EOY_i denotes the year-end dummy, which takes the value of one if the bid negotiation period contains the fourth quarter.

When independent variable *DealQlt* in regression is measured by:					
	BHAR Over Different Horizons				
	[0, 12m]	[0, 24m]	[0, 6m]	[6m,12m]	[12m, 24m]
DealQlt	0.190***	0.106***	0.111	0.262***	0.039
	(0.061)	(0.039)	(0.088)	(0.085)	(0.056)
Return	0.317***	0.321***	0.328***	0.335***	0.338***
	(0.101)	(0.101)	(0.101)	(0.101)	(0.101)
Size	-0.076***	-0.076***	-0.073***	-0.078***	-0.074***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
M/B	-0.001	0.000	-0.002	-0.000	-0.001
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
EOY	0.033	0.038	0.034	0.035	0.037
	(0.063)	(0.063)	(0.064)	(0.063)	(0.064)
Vol	0.007	0.001	0.003	0.002	-0.001
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Cons.	0.619***	0.618***	0.601***	0.638***	0.608***
	(0.131)	(0.131)	(0.131)	(0.131)	(0.131)
Adj-R2	0.022	0.020	0.017	0.022	0.016
# Obs	1,504	1,504	1,504	1,504	1,504

Panel B. Institutional Trading on Good and Bad News

Panel B presents the following regression:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 \left[DealQlt_i\right]^{+(-)} + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)}$ is the change in institutional holdings of acquirer i's stocks during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid closure (completed or withdrawn). $[DealQlt_i]^{+(-)}$ equals $DealQlt_i$ when $DealQlt_i$ is positive (negative) and zero otherwise, $DealQlt_i$ is the measure of bid quality characterized by BHAR over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-yr}$ is the logarithm of the acquirer's market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(0,cls)}$ denotes the aggregate trading volume in bid negotiation period normalized by the shares outstanding, and EOY_i is an end-of-year dummy.

When independent variable $[DealQlt]^+$ or $[DealQlt]^-$ in regression is measured by:				
	BHAR Over Different Horizons			
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
$[DealQlt]^+$	0.421***	0.178**		
	(0.110)	(0.067)		
$[DealQlt]^-$			0.161*	0.112*
			(0.095)	(0.066)
Return	0.323***	0.333***	0.340***	0.339***
	(0.101)	(0.101)	(0.101)	(0.101)
Size	-0.065***	-0.070***	-0.078***	-0.078***
	(0.019)	(0.019)	(0.019)	(0.019)
M/B	-0.005	-0.002	0.001	0.001
	(0.023)	(0.023)	(0.023)	(0.023)
EOY	0.027	0.032	0.029	0.030
	(0.063)	(0.063)	(0.063)	(0.063)
Vol	0.001	-0.002	0.001	-0.003
	(0.031)	(0.031)	(0.031)	(0.031)
Cons.	0.478***	0.534***	0.657***	0.661***
	(0.134)	(0.134)	(0.136)	(0.135)
Adj-R2	0.026	0.020	0.017	0.017
# Obs	1,504	1,504	1,504	1,504

Table 3: Mutual Fund Trading Before Bid Announcement

This table presents the results for the following two regressions

$$\begin{aligned}\Delta Hldg_{i;(-5,-1)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(-5,-1)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(-5,-1)} + \beta_6 EOY_i + e_i \\ \Delta Hldg_{i;(-5,-1)} &= \alpha + \beta_1 |DealQlt_i| + \beta_2 Return_{i;(-5,-1)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(-5,-1)} + \beta_6 EOY_i + e_i\end{aligned}$$

$\triangle Hldg_{i;(-5,-1)}$ is the change in institutional holdings of acquirer i's stocks during an one-year window before the quarter of bid announcement. $DealQlt_i$ is the measure of bid quality characterized by buy-and-hold abnormal return (BHAR) over different horizons, and $|DealQlt_i|$ is the absolute value of $DealQlt_i$. $Return_{i;(-5,-1)}$ is the total return of the acquirer stock during the one-year pre-announcement window, $FirmSize_{i,-1yr}$ is the logarithm of the acquirer's market value one year before the bid, $FirmMB_i$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(-5,-1)}$ is the total trading volume as the percentage of the acquirer's shares outstanding during the one-year pre-announcement window. The end-of-year dummy EOY_i is not included in the regression because the one-year trading period must contain at least one fourth quarter, so $EOY_i = 1$ for all observations.

When independent variable *DealQlt* or |*DealQlt*| in regression is measured by:				
	BHAR Over Different Horizons			
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
DealQlt	-0.447	-0.029		
	(0.321)	(0.048)		
|*DealQlt*|			0.210***	0.135***
			(0.075)	(0.049)
Return	0.334***	0.335***	0.346***	0.348***
	(0.050)	(0.050)	(0.050)	(0.050)
Size	-0.096***	-0.094***	-0.083***	-0.086***
	(0.015)	(0.015)	(0.015)	(0.015)
M/B	0.039**	0.040**	0.035*	0.037*
	(0.019)	(0.019)	(0.019)	(0.019)
Vol	-0.019	-0.019	-0.021*	-0.020
	(0.013)	(0.013)	(0.013)	(0.013)
Cons.	0.761***	0.745***	0.604***	0.621***
	(0.104)	(0.104)	(0.115)	(0.113)
Adj-R2	0.080	0.078	0.084	0.084
# Obs	1,504	1,504	1,504	1,504

Table 4: Subsample Test: Initial Holdings X_0

This table presents the results for the following regression in two subsamples that are constructed based on the institutions' initial holdings, X_0, of the acquirer stocks at the beginning of bid negotiation period:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)}$ is the changes in institutional holdings during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid completion or withdrawal. $DealQlt_i$ is the measure of deal quality characterized by buy-and-hold abnormal return (BHAR) over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-1yr}$ is the logarithm of the acquirer's market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(0,cls)}$ is the total trading volume as percent of the acquirer's share outstanding during bid negotiation period, and EOY_i is an end-of-year dummy.

	High X_0		Low X_0		Difference	
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
DealQlt	0.177***	0.102**	0.001	-0.010	0.176**	0.112**
	(0.065)	(0.044)	(0.032)	(0.022)	(0.074)	(0.049)
Return	0.261**	0.266**	0.141***	0.143***	0.120	0.123
	(0.111)	(0.108)	(0.049)	(0.050)	(0.121)	(0.121)
Size	-0.033	-0.033	-0.107***	-0.106***	0.074	0.074
	(0.020)	(0.020)	(0.010)	(0.010)	(0.022)	(0.022)
M/B	-0.002	0.000	0.001	0.001	-0.001	-0.001
	(0.025)	(0.025)	(0.012)	(0.012)	(0.028)	(0.028)
EOY	-0.002	-0.001	0.003	0.002	-0.004	-0.003
	(0.069)	(0.069)	(0.033)	(0.033)	(0.077)	(0.076)
Vol	-0.049	-0.055	0.074**	0.074**	-0.124***	-0.129***
	(0.034)	(0.034)	(0.015)	(0.015)	(0.037)	(0.037)
Cons.	0.269***	0.267***	0.935***	0.933***	-0.665***	-0.666***
	(0.142)	(0.142)	(0.072)	(0.072)	(0.159)	(0.159)
# Obs	1,448	1,448	1,334	1,334		

Table 5: Subsample Test: Portfolio Weight Wts

This table presents the results for the following regression in two subsamples that are constructed based on the relative weights of acquirer stock in mutual funds' portfolios, Wts:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)}$ is the changes in institutional holdings during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid completion or withdrawal. $DealQlt_i$ is the measure of deal quality characterized by buy-and-hold abnormal return (BHAR) over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-1yr}$ is the logarithm of the acquirer's market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(0,cls)}$ is the total trading volume as a percentage of the acquirer's share outstanding during bid negotiation period, and EOY_i is an end-of-year dummy.

	High Wts		Low Wts		Difference	
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
DealQlt	0.193**	0.125**	0.001	-0.008	0.191**	0.133**
	(0.076)	(0.052)	(0.025)	(0.017)	(0.080)	(0.055)
Return	0.429***	0.426***	0.106**	0.107**	0.323**	0.319**
	(0.119)	(0.119)	(0.044)	(0.044)	(0.127)	(0.127)
Size	-0.072***	-0.073***	-0.039***	-0.040***	-0.032	-0.033
	(0.024)	(0.024)	(0.008)	(0.008)	(0.025)	(0.025)
M/B	0.001	0.004	-0.004	-0.004	0.005	0.008
	(0.028)	(0.028)	(0.010)	(0.010)	(0.030)	(0.030)
EOY	0.054	0.059	0.000	-0.000	0.054	0.059
	(0.079)	(0.079)	(0.027)	(0.027)	(0.084)	(0.084)
Vol	0.001	0.003	0.015	0.015	-0.006	-0.012
	(0.037)	(0.037)	(0.013)	(0.013)	(0.039)	(0.039)
Cons.	0.634***	0.637***	0.316***	0.315***	0.318*	0.322*
	(0.169)	(0.169)	(0.058)	(0.058)	(0.178)	(0.178)
# Obs	1,352	1,352	1,456	1,456		

Table 6: Subsample Test: Deal Size

This table presents the results for the following regression in two subsamples that are constructed based on the relative deal size, $\frac{TranVal}{MV_{Acq}}$:

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)}$ is the changes in institutional holdings during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid completion or withdrawal. $DealQlt_i$ is the measure of deal quality characterized by buy-and-hold abnormal return (BHAR) over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-1yr}$ is the logarithm of the acquirer's market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(0,cls)}$ is the total trading volume as a percentages of the acquirer's shares outstanding during bid negotiation period, and EOY_i is an end-of-year dummy.

	Large		Small		Difference	
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
DealQlt	0.237**	0.130*	0.053	0.015	0.184*	0.115
	(0.104)	(0.073)	(0.042)	(0.027)	(0.112)	(0.078)
Return	0.247	0.254*	0.307***	0.309***	-0.060	-0.055
	(0.151)	(0.151)	(0.080)	(0.080)	(0.171)	(0.171)
Size	-0.078**	-0.077**	-0.041***	-0.040***	-0.037	-0.037
	(0.033)	(0.033)	(0.013)	(0.013)	(0.035)	(0.035)
M/B	0.035	0.041	-0.009	-0.010	0.044	0.051
	(0.046)	(0.046)	(0.014)	(0.014)	(0.048)	(0.048)
EOY	0.122	0.118	-0.088**	-0.088*	0.210*	0.206
	(0.113)	(0.113)	(0.044)	(0.044)	(0.121)	(0.121)
Vol	-0.014	-0.022	0.038	0.037	-0.052	-0.059
	(0.049)	(0.049)	(0.026)	(0.032)	(0.055)	(0.059)
Cons.	0.605***	0.594***	0.340***	0.340***	0.265	0.254
	(0.216)	(0.217)	(0.095)	(0.095)	(0.236)	(0.237)
# Obs	752	752	752	752		

Table 7: Subsample Test: Liquidity

This table presents the results for the following regression in two subsamples that are constructed based on the acquirer stock liquidity :

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)s}$ is the changes in institutional holdings during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid completion or withdrawal. $DealQlt_i$ is the measure of deal quality characterized by buy-and-hold abnormal return (BHAR) over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-1yr}$ is the logarithm of the acquirer's market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the acquirer one year before the bid, $Turnover_{i;(0,cls)}$ is the total trading volume as a percentage of the acquirer's shares outstanding during bid negotiation period, and EOY_i is an end-of-year dummy.

	High		Low		Difference	
	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]	[0, 12m]	[0, 24m]
DealQlt	0.367**	0.207*	0.094*	0.029	0.273*	0.178*
	(0.143)	(0.098)	(0.056)	(0.037)	(0.154)	(0.105)
Return	0.495**	0.480**	0.059	0.067	0.436*	0.414*
	(0.223)	(0.223)	(0.089)	(0.089)	(0.240)	(0.241)
Size	-0.134***	-0.136***	-0.054**	-0.053**	-0.080*	-0.083*
	(0.043)	(0.043)	(0.021)	(0.021)	(0.048)	(0.048)
M/B	-0.003	0.001	-0.008	-0.007	0.005	0.007
	(0.042)	(0.042)	(0.015)	(0.025)	(0.049)	(0.049)
EOY	0.144	0.163	0.015	0.014	0.130	0.149
	(0.138)	(0.139)	(0.067)	(0.067)	(0.152)	(0.153)
Vol	-0.043	-0.054	0.078*	-0.072	-0.122*	-0.126*
	(0.053)	(0.053)	(0.047)	(0.047)	(0.071)	(0.071)
Cons.	1.108***	1.109***	0.440***	0.436***	0.668*	0.673*
	(0.333)	(0.334)	(0.129)	(0.129)	(0.357)	(0.358)
# Obs	584	584	659	659		

Table 8: **Mutual Fund Ability**

This table presents the results for the following regression for mutual funds with different abilities. The coefficients of interest, β_1, together with the robust standard errors, are reported in the table. Funds are classified into quintiles based on their abilities before bid announcements.

$$\begin{aligned}\Delta Hldg_{i;(0,cls)} &= \alpha + \beta_1 DealQlt_i + \beta_2 Return_{i;(0,cls)} + \beta_3 FirmSize_{i,-1yr} \\ &\quad + \beta_4 FirmMB_{i,-1yr} + \beta_5 Turnover_{i;(0,cls)} + \beta_6 EOY_i + e_i\end{aligned}$$

where $\triangle Hldg_{i;(0,cls)}$ is the change in mutual fund holdings during the bid negotiation period that starts from the quarter end of bid announcement and lasts until the quarter end of bid closure (completed or withdrawn). $DealQlt_i$ is the measure of bid quality characterized by BHAR over different horizons, $Return_{i;(0,cls)}$ is the total return of the company stock during the bid negotiation period, $FirmSize_{i,-1yr}$ is the logarithm of the company market value one year before the bid announcement, $FirmMB_{i,-1yr}$ is the market-to-book equity ratio of the company one year before the bid, $Turnover_{i;(0,cls)}$ is the total trading volume as a percentage of the company's shares outstanding during bid negotiation period, and EOY_i is an end-of-year dummy.

Fund Ability Rank	Fund Ability α (%)	BHAR Over Different Horizons	
		[0, 12m]	[0, 24m]
1 (High)	1.050**	0.073**	0.014
	(0.449)	(0.036)	(0.022)
2	0.509***	0.043	0.021
	(0.078)	(0.032)	(0.020)
3	0.289***	-0.024	-0.025
	(0.056)	(0.023)	(0.015)
4	0.093	0.004	-0.006
	(0.062)	(0.027)	(0.018)
5 (Low)	-0.300	-0.035*	-0.018
	(0.329)	(0.020)	(0.014)
Difference (1 - 5)	1.350***	0.109***	0.032
	(0.557)	(0.040)	(0.026)

Figure 1: **Timeline of Trading and Merger Performance**

This figure illustrates three time periods for measuring institutional investors' trading of acquirer stock before, around, and after bid announcements. It also shows the different horizons over which merger performance is measured. $\triangle Hldg_{-5,-1}$ is the change of institutional investors' holding of the acquirer stock during 4 quarter periods before the quarter of bid announcement; $\triangle Hldg_{-1,0}$ is the change of institutional investors' holding of the acquirer stock during the quarter of bid announcement; $\triangle Hldg_{0,cls}$ is the change of institutional investors' holding of the acquirer stock from the quarter end of bid announcement to the quarter end of bid outcome. $BHAR_{cls+n,cls+m}$ is the acquirer's buy-and-hold abnormal return measured in the event window that starts from n quarters after bid outcome and covers up to m quarters after bid outcome. DateAnn and DateClose are the exact date of bid announcement and bid outcome.