Advisor-hedge fund connections and M&A Pricing: Who benefits from information flow?

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Abstract

Using a sample of 2,117 US public M&A transactions from 2000 to 2019, we find evidence suggesting that bidders' advisors may share information about upcoming deals with connected hedge funds in exchange for implicit support of offer prices. Unexpected positions in target firms taken by hedge funds with prime brokerage ties to bidders' advisors before deal announcements are associated with lower premiums and reduced target abnormal returns, particularly for targets with high information asymmetry. This effect weakens when hedge funds can more independently identify potential targets or when bidders' advisors hold shares in targets.

Keywords: Investment banking; short-term hedge funds; information asymmetry; information leakage; mergers and acquisitions.

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1 Introduction

Mergers and acquisitions (M&As) rank among the most significant corporate events. The Institute for Mergers, Acquisitions, and Alliances (IMAA)[1] estimates that at the peak of the 2021 merger wave, the transaction value of US M&As totalled $3,474 billion. Despite their importance, one major challenge in acquisitions is the information asymmetry between acquirer and target. Acquirers face difficulties in assessing the value of targets' resources, while targets may try to hide information that, if known, would reduce their perceived value (Balakrishnan and Koza, 1993; Coff, 1999; Reuer et al., 2012). Such an information asymmetry could lead to acquirers overpaying for targets (Coff, 1999) as it gives targets an informational edge in bargaining (Samuelson, 1984).

Financial advisors, usually investment banks, play a pivotal role in facilitating M&A transactions. In fact, more than 84% (by transaction value) of the deals in our sample involve advisory firms. The input of advisors is especially important when executing complex deals characterized by high levels of information asymmetry (Servaes and Zenner, 1996). However, their involvement may introduce complex dynamics. On the one hand, advisors can improve the efficiency of the deal by reducing asymmetry and assist the bidder in evaluating the fair value of the target. On the other hand, they may exploit privileged information gained during the advisory process to their benefit and purchase target shares for their own portfolios before the announcement of the deal (Bodnaruk et al., 2009).

In this paper, we examine the information flow between bidder's advisors and hedge funds connected to the advisors through a prime-brokerage relationship and its effect on a premium the bidder is ultimately paying, using a sample of 2,117 US mergers of public companies between 2000 and 2019. Several key players merit attention in this setting. (1) A bidder: a firm that intends to acquire a target and may already own an initial equity stake

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[1]The data is available at https://imaa-institute.org/mergers-and-acquisitions-statistics/united-states-ma-statistics/

in the target. (2) An advisor: an investment bank chosen by the bidder to facilitate the deal. This bank may also serve as a prime broker to one or more hedge funds. (3) A target: the firm that is to be acquired through a completed deal. (4) Hedge funds: that may own equity in either the target and/or the bidding firm, and may be connected to the advisor through a prime-brokerage relationship. Information flows within such a network are complex and multi-directional, and are discussed in detail in Section 2.

We find evidence consistent with information flow from advisors to their connected hedge funds, particularly those without prior stakes in target firms. These funds strategically acquire positions in target firms before merger announcements, benefiting from expected positive announcement abnormal returns. In exchange for this privileged information, these funds appear to refrain from resisting bidders' offers, indirectly facilitating lower acquisition premiums for targets characterized by high information asymmetry (henceforth, IA). Our empirical analysis reveals significantly negative effect of short-term holding by connected hedge funds on premiums and target abnormal returns on announcement dates, especially for high-IA targets. Importantly, short-term holdings by unconnected hedge funds do not exhibit similar effects, highlighting the critical role of prime-broker-hedge fund connections in facilitating this type of information transmission.

The negative effect of connected short-term hedge fund holdings on premiums is less pronounced when hedge funds are ex ante less dependent on information shared by their prime brokers and are more capable of identifying potential targets independently. The dependence is more likely to be reduced if the estimated takeover probability for target firms is higher or during periods of merger waves. Conversely, when hedge funds lack specialization in the target's industry and thus are less likely to identify successful targets independently, the negative effect of their holdings on premiums is stronger.

Our analysis contributes to the growing literature on the relationship between hedge funds and their prime brokers and the information flows between these institutions. Hedge funds

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sharing prime brokers exhibit a strong co-movement in returns attributable to information flowing from the common broker (Chung and Kang, 2016). Similarly, information regarding corporate client loans disseminates from prime brokers to hedge funds (Kumar et al., 2020). Hedge funds earn higher abnormal returns from IPO stocks when their prime brokers serve as IPO underwriters (Qian and Zhong, 2018). Prime broker analysts have shown to revise their recommendations to favour their brokerage clients (Chung et al., 2021). In addition, funds of hedge funds exhibit a stronger preference for hedge funds serviced by their connected prime brokers (Aragon et al., 2023). Prime brokerage relations also expose hedge funds to significant counterparty risk. The probability of contagion across hedge funds increases following adverse shocks to their prime broker's share price (Boyson et al., 2010). Hedge funds using Lehman Brothers as their prime broker experience a decline in funding liquidity subsequent to its bankruptcy in 2008 (Aragon and Strahan, 2012). A liquidity shock to a prime broker can be transmitted to connected funds and result in a reduction in credit to hedge funds (Kruttli et al., 2022). We contribute to this literature by highlighting the existence of information flow from prime brokers to their hedge funds clients in M&A deals.

Our analysis also informs discussions concerning the role of M&A advisors. Investment bank advisors may facilitate the successful completion of complex deals characterized by significant informational asymmetries and also reduce transaction costs (Servaes and Zenner, 1996). However, the relevant empirical evidence is mixed. While investment bank involvement may lead to larger shareholder wealth gains (Kale et al., 2003), enhanced M&A returns (Bao and Edmans, 2011; Golubov et al., 2012), and a greater probability of deal completion (Hunter and Jagtiani, 2003), other studies find no association between an advisor's quality and M&A outcomes (Rau, 2000; Hunter and Jagtiani, 2003; Ismail, 2010). Some evidence suggests that the type of advisor impacts the terms of the M&A deals. For example, if a target's own bank acts as the advisor, it fulfils 'a certification role' for the target's quality, which leads to enhanced target abnormal returns (Allen et al., 2004).

Top-tier bidder advisors can enhance outcomes by identifying more synergistic combination, leading to a larger share of synergies to accrue to bidders (Kale et al., 2003; Golubov et al., 2012). Complex deals are more likely to use boutique advisors, and acquirers hiring such advisors tend to pay lower premiums (Song et al., 2013).

At the same time, advisors may exploit information for their own benefit. Bodnaruk et al. (2009) find that investment banks profitably exploit information gained as advisors by taking stakes in target firms before the deal announcement. Their stakes are positively related to bid prospects and to the size of any premium paid for targets. Hence, the authors implicitly document information flowing from the acquirers to the advisors, which the latter use for their benefit. Our paper extends Bodnaruk et al. (2009) by focusing on the information flow between advisors and their connected hedge funds, particularly in cases where targets exhibit high IA. IA creates uncertainty that may discourage banks from directly acquiring target firms. Instead, advisors may share information with connected hedge funds, who then facilitate lower acquisition premiums. Consistent with this mechanism, we find that the negative effect of short-term connected hedge fund holdings on premiums occurs only when advisory firms do not hold stakes in the targets themselves.

Our study also contributes to the literature on the impact of IA in acquisitions and the division of any resulting gains between firms. Acquirer returns are significantly higher in stock-swap acquisitions of difficult-to-value targets (Officer et al., 2009). Targets characterised by greater IA tend to receive larger bid premiums from the acquirers, and the acquirers' investors respond more positively to the acquisition of opaque targets (Cheng et al., 2016). Acquirers strategically exploit their superior bargaining power, are more likely to offer cash payments, and earn a larger fraction of total M&A gains if the target is characterized by higher IA (Luypaert and Van Caneghem, 2017). Acquirers' gains increase if they employ financial advisors in private offers, whereas the opposite is true for public deals (Leledakis et al., 2021) and when targets' ex-advisors are employed (Chang et al., 2016). Bidders

also strategically use toeholds, defined as pre-bid ownership of target shares, to generate an informational advantage over rivals, positively enhancing their profits. Even though target firms control both the number of bidders and the flow of information, granting access to confidential information during the due diligence period (Boone and Mulherin, 2009; Eaton et al., 2022), some information seem to remain inaccessible to bidders, making toeholds a useful tool for bidders. Betton and Eckbo (2000) and Bris (2002) find that the probability of being taken over, the takeover premium, and pre-bid increases in the target's stock price are negatively related to toehold size. In contrast, the post-announcement rise in the target's stock price is positively related to toehold size. Povel and Sertsios (2014) provide evidence that potential acquirers of a target use toeholds to improve their information about possible synergies with the target, and this strategy is more beneficial when the target is opaque. Our results indicate that advisor connections to hedge funds who strategically take stakes in the target firm prior to deal announcements appear to function as an 'indirect toehold', and similarly reduce resistance for bidders.

Finally, we extend the literature on the role of hedge funds in the M&A process. Activist interventions by hedge funds substantially increase the probability of a takeover offer and enhance shareholder value (Boyson et al., 2017). They also improve a firm's M&A decisions and investors respond favourably to such post-activism acquisitions (Wu and Chung, 2022). In contrast, targets characterized by agency problems and facing threats of investor coordination often engage in hostile resistance, which leads to adverse outcomes unless hedge funds provide resistance (Boyson and Pichler, 2019). Dai et al. (2017) show that hedge funds use non-public information to take long positions in M&A target stocks and short positions in acquirer stocks before M&A announcements, and their stakes in targets are positively related to takeover premiums. Our paper extends Dai et al. (2017) by identifying one potential source of such information. We show that hedge funds seem to acquire non-public information through connections with advisors involved in the M&A

process, particularly when the target exhibits high information asymmetry. In such cases, hedge funds seem to be "paying" for this information by accepting lower (while still positive) premiums.

2 Research Design

2.1 Scenarios of information flow

There can be various scenarios of information flow patterns between targets, hedge funds, advisors, and bidders in M&As, as illustrated in Figure 1.

[Figure 1 in here]

If investment banks have strict information barriers between their advisory and brokerage divisions that prevent all formal and informal information sharing, there should be no information flow between connected funds and advisors regarding potential bidders. Consequently, connected fund holdings should not exhibit any differential effect on deal terms compared to unconnected fund holdings. However, such perfect information insulation appears unlikely, given evidence from Qian and Zhong (2018) documenting hedge funds' informational advantages in IPO investments when their prime brokers serve as underwriters.

One potential direction of information flow goes from targets to hedge funds (through their long-term equity holdings in targets), then to advisors (through their prime-brokerage relations with hedge funds), and finally to acquirers, reducing information asymmetry between bidders and targets. This flow aligns with existing literature documenting the role of institutional investors in reducing information asymmetry. For example, Kim et al. (2024) show that institutional investors' information advantage mitigates asymmetric information problems, leading to increased likelihood of stock-for-stock bids, particularly when bidders face high information asymmetry. Similarly, Ferreira et al. (2010) document

that institutional investors facilitate cross-border M&A activity, increase deal success, and support bidders in taking full control of target firms. Brooks et al. (2018) demonstrate that cross-ownership increases merger probability and correlates positively with deal performance.

Under this scenario, connected hedge funds with long-term holdings would share value-relevant information with bidders, reducing information asymmetry and, consequently, acquisition premiums. However, the immediate direct benefits to hedge funds from such information sharing remain unclear. Any potential loss in premium may outweigh informal benefits from maintaining favourable relationships with prime brokers, potentially reducing hedge funds' incentives for such information sharing.

Alternatively, information may flow from acquirers to advisors and subsequently to their connected hedge funds. These funds thereby obtain privileged information and can earn superior returns by taking positions in target firms prior to deal announcements. Such informational advantages would be particularly valuable for funds without prior holdings in the target, as they can generate pure abnormal returns using this information. Related to this scenario, Dai et al. (2017) show that hedge funds exploit M&A-related information, strategically taking long positions in the target's stock in the quarter prior to an announcement. The likelihood of information leakage also increases with the number of external parties involved in a deal. Bodnaruk et al. (2009) document that financial conglomerates, in which affiliated investment banks advise the bidders, increase their positions in targets before M&A announcements, resulting in high profits of such trades. Applying analogous reasoning to connected hedge funds, if information flows from advisory banks to hedge funds with prime brokerage connections, these funds may exploit this information by taking a position in the target firm in advance, realizing any gains around the M&A announcement.

However, bidder advisors may be selective in sharing such information, as leakage carries risks. Early trades by hedge funds could trigger follow-up trading by other market

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participants, leading to pre-announcement price run-ups that disadvantage acquirers. The benefits of information sharing likely increase for targets with high IA, where valuations are uncertain and deal risks are higher. In such cases, advisors may strategically share information with hedge funds who would accept somewhat lower acquisition premiums. This creates a mutually beneficial arrangement for connected hedge funds and advisors when the funds are not likely to independently identify potential targets and the target exhibits high IA.

Consider a stylized example, illustrating cost-benefit trade-off for hedge funds. Suppose the expected premium for a deal is π, and a hedge fund selects the correct target firm with probability p. The expected payoff for such fund is $p \cdot \pi$. When tipped by a connected advisor, hedge fund chooses the correct target with $p = 1$, but it may need to implicitly agree not to resist the acquirer, resulting in a potentially discounted premium $(1 - \lambda) \cdot \pi$, where λ is the discount rate. A risk-neutral hedge fund will be indifferent between acting on its own or using the tip if $p \cdot \pi = (1 - \lambda) \cdot \pi$, implying $p = 1 - \lambda$. This suggests that hedge funds with a lower probability of independently identifying targets are more inclined to accept reduced premiums in exchange for privileged information.

The reaction of other target investors to the offer of a premium of $(1 - \lambda) \cdot \pi$ depends on the precision with which they estimate the fair premium. Investors are more likely to push for a higher premium if it is clear that π is a fair value and $(1 - \lambda) \cdot \pi$ is too low. Conversely, if the precision in estimating π is low, often the case for targets with high IA, investors are less likely to oppose a lower premium $(1 - \lambda) \cdot \pi$.

Therefore, if advisor-prime broker - hedge fund information flow exists, we would expect short-term connected hedge fund holdings to have a negative effect on premium primarily for targets with high IA, and the effect to be more pronounced when the probability of hedge funds to independently identify the correct target is low.

2.2   Deal premium: Regression specification

To evaluate the effect of short-term connected hedge fund holdings on the deal premium we estimate Equation 2:

$$
\begin{aligned}
Premium^j = \alpha \ \ + \ \ & \beta_1 Holding\_connected\_ST^j \\
+ \ \ & \beta_2 Holding\_connected\_ST^j \cdot highIA^j \\
+ \ \ & \delta Controls^j + \epsilon^j
\end{aligned}
\tag{1}
$$

where $Premium$ is the deal premium computed as the ratio of the offer price per share to the target's closing share price one week[2] before the acquisition announcement; $Holding\_connected\_ST$ represents the total holdings of all short-term connected hedge funds in the target firm in deal j in the quarter before the announcement; and $highIA$ takes the value of one for targets characterized by high IA.

Following Dai et al. (2017), we define short-term hedge funds as those hedge funds that unexpectedly take long positions in a target's stock in the quarter prior to an M&A announcement, without having held any prior positions in that stock in the last 3 quarters. Connected hedge funds are defined as those whose prime broker is the advisor to the bidder.

Overall, in our sample there are 218 unique advisors. Out of those, we identify 20 advisors that have connected hedge funds in at least one deal. These advisors include large investment banks with prime-brokerage divisions: the Bank of America Corporation, JP Morgan Chase & Co., Citigroup Inc., Goldman Sachs Group, Morgan Stanley, Merrill Lynch, Lehman Brothers, Bear Stearns, UBS Group AG, Deutsche Bank AG, Credit Suisse Group AG, Royal Bank of Canada, Barclays plc, The Bank of Montreal, BNP Paribas SA, HSBC Holdings plc, Jefferies Financial Group Inc, KPMG International Limited, Société

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[2]We also use the share price four weeks before the announcement in a robustness check specification.

Générale S.A, and Wells Fargo & Company.[3]

To measure target IA, we use stock market and accounting information from CRSP/Compustat and the information on analysts' coverage and earnings forecasts from I/B/E/S to compute the following seven measures for each target firm following Karpoff et al. (2013), Cheng et al. (2016) and Borochin et al. (2019). All variables are measured in the year before the acquisition announcement unless otherwise indicated.

(1) *Amihud* is the average Amihud illiquidity measure;

(2) *SPREAD* is the average bid-ask spread;

(3) *Size* is the natural logarithm of the book value of total assets;

(4) *COVER* denotes analysts' coverage, computed as the number of analysts following the target;

(5) *ERR* is the relative forecast error, computed as the ratio of the absolute difference between the forecast and the actual earnings per share to the price per share;

(6) *DISP* is the average standard deviation of earnings per share over the share price;

(7) *volatility* is average standard deviation of daily stock returns.

We calculate the IA value of a target as follows. For each value of *Amihud*, *SPREAD*, *ERR*, *DISP*, and *volatility*, which lies above the median, and for *Size* and *COVER*, lying below the median for a specific target firm, we assign one risk point to its IA value. A target is said to have high IA if the sum of its risk points (the final value of IA) is above the median value across all targets.

We first estimate the regression with the interaction term between $Holding\_connected\_ST^j$ and $highIA$, as shown in Equation (2), and then we estimate subsample regressions based on targets with either high or low IA separately, excluding the interaction term.

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[3]The 20 advisors that are connected in at least one deal include the largest investment banks, and collectively, they advise on 56% of our sample of deals. In these deals, every advisor may still be unconnected. While we base our main results on all deals in our sample, we repeat the analysis on a sub-sample of deals which use these 20 advisors only. The results are qualitatively the same as those of the main analysis.

We control for other types of hedge fund holdings, including: total holdings of all connected hedge funds ($Holding\_connected$), holdings of short-term unconnected hedge funds ($Holding\_unconnected\_ST$), holdings of short-term hedge funds connected to target advisor ($Holding\_connected\_ST\_t$), holdings of hedge funds having one of the 20 big advisors as a prime broker ($Holding\_bigadvisor$), total hedge fund holdings in a target firm in that quarter ($Holding\_total$), hedge funds' holdings in the acquirer ($Holding\_acquirer$), and acquirers' holdings in the target ($Toehold$). All these holdings capture the incentives of different types of institutions and/or different information sources. For example, $Holding\_unconnected\_ST$ captures the holdings of hedge funds that unexpectedly take positions in the target firm (like in Dai et al., 2017), but their information source is not a prime-broker/advisor of the deal.

In choosing the other control variables, we follow Bodnaruk et al. (2009), Gao et al. (2018), and Chang et al. (2016). All variables are measured in the last fiscal year prior to the acquisition announcement unless otherwise stated. $Return\ on\ assets$ (ROA) is the return on a target firm's assets; $Leverage$ is the equity-to-assets ratio of a target firm; B/M is target's book-to-market value of equity; $Tangible$ is target's ratio of total tangible assets to total assets; $Size_a$ is the logarithm of acquirer's market capitalization; B/M_a is acquirer's book-to-market value of equity; $RELSIZE$ is the ratio of target to bidder total assets; $Valpct$ is the ratio of deal value to acquirer market capitalization; $Holding\_MF$ is the mutual fund holdings in a target firm one quarter before the acquisition announcement; $Pctcash$ is the percentage of cash payment in the consideration; $Hostile$ is a dummy variable taking the value of 1 for a hostile deal, and 0 otherwise; $Tender$ is a dummy variable taking the value of 1 for tender offers, and 0 otherwise; $Merger\ of\ equals$ is a dummy variable taking the value of 1 when the target and acquirer consider their merger a merger of equals; $Diff\_Ind$ is a dummy variable taking the value of 1 for a deal where bidder and target are from different 3-digit SIC code industries, and 0 otherwise; $Number\ of\ bidders$ is the

number of bidders involved in a deal; $Multi\_advisor$ is a dummy variable taking the value of 1 if more than one bidder advisor is involved in a deal, and 0 otherwise; $Ex\_advisor$ is a dummy variable taking the value of 1 if the bidder uses at least one advisor who previously worked for the target, and 0 otherwise.

We also account for the possible influence of shareholder activism by using a dummy variable in our regressions, $Activism$, which equals one if any type of shareholder activism is reported via form 13D within 5 years before a deal announcement, and zero otherwise. Here, shareholder activism occurs when an individual or group of shareholders acquires beneficial ownership of more than 5% of a voting class of a company's securities, as reported via form 13D. Our sample contains 448 deals associated with such shareholder activism.

Finally, we control for the potential selection bias. We first include the Inverse Mills Ratio to account for a possible selection bias on the part of hedge funds. The first-stage probit analysis employs all target firms and estimates the probability of hedge funds owning equity in these target firms. Following Dai et al. (2017), we use: the deals' percentage of cash payment, indicators for a hostile deal and tender offer, holdings by mutual funds in acquirers, the premium paid to the target, the target's return on assets, leverage, size, and book-to-market ratio as predictors of positive hedge fund stakes in targets. We then include the resulting Inverse Mills Ratio ($IMR\_holding$) in all regressions.

Another important selection issue arises in this setting, namely that connections may be related to the advisor's importance and reputation in financial markets, and bidders may deliberately choose a prestigious (hence connected) advisor. To address this aspect of the selection decision, we estimate a probit model for the probability that the acquirer chooses at least one the 20 big advisors as an advisor. We include the corresponding Inverse Mills Ratio ($IMR\_bigbadvisor$) in all regressions. Following Song et al. (2013), the acquirer's choice of a large, reputable bank as the advisor is a function of deal size, percentage of cash payment, an indicator of a hostile deal, holdings by mutual funds in acquirers, whether the targets

and acquirers are in different industries, the number of bidders, the fraction of target shares held by the acquirer before deal announcement, both target and acquirer's book-to-market ratio, and the target's return on equity.

Although using $IMR\_bigbadvisor$ may address certain selection concerns, a mechanical relationship persists: bidders choosing smaller advisors without prime brokerage divisions cannot, by definition, have connected hedge funds holding the target. Therefore, while our main regression analysis is based on the full sample of deals, we also conduct our complete analysis on a subsample restricted to deals involving only large advisors with potential hedge fund connections.

To capture any other potentially missing variables, we include acquirer industry fixed effects, year fixed effects, and advisor fixed effects. We use standard errors clustered by acquirer industry in all equations. Table 1 lists all the key variables and their definitions.

[Table 1 in here]

2.3   Probability of choosing a target and its effect on premium

Our previous analysis suggests that the effect of short-term connected hedge fund holdings on merger premiums should be stronger when hedge funds are less likely to independently identify potential targets. In this section, we examine four different measures to assess this probability and their implications for acquisition premiums.

First, the probability that a hedge fund chooses the correct target is likely to be higher during merger waves, when all the market participants are aware that there are more M&As happening in a certain industry. Following Ahern and Harford (2014), we calculate the number of mergers for each industry-pair of acquirer and target industries in each year. We identify a merger wave in an industry pair when the number of all deals in such a pairing in a year is above the 70th percentile. We then incorporate the interaction

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term $Holding\_connected\_ST \cdot Merger\_wave$ into Equation (2). The impact of short-term connected hedge fund holdings on deal premium shall be lower during merger waves, if our intuition is correct.

Second, we estimate the probability that a firm becomes a target, using its observable characteristics. Using the full Compustat dataset, every year we estimate the following logit regression:

$$Pr(Chosen^k) = \phi(\alpha + \beta Controls^k) \tag{2}$$

where $Chosen^k$ equals one if a firm k is chosen as the target for a deal, and zero otherwise. Following Palepu (1986), the determinants include firm size (log of total assets), book-to-market ratio, return on equity, leverage (equity-to-asset ratio), tangibility (tangible assets/total assets), and industry fixed effects. Finally, we predict each firm's probability of becoming a merger target $Pr(chosen)$ in a given year based on its characteristics and include the interaction $Holding\_connected\_ST \cdot Pr(chosen)$ in the regression. The impact of short-term connected hedge fund holdings on the deal premium is expected to be less pronounced if the probability of a firm becoming a target is higher.

Third, the probability that a hedge fund chooses the correct target is expected to be higher if the hedge fund specializes in the target industry. For each hedge fund, we compute fractional holdings in the industry as the ratio of the total dollar value allocated to those firms in the same four-digit SIC code as the target, scaled by the total value of the reported holdings of the hedge fund. We say that a hedge fund does not specialise in that industry if the fund's fractional holdings in the industry are below the 30th percentile. In our sample, a 30th percentile holding of hedge funds is 0.204% per industry. We include total holdings in the target by short-term connected hedge funds that do not specialize in the target industry $Holding\_connected\_unspecialised$ as an additional control in Equation (2). We expect short-term connected funds to be more willing to collaborate with the bidder when

they do not specialize in the target industry.

Finally, the probability that a hedge fund chooses the correct target is expected to be higher for merger arbitrage funds, as they may be expected to possess skills in identifying potential targets. We include total holdings in the target by short-term connected hedge funds following a merger arbitrage strategy $Holding\_connected\_MergArb$ in Equation (2). Since holdings are reported on a company level and investment styles are reported on individual fund level, we classify a company as potentially having expertize in Merger Arbitrage strategy if at least one fund in this company reports "Event Driven" or "Merger Arbitrage" as its style. We expect short-term connected funds to be less willing to collaborate with the bidder when they follow a merger arbitrage strategy and specialize in M&A.

2.4 Implications for abnormal returns, short selling, and long-term profitability

In this section, we examine the implications of short-term connected hedge fund holdings on market reactions, short-selling activity in bidders, and post-merger performance. To do so, we estimate Equation 3:

$$
\left.\begin{array}{r}
TCAR^j \\
ACAR^j \\
ASIR^j \\
Profitability^j
\end{array}\right\} = \alpha + \beta_1 Holding\_connected\_ST^j \\
+ \beta_2 Holding\_connected\_ST^j \cdot highIA^j + \delta Controls^j + \epsilon^j
\tag{3}
$$

where $TCAR$ ($ACAR$) is the cumulative abnormal returns (CARs) for target (acquirer) firms on the acquisition announcement date, computed using the event study methodology

of Brown and Warner (1985). Following Cai and Sevilir (2012) we estimate the Fama-French 3-factor model for each firm over the 200 trading days ending two months before the announcement. We compute the abnormal returns on the announcement day as the difference between the realized and expected returns. In the main specification, CAR represents the abnormal return computed over a one-day [0], and a 3-day [-1,1] window.

Short-selling the acquirer's stock is another way traders generate profits around M&A announcements, and hedge funds are known for actively adopting short-selling strategies (Appel et al., 2020). If connected hedge funds receive information about an upcoming deal, they may short-sell the bidder's equity in advance of the public announcement and/or increase their level of short selling. In contrast, if connected hedge funds envision information sharing with the bidder, they may refrain from such (strong) short-selling activity in the bidder's stock. These possibilities motivate the examination of the pattern(s) of short-selling in the bidder's shares around the M&A announcement, and relate any such patterns to the holdings of short-term connected hedge funds. Following Dai et al. (2017), we compute the monthly short interest ratio (SIR) for each acquirer as described in Equation (4), where $SHORTINT\_ADJ_t$ is the adjusted short-selling in an acquirer in month t and $SH\_OUT\_ADJ_{t-1}$ is the adjusted number of shares outstanding in month $t-1$.

$$SIR_t = \frac{SHORTINT\_ADJ_t}{SH\_OUT\_ADJ_{t-1}} \tag{4}$$

Then we calculate the average short interest ratio for each bidder over a six month period, leaving a three-month gap prior to the announcement, as shown in Equation (5), where t is the month of the deal announcement. Finally, we compute the abnormal SIR ($ASIR$) for each bidder in months t-1, t, and t+1 using Equation (6).

$$AV\_SIR\_PAST = \frac{1}{6} \sum_{k=4}^{9} SIR(t-k) \tag{5}$$

$$ASIR_t = \frac{SIR_t}{AV\_SIR\_PAST} \tag{6}$$

We use ASIR one month before the announcement month ($ASIR_{t-1}$), ASIR during the announcement month ($ASIR_t$), and during the following month ($ASIR_{t+1}$) as dependent variables in turn.

Last, we consider longer term implications for the bidder, focusing on the post-merger performance of the merged firm. Bodnaruk et al. (2009) document a lower post-merger profitability for mergers in which the bidder's advisor has a stake in the target. Could short-term connected fund holdings in the target similarly lead to poor performance of the merged firm? To answer this question, we use three measures to assess the post-merger performance of the firm: (1) the return on assets (ROA), (2) the return on equity (ROE), and (3) the net profit margin, measured by the ratio of net income to net sales (NPM). We regress these profitability measures, computed at the end of the first fiscal year following the acquisition announcement, on short-term connected funds' holdings and other controls for completed deals only.

3   Data

We use three data sets: (1) a hedge fund sample from the TASS and Eurekahedge databases, (2) hedge fund holdings data from the 13f filings to the Security and Exchange Commission (SEC), and (3) a sample of M&A transactions with detailed information from the Eikon database. We compile our hedge fund sample from the TASS and Eurekahedge databases over the January 1994 to September 2019 period, including information on affiliated companies, such as prime brokers. U.S. registered hedge fund investment companies that manage over $100 million are required by the SEC to file quarterly reports on their holdings. We aggregate all individual hedge funds managed by the same hedge fund

companies and obtain their holdings from the CDA database (Thomson Reuters, 13f filings) following Cui et al. (2023)[4]. In total, our sample comprises 5,713,269 data points of holdings (a hedge fund company-quarter-security uniquely defines each data point), with 651 hedge fund companies holding at least one of the target firms one quarter before the deal announcement.[5]

Our sample of acquisitions, announced between January 2000 to September 2019, is from the Eikon database. We apply several filters commonly used in prior M&A literature (see Boyson et al., 2017; Dai et al., 2017; Wu and Chung, 2022), namely: (1) the disclosed deal value must be greater than USD 1 million; (2) the acquirer should own less than 50% of the target's stock before the acquisition and should seek to own 100% of the target's shares upon successful acquisition; (3) spin-offs, repurchases, and self-tenders are excluded; (4) both the bidder and the target must be U.S. public firms listed on NYSE or Nasdaq, as the hedge fund holdings data are only available for U.S. listed firms.[6] The initial sample contains 3,123 deals. We use only deals for which all variables required for our baseline analysis can be computed using the data from CRSP and Compustat.[7] The final sample includes 2,117 deals. The target CUSIP symbol is used to match the firms in our M&A sample with the companies included in the hedge-fund holdings sample.

Overall, there are 218 unique advisors in our sample, of which 20 have a hedge fund connection at least in one deal. An advisor is said to be connected if it acts as a prime broker to at least one hedge fund that holds equity in a target in a deal for which the advisor is employed. On average, connected advisors advise on more deals than those who

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[4]For each hedge fund company, we check information in Bloomberg to ensure that no company has a side business, such as mutual funds or insurance.

[5]Hedge funds may request confidentiality for their holdings (Agarwal et al., 2013). Agarwal et al. (2013) show that confidential holdings of hedge funds outperform their original holdings. Hence, any results which include confidential holdings are likely to be even stronger than those we document.

[6]This filter allows us to calculate the holdings of hedge funds in both the target and acquirer. Hedge funds may hold other companies, but this is not observed in our sample.

[7]The largest loss of data of 567 and 217 deals is driven by the absence of information on acquirer book-to-market ratio and premium, respectively.

are unconnected (14.972 versus 5.557) and advise on deals with greater value (121.290 versus 7.272 billion dollars).

Table 2 reports the descriptive statistics of deal characteristics. The average holdings of short-term connected and unconnected funds are 0.1% and 0.6%, respectively, when we use the complete sample. Note, if we consider only deals where short-term connected fund holdings in the target are nonzero, these positions increase to 0.4% and 1.1%, respectively. The average holdings of funds connected to the bidder's advisor and the target's advisor are both 0.5%. The average total hedge fund holdings in the target is 8%, while the average toehold is 0.7%. The average duration of deals is approximately 4.5 months. The takeover success rate is 88.3%. The average target premium in our sample is 38.6%. TCAR and ACAR on the announcement date are 17.9% and -1.3%, respectively.

The average target (bidder) has a size of 5.891 (8.167), and a book-to-market ratio of 0.632 (0.658). The average ratio of deal value to acquirer market capitalization is 0.407, and the average mutual fund holdings amount to 7.8%. The fractions of cash deals, hostile deals, and deals in different industries are 51%, 1.9%, and 30.1%, respectively. The average target information asymmetry level is 4.68. On average, there are 1.124 advisors per deal, and 1.434 connected hedge funds and 9.820 unconnected hedge funds take a stake in the target firm. The average monthly short interest ratio for bidders is 0.034.

[Table 2 in here]

4   Empirical Results

Let us first illustrate the relative differences between short-term connected and unconnected hedge funds that take positions in target firms one quarter before announcement. For each deal, we compute two ratios: (1) the fraction of short-term connected holdings relative to total connected holdings and (2) the fraction of short-term

unconnected holdings relative to total unconnected holdings. The average fraction of short-term connected holdings (16%) is significantly higher than that of unconnected holdings (9%), with a t-statistic of 5.37 for the mean difference. These results suggest that connected hedge funds are more likely to take new positions in target firms compared to unconnected funds, after controlling for the baseline holdings of both groups.

Table 3 reports the results from estimating Equation (2), which captures the impact of short-term connected fund holdings on deal premiums. The coefficient on *Holding_connected_ST* is statistically insignificant, pointing of no detectable effect for an average deal. However, the significant negative coefficient on the interaction between *Holding_connected_ST* and *highA* suggests that short-term connected hedge fund holdings decrease the premium of targets with a high level of information asymmetry. Specifically, based on results in Column (1), a one standard deviation increase in short-term connected fund holdings in high-information-asymmetry targets translates to a 0.032 decrease in the premium. Given the average premium of 0.386, such a decrease amounts to more than 8% of the average premium level.

The results remain consistent when we include all other types of holdings in column (2). These other types of holdings are all statistically insignificant. In columns (3) and (4), we conduct subsample regressions based on whether the targets exhibit high or low IA. The coefficient on *Holding_connected_ST* is only negative and significant for targets with high IA. In columns (5) to (8), we use a subsample of deals involving large advisors that can be potentially connected. Our main result – the negative effect of holdings by connected sort-term hedge funds on premium of high-IA targets – remain qualitatively unchanged.

In terms of control variables, the acquirer's toehold in the target firm reduces the target premium. The premium consistently decreases with the target's leverage and the acquirer's book-to-market ratio, while it increases with the target's book-to-market. The premium is also on average higher for deals involving high-IA targets, tender offers, or multiple bidders.

Considering hedge fund trade-off between receiving deal-related information and potential losses of premium (Table 4), our findings consistently support the view that the impact of short-term connected fund holdings is less pronounced when hedge funds are able to select the correct target without information provided by prime brokers. Specifically, during a merger wave or when a firm has a high probability of becoming a target, short-term connected fund holdings lead to a significantly smaller reduction in target premiums (Columns (1) and (2) in Table 4). The coefficients of 22.91 and 6.30 on $Holding\_connected\_ST \cdot Merger\ wave$ and $Holding\_connected\_ST \cdot Pr(chosen)$ are significant at the 1% and 10% levels, respectively. Furthermore, the negative effect of short-term connected fund holdings is more pronounced when hedge funds are not specialized in the target industry (Column (3) in Table 4), with the estimated coefficient of -25.30 significant at the 5% level.

The relationship between information flow and its benefits for different market participants is complex. Bodnaruk et al. (2009) show that investment banks exploit merger information for their own benefit by acquiring stakes in target firms before deal announcements, thereby earning higher premiums. When advisors/prime brokers profit from deals directly, they are likely to have reduced incentive to share information with hedge funds or encourage them to accept lower premiums. Consequently, we expect the impact of short-term connected fund holdings to be more pronounced when the bidder's advisor has no holdings in the target firm.

We test this hypothesis by dividing the deals into subsamples based on whether the bidder's advisor holds stakes in the target firm (Table 5). The coefficient on $Holding\_connected\_ST$ is negative and significant for high-IA targets only when the bidder's advisor has no holdings in the target firm. In this case, a one standard deviation increase in short-term connected fund holdings for high-IA targets corresponds to a 0.052 decrease in the premium, representing more than 13% of the average premium level.

We now consider results related to market reaction on the announcement of deals. Table 6 presents the estimation results from Equation 3, which captures the effects of short-term connected fund holdings on target and acquirer abnormal returns. The abnormal returns are computed over two different event windows: a 1-day [0] window and a 3-day [-1,1] window. The coefficients on $Holding\_connected\_ST \cdot highIA$ are negative and significant for both TCAR windows, using all deals or deals involving large advisors only (columns (1)-(2) and (5)-(6)). For instance, a one standard deviation increase in connected fund holdings for high-IA targets corresponds to a 1.37 basis point decrease in target announcement returns, which amounts to around 8% of the average TCAR in column (1). Additionally, short-term connected fund holdings increase acquirer abnormal returns.

Table 7 reports the results on abnormal short selling of acquirers' stocks. Short-term connected fund holdings exhibit a negative relationship with all measures of $ASIR$ for deals involving high-IA targets and are statistically significant when using $ASIR$ from the month preceding the deal announcement (Columns (1) and (4) in Table 7). A one standard deviation increase in connected fund holdings for high-IA targets decreases abnormal short selling in the bidder in the month prior to the deal announcement by 0.031, which amounts to around 3% of the average $ASIR$ in column(1).

As for post-merger performance (Table 8), we find no significant impact of short-term connected hedge funds' holdings on the merged firm's future profitability, results which contrast with Bodnaruk et al. (2009)'s findings for equity held directly by a deal's advisors.

5 Robustness

5.1 Propensity score matching

In this section, we use a propensity score matching technique to control for other possible (unobserved) differences between deals with and without connected short-term fund holdings. We examine premium and abnormal returns for deals with connected short-term fund holdings compared with a matched control sample of deals where such holdings are absent.

The first-stage probit regression relates the probability of having connected short-term fund holdings to a set of explanatory variables, including: the book-to-market value of both the target and acquirer, target leverage, acquirer size, the asset size ratio of the target to the acquirer, the ratio of deal value to acquirer market capitalisation, percentage of the payment made in cash, a dummy indicating if the target and the acquirer are from different industries, a dummy variable for tender offer, the number of bidders involved in a deal, toehold, mutual fund holdings, and the total hedge fund holdings. Deals with connected short-term fund holdings and other deals are matched using one-to-one matching without replacement based on the estimated propensity score. We retain only those matches for which the differences in the scores are smaller than 0.05, resulting in a total of 257 matched pairs.

The results in Panel A of Table 9 show that the final treated and control groups are indistinguishable in terms of virtually all characteristics used as the basis for matching. In Panel B of Table 9, we compare the differences across the two groups of deals in terms of deal premium paid and the abnormal returns of both target and acquirer on the announcement day, and their cumulative abnormal returns over another three windows [-1,1], [-3,3], and [-5,5], as well as post-merger performance. Deals with short-term connected fund holdings have significantly lower premiums and smaller target abnormal returns in all windows. There is no evidence of significant differences in acquirer abnormal returns between these two deal groups. Additionally, these deals are characterized by lower post-merger performance.

Overall, the matching results support our central conclusion: the pattern of information flow emanates from bidder advisors to hedge funds connected through their prime brokerage relationships, leading to lower deal premiums.

[Table 9 in here]

5.2 Pseudo hedge fund-prime broker connections

One potential concern in our analysis could be the endogeneity of hedge fund-prime broker connections. To address this issue, in the spirit of instrumental variable estimation, we construct estimated connections between hedge funds and prime brokers. Then we define a pseudo-relationship between hedge fund companies and prime brokers and proceed to repeat the analysis using such instrumented connections instead of the actual ones.

For each connected advisor in our sample, we estimate a probit regression for the probability that a hedge fund has this advisor as its prime broker. The dependent variable is a dummy indicating the use of this advisor as a prime broker at the individual hedge fund level. We use hedge fund size, domicile, and strategy as explanatory variables. In total, we have 2,309 hedge funds in our sample. In the next step, we predict hedge fund connections to each advisor. We say a hedge fund is estimated to be connected to a given advisor if the estimated probability of such connection is above the 70th percentile for that advisor. Hence, each hedge fund may have multiple estimated connected advisors. We then aggregate such individual fund level pseudo-connections at a company level to use together with the holdings information. This yields 888 deals with pseudo-connected fund holdings (as compared to 677 truly connected deals in the main sample). We then use this pseudo-relationship to measure short-term connected hedge fund holdings in the target firm, and repeat the analysis.

The results are reported in Table 10. We find that pseudo-connected short-term hedge fund holdings significantly reduce the target premium and increase bidder abnormal returns

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on the deal announcement date for targets with higher IA, which is broadly consistent with our main findings.

[Table 10 in here]

6   Conclusion

This paper analyses the potential channels of information flow between bidders, advisors, and their connected hedge funds and its impact on the deal outcome in M&As. We define short-term connected hedge funds as those that unexpectedly bought equity in the target firm before an M&A announcement while having a prime broker who serves as the bidder's advisor on the M&A deal. Using a sample of 2,117 US public M&A transactions between 2000 to 2019, we find that short-term connected hedge fund holdings lead to a lower premium and lower target abnormal returns around the announcement, especially for targets characterised by high levels of IA.

These findings are consistent with an 'information-for-support' mechanism. Acquirer advisors appear to share information about upcoming deals with connected hedge funds. Hedge funds that previously did not hold positions in the target firm exploit this information by taking stakes in the target's stock during the quarter preceding the deal announcement to benefit from announcement abnormal returns. In exchange, these hedge funds seem to implicitly agree to use their holdings in the target firm as an 'indirect toehold' and refrain from opposing the bidder's offer. Such dynamics leads to lower premiums and reduced target abnormal returns upon the public announcement of the deals when target firms exhibit high levels of information asymmetry. Consistent with this mechanism, we also find some evidence that higher short-term connected fund holdings are linked to reduced short-selling of the acquirers one month before the announcement for deals involving high-IA targets.

Our evidence suggests that affiliated hedge funds are less likely to align with the bidder and sacrifice the premium when the probability of independently identifying the correct merger target by these funds, that is, without any information sharing from the prime broker, is higher. This scenario typically arises during merger waves within the target-acquirer industry pair and when the likelihood of a firm becoming a target is high. Affiliated hedge funds are more inclined to collaborate with the bidder when they lack specialization in the target's industry – that is, when the fraction hedge fund's portfolio allocated to the target firm's industry is low.

Remarkably, the negative effect of connected short-term hedge fund holdings on premiums is pronounced only when advisors/prime brokers hold no direct stakes in the target firms, so when information sharing and potentially lower announcement returns does not adversely affect the performance of their own portfolios.

Our findings contribute to the research on information sharing between prime brokers and their clients (Chung and Kang, 2016; Kumar et al., 2020; Qian and Zhong, 2018), as well as to the literature on how financial advisors reduce information asymmetry between targets and acquirers (Officer, 2007; Leledakis et al., 2021) and the exploitation of M&A deal-related information (Bodnaruk et al., 2009; Dai et al., 2017). We highlight an additional channel through which information can be shared: from advisors to connected hedge funds. Overall, our analysis provides novel insights into the role of advisors and their connections with other financial institutions in shaping M&A outcomes.

Reference

Agarwal, V., Jiang, W., Tang, Y., and Yang, B. Uncovering hedge fund skill from the portfolio holdings they hide. *The Journal of Finance*, 68(2):739–783, 2013.

Ahern, K. R. and Harford, J. The importance of industry links in merger waves. *The Journal of Finance*, 69(2):527–576, 2014.

Allen, L., Jagtiani, J., Peristiani, S., and Saunders, A. The role of bank advisors in mergers and acquisitions. *Journal of Money, Credit and Banking*, 36:197–224, 2004.

Appel, I., Bulka, J., and Fos, V. Active short selling by hedge funds. *CEPR Discussion Papers*, June 2020. Number: 13788 Publisher: C.E.P.R. Discussion Papers.

Aragon, G. O. and Strahan, P. E. Hedge funds as liquidity providers: Evidence from the lehman bankruptcy. *Journal of Financial Economics*, 103(3):570–587, 2012.

Aragon, G. O., Chung, J.-W., and Kang, B. U. Do prime brokers matter in the search for informed hedge fund managers? *Management Science*, 69(8):4932–4952, 2023.

Balakrishnan, S. and Koza, M. P. Information asymmetry, adverse selection and joint-ventures: Theory and evidence. *Journal of economic behavior & organization*, 20 (1):99–117, 1993.

Bao, J. and Edmans, A. Do investment banks matter for M&A returns? *The Review of Financial Studies*, 24(7):2286–2315, 2011.

Betton, S. and Eckbo, B. E. Toeholds, bid jumps, and expected payoffs in takeovers. *The Review of Financial Studies*, 13(4):841–882, 2000.

Bodnaruk, A., Massa, M., and Simonov, A. Investment banks as insiders and the market for corporate control. *The Review of Financial Studies*, 22(12):4989–5026, 2009.

Boone, A. L. and Mulherin, J. H. Is there one best way to sell a company? auctions versus negotiations and controlled sales 1. *Journal of Applied Corporate Finance*, 21(3):28–37, 2009.

Borochin, P., Ghosh, C., and Huang, D. Target information asymmetry and takeover strategy: Insights from a new perspective. *European Financial Management*, 25(1):38–79, 2019.

Boyson, N. M. and Pichler, P. Hostile resistance to hedge fund activism. *The Review of Financial Studies*, 32(2):771–817, 2019.

Boyson, N. M., Stahel, C. W., and Stulz, R. M. Hedge fund contagion and liquidity shocks. *The Journal of Finance*, 65(5):1789–1816, 2010.

Boyson, N. M., Gantchev, N., and Shivdasani, A. Activism mergers. *Journal of Financial Economics*, 126(1):54–73, 2017.

Bris, A. Toeholds, takeover premium, and the probability of being acquired. *Journal of Corporate Finance*, 8(3):227–253, 2002.

Brooks, C., Chen, Z., and Zeng, Y. Institutional cross-ownership and corporate strategy: The case of mergers and acquisitions. *Journal of Corporate Finance*, 48:187–216, 2018.

Brown, S. J. and Warner, J. B. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14(1):3–31, 1985.

Cai, Y. and Sevilir, M. Board connections and M&A transactions. *Journal of Financial Economics*, 103(2):327–349, 2012.

Chang, X., Shekhar, C., Tam, L. H., and Yao, J. The information role of advisors in mergers and acquisitions: Evidence from acquirers hiring targets' ex-advisors. *Journal of Banking & Finance*, 70:247–264, 2016.

Cheng, P., Li, L., and Tong, W. H. Target information asymmetry and acquisition price. *Journal of Business Finance & Accounting*, 43(7-8):976–1016, 2016.

Chung, J.-W. and Kang, B. U. Prime broker-level comovement in hedge fund returns: information or contagion? *The Review of Financial Studies*, 29(12):3321–3353, 2016.

Chung, S. G., Kulchania, M., and Teo, M. Hedge funds and their prime broker analysts. *Journal of Empirical Finance*, 62:141–158, 2021.

Coff, R. W. When competitive advantage doesn't lead to performance: The resource-based view and stakeholder bargaining power. *Organization science*, 10(2):119–133, 1999.

Cui, X., Kolokolova, O., and Wang, G. J. On the other side of hedge fund equity trades. *Management Science*, forthcoming, 2023.

Dai, R., Massoud, N., Nandy, D. K., and Saunders, A. Hedge funds in M&A deals: Is there exploitation of insider information? *Journal of Corporate Finance*, 47:23–45, 2017.

Eaton, G. W., Guo, F., Liu, T., and Officer, M. S. Peer selection and valuation in mergers and acquisitions. *Journal of Financial Economics*, 146(1):230–255, 2022.

Ferreira, M. A., Massa, M., and Matos, P. Shareholders at the gate? institutional investors and cross-border mergers and acquisitions. *The Review of Financial Studies*, 23(2): 601–644, 2010.

Gao, N., Kolokolova, O., and Mattes, A. Does hedge fund short-termism shape up merger payment? *Available at SSRN 3113216*, 2018.

Golubov, A., Petmezas, D., and Travlos, N. G. When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As. *The Journal of Finance*, 67(1): 271–311, 2012.

Hunter, W. C. and Jagtiani, J. An analysis of advisor choice, fees, and effort in mergers and acquisitions. *Review of Financial Economics*, 12(1):65–81, 2003.

Ismail, A. Are good financial advisors really good? The performance of investment banks in the M&A market. *Review of Quantitative Finance and Accounting*, 35(4):411–429, 2010.

Kale, J. R., Kini, O., and Ryan, H. E. Financial advisors and shareholder wealth gains in corporate takeovers. *Journal of Financial and Quantitative Analysis*, 38(3):475–501, 2003.

Karpoff, J. M., Lee, G., and Masulis, R. W. Contracting under asymmetric information: Evidence from lockup agreements in seasoned equity offerings. *Journal of Financial Economics*, 110(3):607–626, 2013.

Kim, K., Luu, E., and Xu, F. Do institutional investors process and act on information? evidence from m&a targets. *The Review of Corporate Finance Studies*, page cfae006, 2024.

Kruttli, M. S., Monin, P. J., and Watugala, S. W. The life of the counterparty: Shock propagation in hedge fund-prime broker credit networks. *Journal of Financial Economics*, 146(3):965–988, 2022.

Kumar, N., Mullally, K., Ray, S., and Tang, Y. Prime (information) brokerage. *Journal of Financial Economics*, 137(2):371–391, 2020.

Leledakis, G. N., Mamatzakis, E. C., Pyrgiotakis, E. G., and Travlos, N. G. Does it pay to acquire private firms? Evidence from the US banking industry. *The European Journal of Finance*, 27(10):1029–1051, 2021.

Luypaert, M. and Van Caneghem, T. Exploring the double-sided effect of information asymmetry and uncertainty in mergers and acquisitions. *Financial Management*, 46(4): 873–917, 2017.

Officer, M. S. The price of corporate liquidity: Acquisition discounts for unlisted targets. *Journal of Financial Economics*, 83(3):571–598, 2007.

Officer, M. S., Poulsen, A. B., and Stegemoller, M. Target-firm information asymmetry and acquirer returns. *Review of Finance*, 13(3):467–493, 2009.

Palepu, K. G. Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics*, 8(1):3–35, 1986.

Povel, P. and Sertsios, G. Getting to know each other: The role of toeholds in acquisitions. *Journal of Corporate Finance*, 26:201–224, 2014.

Qian, H. and Zhong, Z. Do Hedge Funds Possess Private Information about IPO Stocks? Evidence from Post-IPO Holdings. *The Review of Asset Pricing Studies*, 8(1):117–152, 2018.

Rau, P. R. Investment bank market share, contingent fee payments, and the performance of acquiring firms. *Journal of Financial Economics*, 56(2):293–324, 2000.

Reuer, J. J., Tong, T. W., and Wu, C.-W. A signaling theory of acquisition premiums: Evidence from ipo targets. *Academy of Management Journal*, 55(3):667–683, 2012.

Samuelson, W. Bargaining under asymmetric information. *Econometrica: Journal of the Econometric Society*, pages 995–1005, 1984.

Servaes, H. and Zenner, M. The role of investment banks in acquisitions. *The Review of Financial Studies*, 9(3):787–815, 1996.

Song, W., Wei, J. D., and Zhou, L. The value of "boutique" financial advisors in mergers and acquisitions. *Journal of Corporate Finance*, 20:94–114, 2013.

Wu, S.-Y. and Chung, K. H. Hedge fund activism and corporate M&A decisions. *Management Science*, 68(2):1378–1403, 2022.
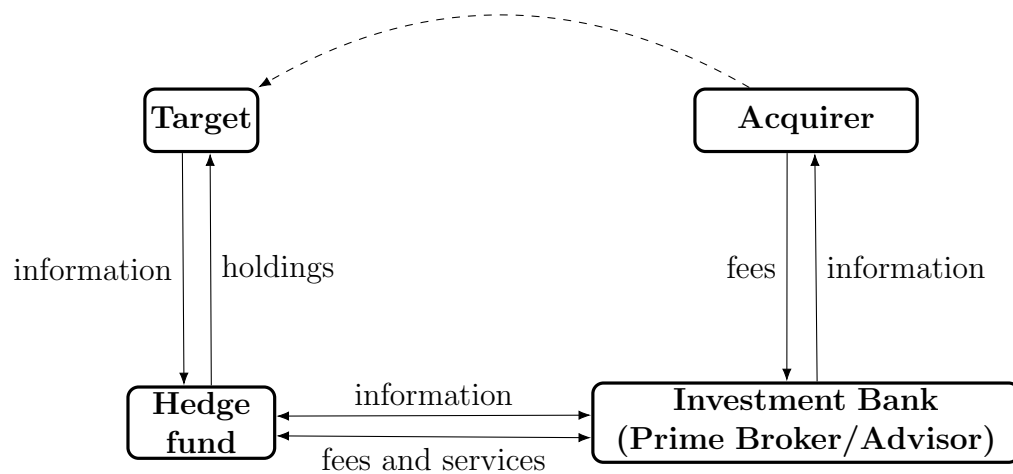
The figure depicts the possible directions of information flows between target firms, hedge funds, investment banks, and acquiring firms in M&A deals.

Figure 1: The information flows in M&A deals.

Tables

Table 1: Variable definitions

This table defines and/or describes the variables used in this paper in alphabetical order.

Variables	Description
ACAR	Acquirer cumulative abnormal returns over event windows of [0], [-1,1], [-3,3], [-5,5], expressed in decimals.
Activism	A dummy variable equal to 1 if any type of shareholder activism is reported via form 13D within 5 years before the deal announcement.
Amihud	The average Amihud illiquidity measure in the year prior to the acquisition announcement.
ASIR	The abnormal short interest for acquirers in the previous, current, and month following in the acquisition announcement.
B/M	The book-to-market value of equity of a target or acquirer measured at the end of the last fiscal year before the acquisition announcement.
Completion	A dummy variable equal to 1 if the deal is completed and 0 otherwise.
COVER	The number of analysts following the target in the year before the acquisition announcement.
Diff_Ind	A dummy variable equal to 1 for a deal where bidder and target are from different 3-digit SIC code industries and 0 otherwise.
DISP	The analyst forecast dispersion for the target in the year prior to the bid.
Duration	The number of months between the deal announcement and the deal final outcome.
ERR	The analyst forecast error for the target in the year before the acquisition announcement.
Ex_advisor	A dummy variable equal to 1 if the bidder uses at least one advisor who previously worked for the target.
Holding_acquirer	Hedge funds' holdings in the acquirer one quarter before the acquisition announcement.
Holding_bigadvisor	Holdings of hedge funds, whose prime broker is a big advisor, in a target firm one quarter before the acquisition announcement.
Holding_connected	Holdings of hedge funds, whose prime broker is the bidder advisor, in a target firm one quarter before the acquisition announcement.
Holding_connected_ST	Holdings of short-term hedge funds, whose prime broker is the bidder advisor, in a target firm one quarter before the acquisition announcement.
Holding_connected_ST_MergArb	Holdings of short-term hedge funds, whose prime broker is the target advisor and employ Merger Arbitrage strategy, in a target firm one quarter before the acquisition announcement.
Holding_connected_ST_t	Holdings of short-term hedge funds, whose prime broker is the target advisor, in a target firm one quarter before the acquisition announcement.
Holding_connected_ST_unspecialised	Holdings of short-term hedge funds, whose prime broker is the target advisor and not specialised in target industry, in a target firm one quarter before the acquisition announcement.
Holding_total	Holdings of all hedge funds in a target firm one quarter before the acquisition announcement.
Holding_unconnected_ST	Holdings of short-term unconnected hedge funds in a target firm one quarter before the acquisition announcement.
Holding_MF	Mutual fund holdings in a target or acquirer firm one quarter before the acquisition announcement.
IA	The target firm's information asymmetry measure based on seven variables ($Amihud$, $SPREAD$, $Size$, $COVER$, ERR, $DISP$, $volatility$).
IMR	The Inverse Mills Ratio.
Leverage	The equity-to-assets ratio of a target firm at the end of the last fiscal year before the acquisition announcement.
Hostile	A dummy variable equal to 1 for a hostile deal and 0 otherwise.
Merger of equals	A dummy variable equals to 1 when the target and acquirer consider their merger a merger of equals and 0 otherwise.
Merger_wave	A dummy variable equal to 1 if the number of mergers in each target and acquirer industry pair in a year is above the 30th percentile.
Multi_advisor	A dummy variable equal to 1 if more than one bidder advisor is involved and 0 otherwise.
NPM	The net profit margin of the new firm at the end of the first fiscal year following the acquisition announcement.
Number of bidders	The number of bidders involved in a deal.
Pctcash	The fraction of the cash payment in the consideration.
Pr(chosen)	The probability of a firm becoming a merger target.
Premium	Premium of offer price to target closing price one week (four weeks) before the acquisition announcement.
RELSIZE	The ratio of the target's asset size to the acquirer's asset size at the end of the last fiscal year before the acquisition announcement.
ROA	The return on assets of the target at the end of the last fiscal year before the acquisition announcement.
ROE	The return on equity of the target at the end of the last fiscal year before the acquisition announcement.
SIR	The short interest ratio for an acquirer measured as the short selling in a month divided by the numbers of shares outstanding in the previous month.
Size	The logarithm of the book value of total assets in the year prior to the acquisition announcement.
SPREAD	The average bid-ask spread over the year prior to the acquisition announcement.
Tangible	The ratio of total tangible assets to total assets at the end of the last fiscal year before announcement.
TCAR	Target cumulative abnormal returns over event windows of [0], [-1,1], [-3,3], [-5,5], expressed in decimals.
Tender	A dummy variable equal to 1 for tender offers and 0 otherwise.
Toehold	The percentage of target shares held by the acquirer 6 months before the acquisition announcement.
Valpct	The ratio of deal value to acquirer market capitalization at the end of the last fiscal year before the acquisition announcement.
Volatility	The return volatility of the target over the year prior to the acquisition announcement.

Table 2: Descriptive statistics

This table reports the descriptive statistics of all deal characteristics defined in Table 1.

	Mean	Median	SD	Min.	Max.	N
Holdings						
Holding_connected_ST	0.001	0.000	0.003	0.000	0.057	2117
Holding_unconnected_ST	0.006	0.000	0.017	0.000	0.300	2117
Holding_connected	0.005	0.000	0.013	0.000	0.079	2117
Holding_connected_t	0.005	0.000	0.014	0.000	0.091	2117
Holding_bigbank	0.036	0.016	0.052	0.000	0.617	2117
Holding_total	0.080	0.056	0.086	0.000	0.366	2117
Holding_acquirer	0.074	0.062	0.065	0.000	0.276	2117
Holding_MF	0.078	0.030	0.103	0.000	0.559	2117
Toehold	0.007	0.000	0.043	0.000	0.467	2117
Premium and CAR						
premium (one week)	0.386	0.299	0.423	-0.578	2.926	2117
premium (four weeks)	0.423	0.323	0.466	-0.582	3.179	2113
TCAR[0]	0.179	0.110	0.245	-0.243	1.392	1902
TCAR[-1,1]	0.255	0.195	0.269	-0.318	1.512	1902
TCAR[-3,3]	0.264	0.207	0.279	-0.326	1.599	1901
TCAR[-5,5]	0.272	0.212	0.289	-0.390	1.710	1900
ACAR[0]	-0.013	-0.006	0.053	-0.220	0.186	1933
ACAR[-1,1]	-0.017	-0.010	0.072	-0.316	0.222	1933
ACAR[-3,3]	-0.018	-0.012	0.089	-0.373	0.305	1933
ACAR[-5,5]	-0.016	-0.011	0.100	-0.412	0.386	1932
Deal characteristics						
Activism	0.212	0.000	0.409	0.000	1.000	2117
B/M_a	0.657	0.399	1.656	-0.345	18.617	2117
B/M_t	0.632	0.502	0.781	-4.145	6.522	2117
Complete	0.883	1.000	0.321	0.000	1.000	2117
Diff_Ind	0.301	0.000	0.459	0.000	1.000	2117
Duration	4.456	3.667	3.304	0.000	33.967	2116
Hostile	0.019	0.000	0.138	0.000	1.000	2117
IA	4.680	5.000	2.159	0.000	7.000	2117
leverage_t	0.409	0.416	0.336	-1.453	0.976	2117
Merger of equals	0.020	0.000	0.141	0.000	1.000	2117
Number of advisors	1.124	1.000	0.976	0.000	10.000	2117
Number of bidders	1.099	1.000	0.356	1.000	4.000	2117
Number of connected HFs	1.434	0.000	3.292	0.000	37.000	2117
Number of unconnected HFs	9.820	6.000	12.140	0.000	88.000	2117
Pctcash	0.510	0.500	0.439	0.000	1.000	2117
RELSIZE	0.368	0.162	0.587	0.001	6.123	2117
ROA_t	-0.067	0.009	0.303	-2.460	0.298	2117
Size_a	8.167	8.107	2.045	2.487	12.904	2117
Size_t	5.891	5.845	1.908	1.177	10.838	2117
Tangible_t	0.856	0.944	0.187	0.186	1.000	2117
Tender	0.184	0.000	0.387	0.000	1.000	2117
Valpct	0.407	0.197	0.648	0.001	6.794	2117
Short selling						
SIR	0.034	0.021	0.040	0.000	0.216	1935
$ASIR_t$	1.153	0.996	1.360	0.000	13.120	1935
$ASIR_{t-1}$	1.013	0.940	1.089	0.000	10.632	1935
$ASIR_{t+1}$	1.559	1.069	2.752	0.000	30.390	1935

Table 3: Target premium

This table reports the results from Equation (2). The dependent variable is the premium paid one week before the announcement. *Holding_connected_ST* are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample=		All deals				Deals involving big advisors		
	All targets	All targets	highIA	lowIA	All targets	All targets	highIA	lowIA
Holding_connected_ST	1.34	3.24	-10.04***	1.45	-0.26	2.99	-18.00***	0.76
	(0.49)	(1.10)	(-3.03)	(0.69)	(-0.10)	(1.10)	(-4.56)	(0.35)
Holding_connected_ST · highIA	-11.96***	-13.27***			-15.96***	-19.01***		
	(-2.97)	(-2.92)			(-3.91)	(-3.97)		
Holding_unconnected_ST		-0.65	-1.17	-1.49		-2.82**	-1.60*	-3.53***
		(-0.83)	(-1.17)	(-1.53)		(-2.49)	(-1.71)	(-2.75)
Holding_unconnected_ST · highIA		-0.34				1.76		
		(-0.33)				(1.18)		
Holding_connected		-0.58	0.19	-1.02		-1.64**	0.57	-1.19
		(-0.62)	(0.19)	(-1.19)		(-2.31)	(0.53)	(-1.48)
Holding_connected · highIA		1.13				3.01**		
		(0.94)				(2.51)		
Holding_connected_t		-0.65	-1.19	-0.05		-1.18	1.44	-0.70
		(-0.71)	(-0.86)	(-0.07)		(-1.28)	(0.95)	(-0.97)
Holding_connected_t · highIA		-0.23				1.80		
		(-0.16)				(1.23)		
Holding_bigadvisor		-0.14	-0.00	-0.26		0.85	-0.69	0.57
		(-0.27)	(-0.01)	(-0.46)		(1.10)	(-1.48)	(0.82)
Holding_bigadvisor · highIA		-0.02				-1.64		
		(-0.02)				(-1.61)		
Holding_total		-0.13	0.05	-0.15		-0.33	0.07	-0.14
		(-0.37)	(0.19)	(-0.47)		(-0.75)	(0.30)	(-0.34)
Holding_total · highIA		0.23				0.51		
		(0.71)				(0.91)		
highIA	0.09***	0.07**			0.07***	0.05**		
	(4.51)	(2.59)			(3.81)	(2.27)		
Holding_acquirer	-0.02	-0.02	-0.04	-0.16	0.08	0.08	0.17	-0.16
	(-0.12)	(-0.09)	(-0.16)	(-0.87)	(0.55)	(0.54)	(0.70)	(-0.90)
Toehold	-0.61***	-0.64***	-1.09***	-0.08	-0.25	-0.30	-0.48	0.04
	(-4.00)	(-4.02)	(-4.70)	(-0.56)	(-1.38)	(-1.67)	(-1.24)	(0.20)
ROA_t	-0.11	-0.10	-0.09	-0.09	-0.18*	-0.17*	-0.21	-0.11
	(-1.50)	(-1.51)	(-0.89)	(-0.67)	(-1.99)	(-2.03)	(-1.25)	(-1.11)
Leverage_t	-0.20***	-0.20***	-0.27***	-0.07	-0.16**	-0.16**	-0.21*	-0.07
	(-4.21)	(-4.22)	(-3.74)	(-1.16)	(-2.38)	(-2.36)	(-1.71)	(-1.10)
B/M_t	0.12***	0.12***	0.13***	0.10	0.15**	0.15**	0.17*	0.18**
	(3.19)	(3.19)	(3.08)	(1.62)	(2.47)	(2.43)	(1.97)	(2.08)
Size_a	0.01	0.01	0.02	0.00	0.03*	0.03*	0.03	0.00
	(1.43)	(1.38)	(1.53)	(0.25)	(1.76)	(1.74)	(1.20)	(0.36)
B/M_a	-0.02**	-0.01**	-0.02***	-0.01	-0.04***	-0.04***	-0.04***	-0.13**
	(-2.71)	(-2.72)	(-2.95)	(-0.87)	(-3.36)	(-3.17)	(-2.85)	(-2.58)
Tangible_t	0.01	0.00	0.00	-0.03	0.02	0.02	0.07	-0.04
	(0.20)	(0.05)	(0.01)	(-0.31)	(0.30)	(0.29)	(0.48)	(-0.42)
RELSIZE	-0.07**	-0.07**	-0.07	-0.03	-0.03	-0.02	-0.01	-0.05
	(-2.31)	(-2.22)	(-1.46)	(-0.91)	(-0.90)	(-0.74)	(-0.24)	(-1.18)
Valpct	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.04
	(0.51)	(0.49)	(0.14)	(0.76)	(0.46)	(0.49)	(0.12)	(1.29)
Holding_MF	-0.16	-0.14	-0.13	-0.02	-0.16**	-0.14**	-0.02	-0.13
	(-1.56)	(-1.63)	(-0.53)	(-0.18)	(-2.28)	(-2.27)	(-0.10)	(-0.84)
Pctcash	0.05*	0.05*	0.03	0.09**	0.04	0.04	0.03	0.11*
	(1.77)	(1.79)	(0.89)	(2.36)	(1.02)	(1.01)	(0.40)	(1.94)
Hostile	-0.09	-0.10	-0.19	-0.09	-0.09	-0.12	-0.22	-0.13
	(-1.34)	(-1.43)	(-1.43)	(-1.01)	(-1.29)	(-1.62)	(-1.52)	(-1.55)
Diff_Ind	0.01	0.01	0.02	0.00	-0.01	-0.01	-0.01	-0.01
	(0.49)	(0.41)	(0.48)	(0.06)	(-0.39)	(-0.43)	(-0.13)	(-0.55)
Merger of equals	-0.13	-0.14	-0.22	-0.12**	-0.17	-0.18*	-0.27	-0.10
	(-1.60)	(-1.64)	(-1.31)	(-2.12)	(-1.59)	(-1.71)	(-1.13)	(-1.42)
Tender	0.08**	0.09**	0.10**	0.11**	0.11***	0.12***	0.13*	0.11**
	(2.30)	(2.29)	(2.12)	(2.38)	(3.21)	(3.58)	(1.99)	(2.64)
Number of bidders	0.08***	0.08***	0.12*	0.09**	0.07**	0.07**	0.16*	0.06
	(3.06)	(3.08)	(1.92)	(2.52)	(2.09)	(2.35)	(1.72)	(1.41)
IMR_holding	0.00	0.00	0.00	0.00*	0.00	0.00*	0.00	0.00*
	(0.02)	(0.27)	(0.14)	(1.94)	(1.40)	(1.71)	(1.06)	(1.78)
IMR_bigadvisor	0.00	0.00	0.00*	-0.00	0.00	0.00	0.00	-0.00
	(0.83)	(0.74)	(1.75)	(-0.24)	(0.62)	(0.59)	(1.13)	(-1.00)
Activism	0.03	0.03	0.06	-0.03	0.02	0.02	0.07	-0.03
	(0.92)	(0.93)	(1.06)	(-0.59)	(0.49)	(0.46)	(0.89)	(-0.82)
Multi_advisor	0.06	0.06	0.16***	0.03	0.05	0.06	0.05	0.03
	(1.31)	(1.45)	(3.11)	(0.65)	(0.88)	(1.10)	(0.41)	(0.63)
Ex_advisor	0.06	0.06	0.20	0.03	0.08	0.08	0.70	0.02
	(0.91)	(0.83)	(0.44)	(0.48)	(0.87)	(0.85)	(1.43)	(0.28)
Constant	0.13	0.15	0.24	0.13	-0.11	-0.13	-0.32	0.13
	(0.85)	(0.98)	(1.09)	(0.78)	(-0.45)	(-0.53)	(-0.61)	(0.62)
Adjusted R-sq	0.14	0.14	0.11	0.18	0.19	0.20	0.17	0.24
Number of deals	2117	2117	1295	822	1179	1179	569	610
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Table 4: Target premium: probability of becoming a target

This table reports the results from Equation (2) for the impact of connected short-term fund holdings on target premium considering the probability of a firm becoming a target. The dependent variable is the premium paid one week before the announcement. *Holding_connected_ST* are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The controls used are the same is in Table 3, which are omitted for sake of space.

	(1)	(2)	(3)	(4)
Holding_connected_ST	-21.25***	-18.43***	-7.85**	-8.08***
	(-4.79)	(-3.46)	(-2.63)	(-3.26)
Holding_connected_ST · Merger wave	22.91***			
	(3.28)			
Holding_connected_ST · Pr(chosen)		6.30*		
		(1.76)		
Holding_connected_ST · Pr(chosen)				
Holding_connected_ST_unspecialized			-25.30**	
			(-2.23)	
Holding_connected_ST_MergArb				-7.40
				(-0.77)
Holding_unconnected_ST	-0.99	-1.02	-1.34	-1.34
	(-1.03)	(-1.04)	(-1.24)	(-1.25)
Holding_connected	0.26	0.33	-0.92	-0.93
	(0.27)	(0.32)	(-0.83)	(-0.85)
Holding_connected_t	-0.95	-1.13	-1.32	-1.37
	(-0.75)	(-0.83)	(-0.85)	(-0.88)
Holding_bigadvisor	-0.04	-0.03	-0.09	-0.09
	(-0.08)	(-0.06)	(-0.18)	(-0.16)
Holding_total	0.08	0.06	0.20	0.21
	(0.28)	(0.21)	(0.73)	(0.75)
Constant	0.22	0.24	0.05	0.05
	(0.98)	(1.07)	(0.20)	(0.22)
Adjusted R-sq	0.11	0.11	0.17	0.17
Number of deals	1295	1295	993	993
Controls	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes

Table 5: Target premium: advisor holdings in target

This table reports the results from Equation (2) for the impact of connected short-term fund holdings on target premium considering the holdings of target by bidder advisors. The dependent variable is the premium paid one week before the announcement. *Holding_connected_ST* are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The controls used are the same is in Table 3, which are omitted for sake of space.

Sample=	(1)	(2)	(3)	(4)
	highIA		lowIA	
	Advisor holdings in target		Advisor holdings in target	
	YES	NO	YES	NO
Holding_connected_ST	-7.87	-17.25***	0.23	10.91
	(-0.98)	(-3.09)	(0.10)	(1.11)
Holding_unconnected_ST	-2.13	-1.26	-3.30**	1.23
	(-1.68)	(-0.74)	(-2.34)	(1.27)
Holding_connected	-1.61	0.81	-0.60	-1.17
	(-0.75)	(0.53)	(-0.53)	(-0.48)
Holding_connected_t	-0.33	-0.77	-0.24	-0.86
	(-0.16)	(-0.49)	(-0.30)	(-0.50)
Holding_bigadvisor	0.73	0.23	0.01	0.28
	(0.49)	(0.35)	(0.01)	(0.46)
Holding_total	0.40	-0.11	0.10	-0.51***
	(0.48)	(-0.25)	(0.19)	(-2.78)
Constant	-1.47	0.32	0.35	0.10
	(-1.33)	(1.59)	(1.21)	(0.57)
Adjusted R-sq	0.28	0.08	0.23	0.24
Number of deals	239	1056	453	369
Controls	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes

Table 6: Target and bidder abnormal return

This table reports the results from Equation (3) for the impact of connected short-term fund holdings on target and bidder abnormal returns. $TCAR$ and $ACAR$ are the cumulative abnormal returns on target and acquirer over an event window of [0] and [-1,1], respectively. $Holding\_connected\_ST$ are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The controls used are the same is in Table 3, which are omitted for sake of space.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample=		All deals				Deals involving big advisors		
	TCAR[0]	TCAR[-1,1]	ACAR[0]	ACAR[-1,1]	TCAR[0]	TCAR[-1,1]	ACAR[0]	ACAR[-1,1]
Holding_connected_ST	0.64	-0.11	1.16**	1.39**	0.16	-0.86	0.90*	1.44**
	(0.41)	(-0.07)	(2.37)	(2.29)	(0.09)	(-0.49)	(1.70)	(2.23)
Holding_connected_ST · highIA	-5.22***	-4.81**	-0.91	-1.89	-8.34***	-6.30*	-0.74	-2.00
	(-3.01)	(-2.07)	(-1.19)	(-1.17)	(-2.85)	(-2.00)	(-0.90)	(-1.11)
Holding_unconnected_ST	-0.79*	-0.98*	0.22	0.48*	-1.25***	-2.12***	0.38	0.80
	(-1.99)	(-1.81)	(1.42)	(1.70)	(-3.88)	(-4.42)	(1.42)	(1.57)
Holding_unconnected_ST · highIA	0.17	0.31	-0.25	-0.59	1.40*	1.66*	-0.35	-0.84
	(0.44)	(0.44)	(-1.24)	(-1.56)	(1.79)	(1.96)	(-1.07)	(-1.46)
Holding_connected	0.54	0.81	-0.12	-0.27	-0.13	0.37	-0.12	-0.28
	(0.75)	(1.24)	(-0.57)	(-1.15)	(-0.18)	(0.73)	(-0.51)	(-0.97)
Holding_connected · highIA	-0.64	-1.09	0.31	0.56*	0.18	-0.51	0.37	0.60*
	(-0.60)	(-1.14)	(0.99)	(1.77)	(0.17)	(-0.51)	(1.11)	(1.84)
Holding_connected_t	-0.09	-0.75	0.03	0.10	-0.61	-1.30**	0.02	0.04
	(-0.18)	(-1.05)	(0.19)	(0.70)	(-1.50)	(-2.05)	(0.10)	(0.21)
Holding_connected_t · highIA	-0.07	-0.76	-0.11	-0.04	0.07	-0.00	-0.19	-0.18
	(-0.10)	(-1.16)	(-0.57)	(-0.13)	(0.11)	(-0.00)	(-0.86)	(-0.56)
Holding_bigadvisor	-0.17	-0.21	0.02	0.00	-0.05	0.15	0.06	0.06
	(-0.77)	(-0.79)	(0.40)	(0.05)	(-0.18)	(0.42)	(0.78)	(0.65)
Holding_bigadvisor · highIA	-0.13	0.05	0.01	-0.01	-0.14	-0.49	-0.04	-0.07
	(-0.33)	(0.11)	(0.10)	(-0.15)	(-0.42)	(-0.98)	(-0.54)	(-0.58)
Holding_total	-0.06	-0.05	0.01	0.01	0.06	-0.03	0.01	-0.03
	(-0.30)	(-0.43)	(0.33)	(0.24)	(0.34)	(-0.20)	(0.26)	(-0.51)
Holding_total · highIA	0.17	0.26	-0.01	0.02	0.01	0.25	-0.01	0.07
	(0.70)	(1.16)	(-0.20)	(0.70)	(0.05)	(1.10)	(-0.09)	(0.82)
highIA	0.02	0.05***	0.01**	0.02**	0.01	0.03	0.02*	0.02*
	(0.87)	(3.25)	(2.34)	(2.52)	(0.41)	(1.12)	(2.01)	(1.92)
Constant	0.07	0.09	-0.07***	-0.07***	-0.08	-0.27	-0.12***	-0.08*
	(1.09)	(1.03)	(-4.68)	(-3.12)	(-0.67)	(-1.63)	(-3.97)	(-1.79)
Adjusted R-sq	0.13	0.21	0.14	0.12	0.15	0.28	0.15	0.20
Number of deals	1902	1902	1933	1933	1072	1072	1068	1068
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Short-selling in the acquirers

This table reports the results from Equation (3), where dependent variables $ASIR_{t-1}$, $ASIR_t$, and $ASIR_{t+1}$ are the abnormal short interest ratio for acquirers in the previous, current, and next month of the deal announcement. $Holding\_connected\_ST$ are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The controls used are the same is in Table 3, which are omitted for sake of space.

	(1)	(2)	(3)	(4)	(5)	(6)
Sample=		All deals			Deals involving big advisors	
	$ASIR_{t-1}$	$ASIR_t$	$ASIR_{t+1}$	$ASIR_{t-1}$	$ASIR_t$	$ASIR_{t+1}$
Holding_connected_ST	3.73	13.08	26.42	3.16	12.80	23.97
	(0.76)	(1.34)	(1.31)	(0.44)	(1.11)	(1.19)
Holding_connected_ST · highIA	-14.05*	-15.20	-34.90	-20.73*	-23.07	-41.69
	(-2.02)	(-1.01)	(-1.28)	(-1.72)	(-1.20)	(-1.29)
Holding_unconnected_ST	-3.41**	-1.72	1.43	-0.63	2.15	9.81
	(-2.06)	(-0.51)	(0.17)	(-0.22)	(0.40)	(0.69)
Holding_unconnected_ST · highIA	1.51	-2.10	-7.20	1.47	-3.46	-12.59
	(0.67)	(-0.57)	(-0.81)	(0.40)	(-0.54)	(-0.79)
Holding_connected	-2.52	-5.70	-8.22	-1.90	-6.68	-14.04*
	(-1.01)	(-1.35)	(-1.11)	(-0.71)	(-1.66)	(-1.88)
Holding_connected · highIA	6.88*	7.35	14.07	5.87*	9.53	22.26**
	(1.93)	(1.04)	(1.14)	(1.76)	(1.54)	(2.05)
Holding_connected_t	-1.22	2.36	8.63	1.35	3.71	8.91
	(-0.76)	(0.61)	(0.90)	(0.55)	(0.77)	(0.81)
Holding_connected_t · highIA	-1.44	-5.98	-12.10	-4.10	-6.01	-10.14
	(-0.80)	(-1.20)	(-1.12)	(-1.23)	(-1.04)	(-0.85)
Holding_bigadvisor	1.25	1.35	2.38	1.38	2.20	4.03
	(0.86)	(0.78)	(0.80)	(0.66)	(0.88)	(0.89)
Holding_bigadvisor · highIA	0.70	0.85	0.14	0.98	-0.37	-2.75
	(0.33)	(0.36)	(0.03)	(0.28)	(-0.10)	(-0.39)
Holding_total	-0.99	-1.17	-1.24	-1.02	-1.29	-0.50
	(-1.18)	(-1.18)	(-0.73)	(-1.27)	(-1.20)	(-0.25)
Holding_total · highIA	-0.24	0.42	0.61	0.33	1.16	1.10
	(-0.22)	(0.32)	(0.31)	(0.31)	(0.78)	(0.48)
highIA	-0.07	-0.11	-0.18	-0.05	-0.09	-0.10
	(-0.75)	(-1.01)	(-1.07)	(-0.62)	(-0.63)	(-0.48)
Constant	1.10**	1.67***	2.46***	0.45	1.02	2.14*
	(2.54)	(2.96)	(3.65)	(1.03)	(1.53)	(1.82)
Adjusted R-sq	0.07	0.11	0.20	0.02	0.01	0.07
Number of deals	1935	1935	1935	1060	1060	1060
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Post-merger performance

This table reports the results from Equation (3), where dependent variables are post-merger performance measures. *ROA*, *ROE*, and *NPM* are the return on assets, return on equity, and net profit margin of the merged firm one year after the acquisition. *Holding_connected_ST* are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Standard errors are clustered by industry and are reported in parenthesis. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The controls used are the same is in Table 3, which are omitted for sake of space.

Sample=	(1)	(2) All deals	(3)	(4)	(5) Deals involving big advisors	(6)
	ROA_{t+1}	ROE_{t+1}	NPM_{t+1}	ROA_{t+1}	ROE_{t+1}	NPM_{t+1}
Holding_connected_ST	0.53	1.22	4.92	0.37	1.21	5.56
	(1.35)	(1.28)	(0.68)	(0.97)	(1.25)	(0.70)
Holding_connected_ST · highIA	-1.24	-2.46	-8.88	-1.24	-3.86	4.31
	(-0.96)	(-1.04)	(-0.57)	(-0.83)	(-1.33)	(0.17)
Holding_unconnected_ST	-0.22**	-0.33	-0.14	-0.24	-0.48	-0.66
	(-2.59)	(-1.16)	(-0.07)	(-1.38)	(-0.96)	(-0.20)
Holding_unconnected_ST · highIA	0.28**	0.75**	0.44	0.33	0.66	-0.23
	(2.57)	(2.09)	(0.19)	(1.31)	(0.88)	(-0.05)
Holding_connected	-0.15	-0.43	-2.67	-0.17	-0.40	-4.58
	(-1.00)	(-0.87)	(-1.28)	(-1.21)	(-1.04)	(-1.41)
Holding_connected · highIA	0.19	0.20	4.89*	0.23*	0.39	7.17
	(1.23)	(0.27)	(1.76)	(1.81)	(0.72)	(1.66)
Holding_connected_t	-0.02	-0.67*	1.17	-0.09	-0.86*	0.27
	(-0.26)	(-1.79)	(0.86)	(-0.76)	(-1.98)	(0.24)
Holding_connected_t · highIA	-0.02	0.66	-1.45	0.08	1.04**	-0.14
	(-0.14)	(1.42)	(-1.03)	(0.51)	(2.17)	(-0.07)
Holding_bigadvisor	-0.00	0.18	-0.00	-0.02	0.34	0.43
	(-0.15)	(1.40)	(-0.00)	(-0.24)	(1.55)	(0.35)
Holding_bigadvisor · highIA	-0.00	0.02	-0.49	-0.01	-0.29	-1.73
	(-0.10)	(0.08)	(-0.56)	(-0.10)	(-1.10)	(-0.89)
Holding_total	0.05	-0.06	0.68	0.07**	-0.13	1.27**
	(1.64)	(-0.60)	(1.47)	(2.25)	(-0.90)	(2.17)
Holding_total · highIA	-0.03	-0.10	0.08	-0.04	-0.02	0.15
	(-0.81)	(-0.46)	(0.14)	(-1.01)	(-0.16)	(0.18)
highIA	0.00	-0.00	0.02	-0.00	-0.01	-0.04
	(1.21)	(-0.19)	(0.42)	(-0.20)	(-1.16)	(-0.59)
Constant	0.00	-0.03	0.01	-0.05*	-0.14	-2.26***
	(0.01)	(-0.32)	(0.04)	(-1.77)	(-1.51)	(-3.62)
Adjusted R-sq	0.20	0.17	0.13	0.13	0.16	0.11
Number of deals	1935	1935	1932	1073	1073	1073
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: Propensity score matching results

Panel A reports the balancing test results from the propensity score matching procedure. The treated group includes deals with connected fund holdings, and the control group includes other deals. Panel B reports the propensity score matching results for deals announced between January 2000 and September 2019. All variables are defined in Table 1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

| | Panel A: Matching quality | | | |
	Treated (with short-term connected holdings)	Control (without short-term connected holdings)	%bias	t-stat
B/M_t	0.472	0.478	-1.200	-0.14
Leverage_t	0.443	0.467	-7.900	-0.90
Size_a	9.200	9.364	-9.400	-1.07
B/M_a	0.413	0.419	-1.200	-0.14
RELSIZE	0.383	0.383	-0.100	-0.01
Valpct	0.462	0.379	15.000	1.70*
Pctcash	0.541	0.590	-11.300	-1.28
Diff_Ind	0.253	0.261	-1.800	-0.20
Tender	0.226	0.265	-9.000	-1.02
Number of bidders	1.109	1.136	-7.300	-0.83
Toehold	0.002	0.002	-0.300	-0.03
Holding_MF	0.118	0.119	-0.400	-0.04
Holding_total	0.125	0.134	-9.700	-1.10
	Panel B: Matching results			
	Treated (with short-term connected holdings)	Control (without short-term connected holdings)	Difference	t-stat
Premium (one week)	0.319	0.415	-0.096	-2.93***
Premium (four weeks)	0.343	0.452	-0.109	-3.11***
TCAR[0]	0.146	0.221	-0.076	-3.69***
TCAR[-1,1]	0.210	0.289	-0.078	-3.64***
TCAR[-3,3]	0.222	0.298	-0.076	-3.42***
TCAR[-5,5]	0.231	0.306	-0.076	-3.28***
ACAR[0]	-0.017	-0.012	-0.005	-0.99
ACAR[-1,1]	-0.020	-0.015	-0.005	-0.76
ACAR[-3,3]	-0.020	-0.013	-0.006	-0.78
ACAR[-5,5]	-0.018	-0.014	-0.004	-0.52
ROA_{t+1}	-0.001	0.010	-0.011	-3.30***
ROE_{t+1}	-0.001	0.031	-0.032	-2.74***
NPM_{t+1}	-0.105	0.013	-0.118	-1.75*

Table 10: Target premium: pseudo connection

This table reports the results from Equation (2) for the impact of connected short-term fund holdings on target premium using pseudo hedge fund-prime broker connections. The dependent variable is the premium paid one week before the announcement. $Holding\_connected\_ST$ are the holdings of connected short-term hedge funds in a target firm one quarter before the acquisition announcement. Other variables are defined in Table 1. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Premium		TCAR[0]		ACAR[0]	
Sample=	highIA	lowIA	highIA	lowIA	highIA	lowIA
Holding_connected_ST	-3.75***	-2.23	-0.36	-0.62	0.54**	0.66
	(-2.82)	(-1.01)	(-0.31)	(-0.56)	(2.31)	(1.45)
Holding_unconnected_ST	-1.31	-0.86	-0.96**	-0.88	-0.04	0.27
	(-1.08)	(-0.69)	(-2.63)	(-0.99)	(-0.34)	(1.08)
Holding_connected	-0.55	0.09	-0.27	0.17	-0.04	0.01
	(-1.03)	(0.13)	(-0.75)	(0.48)	(-0.69)	(0.14)
Holding_connected_t	-0.28	-0.61*	-0.09	0.01	-0.03	0.10
	(-0.67)	(-1.95)	(-0.34)	(0.06)	(-0.44)	(1.44)
Holding_bigadvisor	0.23	-0.11	-0.25	-0.26	0.02	-0.02
	(0.36)	(-0.17)	(-0.69)	(-1.06)	(0.63)	(-0.35)
Holding_total	0.07	-0.16	0.21	-0.13	-0.00	-0.01
	(0.22)	(-0.48)	(0.96)	(-0.66)	(-0.03)	(-0.52)
Constant	0.25	0.15	0.08	0.12	-0.04***	-0.09*
	(1.13)	(0.80)	(0.78)	(1.12)	(-3.21)	(-1.78)
Adjusted R-sq	0.11	0.18	0.08	0.20	0.12	0.20
Number of deals	1295	822	1095	807	1185	748
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Advisor, Year FE	Yes	Yes	Yes	Yes	Yes	Yes