

# Hedge Fund Activism in Leveraged Buyouts\*

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# Hedge Fund Activism in Leveraged Buyouts

## Abstract

I examine whether and, if so, how the presence of hedge funds, as shareholders of the target of a proposed leveraged buyout (LBO), enhances target shareholder wealth. I find that preannouncement hedge fund presence is positively related to the initial buyout premium. This effect is robust and economically significant: a two standard deviation increase in the measure of preannouncement hedge fund presence is associated with an increase of 7–9 percentage points in the initial premium. I also show that this relationship is stronger for firms with less liquid stocks, which supports an active role for hedge funds, rather than a passive (or informational) role. Furthermore, I find that for offers with a low initial premium, greater hedge fund net buying during the announcement quarter is associated with a greater likelihood and a larger magnitude of an upward revision of the premium. I also show that hedge fund presence is positively associated with the probability of receiving an LBO offer. However, conditional on the receipt of an offer, hedge funds do not increase the probability of deal consummation. Nevertheless, targets with greater hedge fund presence are associated with a higher abnormal return around withdrawal announcement and a higher probability of being acquired subsequently. Finally, I show that hedge funds' strategy of investing in potential LBO candidates delivers abnormal returns.

JEL CLASSIFICATION: G23, G34, G14

KEYWORDS: Hedge funds, private equity, leveraged buyouts (LBOs), takeovers, shareholder activism, large shareholders

# 1 Introduction

Hedge funds have become increasingly important players in the market for corporate control. In particular, by taking large, non-controlling, and relatively long-term positions in underperforming firms, hedge funds have actively pressured managers to sell part of or even the entire firm, become involved in takeover negotiations, and blocked acquisition offers. Although hedge fund activism in corporate control transactions is widely discussed, little is known concerning the effect of such activism on shareholder gains in takeovers.

Hedge funds have two advantages over traditional institutions which make them unique players in the market for corporate control. First, as is suggested by the recent literature on hedge fund activism, hedge funds are more effective in monitoring management than are other institutional investors (see, for example, Brav, Jiang, Partnoy, and Thomas, 2006). Thus, hedge funds could play an active monitoring role in the takeover setting, where conflicts of interests between target management and target shareholders often arise (Jensen and Ruback, 1983). Second, unlike mutual funds and pension funds, hedge funds tend to hold highly concentrated positions in small numbers of companies and even make attempts to acquire these companies. As a result, hedge funds may have the potential to *determine* the outcome of a takeover.

In this paper, I examine the role of hedge funds in leveraged buyouts (LBOs). In particular, I study whether, and if so how, the presence of hedge funds, as shareholders of a buyout target, enhances target shareholder wealth. LBOs are controversial, and one of the main controversies is whether existing public shareholders are bought out at a “fair” price. Claims are often made in the business press that private equity firms, with the help of target management, acquire and profit from companies at the expense of public shareholders.<sup>1</sup> While DeAngelo, DeAngelo, and

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<sup>1</sup>An apparent conflict of interest in LBOs which involve management participation is that managers play the dual role of a buyer and a seller. Even if managers do not participate in the transaction, they still have greater incentive to pursue personal benefits at the expense of public shareholders in LBOs than in interfirm takeovers. The reason is twofold. First, managers are more likely to be retained following a buyout, whereas in an interfirm takeover, particularly a hostile one, managers are likely to be replaced after the acquisition. Hartzell, Ofek, and Yermack (2004) find that two thirds of target CEOs are forced out at the time when their firms are acquired in interfirm takeovers. Second, private firms can afford superior performance-based compensation to incentivize managers. Jensen (1986) reports that, even without considering bonus and incentive plans, a \$1,000 increase in shareholder value would lead to a \$64 increase in personal wealth of the median post-LBO firm manager. In contrast, counting all sources of compensation, the personal wealth increase of the median public-company CEO is only \$3.25 for the same increase in shareholder value.

Rice (1984) find no evidence of public shareholders being expropriated by majority shareholders in going private transactions, Bargeron, Schlingemann, Stulz, and Zutter (2007) show that the gain for target shareholders when a public firm makes the acquisition is 63% higher than when the acquirer is a private equity firm (46.5% versus 28.5%). Thus, this paper examines the role of hedge funds in a setting where substantial shareholder value is at stake and the potential for conflict of interest between stockholders and firm managers is high.

Using a sample of buyout proposals involving U.S. public corporations during the 1990 – 2006 period and a hand-collected dataset on hedge fund holdings, I find evidence that hedge funds increase target shareholder wealth in LBOs. In particular, I find that LBO targets with greater hedge fund presence before the announcement are associated with a higher initial premium. A two standard deviation increase in the measure of preannouncement hedge fund presence is associated with an increase of 7–9 percentage points in the initial premium, or a dollar gain of over \$47 million per deal for target shareholders. This result is robust to controls for target firm characteristics (such as firm size, free cash flow, tax liability, growth prospects, and industry membership), the presence of public pension funds and mutual funds, shareholder investment horizon, board characteristics, and so on.

I also show that, for offers with a low initial bid, greater net buying by hedge funds during the announcement quarter is associated with a greater likelihood and a larger magnitude of an upward revision in the bid. Furthermore, hedge fund presence is positively associated with the probability of receiving an LBO offer. A two standard deviation increase in hedge fund presence increases the probability of receiving an LBO offer by 18.9%. Decomposing hedge fund presence into an active and a passive portion, I show that this effect is explained by the presence of active hedge funds (13D filers). Finally, conditional on the receipt of an offer, hedge fund presence does not increase the likelihood of deal completion. Nevertheless, targets with greater hedge fund presence are associated with a higher abnormal return around withdrawal announcement and a higher probability of being acquired subsequently.

Why hedge funds are associated with enhanced shareholder wealth in LBOs? This paper considers two possible roles for hedge funds: the role of “active shareholders,” as in Gomes (2001), and the role of “large shareholders,” as in Shleifer and Vishny (1986) and Cornelli and Li (2002).

Although these studies are not specific to hedge fund shareholders, their theories underlie the testable hypotheses I examine in this paper. Under the active shareholder theory, the presence of active investors, such as hedge funds, as shareholders of the buyout target could ex ante force the bidder to offer a high preemptive bid. This situation arises because by accumulating blocks of target shares both before and after the buyout announcement, active shareholders could potentially block a transaction by not tendering or by tendering only for a high premium. Anticipating this, the private equity bidder will make a high preemptive bid. I refer to this theory as the active shareholder hypothesis. The large shareholder theory, on the other hand, predicts that large shareholders improve shareholder value by facilitating buyout transactions. In a diffusely held firm, value-enhancing takeovers may not take place because small shareholders will free ride on the improvement implemented by an outside bidder. The presence of large shareholders can mitigate this free-rider problem, since the large gains from their own shares in the event of a takeover provide them an incentive to initiate a takeover or to facilitate a third-party takeover. I refer to this theory as the large shareholder hypothesis. The two hypotheses are not mutually exclusive; indeed, both roles are in the spirit of shareholder activism: buying shares in order to profit from planned intervention.

In connection with the active shareholder hypothesis, I also examine a closely related informational explanation. Suppose that hedge funds are informed about a prospective buyout and increase their holdings in the target in advance.<sup>2</sup> A positive relationship between preannouncement hedge fund presence and the initial buyout premium would be expected regardless of whether hedge funds use their voting rights to hold out the transaction. I make use of a novel prediction of Gomes (2001), which states that the positive relationship should be stronger for targets with less liquid stocks under the active shareholder hypothesis. This situation arises because active shareholders are less able to accumulate blocks in less liquid stocks after announcement and hence their presence before announcement plays a greater role in determining the premium. In contrast, under the informational explanation, because informed trading would have pushed up the price of the targets with less liquid stocks before the offer,<sup>3</sup> the premiums for these targets would actually

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<sup>2</sup> Acharya and Johnson (2007) find evidence of insider trading before buyout announcements.

<sup>3</sup> Informed investors are less able to conceal their information in trading less liquid stocks, since there are less noise traders to provide camouflage. This notion is first proposed by Kyle (1985).

be lower. Thus, the informational explanation suggests that the positive relationship be weaker for targets with less liquid stocks. I show that this relationship is stronger for firms with less liquid stocks – hence the results are not driven simply by hedge funds being informed.

These findings seem to echo anecdotal evidence that hedge funds play an active and strategic role in LBOs. For example, an article in *Institutional Investor* (“Alpha Maelstrom,” June 2006) comments that “[i]ncreasingly ... activist hedge funds are obstructing this stream of [buyout] deals ... [and] [m]ore often than not the outcome of such episodes favors public market shareholders.” In the attempted buyout of Titan International by private equity firm One Equity Partners, hedge fund JANA Partners increased its holdings of Titan from 5% before the announcement to 15% afterwards and forced the bidder to withdraw its offer. The hedge fund’s move to block the deal seemed a wise one, particularly since the market price of Titan stock two years after the offer was 50% higher than the offer price. Another example of confrontation between hedge funds and private equity bidders is the buyout of ShopKo Stores. Elliot Associates, a hedge fund that held 8% of the buyout target, actively opposed the proposed buyout from Goldner Hawn Johnson & Morrison. Elliot invited another private equity firm, Sun Capital, to make a rival bid. A bidding contest ensued, and Sun Capital wound up acquiring the target with a much higher price. As a result, compared to the initial bid, the closing offer increased the wealth of ShopKo shareholders by 20.8%, or \$147.6 million.

Interestingly, hedge funds do not seem to play a significant role in interfirm takeovers. In particular, I find that preannouncement hedge fund presence is not associated with takeover premiums. I also show that hedge fund net buying during the announcement quarter does not predict the probability and magnitude of bid revisions, or the probability of deal consummation. Why are there such differences in the role of hedge funds between LBOs versus interfirm takeovers? As will be discussed later, I propose several possible explanations, including the preferences of hedge funds towards particular stock characteristics, information acquisition costs, and potential gains/losses from shareholder litigation.

While hedge funds seem to perform a valuable function for target shareholders in LBOs, a natural question to ask is: does such activism benefit themselves as well? To address this question, I construct a sample of potential LBO target stocks. I use calendar-time portfolio regression approach

to examine the profitability of hedge funds' investment in these potential LBO candidates. I show that the stocks that hedge fund managers buy significantly outperform those that they sell in the subsequent 6 months, particularly during the post-1999 LBO boom. For example, an active strategy based on hedge fund trading in these potential LBO target stocks delivers an abnormal return, in excess of Fama-French-Carhart four-factor model, of 17.4% per annum during 1999 – 2006.

This paper is related to two strands of empirical literature, with the first one being the literature on hedge fund activism. Brav, Jiang, Partnoy, and Thomas (2006) find large positive abnormal returns when hedge funds first disclose holdings larger than 5% in their 13D filings. Greenwood and Schor (2007) show that these returns largely come from the subset of events in which the activist ex post successfully forces target firms into a takeover. In addition, Becht, Franks, Mayer, and Rossi (2008) conduct a case study of the Hermes UK Focus Fund using a unique dataset. They show that the fund executes shareholder activism primarily through private engagements. This paper extends previous research in two ways. First, I show that hedge funds use their voting rights to enhance target shareholder wealth in takeovers. Second, by using 13F data, I am able to track the holdings of hedge funds around takeover offers, and relate them to shareholder gains.

This paper also connects to the literature on the role of institutional investors in takeovers. For example, Stulz, Walkling, and Song (1990), Gaspar, Massa, and Matos (2005), Hsieh and Walkling (2005), Larcker and Lys (1987), and Peck (1996). This stream of literature, however, has not examined the role of hedge funds in takeovers (including LBOs). To the best of my knowledge, this is the first paper to investigate the role of hedge funds in takeovers.

The balance of the paper is organized as follows. Section 2 develops the two hypotheses in detail. Section 3 describes the data and summary statistics. Section 4 presents empirical results and Section 5 concludes with a discussion of the results.

## **2 Hypotheses Development**

In this section, I rely on previous theories to develop hypotheses about how hedge funds affect target shareholder wealth in LBOs. As mentioned earlier, the theories are not developed specifically for

hedge funds, but rather for general shareholders. Nevertheless, they provide useful insights on the possible roles of hedge funds.

## 2.1 Active Shareholder Hypothesis

Since the consummation of a takeover typically requires a certain percentage of target shareholders to vote in favor of the transaction (in mergers) or to tender their shares (in tender offers), shareholders with substantial stakes can potentially block a deal. Gomes (2001) models freeze-out tender offers as a bargaining game between the bidder and active shareholders. The idea is that active shareholders could accumulate blocks of target shares both before and during the offer, which empowers them to hold out a transaction. In equilibrium, there is a positive relationship between active shareholders' accumulation of shares before the offer and the initial takeover premium. Intuitively, the greater the stake (hence bargaining power) held by active shareholders, the higher the price the bidder will have to pay.

Gomes (2001) also points out that the relationship is stronger for targets with less liquid stocks. The intuition is that the equilibrium takeover premium is determined by the hold-out power of active shareholders, which has two components: one is associated with the blocks that active shareholders hold before the offer and the other is additional blocks that active shareholders can accumulate during the offer. For targets with less liquid stocks, active shareholders are less able to accumulate shares after the announcement, and hence less likely to enhance their hold-out power. As a consequence, the preannouncement presence of active shareholders plays a greater role in determining the equilibrium premium for less liquid stocks. As mentioned above, this prediction enables me to distinguish between the active shareholder hypothesis and the informational explanation. Under the informational explanation, one would expect the relationship be weaker for firms with less liquid stocks. This arises because informed investors are less able to conceal their information when trading in less liquid stocks, and, as such, the stock price would have appreciated to reflect the increased probability of a takeover before the announcement, which leads to a low premium.

Although the equilibrium outcome is that the bidder makes a high preemptive bid and clinch the deal, there are out-of-equilibrium outcomes where the bidder makes a low initial bid. In such

cases, active shareholders could enter and accumulate more shares to enhance their hold-out power, which could force the bidder to increase her bid. The model predicts that, for offers with a low initial premium, there is a positive relationship between net buying by active shareholders during the offer and revisions in the bid.

The hold-out power could also arise from active shareholders' superior ability to evaluate a buyout offer. Gomes' (2001) model abstracts from information asymmetry between the bidder and target shareholders concerning the post-takeover value of the firm. However, in a world where the bidder have an information advantage over target shareholders, the division of the gains will generally be tilted toward the more informed party, i.e., the bidder.<sup>4</sup> If active shareholders are able to produce information on a buyout offer, they can potentially persuade other public shareholders, or a fraction of them sufficient to hold out the transaction. Active shareholders have influence on the voting or tendering decision of other public shareholders because of their informational advantage and the fact that the interests of these active shareholders are aligned with those of other public shareholders. Thus, even if active shareholders do not de facto possess the necessary shares or votes to block a transaction, they could still ex ante force private equity buyers to offer a high initial bid.

Hedge funds could play the role of active shareholders for the following reasons. First, hedge funds are significant shareholders in LBO targets. As shown below, hedge funds on average hold 5.1% of the outstanding shares of the target prior to the buyout announcement. Second, compared to traditional institutions, hedge funds are presumably more sophisticated in producing information in LBOs. Since they invest in distressed firms and even make attempts to take firms private, hedge funds may possess an information advantage in evaluating LBO offers. Last, since a buyout transaction involves more due diligence and negotiation than acquiring a minority stake in a potential target firm, it is reasonable that hedge funds could build a position in advance of the buyout announcement. To summarize, active shareholder theory implies the following three testable hypotheses:

**H1:** The initial buyout premium is an increasing function of hedge fund presence prior to the buyout offer.

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<sup>4</sup>Ausubel, Cramton, and Deneckere (2002) provide a review of sequential bargaining with incomplete information.

**H2:** The positive relationship between preannouncement hedge fund presence and the initial buyout premium is stronger for firms with less liquid stocks.

**H3:** Hedge fund net buying during the offer increases the likelihood and magnitude of bid revisions for offers with a low initial bid.

## **2.2 Large Shareholder Hypothesis**

In Shleifer and Vishny (1986), large shareholders (of the target firm) play the role of facilitating takeovers. In a widely held firm, a value-enhancing takeover may not always take place. This situation arises because small shareholders will free ride on the bidder, who bears the takeover cost, by demanding the full value of the improvement, thereby rendering the takeover unprofitable for the bidder. This is classic “free-rider” problem suggested by Grossman and Hart (1980). Shleifer and Vishny (1986) argue that the presence of large shareholders can help resolve this free-rider problem. Since a takeover generates large gains on the shares they already hold, large shareholders can take over the firm and still make a profit after taking into account the takeover cost. Even when large shareholders do not initiate takeovers, their presence could facilitate third-party takeovers by splitting the large gains on their own shares with the outside bidder. Thus, the likelihood of a takeover increases with large shareholders’ holdings of the firm’s stock.

Cornelli and Li (2002) demonstrate that even if there are no large shareholders at the time of the offer, arbitrageurs could enter and accumulate shares after the announcement. These arbitrageurs therefore become large shareholders who play the role of mitigating the free-rider problem. Their model predicts a positive relationship between the accumulation of shares by arbitrageurs during the offer and the likelihood of deal completion.

Hedge funds could play the role of large shareholders for several reasons. First, hedge funds hold significant stakes (5.1%) in target companies, which provides them an incentive to resolve the free-rider problem. Second, merger arbitrage is one of the popular strategies employed by hedge fund managers. Arbitrageurs typically buy target shares at a price below the offer price on the open market after the deal is announced, wait until the effective date of the deal, and then tender the shares to the bidder. Third, hedge funds provide funding to private equity sponsors as active

buyers of high-yield debt. Since they share the gains with the bidder, hedge funds have an incentive to facilitate the transactions. Last, to the extent that the marginal capital gain tax rates are lower for hedge funds than for the average investor,<sup>5</sup> it provides hedge funds an incentive to tender their shares for a given premium (Stulz, Walkling, and Song, 1990). To summarize, large shareholder theory implies the following two testable hypotheses:<sup>6</sup>

**H4:** Hedge fund presence increases the likelihood of receiving an LBO offer.

**H5:** Hedge fund net buying during the offer increases the likelihood of deal completion.

### 3 Data and Summary Statistics

Data on stock holdings of hedge fund managers are retrieved from Thomson Financial CDA/Spectrum Institutional (13F) Holdings Database. Although they are largely unregulated, hedge funds managing over \$100 million of 13F securities are required to file 13F forms quarterly for all U.S. equity positions worth over \$200,000 or consisting of more than 10,000 shares.

Since the 13F database does not identify hedge fund managers, I manually construct a list of hedge fund managers with Thomson Financial identifiers (MGRNO). I first identify candidate hedge fund managers from 2002 – 2007 issues of *Institutional Investor* magazine’s annual Hedge Fund 100 list and match each candidate hedge fund manager by name in the 13F database. This list is then supplemented by a list of large fund managers from 13F. Since hedge fund managers are likely classified into two types: independent investment advisor (type 4) and all others (type 5), I pick fund managers in the two categories with dollar value of equity portfolio exceeding \$1 billion (in 2006 dollars) in any of the years from 1990 to 2006. This procedure produces a list of 1641 fund managers. Following Brunnermeier and Nagel (2004), I identify a manager as a hedge fund manager if either of the following two conditions is satisfied. First, the fund manager is not registered as an investment advisor with the SEC, and the company website or web-based searches suggest that the manager is a hedge fund. Second, if the manager is registered, I require that Form

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<sup>5</sup>Many hedge funds in the sample are offshore funds which are held in tax-haven locations and provide eligible investors significant tax benefits compared to the US.

<sup>6</sup>It should be noted that all hypotheses except **H4** are conditioned on the receipt of an LBO offer.

ADV show that at least 50% of its clients are “other pooled investment vehicles (e.g., hedge funds)” or “high net worth individuals,” and it charges performance-based fees. There are 337 hedge fund managers in the sample. The hedge fund holdings database employed in this paper is comparable to that in Griffin and Xu (2007), which is by far the most comprehensive dataset on hedge fund holdings.

One limitation of the hedge fund data is that CDA/Spectrum only provides information on long equity positions of institutions. Thus, this paper does not consider bond positions and more flexible investment strategies by hedge funds such as derivatives and short selling. Despite this, these strategies do not seem to be able to provide a complete explanation to the results.<sup>7</sup>

I retrieve LBOs announced during 1990 to 2006 from Securities Data Company’s (SDC) Merger and Acquisition Database. I require that the target firm is listed in NYSE, AMEX or NASDAQ; that the target’s CUSIP can be matched with Center for Research in Securities Prices (CRSP) data; that deal value exceeds \$10 million; that the acquirer is not publicly listed;<sup>8</sup> that the outcome of the LBO is known (either completed or withdrawn); and that the target stock is held by the sample hedge funds in at least one of the quarters during the preannouncement one-year period.<sup>9</sup> I also exclude LBO targets with prior information leakage to provide a clean test of the relationship between preannouncement trading activities by hedge funds and initial buyout premium. Specifically, I search Factiva for news stories indicating that the firm sought a buyer, was in merger talks, or received a takeover proposal in the one year prior to the announcement. The final sample consists of 196 LBO deals.

I calculate hedge fund ownership (HFO) for a specific stock in a given quarter by summing the reported holdings of the sample hedge funds and dividing by the total shares outstanding for the firm. If a stock is not held by any reporting hedge fund, then I set HFO to zero. The change in

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<sup>7</sup>If hedge funds hold both bond and equity positions in the target before announcement, their incentive might differ from that of equity-only shareholders. Hedge funds with a long position in pre-buyout bonds are likely to obstruct the proposed LBO and vice versa, since LBOs typically result in value losses for debtholders. Another concern is that hedge funds may use derivative and short positions to decouple economic ownership and voting rights and engage in “empty voting” (Hu and Black, 2007). Since the target typically experiences large positive return around the announcement, put/short positions in the target share would reduce the incentive of hedge funds to play an active role in LBOs and vice versa.

<sup>8</sup>Up to December 2006, all private equity firms in the U.S. are privately held. This requirement also excludes transactions where publicly listed firms are part of the acquirer group.

<sup>9</sup>For the sake of robustness, I also include targets that are not held by hedge funds in any of the quarters in the one-year period before announcement, the results are qualitatively the same. See Section 4.1.3.

hedge fund holdings, or net buying by hedge funds, is computed as the change in the fraction of shares held. The timing of activities is illustrated in Figure 1. Quarter  $t$  is the quarter in which the buyout transaction is announced. I compute the change in hedge fund holdings for three windows, which are one year prior to buyout announcements, two quarters prior to buyout announcements, and the announcement quarter. For example, hedge fund trading during the announcement quarter ( $\Delta\text{HFO}_{t-1 \rightarrow t}$ ) is calculated as the difference between hedge fund holdings at quarter  $t-1$  ( $\text{HFO}_{t-1}$ ) and those at quarter  $t$  ( $\text{HFO}_t$ ).

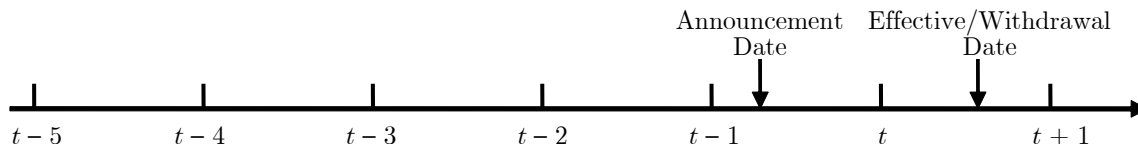


Figure1: Time line depiction of empirical analysis for LBOs and hedge fund holdings

To further explore the impact of hedge funds of different “activeness,” I classify hedge funds into two groups: active hedge funds and passive hedge funds. A hedge fund is identified as an active one if it has filed 13D at least once during the sample period, and a passive one if it never files 13D. In this way, I decompose hedge fund ownership into ownership by active hedge funds (ActiveHFO) and that by passive hedge funds (PassiveHFO).

To compare hedge funds with traditional institutions, I construct ownership by public pension funds and mutual funds in a similar fashion. I obtain a list of public pension funds members of the Council of Institutional Investors and search for the names in CDA/Spectrum. I was able to identify 15 public pension funds. I use Thomson Financial Mutual Fund Holdings Database to construct ownership by mutual funds.

I retrieve security characteristics, such as stock returns, price, and industry classification, for the sample LBO target firms from the CRSP stock file. I obtain accounting information from the Compustat file. Premium is calculated as the initial offer price divided by the target’s closing price 20 trading days prior to the announcement date minus one. Cumulative abnormal announcement return is the cumulative CAPM-adjusted return over the three-day window around the announcement date.<sup>10</sup> Following Lehn and Poulsen (1989), I construct some measures that are related to

<sup>10</sup>I estimate CAPM betas using stock returns from day  $-379$  to day  $-127$  relative to the announcement day as in Schwert (1996).

the buyout premium and the likelihood of a firm going private. These measures include excess cash flow divided by market equity (Excess Cash Flow/Equity), tax liability relative to equity (Taxes/Equity), and sales growth during the two years immediately preceding the announcement.

Table 1 reports the distribution of LBOs by year. The LBO wave of the late 1990s is evident in the table. There is a trend of increasing deal size over time. The average deal value increases by 13 fold, from \$169.52 million in early 1990s to \$2397.35 million in 2006. Initial buyout premium is higher during some years, like 1998-2001, but there is no trend in the time series. Over the years, hedge funds consistently increase their holdings of the target stocks before announcement. Specifically, they increase their holdings over the one year period before announcement by 1.03 percentage points, which represents an increase of 25.43% from their holdings at the start of the one-year period.

[Insert Table 1 about here]

Summary statistics for the sample LBOs are presented in Table 2. I winsorize all variables at the 1st and 99th percentiles to reduce the influence of extreme observations. Deal value has a mean of \$924.20 million and a median of \$315.55 million, suggesting a highly skewed distribution. The average premium is 30.78% and the three-day announcement return is 20%. These numbers are comparable to the existing literature.<sup>11</sup> The average hedge fund ownership at the time of announcement is 5.08%, and active hedge funds account for most of the holdings (4.01%). The average net buying by hedge funds during the announcement quarter is 1.74% of the outstanding shares of the target, suggesting substantial postannouncement arbitrage activities by hedge funds. In contrast to the increase in holdings by hedge funds before announcement, public pension funds and mutual funds either maintain or reduce their positions. Combined with the evidence that target stocks underperform the market by 9.22% before announcement, this finding is consistent with these traditional institutional investors following the “Wall Street Walk,” i.e., voting with their feet by selling shares in underperforming firms (Parrino, Sias, and Starks, 2003).

[Insert Table 2 about here]

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<sup>11</sup>See, for example, Bargeron, Schlingemann, Stulz, and Zutter (2007) and Guo, Hotchkiss, and Song (2007).

## 4 Empirical Results

This section presents empirical results. I start by showing the impact of hedge fund presence on target shareholder wealth in LBOs. In particular, I examine the following four questions: (1) Does preannouncement hedge fund presence increase the initial buyout premium? (2) Does postannouncement hedge fund trading affect bid revisions? (3) Does hedge fund presence increase the probability of receiving an LBO offer? and (4) Does postannouncement hedge fund trading increase the probability of deal completion, and relatedly, how does hedge fund presence affect shareholder wealth in cancelled LBOs? I then examine the same questions using a sample of interfirm takeovers. The last subsection examines whether the strategy of investing in potential LBO candidates deliver abnormal returns for hedge funds.

### 4.1 Preannouncement Hedge Fund Presence and Initial Buyout Premium

The central question is whether hedge fund presence before announcement affects initial LBO premium. I use four measures to proxy for preannouncement hedge fund presence: (1) HFO at the quarter end immediately before buyout announcement ( $\text{HFO}_{t-1}$ ), (2) change in HFO during the two quarters before announcement ( $\Delta\text{HFO}_{t-3 \rightarrow t-1}$ ), (3) a decomposition of  $\text{HFO}_{t-1}$  into  $\text{ActiveHFO}_{t-1}$  and  $\text{PassiveHFO}_{t-1}$ , and (4) a Herfindahl Index of hedge fund ownership concentration at quarter  $t - 1$ .<sup>12</sup> The first two measures are the main focus of this study.

Figure 2 plots the average cumulative abnormal return by preannouncement hedge fund presence from 20 days before buyout announcement to 20 days afterwards. I partition the sample LBOs into two groups based on the median of  $\text{HFO}_{t-1}$  and  $\Delta\text{HFO}_{t-3 \rightarrow t-1}$ . The average abnormal return during the  $[-20, 20]$  window is 27.0% for targets with high  $\text{HFO}_{t-1}$  and 18.9% for those with low  $\text{HFO}_{t-1}$ . The difference between the returns of the two groups is both economically and statistically significant ( $p$ -value = .047). The results for  $\Delta\text{HFO}_{t-3 \rightarrow t-1}$  are similar. This evidence is consistent with **H1**.

[Insert Figure 2 about here]

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<sup>12</sup>I calculate the Herfindahl Index of hedge fund ownership as the sum of the squares of the proportion of shares outstanding held by each hedge fund.

### 4.1.1 Multivariate Regressions

I run multivariate regressions to examine the relationship between preannouncement hedge fund presence and the initial buyout premium. I consider two groups of control variables. The choice of the first group is based on the LBO literature that firms having excess cash flows, high tax liabilities, and low growth prospects are associated with high buyout premiums. It is possible that hedge fund managers use such information to identify potential buyout targets and increase their holdings in these firms prior to an announcement. The second group of variables is used to control for the effect of target shareholder attributes on takeover premiums. I choose the following variables: ownership by public pension funds and mutual funds (PPFO and MFO), shareholder turnover, and industry exposure of hedge funds. Following Gaspar, Massa, and Matos (2005), I measure shareholder turnover of a target firm as the weighted average of the total portfolio turnover rates of its institutional shareholders over four quarters prior to the announcement quarter. To control for the possibility that hedge funds are simply better at predicting buyout premiums, I include industry exposure of hedge funds, measured as the average percentage of hedge fund shareholders' portfolios that are invested in the industry the target firm belongs to. As suggested by Gaspar, Massa, and Matos (2005), the measure is meant to capture the informational effect of shareholders, since an investor who is heavily invested in an industry is likely to have an information advantage for that industry. I also include firm size and past return as controls, since the pool of LBO target firms is tilted towards larger and better performing firms in recent years.

Table 3 shows the results for multivariate regressions where the dependent variable is initial buyout premium (first four columns) and abnormal announcement returns (last four columns).<sup>13</sup> The coefficients for  $HFO_{t-1}$ ,  $\Delta HFO_{t-3 \rightarrow t-1}$ , and  $Herfindahl(HFO)_{t-1}$  are significantly positive in most cases, which again supports **H1** that preannouncement hedge fund presence enhances target shareholder wealth. To get some sense of economic significance, note that one standard deviation of  $HFO_{t-1}$  ( $\Delta HFO_{t-3 \rightarrow t-1}$ ) is 6.47% (2.94%). Thus, a two standard deviation increase in  $HFO_{t-1}$  ( $\Delta HFO_{t-3 \rightarrow t-1}$ ) is associated with an increase of 8.66% (7.03%) in the initial premium.<sup>14</sup> Given that the average market capitalization of the sample firms is \$670.5 million, this translates to a

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<sup>13</sup>It should be noted that announcement returns incorporate the market-assessed probability of bid failure and revisions, whereas premiums do not.

<sup>14</sup>The calculation is based on the coefficient estimates in the first two columns of Table 3.

dollar gain of \$58.07 (\$47.14) million per deal for target shareholders.

When I decompose  $HFO_{t-1}$  into an active and a passive portion, the results show that the effect of hedge fund presence on the initial premium is explained by active hedge funds (Column 3), whereas the effect of hedge fund presence on the announcement return comes mainly from the presence of passive hedge funds (Column 7). To the extent that the market attributes the presence of active hedge funds to increased probability of a takeover, share price will increase with the stake held by active hedge funds. Since the premium reflects some of the preannouncement price runup, a regression of the premium on the presence of active hedge funds would in part capture some of this effect.<sup>15</sup> On the other hand, passive hedge funds seem to be more important in increasing announcement returns, perhaps because they may team up with active hedge funds during the takeover negotiation. On balance, the findings suggest that both active and passive hedge funds play some role in enhancing target shareholder wealth.

In contrast to the findings on hedge funds, the coefficients on  $PPFO_{t-1}$  and  $MFO_{t-1}$  are insignificant. This evidence suggests that the presence of public pension funds and mutual funds does not affect shareholder gains in LBOs. For robustness, I use the change in public pension fund ownership ( $\Delta PPFO_{t-3 \rightarrow t-1}$ ) and that in mutual fund ownership ( $\Delta MFO_{t-3 \rightarrow t-1}$ ) before announcement to proxy for their preannouncement presence. The results, not reported, are qualitatively similar. Officer, Ozbas, and Sensoy (2008) show that institutional ownership is associated with higher premium in LBO deals sponsored by two or more private equity firms. My findings suggest that this effect may be due to hedge funds in particular.

Table 3 also reveals a number of other interesting findings. Large firms are associated with low premiums. Two possible explanations are: (1) it is harder to generate efficiency gains for larger targets, and (2) bidder competition is less intense for larger targets. Consistent with Gaspar, Massa, and Matos (2005), I find some evidence that targets whose shareholders are of short investment horizons receive low premiums. Firm characteristics, such as excess cash flow, tax liability, and sales growth, do not affect buyout premiums. These findings are generally consistent with Ippolito and James (1992) and Halpern, Kieschnick, and Rotenberg (1999).

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<sup>15</sup>In Section 4.3, I show that the presence of active hedge funds, instead of passive hedge funds, increases the likelihood of receiving an LBO offer.

[Insert Table 3 about here]

#### 4.1.2 The Effect of Stock Liquidity

The active shareholder hypothesis suggests that the positive relationship between preannouncement hedge fund presence and initial buyout premium should be stronger for firms with less liquid stocks. Alternatively, the informational explanation predicts that the relationship should be weaker for firms with less liquid stocks. To examine this liquidity effect, I include a liquidity measure, and an interaction term combining the liquidity measure and preannouncement hedge fund presence in the multivariate regressions. I use Amihud (2002) illiquidity ratio as a liquidity proxy. For each target firm, the illiquidity ratio is measured as the three-month average of the monthly Amihud illiquidity measure over the quarter preceding the announcement.

Table 4 shows that the coefficients of the interaction terms are highly significant, and have the anticipated positive sign. The economic magnitude is substantial as well. For example, a one standard deviation increase in  $HFO_{t-1}$  at the announcement, combined with a one standard deviation increase in stock illiquidity, is associated with an increase of 13.71 (7.35) percentage points in the premium (abnormal announcement return). The evidence is consistent with **H2** that preannouncement hedge fund presence is a stronger predictor of the premium when the stock is less liquid. This finding strengthens the interpretation that hedge funds play an active role, rather than a passive information role, in LBOs.

[Insert Table 4 about here]

#### 4.1.3 Robustness Checks

**Board Characteristics** Cotter, Shivdasani, and Zenner (1997) and Moeller (2004) find evidence that takeover premiums are higher for targets with more effective boards and greater shareholder control. If hedge funds tend to invest in better governed firms, or pressure firms to institute better governance, we will observe a positive relationship between hedge fund presence and buyout premiums. To test this possibility, I collect target board characteristics from RiskMetrics (formerly

IRRC) and by manually searching SEC filings. In particular, I consider three board characteristics variables: board independence (the fraction of independent outside directors on the board), board size, and CEO-chairman duality. I was able to find board information for 190 LBO targets.

The first two columns in Table 5 show the results on initial buyout premium when the board characteristics are included as controls. The effect of board independence on initial premium is positive but insignificant. Board size and CEO-chairman duality are not significant in determining buyout premiums. Most importantly, the coefficients of HFO and  $\Delta$ HFO remain positive and significant, suggesting that hedge fund presence enhances shareholder gains directly, rather than indirectly through the board.

[Insert Table 5 about here]

**Targets with Zero Hedge Fund Ownership** In the main tests, I exclude targets that are not held by hedge funds during the one-year period before announcement. For robustness, I include these firms and re-run the tests using this expanded sample. The results, reported in Columns 3 and 4 of Table 5, are qualitatively unchanged.

**Acquirer Fix Effects** A potential concern is that the results are driven by some private equity buyers that are attracted to targets with hedge fund presence and able to pay a high premium. To test this possibility, I control for acquirer fix effects. There are 89 distinct acquirers in the sample. The results, reported in the last two columns in Table 5, show that the coefficients of HFO and  $\Delta$ HFO are still positive and significant.

To summarize, preannouncement presence of hedge funds is positively associated with initial buyout premium. This effect is not present for other institutional investors, such as public pension funds and mutual funds. Notably, this effect is stronger for firms with less liquid stocks, thereby supporting the active shareholder hypothesis rather than the informational explanation.

## 4.2 Hedge Fund Trading During the Offer and Bid Revisions

The active shareholder hypothesis predicts that hedge funds increase their holdings in LBOs with a low initial bid during the offer and force the bidder to increase the premium. For this test, I restrict the sample to LBO deals that the announcement date and the effective/withdrawal date are not in the same quarter. Since hedge fund holdings data is available on a quarterly basis, this requirement ensures that the trading activity of hedge funds during the announcement quarter *precedes* bid revisions and deal completion/termination.<sup>16</sup> Seventeen buyout transactions are excluded from the sample, because the announcement date and the resolution date are in the same quarter.

Table 6 reports regression results on bid revisions.<sup>17</sup> The dependent variable in Model 1 is a binary variable which equals 1 if the initial buyout premium is revised upward (closing bid > opening bid) and 0 otherwise.<sup>18</sup> In addition to the controls in previous specifications, I also include initial premium, hedge fund trading during the announcement quarter, an interaction term combining initial premium and hedge fund trading, and spread. Spread is calculated as (initial offer price  $-P_t$ )/ $P_t$ , where  $P_t$  is the target firm's stock price on the last day of the announcement quarter. To the extent that the spread captures the market-assessed probability of bid revisions, controlling for the spread would rule out the possibility that hedge funds simply bet on an increase in the bid by using market information. Model 2 uses the same set of independent variables to predict the magnitude of bid revision for the subsample that the bid is revised.

The results show that the coefficient of the interaction term in both models is significantly negative, suggesting that for low-premium offers, the increase in hedge fund holdings of the target shares during the offer is associated with both a greater likelihood and a larger magnitude of an upward revision in the bid. The economic magnitude is large as well. If hedge funds respond to a one standard deviation decrease in the initial premium by a one standard deviation increase in their trading, the probability of a bid revision increases by 7.30%. Similarly, conditional on a bid

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<sup>16</sup>SDC does not provide the date of bid revisions, thus I assume that bid revisions are close to deal completion or cancellation.

<sup>17</sup>For the regressions on bid revisions (Table 6) and deal completion (Table 8), I do not include industry fixed effects. This is because of two reasons. First, it seems unlikely that industry membership plays a role in bid revisions or deal completion. Second, 1/3 of the observations will be dropped if I include industry fixed effects, because some industry dummies perfectly predict outcomes. Nevertheless, the results are qualitatively unchanged, if I include industry fixed effects.

<sup>18</sup>The unconditional probability of bid revision is 23.5% (17.3% upward revision and 6.2% downward revision).

revision, the magnitude of the bid revision increases by 6.98 percentage points. The evidence is consistent with the prediction that hedge funds demand higher premiums by actively increasing their stakes in offers with a low initial premium (**H3**).

An alternative explanation is that hedge fund trading is positively correlated with the emergence of competing bidders, which in turn forces the initial bidder to revise the bid upward. To test this possibility, I re-run the tests using the subsample of LBOs which have only one bidder. The results, reported in the last two columns of Table 6, show that the coefficients of the interaction terms remain negative and significant. Thus, the results are not explained by bidder competition.

[Insert Table 6 about here]

### 4.3 Hedge Fund Presence and the Likelihood of Receiving an LBO Offer

The large shareholder hypothesis predicts that the presence of hedge funds increases the likelihood of receiving an LBO offer. To test this prediction, I construct a control sample following Lehn and Poulsen (1989). Specifically, I match the sample LBO firms with control firms in the same quarter, same industry, and whose market value of equity is closest to the sample firms' equity at the end of the fiscal year preceding the year of the LBO. I also require that the matched firm does not receive a takeover offer in the two-year period around announcement.

Table 7 reports the results from several probit regressions where the dependent variable is one for LBO firms and zero for the control firms. The specifications are similar to those used in predicting LBO premiums (Table 3). Again, I use four proxies to measure hedge fund presence. The results show that  $HFO_{t-1}$ ,  $\Delta HFO_{t-4 \rightarrow t-1}$ , and  $Herfindahl(HFO)_{t-1}$  have positive and significant coefficients. The economic magnitude is large as well. Since the  $HFO_{t-1}$  variable has a standard deviation of 5.67%, a two standard deviation increase in  $HFO_{t-1}$  would increase the likelihood of receiving an LBO offer by 18.93%. The results for  $\Delta HFO_{t-4 \rightarrow t-1}$  are weaker, but still significant at the 10% level. The evidence is consistent with hedge funds play the role of large shareholders by increasing the probability of receiving a takeover offer (**H4**).

An alternative interpretation of the evidence is that hedge funds are informative about the

buyout offer. Put differently, an LBO would take place regardless of the influence of hedge funds. I address this concern by decomposing  $\text{HFO}_{t-1}$  into an active and a passive portion. Under the premise that they have the same stock picking skills, one would expect that active and passive hedge funds will have the same effect on the probability of receiving a buyout offer if they simply speculate on an offer. The large shareholder hypothesis, on the other hand, suggests that the effect of active hedge funds should be stronger than that of passive hedge funds. The results, reported in Column 3 of Table 7, show that the coefficient for  $\text{ActiveHFO}_{t-1}$  is positive and highly significantly, whereas that for  $\text{PassiveHFO}_{t-1}$  is insignificant. Importantly, an  $F$ -test rejects the null hypothesis that the two coefficients are identical. ( $p$ -value = 0.087). This finding suggests that hedge funds not simply bet on, but actively push for, an LBO.<sup>19</sup>

Table 7 also reveals a number of other interesting findings. In contrast to hedge funds, presence of public pension funds and mutual funds is not associated with the likelihood of receiving a buyout offer. Firms with poor stock performance are more likely to become buyout targets. Additionally, the coefficients in front of Excess Cash Flow/Equity, Taxes/Equity, and Sales Growth are significant and have the same sign as in Lehn and Poulsen (1989). The results are consistent with the notion that excess cash flow, high tax liabilities, and low growth prospects drive a firm's decision to go private.

[Insert Table 7 about here]

#### 4.4 Hedge Fund Trading During the Offer and Bid Withdrawals

To examine the impact of hedge fund trading on the likelihood of deal completion (the opposite of bid withdrawals), I run probit regressions in which the dependent variable is one if the offer succeeds and zero if it fails. Like in Table 6, I require that the announcement date and the effective/withdrawal date are not in the same quarter and use the same set of control variables. Table 8 presents the results. The coefficient on hedge fund trading during the announcement quarter ( $\Delta\text{HFO}_{t-1 \rightarrow t}$ ) is insignificant, suggesting that hedge fund net buying during the offer does not affect

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<sup>19</sup>Greenwood and Schor (2007) provide similar findings. They find that when hedge funds acquire more than 5% of the outstanding shares of a firm, the firm is more likely to be acquired subsequently than a matched firm without hedge fund block holdings.

the likelihood of deal completion. I also use hedge fund holdings at the end of the announcement quarter ( $\text{HFO}_t$ ) to proxy for the influence of hedge funds. The results remain insignificant.

Interestingly, when I decompose hedge fund trading into trading by active hedge funds ( $\Delta\text{ActiveHFO}_{t-1 \rightarrow t}$ ) and that by passive hedge funds ( $\Delta\text{PassiveHFO}_{t-1 \rightarrow t}$ ), the results show that trading by active hedge funds during the announcement quarter is negatively associated with the probability of deal consummation, at the 10% significance level. Overall, the evidence does not support the prediction that hedge funds facilitate the completion of an LBO (**H5**).

[Insert Table 8 about here]

Although hedge funds seem to block LBO attempts, target shareholder wealth may not necessarily be adversely impacted if the firm makes a good target for future takeovers. To test this possibility, I examine abnormal returns around the announcement of LBO proposal withdrawals and the probability of being taken over following the failed LBO attempt.

Figure 3 plots the average cumulative abnormal return by hedge fund trading during the announcement quarter from 20 days before withdrawal announcement to 20 days afterwards. I partition the withdrawn LBO offers into two groups based on the median net buying by hedge funds during the announcement quarter ( $\Delta\text{HFO}_{t-1 \rightarrow t}$ ). The average abnormal return during the  $[-20, 20]$  window is  $-3.46\%$  for targets with high  $\Delta\text{HFO}_{t-1 \rightarrow t}$  and  $-19.54\%$  for those with low  $\Delta\text{HFO}_{t-1 \rightarrow t}$ . Thus, although hedge funds block LBO attempts, share price does not drop significantly for targets with high hedge fund presence. This situation could arise because the probability of a new bid emerging remains high due to the presence of hedge funds. I test this possibility by examining the probability of being taken over in the subsequent two years. I find that the probability is almost 250% higher for targets with high  $\Delta\text{HFO}_{t-1 \rightarrow t}$  than for targets with low  $\Delta\text{HFO}_{t-1 \rightarrow t}$  (52.38% versus 15%). Thus, hedge funds seem to play a strategic role in cancelled LBOs by facilitating future takeovers.

[Insert Figure 3 about here]

## 4.5 Hedge Fund Presence and Target Shareholder Wealth in Interfirm Takeovers

The discussion so far has focused only on LBOs. A natural question to ask is whether hedge funds play a similar role in general takeovers. To address this question, I retrieve a sample of interfirm takeovers announced during 1990 – 2006 from SDC Merger and Acquisition Database. I require that both the target firm and the acquirer firm be public companies and the target firm is listed by the CRSP. After applying similar filters as in the LBO sample, such as those on deal size, outcome, and hedge fund holdings, the final sample includes 1909 interfirm takeovers.

I run multivariate regressions to examine the relationship between preannouncement hedge fund presence and initial takeover premiums. The results are reported in Table 9. In addition to hedge fund presence measures and other shareholder characteristics, I include takeover-related control variables that are also used in Bargaron, Schlingemann, Stulz, and Zutter (2007). The results show that the coefficients for hedge fund presence measures are generally insignificant, suggesting that hedge funds do not play a role in determining the premium in interfirm takeovers. This evidence contrasts with our findings in LBOs.

I also examine the impact of hedge fund trading during the offer on bid revisions and the likelihood of deal completion using the interfirm takeover sample. The results, not reported, show that hedge fund trading does not affect either bid revisions or success probabilities.

[Insert Table 9 about here]

## 4.6 Profitability of Hedge Fund Trading in Potential LBO Candidates

Since hedge funds perform a valuable function in LBOs, it is interesting to ask whether their activism delivers abnormal returns. This section employs a calendar-time portfolio regression approach to examine the profitability of hedge funds' investment in potential buyout candidates.

As discussed earlier, stock performance, free cash flow, tax liabilities, and industry affiliation are among the most important predictors of firms' likelihood of going private. I use these characteristics to identify potential LBO candidates. Specifically, at the end of each quarter of the sample period (1990 – 2006), I sort all stocks in the CRSP-Compustat universe with hedge fund presence based

on past six-month stock performance, excess cash flow to market equity ratio, and tax liability to market equity ratio. A stock is considered a potential LBO target if it meets the following conditions: (1) its past six-month return is in the bottom third of the distribution for the entire universe; (2) its excess cash flow is in the top third of the distribution for the entire universe; (3) its tax liability is in the top third of the distribution for the entire universe; and (4) it is affiliated with one of the eight industries using Fama-French 12 industry classification.<sup>20</sup> This process generates a sample of potential buyout candidates with 10,031 firm/quarter observations.

At each quarter end during 1990 – 2006, I form two portfolios, with the first being a passive portfolio of all potential buyout target stocks. I keep the stocks in a portfolio for a six-month holding period following the event quarter. I rebalance quarterly to add new firms that fall in the category of potential LBO candidates and drop the firms that have just reached the end of their holding period. Following Mitchell and Stafford (2000), I exclude multiple observations of the same firm that appears within the same holding period.

I form a second portfolio to examine hedge funds' profitability in investing in buyout candidates. In particular, I form a long-short portfolio of potential LBO target stocks based on hedge fund trading during the six-month period over which the stock returns are measured. The long component consists of the top quintile firms and the short component consists of bottom quintile firms in terms of hedge fund trading. Similar to the passive portfolio of all potential buyout candidates, stocks in the spread portfolio are held for six months and rebalanced quarterly. I test whether the spread portfolio generates significant abnormal returns.

Table 10 reports the results for both equal-weighted and value-weighted portfolios. Panel A reports the estimates when the excess return of the passive portfolio of all potential LBO candidates is regressed on the Fama-French-Carhart four factors using the full sample. Over the six-month holding period, the value-weighted portfolio of all potential LBO candidates generates a positive abnormal return of 0.46% per month, or 5.5% per annum. Using equal-weighted return delivers similar results.

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<sup>20</sup>These industries are consumer nondurables, consumer durables, manufacturing, business equipment, wholesale and retail, healthcare and medical equipment, finance, and others. Firms in these industries make up 90% of the LBO sample.

Panel B shows the results for the spread portfolio of stocks that hedge funds buy minus stocks that they sell. The alpha of the spread portfolio is positive and significant, suggesting that hedge funds earn abnormal returns from investing in potential LBO target stocks. The value-weighted portfolio exhibits an abnormal return of 0.73% per month, or 8.8% per annum. The equal-weighted results are weaker, but still significant at the 10% level.

To shed further light on the profitability of the strategy of investing in potential LBO candidates, I split the sample into two subsamples based on LBO intensity. Because the 1999 – 2006 period is characterized by an LBO boom, I expect hedge funds’ investment in LBO candidates be more profitable during this subperiod. Panel C and D report the 1999 – 2006 subperiod results for the passive portfolio of all potential LBO targets and for the spread portfolio based on hedge fund trading, respectively.<sup>21</sup> Two patterns emerge from the table. First, the naïve strategy of holding all LBO candidates delivers marginally significant abnormal returns. Second, the active strategy based on hedge fund trading generates abnormal returns of 12.9% and 17.4% per annum for equal-weighted and value weighted portfolios, respectively. Thus, investing in potential buyout target stocks during the LBO boom pays off for hedge funds.

[Insert Table 10 about here]

## 5 Discussion and Conclusion

This paper is the first to examine the shareholder wealth effect of hedge fund activism in takeovers. By manually identifying hedge fund managers in 13F database, I was able to track hedge fund holdings around takeover offers and relate them to shareholder gains. I consider two possible roles for hedge funds: (1) an active shareholder role where hedge funds use hold-out power to enhance target shareholder wealth, and (2) a large shareholder role where hedge funds help resolving the free-rider problem by facilitating takeovers.

I find evidence consistent with hedge funds playing an active role in LBOs. In particular, hedge fund presence before the announcement is positively associated with the initial buyout premium.

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<sup>21</sup>The results for the 1990 – 1998 subperiod are not reported. The abnormal returns of the portfolios during the period are insignificant, which makes sense since there are not many buyout activities in the early 1990s.

This effect is not present for public pension funds and mutual funds. I also find that this relationship is stronger for firms with less liquid stocks, which is consistent with the hypothesis that hedge funds use hold-out power to push for a high price (Gomes, 2001). Furthermore, for offers with a low initial premium, greater hedge fund net buying during the announcement quarter is associated with a greater likelihood and a larger magnitude of an upward revision of the premium.

I also find evidence that hedge funds play a variation of the large shareholder role. Consistent with the large shareholder hypothesis, the presence of hedge funds increases the likelihood that the target receives a buyout offer. However, conditional on the receipt of an offer, hedge fund presence does not increase the probability of deal completion. A further investigation of cancelled LBOs reveals that targets with greater hedge fund presence are associated with higher abnormal returns around the announcement of bid withdrawals and a higher probability of receiving new bids subsequently. This evidence seems to suggest that hedge funds play a strategic role in LBOs. On the one hand, they force target firms into a buyout, but, on the other hand, they ensure that the buyout is executed on a fair term.

While they perform a valuable role and enhance shareholder wealth in LBOs, hedge funds do not seem to play a role in interfirm takeovers. Specifically, I find that preannouncement hedge fund presence is not correlated with the initial takeover premium, and hedge fund trading during the announcement quarter does not affect bid revisions and deal success probabilities. Some possible explanations for such differences are as follows. First, LBO targets tend to be poorly performing firms (Halpern, Kieschnick, and Rotenberg, 1999) and hedge fund managers have a preference for the equity of such firms (Brophy, Ouimet, and Sialm, 2006 and Griffin and Xu, 2007). As a consequence, hedge funds are likely to be a significant shareholder in LBO targets and hence to have an influence over the LBO premium and the probability of success. Second, it is likely that information acquisition costs for hedge funds are lower in LBOs than in interfirm takeovers. Hedge funds, given the recent trend of increasingly turning to private equity market to boost returns (Rozwadowski and Young, 2005), are likely to understand the LBO insights (for example, how to structure the transaction and where the efficiency gains come from) and will have information skill sets, similar to those of private equity firms, that are useful in identifying potential buyout targets before announcement and in pricing buyout deals once they have been announced. In contrast,

interfirm takeover offers typically involve synergies, which are acquirer-specific and harder to assess for outsiders than for insiders. Because of the difference in information acquisition costs, hedge funds could exert more influence in LBOs than in general takeovers, *ceteris paribus*. Third, there is more likely a positive outcome, in the form of additional monetary consideration, to shareholder litigation in LBOs than in arm's length takeovers (Thompson and Thomas, 2004), which provides an incentive for hedge funds to pursue investments in LBO targets. The ability to extract better terms *ex post* in court also strengthens the bargaining position of hedge funds *ex ante* in buyout transactions.

Of particular interest to academics and policymakers is that hedge funds seem to provide a useful counterweight to offset the concern of shareholder expropriation by private equity bidders. Contrary to what some critics have claimed, the private equity market seems to be competitive due to the participation of hedge fund shareholders. Since LBO targets are characterized by poor performance, high potential for conflict of interest on the part of managers, and hence selling by traditional institutional investors, the findings suggest that hedge funds play an important economic role in a market where other institutions follow the "Wall Street Walk."

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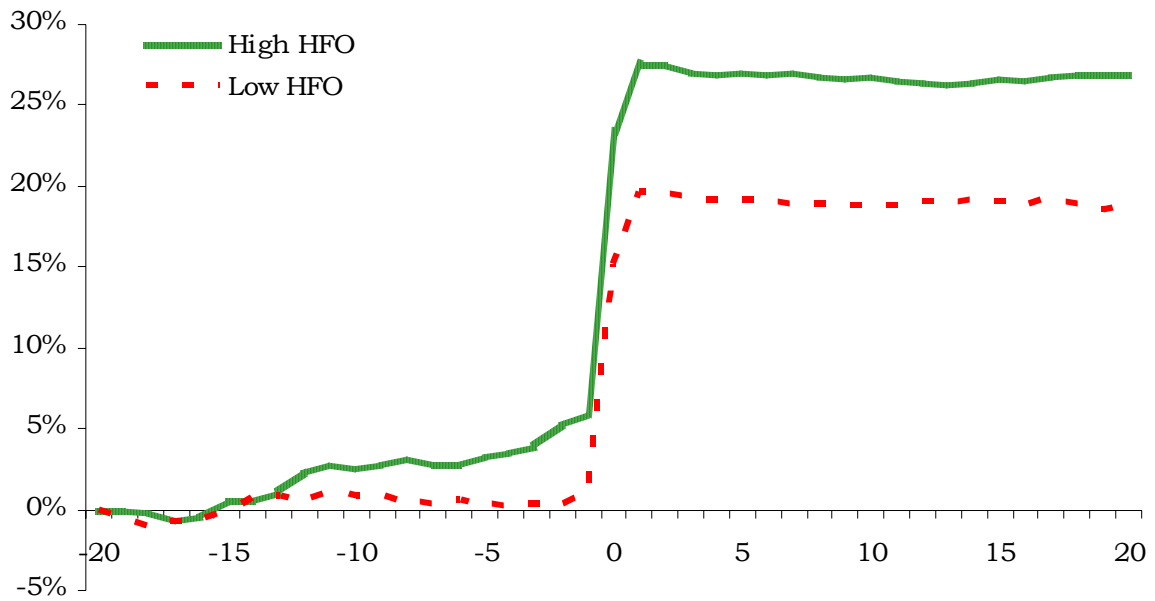
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## Figure 2

Abnormal returns around LBO announcement by preannouncement hedge fund presence

This figure plots average cumulative abnormal returns during a 40-day interval around the announcement of buyout offer (day 0). I partition the sample LBOs into two groups based on the median of preannouncement hedge fund presence. The solid (dashed) line is for LBO targets that the preannouncement presence of hedge funds is high (low). I use two proxies for preannouncement hedge fund presence: the adjusted HFO (Panel A) and change in HFO (Panel B). The adjusted HFO is obtained as the residual from a regression of the raw HFO on year and industry dummies, and several stock-specific characteristics, such as market capitalization, book-to-market ratio, lag returns, price, turnover, and stock volatility. Abnormal returns are calculated using Fama-French three factor model.

Panel A: LBO Targets by Adjusted HFO<sub>t-1</sub>



Panel B: LBO Targets by  $\Delta$ HFO<sub>t-3→t-1</sub>

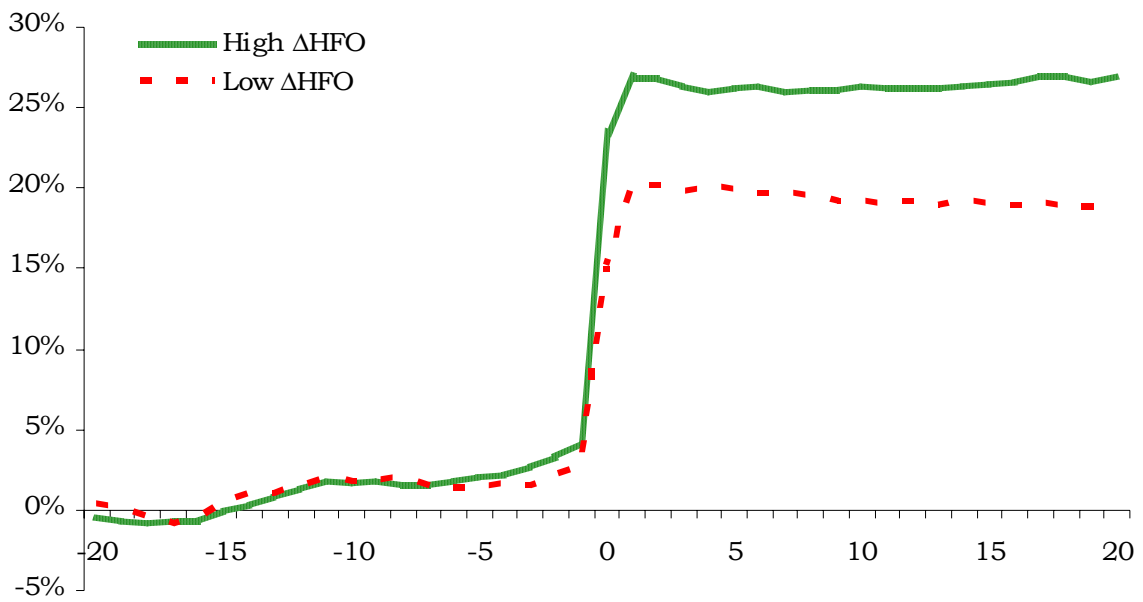


Figure 3

Abnormal returns around announcement of LBO proposal withdrawals by hedge fund trading during the announcement quarter

This figure plots average cumulative abnormal returns during a 40-day interval around the announcement of LBO proposal withdrawals (day 0). I partition the withdrawn LBOs into two groups based on the median of hedge fund trading during the announcement quarter ( $\Delta HFO_{t-1 \rightarrow t}$ ). The solid (dashed) line is for LBO targets that hedge fund trading during the announcement quarter is high (low). Abnormal returns are calculated using Fama-French three factor model.

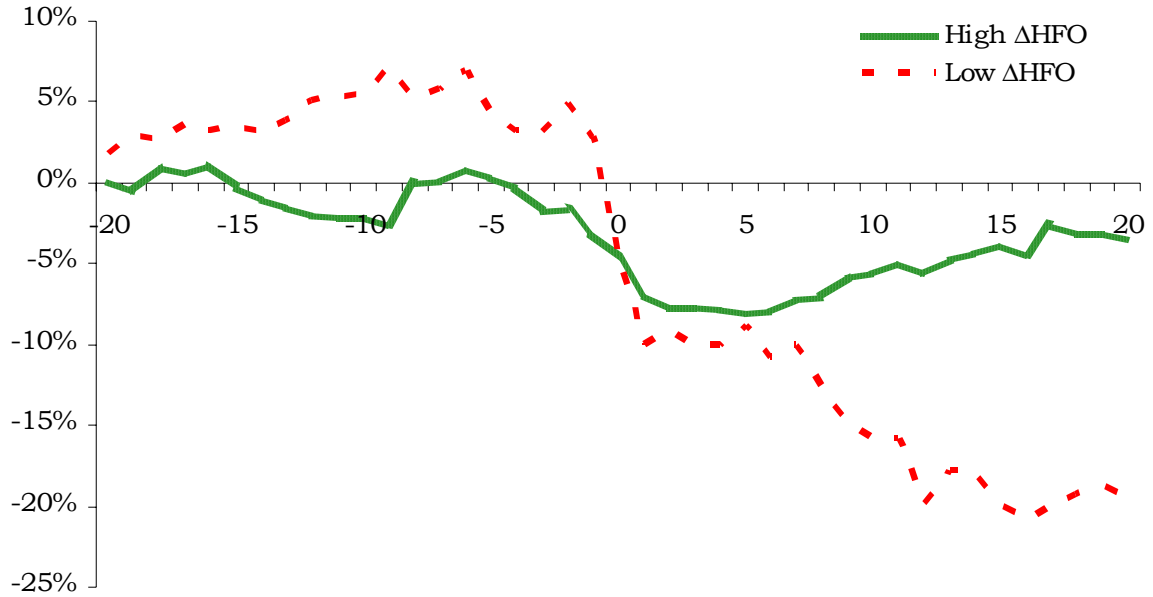


Table 1

## Distribution of leveraged buyouts, January 1990 to December 2006

Table 1 reports the distribution of the sample of leveraged buyouts and the mean statistics of deal- and target-related variables. Deal value is the total consideration that the acquirer paid for the percentage of the target plus any liabilities assumed. Initial Premium is calculated as the initial offer price divided by the target's closing price 20 trading days prior to the announcement date minus one.  $HFO_{t-1}$  is hedge fund ownership at the end of quarter  $t - 1$ .  $\Delta HFO_{t-5 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t - 5$  to  $t - 1$ . The announcement quarter is  $t$ . The last row reports the total number of LBO deals in the full sample and mean statistics for other variables.

Year	No. of deals	Deal value (\$mil)	Initial Premium (%)	$HFO_{t-1}$ (%)	$\Delta HFO_{t-5 \rightarrow t-1}$ (%)
90-95	4	169.52	20.52	1.67	0.18
1996	5	179.80	23.50	4.72	1.41
1997	9	474.65	27.53	3.86	-0.03
1998	15	191.95	40.62	3.48	1.99
1999	31	319.95	32.75	2.94	0.20
2000	27	483.00	43.27	4.08	0.84
2001	12	141.30	49.22	1.27	0.83
2002	13	379.15	23.78	3.89	-0.11
2003	5	294.99	42.82	7.13	2.60
2004	14	944.82	23.88	4.66	-0.05
2005	23	1609.94	25.78	8.65	1.72
2006	38	2397.35	19.79	8.20	1.98
Full Sample	196	924.20	30.78	5.08	1.03

## Table 2

### Summary statistics for the LBO sample

Table 2 reports summary statistics on the LBO sample. Deal Value is the total consideration that the acquirer paid for the target plus any liabilities assumed. Initial Buyout Premium is calculated as the initial offer price divided by the target's closing price 20 trading days prior to the announcement date minus one. CAR3 is the cumulative CAPM-adjusted return over the three-day window around the announcement date. Pr(Bid Revision) is the probability of an upward revision in the bid. E(Bid Revision) is measured as closing bid divided by opening bid minus 1 for LBOs that the bid is revised. Deal Completion is a dummy variable that equals 1 if the deal succeeds. Spread is calculated as  $(\text{initial offer price} - P_t) / P_t$ , where  $P_t$  is the target firm's stock price on the last day of the announcement quarter. Toehold is measured as the acquirer's holdings of the target's stock before the announcement.  $\text{HFO}_{t-1}$  is hedge fund ownership at the end of quarter  $t - 1$ .  $\Delta\text{HFO}_{t-5 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t - 5$  to  $t - 1$ .  $\Delta\text{HFO}_{t-3 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t - 3$  to  $t - 1$ .  $\Delta\text{HFO}_{t-1 \rightarrow t}$  is the change in hedge fund holdings from quarter  $t - 1$  to  $t$ .  $\text{ActiveHFO}_{t-1}$  and  $\text{PassiveHFO}_{t-1}$  are the fraction of outstanding shares owned by active hedge funds (13D filers) and passive hedge funds (non 13D filers), respectively, at the end of quarter  $t - 1$ .  $\text{Herfindahl(HFO)}$  is the Herfindahl index of HFO at the end of quarter  $t - 1$ .  $\text{PPFO}_{t-1}$  and  $\text{MFO}_{t-1}$  are public pension fund ownership and mutual fund ownership at the end of quarter  $t - 1$ , respectively. Public pension funds are those belonging to the list of members of the Council of Institutional Investors. Shareholder Turnover of a target firm is the weighted average of the total portfolio turnover rates of its institutional shareholders over four quarters prior to the announcement quarter (following Gaspar, Massa, and Matos, 2005). Industry Exposure is measured as the average percentage of hedge fund shareholders' portfolios that are invested in the industry the target firm belongs to. Target Firm Characteristics are measured at the most recent fiscal year prior to the announcement date. Size is measured as stock price multiplied by the number of shares outstanding (item #199 \* item #25) plus book value of debt (item #9 + item #34). Past Abnormal Return is measured as the six-month market-adjusted buy-and-hold return prior to the announcement quarter. Excess Cash Flow is measured as income before depreciation (item #13) minus income tax (item #16 - change in item #35) minus interest expense (item #15) minus common and preferred dividends (item #21 + item #19) divided by Market Equity. Taxes is measured as income tax divided by Market Equity. Sales growth is measured as the average increase in net sales during the two years preceding the buyout announcement. I winsorize all variables at the 1st and 99th percentiles to reduce the influence of extreme observations. For each variable, I report the mean, median, 25th percentile, 75th percentile, and standard deviation.

	Mean	Median	25th Percentile	75th Percentile	Standard Deviation
<i>Panel A: Deal Characteristics</i>					
Deal Value (\$mil)	924.20	315.55	88.62	766.13	2230.18
Initial Buyout Premium (%)	30.78	26.98	15.43	39.13	22.13
CAR3 (%)	20.00	18.09	9.81	27.84	16.02
Pr(Bid Revision) (%)	17.35	0.00	0.00	0.00	37.96
E(Bid Revision) (%)	5.01	6.55	0.50	10.53	11.59
Pr(Deal Completion) (%)	73.47	100.00	0.00	100.00	44.26
Spread (%)	5.36	3.38	1.31	7.84	10.75
Toehold (%)	23.60	24.30	11.85	34.15	12.38
<i>Panel B: Target Shareholder-Related Variables</i>					
HFO <sub>t-1</sub> (%)	5.08	2.66	0.32	7.12	6.47
$\Delta$ HFO <sub>t-5→t-1</sub> (%)	1.03	0.15	-0.83	2.36	4.41
$\Delta$ HFO <sub>t-3→t-1</sub> (%)	0.38	0.00	-0.75	1.33	2.94
$\Delta$ HFO <sub>t-1→t</sub> (%)	1.74	0.80	0.00	3.09	3.82
ActiveHFO <sub>t-1</sub> (%)	4.01	1.40	0.15	5.68	5.76
PassiveHFO <sub>t-1</sub> (%)	1.08	0.10	0.00	1.25	2.03
Herfindahl(HFO) <sub>t-1</sub> (%%)	31.90	2.50	0.09	24.40	88.49
PPFO <sub>t-1</sub> (%)	1.59	0.60	0.00	2.38	2.39
$\Delta$ PPFO <sub>t-5→t-1</sub> (%)	0.00	0.00	-0.28	0.23	1.14
$\Delta$ PPFO <sub>t-3→t-1</sub> (%)	0.03	0.00	-0.17	0.21	1.38
MFO <sub>t-1</sub> (%)	8.64	7.24	2.85	12.88	6.99
$\Delta$ MFO <sub>t-5→t-1</sub> (%)	-0.09	0.03	-2.38	2.22	5.16
$\Delta$ MFO <sub>t-3→t-1</sub> (%)	-0.22	0.00	-1.72	1.67	3.83
Shareholder Turnover	0.33	0.31	0.25	0.38	0.13
Industry Exposure (%)	5.09	2.63	0.96	7.17	6.31
<i>Panel C: Target Firm Characteristics</i>					
Log(Size)	5.75	5.75	4.67	6.84	1.50
Past Abnormal Return (%)	-9.22	-17.36	-40.02	9.83	47.93
Excess Cash Flow	0.13	0.12	0.06	0.20	0.24
Taxes	0.03	0.03	0.01	0.05	0.05
Sales Growth	0.21	0.11	0.01	0.24	0.47

### Table 3

Preannouncement hedge fund presence and target shareholder wealth in LBOs:  
Multivariate regression results

Table 3 reports multivariate regression results with initial buyout premium (first three columns) and cumulative abnormal announcement returns (CAR3, last three columns) as dependent variables.  $HFO_{t-1}$  is the fraction of shares owned by hedge funds at the end of quarter  $t-1$ .  $\Delta HFO_{t-3 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t-3$  to  $t-1$ .  $ActiveHFO_{t-1}$  and  $PassiveHFO_{t-1}$  are the fraction of outstanding shares owned by active hedge funds (13D filers) and passive hedge funds (non 13D filers), respectively, at the end of quarter  $t-1$ .  $Herfindahl(HFO)$  is the Herfindahl index of HFO at the end of quarter  $t-1$ . See Table 2 for the definition of other variables. Year and industry dummies are included in all regressions. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable:	Initial Buyout Premium				CAR3			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HFO <sub>t-1</sub>	0.669 (2.31)**				0.450 (2.22)**			
$\Delta$ HFO <sub>t-3→t-1</sub>		1.196 (2.19)**				0.977 (2.42)**		
ActiveHFO <sub>t-1</sub>			0.609 (1.91)*				0.259 (1.32)	
PassiveHFO <sub>t-1</sub>			1.246 (1.57)				2.281 (3.04)***	
Herfindahl(HFO) <sub>t-1</sub>				3.552 (1.96)*				0.990 (0.93)
PPFO <sub>t-1</sub>	0.360 (0.50)	0.477 (0.63)	0.346 (0.48)	0.310 (0.42)	0.773 (1.09)	0.865 (1.22)	0.730 (1.14)	0.748 (0.99)
MFO <sub>t-1</sub>	0.062 (0.23)	0.196 (0.76)	0.054 (0.20)	0.125 (0.49)	0.059 (0.28)	0.151 (0.70)	0.032 (0.16)	0.114 (0.59)
Shareholder Turnover	-0.298 (1.76)*	-0.180 (1.11)	-0.305 (1.81)*	-0.259 (1.58)	-0.154 (1.28)	-0.073 (0.64)	-0.177 (1.46)	-0.127 (1.12)
Industry Exposure	-0.031 (0.07)	-0.054 (0.12)	-0.047 (0.10)	0.024 (0.06)	-0.450 (1.37)	-0.475 (1.43)	-0.502 (1.51)	-0.386 (1.23)
Log(Size)	-0.048 (3.40)***	-0.050 (3.47)***	-0.048 (3.43)***	-0.043 (2.98)***	-0.037 (2.85)***	-0.038 (2.95)***	-0.037 (2.97)***	-0.038 (3.01)***
Past Return	-0.064 (1.21)	-0.057 (1.11)	-0.063 (1.20)	-0.062 (1.16)	-0.058 (1.48)	-0.053 (1.39)	-0.056 (1.43)	-0.044 (1.29)
Toehold	-0.104 (0.41)	-0.111 (0.45)	-0.106 (0.41)	-0.066 (0.26)	-0.036 (0.18)	-0.050 (0.25)	-0.042 (0.21)	0.028 (0.16)
Excess Cash Flow	0.042 (0.41)	0.062 (0.61)	0.048 (0.46)	0.036 (0.35)	0.108 (1.27)	0.124 (1.49)	0.128 (1.49)	0.100 (1.27)
Taxes	0.134 (0.30)	0.134 (0.30)	0.158 (0.37)	0.084 (0.19)	0.174 (0.48)	0.184 (0.50)	0.252 (0.76)	0.106 (0.28)
Sales Growth	-0.002 (0.05)	-0.015 (0.39)	-0.000 (0.00)	-0.005 (0.14)	0.015 (0.46)	0.006 (0.18)	0.021 (0.66)	0.009 (0.32)
Constant	0.341 (2.09)**	0.360 (2.29)**	0.334 (2.02)**	0.309 (1.90)*	0.431 (3.34)***	0.450 (3.38)***	0.410 (3.29)***	0.435 (4.12)***
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	196	196	196	196	196	196	196	196
R-squared	0.45	0.45	0.45	0.45	0.28	0.28	0.31	0.25

#### Table 4

Preannouncement hedge fund presence and target shareholder wealth in LBOs:  
The effect of liquidity

Table 4 reports multivariate regression results with initial buyout premium (Columns 1 and 2) and cumulative abnormal announcement returns (CAR3, Column 3 and 4) as dependent variables.  $HFO_{t-1}$  is hedge fund ownership at the end of quarter  $t-1$ .  $\Delta HFO_{t-3 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t-3$  to  $t-1$ . AmihudIlliq is the three-month average of the monthly Amihud (2002) illiquidity ratio over the quarter prior to the announcement. See Table 2 for the definition of other variables. Year and industry dummies are included in all regressions. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable:	Initial Buyout Premium		CAR3	
	(1)	(2)	(3)	(4)
AmihudIlliq*HFO <sub>t-1</sub>	0.629 (5.31)***		0.337 (3.19)***	
HFO <sub>t-1</sub>	0.419 (1.49)		0.319 (1.42)	
AmihudIlliq*ΔHFO <sub>t-3→t-1</sub>		1.156 (2.61)**		0.538 (1.52)
ΔHFO <sub>t-3→t-1</sub>		0.695 (1.21)		0.725 (1.65)
AmihudIlliq	-0.007 (0.99)	-0.003 (0.38)	-0.011 (1.78)*	-0.008 (1.31)
PPFO <sub>t-1</sub>	0.328 (0.48)	0.512 (0.69)	0.710 (1.10)	0.833 (1.23)
MFO <sub>t-1</sub>	0.089 (0.33)	0.138 (0.53)	0.063 (0.30)	0.115 (0.52)
Shareholder Turnover	-0.329 (2.05)**	-0.137 (0.87)	-0.198 (1.72)*	-0.080 (0.69)
Industry Exposure	-0.338 (0.79)	-0.082 (0.17)	-0.699 (2.32)**	-0.571 (1.78)*
Log(Size)	-0.043 (2.84)***	-0.050 (3.32)***	-0.039 (2.85)***	-0.044 (3.14)***
Past Return	-0.062 (1.19)	-0.082 (1.59)	-0.064 (1.64)	-0.071 (1.83)*
Toehold	-0.065 (0.27)	-0.128 (0.53)	-0.000 (0.00)	-0.041 (0.22)
Excess Cash Flow	-0.042 (0.49)	0.053 (0.52)	0.055 (0.76)	0.112 (1.50)
Taxes	-0.062 (0.15)	0.055 (0.12)	0.090 (0.26)	0.167 (0.47)
Sales Growth	-0.004 (0.09)	-0.024 (0.59)	0.005 (0.16)	-0.008 (0.25)
Constant	0.341 (2.02)**	0.368 (2.25)**	0.472 (3.63)***	0.494 (3.70)***
Year/Industry FE	Yes	Yes	Yes	Yes
Observations	196	196	196	196
R-squared	0.50	0.47	0.32	0.31

Table 5

## Preannouncement hedge fund presence and target shareholder wealth in LBOs: Robustness

Table 5 reports multivariate regression results with initial buyout premium as dependent variables using the LBO sample. In the first two columns, board characteristics are included as controls. In Column 3 and 4, I expand the sample by including firms that are not held by hedge funds during the one-year period before announcement. In Column 5 and 6, I include acquirer fixed effects. In Column 7, a Herfindahl index of hedge fund ownership is used as an alternative measure of hedge fund presence. Board Independence is the fraction of independent outside directors on the board. Log(Board Size) is the logarithm of the number of directors on board. CEO-Chairman Dummy equals 1 if the titles of CEO and Chairman are vested in the same individual and 0 otherwise. See Table 2 for the definition of other variables. Year and industry dummies are included in all regressions. Numbers in parentheses are *t*-statistics. All standard errors are robust to heteroskedasticity. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable: Initial Buyout Premium						
	Include Board Characteristics		Include Firms with Zero HFO		Include Acquirer Fix Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
HFO <sub><i>t</i>-1</sub>	0.639 (2.17)**		0.696 (2.32)**		1.181 (2.06)**	
ΔHFO <sub><i>t</i>-3→<i>t</i>-1</sub>		1.181 (2.07)**		1.376 (2.54)**		2.366 (1.72)*
PPFO <sub><i>t</i>-1</sub>	0.181 (0.25)	0.243 (0.32)	0.698 (0.86)	0.872 (1.04)	0.728 (0.53)	0.175 (0.12)
MFO <sub><i>t</i>-1</sub>	0.064 (0.24)	0.196 (0.75)	0.002 (0.01)	0.095 (0.36)	-0.766 (0.99)	-0.816 (1.05)
Shareholder Turnover	-0.287 (1.62)	-0.158 (0.96)	-0.302 (2.12)**	-0.197 (1.33)	-0.666 (1.89)*	-0.606 (1.83)*

Industry Exposure	0.010 (0.02)	-0.002 (0.00)	0.084 (0.17)	0.147 (0.30)	-0.148 (0.13)	-0.023 (0.02)
Log(Size)	-0.045 (2.97)***	-0.047 (3.15)***	-0.041 (3.22)***	-0.040 (3.13)***	-0.098 (2.69)***	-0.087 (2.60)**
Past Return	-0.059 (1.12)	-0.052 (1.04)	-0.064 (1.63)	-0.063 (1.67)*	-0.099 (0.77)	-0.139 (1.13)
Toehold	-0.064 (0.26)	-0.058 (0.25)	-0.162 (0.91)	-0.175 (1.02)	-0.218 (0.37)	-0.147 (0.29)
Excess Cash Flow	0.038 (0.36)	0.062 (0.59)	0.042 (0.43)	0.068 (0.72)	0.207 (0.83)	0.313 (1.39)
Taxes	0.151 (0.35)	0.165 (0.38)	-0.026 (0.07)	0.009 (0.03)	-0.774 (0.87)	-0.803 (0.90)
Sales Growth	-0.006 (0.15)	-0.018 (0.49)	-0.036 (1.00)	-0.045 (1.28)	0.183 (1.10)	-0.001 (0.01)
Board Independence	0.139 (1.37)	0.156 (1.54)				
Log(Board Size)	-0.024 (0.54)	-0.027 (0.61)				
CEO-Chairman Dummy	0.032 (0.75)	0.049 (1.17)				
Constant	0.459 (3.09)***	0.433 (3.00)***	0.495 (4.52)***	0.490 (4.57)***	0.561 (1.34)	0.706 (1.68)*
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	190	190	226	226	196	196
R-squared	0.46	0.46	0.37	0.36	0.78	0.79

Table 6

Change in hedge fund holdings during the announcement quarter and bid revisions in LBOs

The first and the third columns report probit regression results, where the dependent variable is a binary variable which equals 1 if the buyout bid is revised upward (closing bid > opening bid) and 0 otherwise. The coefficient estimates reported are marginal effects of independent variables. The second and the fourth columns report multivariate regression results with the magnitude of bid revision (closing bid/opening bid - 1) as dependent variables for the subsample that the bid is revised.  $\Delta\text{HFO}_{t-1 \rightarrow t}$  is the change in hedge fund holdings from quarter  $t-1$  to  $t$ . The sample is restricted to the subsample that the announcement date and the effective/withdrawal date are not in the same quarter. See Table 2 for the definition of other variables. Year dummies are included in all regressions. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable:	Full Sample		Single-Bidder Sample	
	Likelihood of Revision (1)	Magnitude of Revision (2)	Likelihood of Revision (3)	Magnitude of Revision (4)
Premium* $\Delta$ HFO $_{t-1 \rightarrow t}$	-8.634 (3.79)***	-8.251 (2.52)**	-4.808 (2.21)**	-10.785 (1.82)*
Premium	-0.120 (1.05)	-0.078 (1.06)	-0.261 (4.04)***	-0.193 (2.21)**
$\Delta$ HFO $_{t-1 \rightarrow t}$	3.468 (3.77)***	1.080 (1.69)	2.028 (2.08)**	1.112 (0.76)
Spread	-1.639 (3.88)***	-0.513 (2.08)**	-1.539 (3.17)***	-0.254 (0.60)
$\Delta$ PPFO $_{t-1 \rightarrow t}$	5.101 (1.24)	6.376 (1.89)*	1.841 (0.51)	4.961 (1.33)
$\Delta$ MFO $_{t-1 \rightarrow t}$	1.000 (2.15)**	0.457 (1.00)	0.500 (1.70)*	0.149 (0.20)
Shareholder Turnover	0.095 (0.47)	0.247 (2.34)**	0.048 (0.21)	0.148 (0.61)
Industry Exposure	0.097 (0.30)	0.006 (0.02)	0.413 (1.42)	1.128 (1.82)*
Log(Size)	0.024 (1.58)	-0.012 (0.67)	0.030 (2.17)**	-0.003 (0.14)
Past Return	0.023 (0.53)	0.083 (1.49)	-0.089 (2.50)**	0.017 (0.20)
Toehold	0.400 (2.48)**	0.538 (2.74)**	0.393 (2.99)***	0.137 (0.55)
Excess Cash Flow	-0.071 (0.69)	-0.030 (0.56)	0.058 (0.86)	0.009 (0.15)
Taxes	-0.107 (0.19)	-0.169 (0.35)	0.793 (2.07)**	0.100 (0.13)
Sales Growth	0.040 (1.16)	-0.025 (1.38)	0.040 (1.49)	-0.065 (1.84)*
Constant		-0.107 (0.86)		-0.175 (0.81)
Year FE	Yes	Yes	Yes	Yes
Observations	164	44	147	37
(Pseudo) R-squared	0.35	0.69	0.39	0.75

## Table 7

Hedge fund presence and the subsequent likelihood of receiving an LBO offer:  
Matched-sample probit regressions

Table 7 reports results for probit regressions where the dependent variable is zero for the control firms and one for LBO firms.  $HFO_{t-1}$  is hedge fund ownership at the end of quarter  $t-1$ .  $\Delta HFO_{t-5 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t-5$  to  $t-1$ . See Table 2 for the definition of other variables. Year and industry dummies are included in all regressions. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable: LBO Firm Dummy				
	(1)	(2)	(3)	(4)
HFO <sub>t-1</sub>	1.677 (2.90)***			
$\Delta$ HFO <sub>t-5→t-1</sub>		1.383 (1.79)*		
ActiveHFO <sub>t-1</sub>			2.155 (3.28)***	
PassiveHFO <sub>t-1</sub>			-0.790 (0.50)	
Herfindahl(HFO) <sub>t-1</sub>				14.542 (2.21)**
Industry Exposure	-1.322 (2.37)**	-1.302 (2.29)**	-1.288 (2.31)**	-1.277 (2.32)**
PPFO <sub>t-1</sub>	-1.479 (0.88)	-0.998 (0.60)	-1.132 (0.66)	-1.428 (0.85)
MFO <sub>t-1</sub>	-0.615 (1.38)	-0.446 (1.00)	-0.602 (1.35)	-0.524 (1.19)
Shareholder Turnover	0.059 (0.23)	0.207 (0.84)	0.105 (0.41)	0.137 (0.55)
Log(Size)	0.103 (3.57)***	0.105 (3.59)***	0.104 (3.56)***	0.112 (3.89)***
Past Return	-0.098 (2.08)**	-0.104 (2.19)**	-0.090 (1.90)*	-0.094 (2.00)**
Excess Cash Flow	0.633 (3.53)***	0.658 (3.76)***	0.623 (3.52)***	0.632 (3.57)***
Taxes	2.133 (2.97)***	2.164 (3.11)***	2.048 (2.82)***	1.998 (2.78)***
Sales Growth	-0.148 (2.23)**	-0.164 (2.46)**	-0.150 (2.29)**	-0.152 (2.28)**
Year/Industry FE	Yes	Yes	Yes	Yes
Observations	392	392	392	392
Pseudo R-squared	0.13	0.12	0.14	0.12

## Table 8

Change in hedge fund holdings during the announcement quarter and the probability of deal completion in LBOs

Table 8 reports the probit regression results where the dependent variable is a binary variable which equals 1 if the deal succeeds and 0 otherwise using the LBO sample.  $\Delta\text{HFO}_{t-1 \rightarrow t}$  is the change in hedge fund holdings from quarter  $t-1$  to  $t$  (the announcement quarter).  $\Delta\text{ActiveHFO}_{t-1 \rightarrow t}$  ( $\Delta\text{PassiveHFO}_{t-1 \rightarrow t}$ ) is the change in holdings by active (passive) hedge funds from quarter  $t-1$  to  $t$ .  $\text{HFO}_t$  is hedge fund ownership at the end of the announcement quarter  $t$ . See Table 2 for the definition of other variables. Year dummies are included in all regressions. The coefficient estimates reported are marginal effects of independent variables. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity and arbitrary within-industry serial correlation. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable: Deal Consummation Dummy			
	(1)	(2)	(3)
$\Delta\text{HFO}_{t-1 \rightarrow t}$	-1.581 (1.56)		
$\Delta\text{ActiveHFO}_{t-1 \rightarrow t}$		-2.193 (1.78)*	
$\Delta\text{PassiveHFO}_{t-1 \rightarrow t}$		0.127 (0.07)	
$\text{HFO}_t$			-0.341 (0.74)
Spread	-0.876 (2.10)**	-0.851 (2.07)**	-0.837 (1.95)*
$\Delta\text{PPFO}_{t-1 \rightarrow t}$	1.106 (0.27)	1.640 (0.37)	1.252 (0.30)
$\Delta\text{MFO}_{t-1 \rightarrow t}$	-1.401 (1.99)**	-1.342 (1.80)*	-1.366 (2.03)**
Shareholder Turnover	-0.188 (0.73)	-0.190 (0.76)	-0.182 (0.73)
Industry Exposure	0.338 (0.63)	0.330 (0.63)	0.449 (0.80)
Initial Premium	0.046 (0.27)	0.066 (0.37)	0.062 (0.36)
Log(Size)	-0.005 (0.21)	-0.004 (0.17)	-0.006 (0.24)
Past Return	0.218 (3.01)***	0.219 (3.08)***	0.234 (3.13)***
Toehold	0.468 (1.31)	0.404 (1.09)	0.541 (1.58)
Excess Cash Flow	-0.280 (1.51)	-0.291 (1.56)	-0.246 (1.44)
Taxes	1.616 (2.69)***	1.742 (2.88)***	1.580 (2.64)***
Sales Growth	0.008 (0.09)	0.012 (0.13)	0.006 (0.07)
Year FE	Yes	Yes	Yes
Observations	168	168	168
Pseudo R-squared	0.19	0.20	0.18

## Table 9

Preannouncement hedge fund presence and target shareholder wealth in interfirm takeovers: Multivariate regression results

Table 9 reports multivariate regression results with initial takeover premiums (Columns 1 and 2) and cumulative abnormal announcement returns (CAR3, Column 3 and 4) as dependent variables using a sample of 1909 interfirm takeovers.  $HFO_{t-1}$  is hedge fund ownership at the end of quarter  $t-1$ .  $\Delta HFO_{t-3 \rightarrow t-1}$  is the change in hedge fund holdings from quarter  $t-3$  to  $t-1$ . Tobin's  $Q$  is measured as the ratio of market value of assets (item #6 + item #9 \* item #25 - item #60) to book value of assets (item 6). Debt is measured as the ratio of book value of debt (item #9 + item #34) to the sum of the book value of debt and the market value of equity. Operating Cash Flow is measured as Income before extraordinary items (item #18) plus depreciation (item #14) divided by the book value of assets. Stock Offer, Cash Offer, Diversifying, Hostile, Tender Offer, Target Termination Fee, and Bidder Lockup are binary variables that equal to 1 if the transaction respectively is a stock-swap deal, a cash only deal, a cross-industry acquisition, is hostile, is a tender offer, includes target termination fees, or includes bidder lockup provisions. AmihudIlliq is the three-month average of the monthly Amihud (2002) illiquidity ratio over the quarter prior to the announcement. See Table 2 for the definition of other variables. Year and industry dummies are included in all regressions. Numbers in parentheses are  $t$ -statistics. All standard errors are robust to heteroskedasticity. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

Dependent Variable:	Initial Takeover Premium		CAR3	
	(1)	(2)	(3)	(4)
HFO <sub>t-1</sub>	-0.212 (1.42)		-0.036 (0.37)	
ΔHFO <sub>t-3→t-1</sub>		-0.599 (1.85)*		-0.224 (1.19)
PPFO <sub>t-1</sub>	-0.473 (0.76)	-0.469 (0.76)	0.286 (0.67)	0.293 (0.68)
MFO <sub>t-1</sub>	-0.179 (1.22)	-0.205 (1.41)	-0.241 (2.51)**	-0.245 (2.56)**
Shareholder Turnover	0.187 (3.16)***	0.167 (3.09)***	0.070 (1.94)*	0.068 (2.02)**
Industry Exposure	-1.343 (0.40)	-1.461 (0.43)	1.079 (0.47)	1.045 (0.45)
Log(Size)	-0.014 (1.98)**	-0.015 (2.16)**	0.001 (0.15)	0.001 (0.12)
Past Return	-0.014 (1.23)	-0.014 (1.25)	-0.006 (0.87)	-0.006 (0.87)
Toehold	-0.388 (2.29)**	-0.368 (2.17)**	-0.084 (0.74)	-0.078 (0.69)
Q	0.000 (0.00)	0.000 (0.05)	-0.007 (1.56)	-0.007 (1.55)
Debt	0.015 (0.31)	0.015 (0.31)	0.002 (0.05)	0.002 (0.05)
Operating Cash Flow	-0.136 (1.97)**	-0.130 (1.89)*	-0.091 (2.41)**	-0.089 (2.36)**
Stock Offer	0.004 (0.19)	0.007 (0.29)	-0.005 (0.41)	-0.005 (0.35)
Cash Offer	0.019 (0.93)	0.019 (0.95)	0.069 (5.22)***	0.069 (5.26)***
Diversifying	-0.013 (0.74)	-0.013 (0.74)	-0.016 (1.49)	-0.016 (1.49)
Hostile	-0.032 (1.10)	-0.033 (1.13)	0.011 (0.61)	0.011 (0.61)
Tender Offer	0.091 (3.81)***	0.092 (3.85)***	0.099 (5.58)***	0.099 (5.60)***
Target Termination Fee	0.003 (0.15)	0.004 (0.20)	0.011 (0.87)	0.012 (0.91)
Bidder Lockup	-0.129 (2.66)***	-0.130 (2.67)***	-0.059 (2.06)**	-0.060 (2.07)**
AmihudIlliq	0.025 (3.69)***	0.025 (3.67)***	0.010 (2.90)***	0.010 (2.88)***
Constant	0.347 (6.44)***	0.342 (6.40)***	0.162 (4.63)***	0.161 (4.62)***
Year/Industry FE	Yes	Yes	Yes	Yes
Observations	1909	1909	1909	1909
R-squared	0.18	0.18	0.17	0.17

## Table 10

### Profitability of hedge fund trading in potential buyout targets using calendar-time portfolio regression approach

Table 10 reports estimates of the abnormal return of a passive portfolio of all potential LBO candidates and an active spread portfolio based on hedge fund trading. At the end of each quarter of the sample period (1990-2006), I sort all stocks in the CRSP-Compustat universe with hedge fund presence based on past six-month stock performance, excess cash flow to market equity ratio, and tax liability to market equity ratio. A stock is considered a potential LBO target if it meets the following conditions: (1) its past six-month return is in the bottom third of the distribution for the entire universe; (2) its excess cash flow is in the top third of the distribution for the entire universe; (3) its tax liability is in the top third of the distribution for the entire universe; and (4) it is affiliated with one of the eight industries using Fama-French 12 industry classification. At each quarter end, I form a portfolio of all potential buyout target stocks. I also form a long-short portfolio of these stocks based on hedge fund trading during the six-month period over which the stock returns are measured. The long component consists of the top quintile firms and the short component consists of bottom quintile firms in terms of hedge fund trading. I keep the stocks in a portfolio for a six-month holding period following the event quarter. I rebalance quarterly to add new firms that fall in the “bad stock” category and drop the firms that have just reached the end of their holding period. Following Mitchell and Stafford (2000), I exclude multiple observations of the same firm that appears within the same holding period. Panel A reports the estimates when the excess return of the portfolio of potential LBO candidates is regressed on the Fama-French-Carhart four factors using the full sample. Panel B reports the results for the spread portfolio using the full sample. Panel C and D report results for each portfolio using the subsample of 1999-2006. Significance on a 10% (\*), 5% (\*\*), or 1% level (\*\*\*) is indicated.

	Equal-weighted portfolios		Value-weighted portfolios	
	Coefficient	t-statistics	Coefficient	t-statistics
<i>Panel A: Portfolio of All Potential LBO Candidates (Full sample)</i>				
$\alpha$ (x100)	0.411	2.39**	0.458	2.55**
$\beta_{Rm-Rf}$	1.016	21.86***	1.188	24.55***
$\beta_{SMB}$	0.801	16.20***	0.152	2.95***
$\beta_{HML}$	0.668	10.94***	0.569	8.96***
$\beta_{UMD}$	-0.481	-13.59***	-0.436	-11.83***
Adjusted R-squared	0.84		0.82	
N	204		204	
<i>Panel B: Spread Portfolio Based on Hedge Fund Trading (Full sample)</i>				
$\alpha$ (x100)	0.486	1.93*	0.731	2.28**
$\beta_{Rm-Rf}$	-0.021	-0.32	-0.102	-1.18
$\beta_{SMB}$	0.091	1.26	0.273	2.97***
$\beta_{HML}$	0.095	1.07	0.117	1.03
$\beta_{UMD}$	-0.087	-1.68*	-0.227	-3.44***
Adjusted R-squared	0.01		0.07	
N	204		204	
<i>Panel C: Portfolio of All Potential LBO Candidates (Post-1999 sample)</i>				
$\alpha$ (x100)	0.537	1.80*	0.564	1.85*
$\beta_{Rm-Rf}$	0.897	11.02***	1.073	12.93***
$\beta_{SMB}$	0.804	10.46***	0.117	1.49
$\beta_{HML}$	0.718	7.77***	0.586	6.21***
$\beta_{UMD}$	-0.512	-10.21***	-0.422	-8.24***
Adjusted R-squared	0.82		0.79	
N	96		96	
<i>Panel D: Spread Portfolio Based on Hedge Fund Trading (Post-1999 sample)</i>				
$\alpha$ (x100)	1.073	2.88***	1.454	3.35***
$\beta_{Rm-Rf}$	-0.119	-1.17	-0.293	-2.48**
$\beta_{SMB}$	0.132	1.38	0.295	2.64***
$\beta_{HML}$	0.008	0.07	-0.004	-0.03
$\beta_{UMD}$	-0.186	-2.98***	-0.367	-5.03***
Adjusted R-squared	0.05		0.20	
N	96		96	