Influencing Control: Jawboning in Risk Arbitrage*

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Abstract

This study analyzes a relatively new phenomenon of "activist risk arbitrage" during 2000-2014, in which some shareholders attempt to change the course of an announced M&A deal through public campaigns and interventions and profit from improved terms for either target or acquirer shareholders. Compared to conventional (passive) risk arbitrageurs, activist arbitrageurs are more likely to select deals that are susceptible to managerial conflicts of interest, including going-private deals, "friendly" deals, and deals with lower announcement premiums. While activists successfully block a significant proportion of planned deals, their selective targeting results in an increase in the sensitivity of deal completion to market price signals, and only a modest decrease in the probability of eventual sales of the targets. Finally, activist risk arbitrage yields significantly higher returns than passive arbitrage, after incorporating incremental deal risk.

Key Words: Activist Risk Arbitrage; M&A.

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1 Introduction

In December 2012, Plains Exploration & Production (NYSE ticker: PXP), a petroleum company based in Houston, was preparing to be acquired by Freeport-McMoRan (NYSE ticker: FCX), a natural resources company based in Phoenix. At the offer price of $45.96 (a combination of $25 in cash and 0.6531 FCX shares), the existing shareholders stood to gain a premium of 26.2% over the pre-announcement price. The special meeting for the merger was scheduled for May 20, 2013. Then on May 6, 2013, CR Intrinsic Investors, a subsidiary of SAC Capital Advisors and a 3.8% owner of PXP, sent a public letter to the board announcing its intent to vote against the deal and to persuade other shareholders to do the same. The letter stated that CR Intrinsic valued PXP at $49.56 based on the strong results of the company and industry performance following the merger agreement.

By then a "wolf pack" appeared to have formed. On the same day, Arrowgrass Capital Partners, a hedge fund based in London and New York, announced a 3.7% stake and denounced the proposed merger. Another hedge fund manager, John Paulson, was the largest outside shareholder (9.9%) at the time but did not express his voting preference. The dissidents quickly secured support from the two leading proxy advisors, Institutional Shareholder Services ("ISS") and Glass Lewis, both of which on the next day recommended voting against the transaction. On May 20, FCX allowed PXP to declare a special one-time dividend of $3 per share prior to merger consummation, and promised supplemental dividends post-merger. Paulson immediately pledged his shares in favor of the deal, and the merger proposal passed at the meeting held later that day. The stock closed at $48.99, a 38.2% premium over the pre-announcement price. During the same period, the S&P 500 appreciated 16.8% and the energy sector index (NYSE: VDE) rose 14.2%.

This story is reminiscent of an "M&A arbitrage" or "risk arbitrage" strategy by speculators, but carries features that are distinct from the conventional risk arbitrage analyzed

in the literature.[1] In conventional, or "passive," risk arbitrage, a speculator takes a long position in the target company (the speculator may also take a simultaneous short position in the acquirer in stock deals) right after the announcement of an acquisition—this was the strategy employed by CR Intrinsic. Although target stock price generally increases after deal announcement, it will likely remain below the final purchase price due to risks that the deal may fail. The passive arbitrageur then votes his shares in favor of the merger and hopes to profit from full price convergence at deal consummation. During the process the speculator does not "voice" his opinion other than voting his shares. In fact, the passive arbitrageur avoids engaging the management so as not to compromise his freedom to trade under insider trading rules—here CR Intrinsic diverged from the typical route of risk arbitrage.

Instead, CR Intrinsic loudly voiced its opinion that the target deserved a higher bid, and threatened to block the deal via both its own voting rights and, more importantly, its influence on other shareholders. If it had adopted a passive risk arbitrage strategy, CR Intrinsic would have earned a return of 3.3% from its long position (from right after the initial merger announcement to the final tendering of the stock at $45.96). However, with its activist risk arbitrage strategy, CR Intrinsic pocketed a much higher return of 10.1%. The incremental costs were the time/effort spent in jawboning, in writing and disseminating public letters, and perhaps a higher risk that the deal will completely fall through, after which the price could go back to its pre-announcement level.

The CR Intrinsic/PXP case is no longer an exception. Such activist arbitrage activities have been on the rise since early 2000s: they were observed in 0.6% of all M&A deals in 2000, compared to 13% and 6.5% of all such deals in 2013 and 2014, respectively. However, the academic literature has not formally analyzed the full process, characteristics, or the impact of activist risk arbitrage on the market for corporate control. As shareholder activism

[1]The representative work in this area includes theory work by Cornelli and Li (2002) and Gomes (2012), and empirical studies by Baker and Savasoglu (2002), Mitchell, Pulvino, and Stafford (2004), Hsieh and Walkling (2005), and Cao, Goldie, Liang, and Petrasek (2015).

launched by institutional investors becomes an increasingly more common form of corporate governance,[2] its blend with a popular, traditionally non-activist, arbitrage strategy is instructive. A signature of institutional investor activism has been that it strives to influence corporate policies and governance, but does not aim for control (Brav, Jiang, Partnoy, and Thomas, 2008a). The activist arbitrage strategy, by instilling shareholder activism into corporate control events, thus bridges the two by "influencing control."

Our study builds on three disjoint subsamples covering all 4,278 M&A deals between 2000 and 2014. The most important of the three is the "event sample:" a manually composed sample of 318 activist risk arbitrage events where there was observed jawboning by outside blockholders after the initial announcement of an acquisition. Next in importance to the event sample is the "conditional control sample," which consists of 2,549 deals involving disclosed passive risk arbitrage events. The final subsample is the "unconditional control sample," which is the 881 deals that are left over. Both control samples are constructed following the standard procedure used in the M&A and the (passive) risk arbitrage literature.

Our analyses reveal similarities as well as dissimilarities between the two forms of risk arbitrage strategies. On the one hand, both types prefer larger deals and target companies with higher institutional ownership. On the other hand, the most striking dissimilarity is that activist arbitrageurs are more likely to attack going-private deals, in which the acquirers are often the managers themselves ("MBOs") and/or financial acquirers (such as private equity firms).[3] Second, the best predictor for an arbitrageur to be an activist rather than remaining passive is a relatively low announcement premium. Third, activists are more likely to disturb otherwise "friendly" deals. Presumably in those deals, the board and the management, by endorsing the deals with favored acquirers, may not have done their due diligence to challenge the acquirers for better terms or to solicit competing bids. These results suggest that activist

[2]Please see Gillan and Starks (2007) for a survey on general shareholder activism, and Brav, Jiang, and Kim (2010) for a survey on hedge fund activism.

[3]The acquirers in non-going private M&A deals are more likely to be other companies strategically aiming for synergies or better market positioning.

risk arbitrage is potentially an important form of governance in guarding investors' interests during corporate control changes that are susceptible to management self-dealing or other forms of managerial conflict of interest.

As expected, activist arbitrageurs earn much higher average returns than passive ones, compensating for the "jaw pain" as well as for the assumption of higher risks—both legal and deal risks. Baker and Savasoglu (2002) document an annualized return of 7-11% for passive risk arbitrageurs, and this number is reduced to 5-6% in our more recent sample. The annualized average return accrued to activist arbitrageurs is 19.2% from post-deal announcement to resolution. To the extent that any abnormal return in trading has to come from some form of "private information," the return spread between the activist and passive strategies is not surprising. In Cornelli and Li's (2002) model, a passive risk arbitrageur "creates" private information after purchasing shares because he is now privately informed about his own voting decision, which in turn increases the value of the shares by raising the probability of a favorable vote outcome and therefore the probability of deal completion.[4] Applying the same framework to an activist risk arbitrageur, her information advantage becomes greater because she is privately informed about her intention (and her confidence in her own ability) to push up the price of the target stock, which creates more room for the return spread.[5]

By threatening to block an announced deal in order to extract a higher price, the activist arbitrageurs stand ready to assume higher deal failure risk than the passive arbitrageurs who simply vote their shares in favor of the deal. To the extent that activists, like the passive risk arbitrageurs, are better off with completed than withdrawn deals ex post, they have an incentive to pick deals with low "inherent" deal failure risk, e.g., deals in which the targets

[4]Note that even passive risk arbitrage contains an activist element in that the arbitrageur's action potentially affects the terminal value of the security being arbitraged, as opposed to a "pure trading" arbitrage strategy where the security value is exogenous and arbitrageurs merely profit from a convergence of price to the value. For a more detailed discussion, please see Bradley, Brav, Goldstein, and Jiang (2010).

[5]In Gomes' (2012) model, the passive arbitrageurs may also collectively push up the bids in a minority freeze-out because the acquirers set a high preemptive bid to counter the hold-out by the arbitrageurs. In this setting, the higher bid price arises in equilibrium with mutually consistent beliefs, rather than through influence and persuasion as in the activist arbitrage discussed in this study.

(and/or acquirers) are determined to sell (and/or buy), such that tough negotiation is more likely to lead to an improved term for the shareholders rather than a withdrawal. Such a selection effect is borne out in data. While the average deal completion rate of the activist arbitrage subsample is a modest 3.5% lower than that of the complement subsample, the impact of activists on the deal completion rate is estimated to be 23% once the unobserved heterogeneity in deal failure risk is accounted for. Relatedly, a hazard analysis indicates that activists do not noticeably slow down the process toward deal completion.

More importantly, activist arbitrage significantly increases the sensitivity of deal completion to ex-ante completion probability, where the latter is proxied by the ratio of announcement-window target stock price change to the offered premium. Therefore, activist arbitrageurs are not only sophisticated in picking deals for which there is more room for improvement and deals with high ex ante probability of completion, but they also increase (decrease) the completion rate of deals that are welcomed (unfavored) by the market while entailing a modest ex post incremental rate of deal failure overall. Such a combination suggests a sustainable equilibrium in which activists do well for themselves while doing good for the shareholders in M&A targets.

For completeness, we also study the 47 deals during our same sample period where activists intervene on the acquirer's side after an M&A announcement. The prime candidates for such interventions are stock deals with multiple bidders, common conditions identified by the M&A literature to be associated with over-pay and agency problems in general (Fuller, Netter, and Stegenoller, 2002; Harford and Li, 2007; Fu, Lin, and Officer, 2013). Activists succeed in slashing the paid premium or blocking the acquisition altogether: premiums paid to targets are lowered by 7%, and the deal completion rate is cut by 36-37%. To the extent that a large number of acquisitions of public targets seem to be value destructive for acquirer shareholders especially when compounded with weak governance (Moeller, Schlingemann, and Stulz, 2005; Masulis, Wang, and Xie, 2007), activist arbitrageurs on the acquirer

side constitute a powerful counterbalance, and complements their role on the target side in defending shareholder interest.

Our paper is related to, but distinct from a recent study by Boyson, Gantchev, and Shivdasani (2015), which analyzes how hedge fund activists propose and facilitate acquisition activities at firms they intervene into. In their setting, activists play a positive role to increase the odds that the target firms will receive takeover bids. In contrast, our study analyzes how activists alter the course of existing M&A deals that were initiated and announced by management in order to make them more favorable to the shareholders. The two papers do not overlap in either the time line (before vs. after M&A formation) or the sample deals (promoted vs. dissented by the activists). The two studies taken together, however, form a comprehensive picture on how the "influence-based" shareholder activism is reshaping the market for corporate control, a new direction in activist investing beyond improving operating efficiency and corporate governance.

2 Data Sources, Sample Construction, and Sample Overview

2.1 Sample of mergers and acquisitions

Our sample of mergers and acquisitions ("M&As"), announced between January 1, 2000 and December 31, 2014, is constructed using information from the Securities Data Company ("SDC") database. We include all attempted acquisitions, regardless of whether they are consummated or not. We apply the following filters commonly used in the prior M&As literature (Hsieh and Walkling, 2005; Gaspar, Massa, and Matos, 2005; Baker and Savasoglu, 2002): (1) The target company must be covered by CRSP before deal announcement. (2) The acquirer must own less than 50% of the target's stock before the acquisition, and must own more than 50% after the acquisition. (3) Each deal must be classified as a stock, cash

or hybrid (part stock and part cash) deal.[6] As SDC's definition of payment form is different from merger agreements for certain deals, especially those labeled by SDC as "Unknown" and "Other," we manually collect the form of payment for all sample deals from merger agreements and 8-Ks filed with the SEC. For stock transactions involving floating-exchange ratios and collars,[7] we gather information about the terms of the transaction and key dates from the same SEC filings. (4) The transaction must not be classified by SDC as a divestiture, spin-off or repurchase.

Finally, we verify in Factiva all mergers with deal status labeled as "Pending." If the deal has since been consummated or withdrawn, we change its status accordingly. We then drop deals with a "Pending" status as of August 2015. These criteria result in a sample of 4,278 deals. Data on the deal announcement date, effective date, withdrawal date, deal premium, and characteristics of the target and acquirer are collected from the SDC. Institutional holdings data are from the Thomson Financial 13F Database, and firm characteristics and stock prices/returns are from Compustat and CRSP, respectively.

2.2 Sample of activist risk arbitrage

2.2.1 Sample construction

Activist risk arbitrage is a relatively new phenomenon without an official definition. Loosely speaking, such arbitrage could be any attempt by shareholders to profit from an announced merger and acquisition deal by exercising shareholder rights beyond voting, and therefore could take a variety of forms. We group all such activities into two basic categories and construct the samples accordingly: Activist risk arbitrage in targets and activist risk

[6]Like Gaspar, Massa, and Matos (2005) and Dai, Massoud, Nandy, and Saunders (2013), we include hybrid deals in our sample, while Hsieh and Walkling (2005) and Baker and Savasoglu (2002) exclude such deals.

[7]A collar agreement can be viewed as a combination of stock and cash offers; it mitigates the impact of uncertainty about the buyer's share price through either a transfer of cash or an adjustment in the exchange ratio. See Fuller (2003) and Officer (2004) for a more detailed description of collar offers.

arbitrage in acquirers. There are 302 cases in all.

In a related popular strategy, activist arbitrageurs purchase stocks in a merger target to exercise their appraisal rights, which allows dissenting shareholders to seek value they deem "fair" from a court rather than to accept the merger consideration. There were 323 appraisal appeals against public companies filed in the Delaware Court of Chancery from 2000 - 2014. Appraisal arbitrage may well represent an arbitrageur's "last resort" after he failed to convince the majority shareholders to improve or to block the deal. However, there is a critical difference in that the gain from a successful appraisal arbitrage accrues only to the dissenters who withheld their votes, and is not shared by other shareholders. Hence, support from other shareholders is not necessary for appraisal petitioners. Due to this difference, appraisal arbitrage in more recent years has evolved into a standalone litigation-based investment strategy by a specialized group of investors (e.g., Merion Capital) with little overlap with the group of activist investors in our sample (Korsmo and Myers, 2014). For the purpose of this study, we do not include appraisal petitions which are not accompanied by activist campaigns aiming at improving acquisition terms for all shareholders.

1. *Activist risk arbitrage in targets ("Target arbitrage")*

This is the most important category and account for 84.4% of our sample of activist arbitrage events. The case outlined in the Introduction belongs to this group. A defining feature of all the cases in this category is that the arbitrageurs, who hold sizable but strictly minority equity stakes in the target companies after the announced M&A deals, launch public campaigns (ranging from shareholder proposals to proxy contests) in order to block the deal under the current terms; and in most cases, to extract better terms from the acquirers for target shareholders. A successful target arbitrage presumably benefits all shareholders of the targets. Figure 1 illustrates the typical path of a target arbitrage, juxtaposed with that of a conventional passive arbitrage, from the announcement of the M&A deal to its resolution.

[Insert Figure 1 here.]

The primary data source to identify all such events is SharkRepellent – a data provider that specializes in corporate governance – which identifies 230 merger targets with activist campaigns (318 deal-activist pairs, as 60 deals involved multiple activists' participation) during the period from 2000 to 2014. For each target firm, we identify the activist arbitrageurs as the institutional investors who publicly criticized the transaction or solicited proxies against the deal. We then manually collect activist arbitrageurs' plans and actions through their press releases (letters to boards/management) and Schedule 13D filings if these investors acquired more than 5% of a publicly traded target company. Such information includes the ownership stake, announcement date (press release or Schedule 13D filing date), and withdrawal date if the campaign was unsuccessful.

Several additional steps ensure sample completeness. In the first step, we manually collect all Schedule 13D filings between deal announcement and resolution for all mergers announced between 2000 and 2014. The filing entity is regarded as an activist arbitrageur if it satisfies either of the following two criteria: (1) It states under Item 4 that the purpose of the investment was to object to the current structure of the acquisition, or to propose different terms for the deal.[8] (2) The results of our extensive news searches in Factiva yield press releases (letters to boards/management) indicating that the activist expressed concerns about an announced deal and objected to the acquisition under the current contract terms.

The first step yields 20 cases where the arbitrageurs held more than a 5% stake in the target company (due to the requirement of Schedule 13D filings). In the second step, the news searches only uncover an additional five target firms involving activist arbitrageurs with sub-5% holdings. These steps put the total number of merger targets with activist

[8]It is worth noting that passive risk arbitrageurs who are 5% or more beneficial owners of the target company must also complete a Schedule 13D filing. However, for the arbitrageur to be considered "passive" in our analysis, Item 4 of the filing should not contain language that challenges the announced deal; nor should the filer issue any public letter commenting on or criticizing the deal.

campaigns at 255.

2. *Activist risk arbitrage in acquirers ("Acquirer arbitrage")*

Following the same procedure as that outlined in the previous section, we further identify 47 acquirers targeted by activist arbitrageurs during the same period. Appendix A presents an example. In most cases, the activists deem the announced deal as overpaying or as deficient in due diligence, and strive to block the deal altogether (if it is deemed value destroying) or to modify the terms in favor of the acquirer. In contrast to passive arbitrageurs who short the acquirer, activist arbitrageurs in these cases long the acquirer and hope to profit from value improvement rather than from spread convergence.

Common to both categories of events is the "negative" risk arbitrage in which the arbitrageur campaigns against the deal in its current form. A comprehensive search of Schedule 13D filings and news stories using Factiva would also yield cases for "affirmative" risk arbitrage in which investors buy shares in order to vote in favor of the deal, and sometimes may even publicly promote the deal in order to influence other shareholders. We exclude such events from our sample of activist arbitrageurs. In fact, our sample of passive risk arbitrageurs (to be described in Section 2.3) includes some of these "positive" arbitrage events. Naturally, analyses of activist arbitrage on the target side and that on the acquirer side require different data inputs and address different research questions. Most of our empirical analyses focus on the target side, with the exception of Section 6 which provides a brief description of activism on the acquirer side.

2.2.2 Sample overview

1. *Activities and players*

Figure 2 plots the frequency of merger transactions and activist arbitrage activities in merger targets over our sample period. Activist arbitrage activity is generally correlated with M&A volumes, reaching its peak in 2007, before dropping significantly during the financial

crisis and then resuming in recent years.

[Insert Figure 2 here.]

Further, Appendix B lists the top players in our sample that invested in at least four merger targets. The top four are GAMCO Investors, Inc., Ramius LLC, Millennium Management LLC, and Elliott Associates, LP, and combined they account for 10.6% of all the deals.

2. *Ownership and investment horizon*

To start with, Table 1 reports the size of activist arbitrageurs' stakes in merger targets at disclosure as well as their duration of their investment horizon. The median initial (maximum) percentage stake that activist arbitrageurs take in the merger target is 7.0% (8.9%), and the median dollar investment is $25.3 ($29.4) million.[9] The level of ownership is comparable to the full sample of hedge fund activism reported in Brav, Jiang, Partnoy, and Thomas (2008), but it is substantially higher than the typical stake held by passive arbitrageurs (for which the median is 0.65%).

As activist arbitrageurs in general do not hold controlling blocks, they implement changes in a deal via influence on the board or fellow shareholders. The "influence" based tactics, from public campaigns to proxy solicitation, are thus necessitated by the gap between the typical ownership of activists and the votes required to block an existing deal or to pass a revised deal. Almost all (249 out of the 255) merger targets required the approval of a majority of shares outstanding (nine such deals require the approval of a two-thirds supermajority). The remaining six deals require the approval of a majority of shares voted (counting abstention shares). Given that the average (median) approval rate in our sample

[9]The "Initial" columns show the stakes that the activist arbitrageur holds in a merger target when it initially discloses its positions through a Schedule 13D filing or a press release. The "Maximum" columns report the maximum stakes activist arbitrageurs hold in a merger target, which are retrieved from subsequent new disclosures by other activist arbitrageurs as well as amendments to the initial disclosure.

is 65.1% (66.8%), the votes directly commanded by the activist arbitrageurs' are unlikely to be pivotal. Hence persuasion to win fellow shareholder support is crucial.

[Insert Table 1 here.]

Regarding activist arbitrageurs' investment horizons, Table 1 shows that the median duration between deal announcement and initial disclosure of activist arbitrageur holdings is 25 calendar days, with an interquartile range of 6 to 64 days, indicating that the risk arbitrageurs are swift in establishing toeholds right after announcement. Such quick action is made possible by being part of a massive share turnover among a diverse shareholder clientele during the period. Jetley and Ji (2010) find that trading volume in target stocks subsequent to merger announcements is more than ten times higher than normal levels. The median duration between initial disclosure of holding and deal resolution is 83 days, affording activist arbitrageurs plenty of time to influence completion as well as the terms of the merger.

3. *Activist arbitrage tactics*

Activist arbitrageurs use a variety of tactics to oppose an announced deal under the stated terms. The most common ones include: (1) Public criticism of the transaction through letters addressed to the target's board and/or shareholders, usually accompanied by press releases (148 cases). The same letters are often attached to Schedule 13D filings under Item 4 (157 cases). (2) Proxy solicitation intended to veto the deal (49 cases, 23 of which involve proxy contests). (3) Proposing alternative acquisitions (11 cases). (4) Lobbying proxy advisory firms like ISS in order to influence their institutional shareholder clients. For our sample transactions, 84 voting recommendations issued by ISS were disclosed,[10] with an overall support rate of 69.0%. This implies that unconditionally ISS supported the dissidents 31.0%

[10]ISS issues a voting recommendation when enough of its fund clients hold the merger target. In many cases, ISS's recommendation is disclosed by either the activist or the merger target. Since the party with ISS support has the incentive to disclose, we believe our data collection was comprehensive.

of the times. Such a rate is impressive given that ISS's approval is almost automatic at a 98.7% rate in the absence of a dissention.[11]

2.3 Sample of passive risk arbitrageurs

Passive risk arbitrageurs are investors who purchase stocks after an acquisition announcement for the purpose of voting on the deal, but do not openly criticize or campaign against the deal or attempt to change its major terms. Estimates of (passive) arbitrage funds' ownership of the target's shares subsequent to the merger announcement range from 15% during 1992-1999 (Hsieh and Walkling, 2005) to 35% during 1985-2004 (Officer, 2007). To identify passive arbitrageurs, we follow the methodology developed by Hsieh and Walkling (2005) using the Thomson Reuters institutional 13F ownership information.

First, we require that a deal span at least two quarters. That is, the deal announcement and resolution cannot fall into the same quarter. This step eliminates 654 deals, and our sample is reduced to 3,634 deals. The purpose of this step is to make sure that we can calculate the change in institutional ownership around the deal announcement. Second, we require that the arbitrageur have a positive change in stock ownership for at least six deals and in more than 60% of all deals in which it has disclosed holdings between the end of Quarter t-1 and the end of Quarter t—presumably during which the deal is announced. Institutional investors meeting these criteria are classified as passive risk arbitrageurs in those deals. Though the two numerical cutoffs are arbitrary, robustness checks ensure that our main results are not affected by the specific choices within a reasonable range.

The above steps identify 3,826 unique passive risk arbitrageurs between 2000 and 2014. We then proceed to identify deals that involve passive arbitrageurs but lack participation by any of the activist arbitrageurs in our sample. The double criteria yield 2,314 deals.

[11] This is calculated based on 521 mergers without activist presence in ISS's Voting Analytics database during 2003-2011.

In addition to identifying passive risk arbitrageurs through 13F filings, we supplement the search by processing all schedule 13D filings between announcement and resolution for all deals between 2000 and 2014. The filer is considered a passive arbitrageur if it meets two criteria: First, the filing investor does not state under the Item 4 of Schedule 13D a purpose to influence the pending merger beyond the entitled voting rights; second, there is no trace in the public news archive indicating the opposite. This procedure yields an additional 235 unique passive risk arbitrageurs.

After merging our M&A database with the samples of risk arbitrageurs, we end up with 204 deals targeted by activist arbitrageurs, 2,549 deals involving passive arbitrageurs (but not activists), and 881 deals with no disclosed arbitrageurs. Of the total of 3,634 mergers, 2,160 are cash offers, 804 are stock deals, and the rest are a mixture of the two.

3 Deal Selection by Activist Arbitrageurs

3.1 Comparing activist arbitrage with the control samples

Our first analysis examines the characteristics of merger targets that attract activist arbitrageurs. The first column of Table 2 reports characteristics of merger targets held by activist arbitrageurs, and the next two columns compare these merger targets with those held by passive-only arbitrageurs, the traditional risk arbitrageurs documented in the prior literature (e.g., Hsieh and Walkling, 2005; Mitchell, Pulvino and Stafford, 2004), and targets in deals involving no disclosed arbitrageurs.

[Insert Table 2 here.]

Panel A compares ex ante deal characteristics between the activist arbitrage subsample and two subsamples involving passive-only arbitrageurs or no arbitrageurs at all. Deals held by activist arbitrageurs on average have an announcement premium of 18.9%, compared

to a 32.7% premium for deals involving passive arbitrageurs (t-statistic for the difference equals -7.6), and a 37.4% premium for those without disclosed arbitrageurs (t-statistic for the difference equals -8.0). As the announcement premium is a common proxy for how much the offer price exceeds the merger target's closing stock price one day prior to the announcement, the significant difference indicates that activist arbitrageurs are "bargain hunters:" They tend to target deals with lower announcement premiums, which have more room for a higher bid. Activist arbitrageurs also are more likely to invest in going-private deals, many of which are management-led buyouts and cash deals. These financial buyers tend to initiate lower bids than strategic or corporate buyers, whose higher offer prices can be justified by potential synergies created in the merger (e.g., Bargeron, Schlingemann, Stulz, and Zutter, 2008).

Deals involving activist arbitrageurs are less likely to have defensive tactics, such as a shareholder rights plan, against takeovers. This makes hostile takeovers more likely to succeed as a last resort, potentially increasing arbitrageurs' profits. Activist arbitrageurs also tend to target deals with higher institutional holdings, compared to deals involving passive arbitrageurs or those without disclosed arbitrageurs, consistent with a key finding of Bradley, Brav, Goldstein, and Jiang (2010), who analyze activists' endeavor in opening up closed-end funds. Institutional ownership indicates the sophistication of the shareholder base. As minority stockholders, activist arbitrageurs need the support of other institutional investors in order to achieve their agenda, and need to avoid the voting apathy that is typical of retail investors (Harris, 2010).

Panel B compares key ex post outcomes. Indeed, deals involving activist arbitrageurs on average have a higher revision return, which is the increase in the acquirer's bid scaled by target share price right before the initial takeover announcement. The fact that passive arbitrage is not associated with a positive premium revision (confirming the same finding in Hsieh and Walkling, 2005) reflects the defining property of passive arbitrage. In this context,

activist arbitrageurs achieve a positive outcome for shareholders that passive arbitrageurs do not. Activists usually pressure the boards of merger targets to reject the initial offer or to seek an alternative bid, often resulting in a higher offer price, either from the original bidder or a third-party acquirer. Such a tactic is reflected in the significantly (at the 1% level) higher probability of multiple bidders (at 27%, which is 20.3% and 14.9% higher than the passive-only and no-arbitrage subsamples). In fact, out of the 55 multiple-bidder deals targeted by activist arbitrageurs, 69.1% of them engaged new bidders only *after* these arbitrageurs initiated their proposals.

Apparently, activists accomplish higher expected revision return by credibly threatening to veto marginal deals using their own shares and their influence over other shareholders. The average completion rate of the deals involving activists, at 72.5%, represents a 14.6% (6.5%) drop from the level seen in the passive-arbitrage (no-arbitrage) subsample.

3.2 Determinants of Activist Arbitrageurs' Participation

The comparison of summary statistics discussed in the previous section serves as a diagnostic test for the determinants of activist arbitrage among all M&A deals. In this subsection, we resort to formal tests that control for all determinants, valued at the initiation of the events, using two statistical methods.

3.2.1 Unconditional analysis: Unordered choices among activist arbitrage, passive arbitrage, and no arbitrage

Panel A of Table 3 reports results from fitting an unordered choice model using the multinomial logit regression method. The state of "no arbitrage" serves as the base outcome. Columns (1) and (2) display the coefficients (and the associated marginal probability) representing the marginal effect of each of the regressors on the likelihood of activist and passive arbitrage relative to the base outcome. The set of the regressors are the same as

those in Table 2 with the critical difference that all variables in the regressions are measured at the time of deal announcement.

[Insert Table 3 here.]

Most importantly, and consistent with results in Table 2, *Announcement premium* has a significant (at the 1% level) impact on the likelihood of ownership by activist arbitrageurs. A one-standard deviation increase in the announcement premium is associated with a decrease in the marginal probability of 4.1%. Relative to the unconditional probability for the presence of activist arbitrageurs, 6.0%, the incremental probability is remarkable. Such a relation indicates that activist arbitrageurs seek to identify deals with low announcement premiums, which have a high potential for increased bids, especially when the low premium is associated with potential conflicts of interest. In fact, the arbitrageurs' stated goals in their 13D filings or news releases are consistent with this finding: key phrases like "substantially undervalued" and "inadequate" are common in their statements.

The coefficients associated with three more deal characteristics support the conflict of interest hypothesis. Activist arbitrageurs are 4.1 percentage points more likely to emerge in *Going-private* deals (25.9% of all transactions), usually financed by financial, rather than strategic, sponsors; 4.0 percentage points more likely to intervene in a *friendly* deal (93.3% of all transactions), and 1.5 basis point more likely to dissent for every one percentage point increase in insider ownership. The first two effects are significant at the 1% level while the third at the 10% level. In a regression framework, such effects are net of that of the offered premium, that is, the analysis already takes into account that financial and/or friendly buyers typically offer lower bids than strategic buyers. In particular, going-private deals are among the most prone to conflicts of interest, especially when a controlling (or major) shareholder is a member of the buyer group (which is correlated with insider ownership) because the ownership interest gives it the power to effectively control the approval of the transaction

(and to veto any alternative transaction), while minority or unaffiliated stockholders are susceptible to potential coercion and other manipulative tactics. A similar argument applies, to a lesser degree, to "friendly" deals, where the board endorses the proposed transaction. These coefficients thus exemplify the corporate governance element in the activist arbitrageur strategy.

Furthermore, the coefficient for *Institutional ownership* suggests that the merger target's shareholder clientele has a significant impact on the likelihood of activist arbitrageurs' involvement. A one-standard deviation increase in institutional holdings is associated with an increase in the marginal probability of 1.7% (significant at the 1% level). Given their minority stakes in merger targets and the typical "apathy" of retail and small investors (Black, 1990), it is crucial for activists to rely on the support of these institutional investors in order to have their strategies implemented.

Deal value positively predicts the presence of activist arbitrageurs, and the coefficient is statistically significant at the 1% level. However, the economic magnitude of the marginal probability is modest. In addition, *Acquirer toehold* and *Insider ownership* are also positively related to activist arbitrage. The effect of acquirer toeholds is consistent with Betton and Eckbo's (2000) finding that higher toeholds are associated with lower offered premiums, which, in our context, implies a higher probability of being targeted by activists. The remaining independent variables, including *Target-acquirer same industry*, *ROA*, *Stock deal*, *Defense*, and *Tender offer*, are not significant predictors for the emergence of activist arbitrage.

Column (2) of Panel A, Table 3 reports the determinants of passive arbitrage, from the same estimation procedure, relative to the base state of target firms involving no disclosed arbitrageurs. Results indicate that deals attracting passive-only arbitrageurs tend to be bigger, with a larger institutional investor base, endorsed by the board, and entail a larger acquirer toehold and a higher level of insider ownership. All these coefficient estimates

are significantly and positively associated with deal completion—hence a passive arbitrage strategy is likely to accomplish spread convergence with little deal risk.

To the extent that merger targets' corporate governance quality may also affect activist arbitrageurs' participation decision, we further control for the "entrenchment index," proposed by Bebchuk, Cohen, and Ferrell (2009) on a subsample where the index is available. The results remain largely similar (not tabulated) while the entrenchment index per se is not significant. Interestingly, there appears to be little relationship between announcement premium and the relative probability of a deal being targeted by passive arbitrageurs, consistent with the arbitrageurs' focus on spread convergence upon deal completion rather than value improvement.

3.2.2 Determinants of activist participation conditional on arbitrageur presence

The conditional analysis assesses the determinants of activism conditional on the participation of any type of risk arbitrageurs. Column (1) of Panel B, Table 3 reports the results from a probit regression analyzing what motivates investors to take the activist approach in the subsample that excludes the no-arbitrage cases. The two most important determinants from the unconditional analysis remain significant (at the 1% level): a one-standard deviation increase in the announcement premium is associated with a 4.2% decrease in the marginal probability of being targeted by activists, and going-private deals are 5.2 percentage points more likely to invite activists. The consistency between the unconditional and conditional relations reaffirms the strong corporate governance motivation underlying activist arbitrageurs. *Stock deal* has a negative effect with marginal significance, possibly due to the fact that such deals are not eligible for appraisals, a potential last resort for an activist to demand a higher value after the public activism fails.

As a robustness check, the unconditional and conditional analyses are carried out for "friendly" deals only (not tabulated), because the type of contracting and requirements for

votes are arguably more uniform within this group. In this subsample we find that the results on other determinants from both unconditional and conditional analyses are nearly identical to those in Table 3.

Results in column (1) of Panel B, Table 3 reveal differences between activist and passive risk arbitrage, but they do not tell whether these differences are due to activism or different investor styles because the two group of funds do not fully overlap. To disentangle the two effects, we restrict our sample to investors who engage in both activist and passive arbitrage, resulting in a sample involving 120 unique funds. We then repeat the same regression as in column (1) except adopting a linear probability model with fund fixed effects. Column (2) of Panel B reports the results, which suggest that a given arbitrageur is more likely to turn activist on going-private and friendly deals with lower premium. In addition, activists prefer larger deals and cash transactions.

4 Deal Resolution: Completion Rates and Duration

4.1 Deal resolution and activist arbitrage

4.1.1 Deal completion rates and duration

The effect of arbitrageurs' campaigns on the probability of deal consummation reflects a curious trade-off. On one hand, these sophisticated investors can push the target board to reject inadequate offers and to seek higher bids; on the other hand, activist arbitrageurs' involvement could cause delays due to extended negotiations or even withdrawals if the higher expectation for paid premium drives potential suitors away. Therefore, "deal completion" could be measured in two ways in this context. By default, we classify a deal as "completed" if the target is sold to the buyer pursuant to the announcement, including under altered terms. In sensitivity analysis, we adopt an alternative measure to also include in "completed

deals" targets that are eventually sold to another buyer within one year from the original announcement. The first approach assesses to which extent activists uproot the original deal; while the alternative measure takes into consideration that target shareholder returns are determined by deal duration and eventual price terms, which are not necessarily tied to a particular acquirer.

To calibrate whether activists heighten risk of deal failure, we start with a probit regression of deal completion with activist involvement as a key predictive variable. Results are reported in Panel A of Table 4 where the two columns accommodate both definitions of deal completion. At a correlational level, deals targeted by activist arbitrageurs are 3.5 percentage points less likely to be consummated other things being equal, and the effect is economically meaningful but only marginally significant (at the 10% level). This difference is notably lower than that reported in Panel B of Table 2, suggesting that activists are more likely to target deals that have lower probability of completion based on observable characteristics, such as going-private transactions and low-premium deal (which naturally encounter greater resistance from shareholders).

Under the alternative definition of deal completion (by any buyer), the marginal effect is further lowered to -2.9%, which is not statistically significant. The fact that activist involvement does not seem to be associated with a significantly lower rate of eventual sale could be due to the fact that activist involvement tends to put the target "in play" which increases the probability of it being sold (Greenwood and Schor, 2009; Boyson, Gantchev, and Shivdasani, 2015), even if not to the current bidder. Consistent with the existing literature, we also find that friendly deals (Hsieh and Walkling, 2005) and tender offers (Betton, Eckbo, and Thorburn, 2008) are more likely to be consummated, and that the use of defense tactics is associated with lowered deal success rates (Field and Karpoff, 2002).

[Insert Table 4 here.]

In addition to affecting the probability of eventual deal completion, activist campaigns could cause delays in the merger process, potentially creating higher costs for shareholders. In Panel B of Table 4, we report results connecting the duration of the merger (from announcement to resolution) to activist arbitrageurs' involvement. In column (1), the dependent variable is the logarithm of the days between deal announcement and the resolution to the current deal, where the resolution date could be either completion or withdrawal. The key independent variable is the dummy variable *Activist arbitrage*, and the other covariates are the same as in Panel A. The duration of a deal involving activist arbitrageurs on average takes 7.2% longer than those without, but the difference is not statistically significant. The effects of the covariates are intuitive. On average, larger deals, stock mergers and deals that involve defense tactics take a longer time to consummate, while friendly bids and tender offers have a shorter duration.

As discussed earlier, an eventual sale of the company to any buyer may be just as important for shareholders. In column (3) of Panel B, the dependent variable is modified for the 80 deals that were withdrawn from the original agreement but where the target was successfully sold within one year to a third party. For those deals, deal duration becomes the days between deal announcement and the effective date of eventual sale. The coefficient on *Activist arbitrage* indicates that activists' involvement lengthens deal duration by 6%, but the effect is not significant either.

Hazards analyses using the Cox (1972) proportional hazards model,[12] reported in columns (2) and (4) of Panel B, Table 4, yield qualitatively similar results. The estimated hazard ratio (which is equal to the exponentiated coefficient) associated with the dummy variable *Activist arbitrage* imply that, conditional on a deal being in process, the probability of a current (any) deal closure on a given day is about 17% (14%) lower with the presence of an activist arbitrageur. The coefficient estimates are significant at the 10% level.

[12]In the Cox model, the hazard function at a given time t (from initiation), conditional on the incompletion of the deal, is characterized as $h_i(t) = h_0(t)e^{X_i\beta}$ where $h_0(t)$ is an unspecified (or nonparametric) function.

Panel B of Table 4 concludes that overall the involvement of activists marginally (both economically and statistically) delay the deal from proceeding to closure. Imputed on an average duration of 137 days, the marginal effect amounts to around 10 days.

4.1.2 Completion rates and market signals

As discussed, a necessary component in the activist arbitrage strategy is a credible threat (reflected in ex post outcomes) to block some deals. It remains to be shown what types of marginal deals activists choose to impede. For believers of market efficiency, the desirability of a deal for target shareholders could be gleaned from stock market response during the announcement window. We thus relate actual deal completion rate to a proxy for the ex-ante completion rate, conditional on activist intervention. The variable, *Ex ante completion probability*, is defined as $(P_{+1} - P_{-1})/(P_{\text{Initial Offer}} - P_{-1})$, in which P_{-1} and P_{+1} denote the target's stock prices one day before and after the deal announcement, respectively.[13] This measure is similar to those used in Brown and Raymond (1986) and Larcker and Lys (1987), and captures the intuition that the difference in the post-announcement price of the target's stock and the price offered by the acquirer reflects the market's belief of the probability of a deal's failure, in which case the price could fall back onto the pre-announcement level. To make sure that activist interventions do not contaminate this ex-ante completion rate, we eliminate 17 deals in which the activist arbitrageurs disclosed their holdings within one day of the deal announcement.

Importantly, *Ex ante completion probability* empirically positively predicts the success of a deal: In our sample, a one-standard deviation increase in the measure leads to a 3.5 percentage point increase in success for an average deal (significant at the 1% level), controlling for major deal characteristics. Moreover, a simple comparison shows that the ex-ante completion probability for deals targeted by activists, at 72.6%, is 0.2 percentage points higher

[13] Alternative measures such as $(P_{+1} - P_{-20})/(P_{\text{Initial Offer}} - P_{-20})$ and $(P_{+1} - P_{-10})/(P_{\text{Initial Offer}} - P_{-10})$ yield similar results.

than that of the control sample, and the difference is statistically insignificant (t-statistic = 0.08). This suggests that activist arbitrageurs do not appear to target deals that are perceived by the market to have a lower likelihood of completion.

The most important result concerns how the relationship between ex-ante and ex-post deal completion rates differs between deals involving activist arbitrageurs and the other deals. Results are reported in Panel C of Table 4, applying probit regressions separately on the activist and non-activist subsamples, including the same covariates as those in Panel A with the addition of *Ex ante completion probability*. We observe a sizable difference in the coefficients between the two samples: a one-percentage-point increase in the ex-ante completion probability leads to a 34.3 basis-point increase in the consummation of deals involving activists, as opposed to a 9.3 basis-point increase for deals involving no activists. The two-sample t-test for these two coefficient estimates rejects the null hypothesis that they are equal at the 5% significance level.

In summary, although their presence is associated with an increase in the risk that a target will fail to be the sold to the intended acquirer, activist arbitrageurs also make deal success more (less) likely when it is welcomed (not welcomed) by the market. The theoretical work by Edmans, Goldstein, and Jiang (2015) and empirical study by Luo (2005) show that the sensitivity of deal completion to market reaction is indicative of corporate insiders learning from the collective wisdom of the market to make better investment decisions. Our results thus support the hypothesis that activists serve as monitors so as to make management more receptive to the cues from the market prices.

4.2 Deal completion: selection and treatment effects

While both activist and passive risk arbitrageurs profit from deal consummation and hence have the incentive to select deals with the best prospects of completion, their "treatment effects" are distinct. Passive arbitrageurs' actions (i.e., consolidating share ownership

and casting positive votes) work to further improve the deal success rate in order to maximize their returns from spread convergence (Cornelli and Li, 2002; Cao, Goldie, Liang, and Petrasek, 2015); in contrast, activists' strategy requires that they block some potentially under-paying deals in order to extract higher payments from acquirers on the surviving deals. The nature of activist arbitrage thus implies a "negative" selection bias, that is, because the selection effect and the treatment effect work in opposite directions, its effect on deal completion is likely to be under-estimated in a reduced-form regression like the one in Panel A of Table 4.

4.2.1 Separating selection and treatment effects: An instrumental variable approach

A separation of the treatment effect from the selection effect requires an instrumental variable that affects the participation by activists after M&A deal announcement, but does not affect deal completion other than due to the activist campaigns. The instrument of our choice is the net-asset-value (NAV) returns of the activist hedge funds prior to an M&A announcement. More specifically, we construct the variable *Prior excess return of activist funds* as follows. First, we match all the activist funds that ever appear in our sample (a proxy for the "universe" of activist arbitrageurs during the sample period) to two major hedge fund databases, Lipper TASS and CISDM (both accessible via WRDS), resulting in 67 matched funds. Second, we construct a value-weight monthly NAV return series that in excess of the CRSP value-weighted returns. Lastly, for each M&A observation in our sample, we impute the returns to the activist funds during the [t-6, t-1] month window. The resulting variable has a mean (median) of 4.3% (4.6%) and a standard deviation of 4.5%. Because the variable is recorded to specific event months, it is able to predict cross-sectional variations in activists' presence in M&A deals despite being constructed from a time-series variable.

We then proceed to a bivariate probit model consisting of two simultaneous equations for discrete outcomes: One for deal completion and one for activist participation. The results are reported in Panel A, Table 5. The endogenous variable in the *Deal completion* equation is *Activist arbitrage*, and *Prior excess return of activist funds* is excluded in the equation. The validity of *Prior excess return of activist funds* as an instrument for activist participation, or its "exclusion restriction," relies on the fact that the variable captures independent factors from the activist capital supply side rather than circumstances in the M&A market.[14] Several properties of the measure as well as the setting are helpful. First, unlike activist interventions in companies, the timing of a risk arbitrage is not a choice made by the hedge fund because the window of opportunity is a short one right after an M&A announcement. Second, the lagged NAV return is a retrospective measure for the appreciation of assets held by the funds in the past, which does not contain the market valuation or expectation of the hedge fund's future success. Third, the excess return measure is close to being temporally uncorrelated (as it should be in a relatively efficient market). Empirically, the temporal correlation 4.5 months apart (the typical duration from deal announcement to completion) is indistinguishable from zero (-0.02). Hence, though market conditions tend to affect both hedge fund returns and M&A outcomes concurrently during the time around deal resolution, they are not correlated with the past excess returns of activist hedge funds.

The "relevance" of the instrument is easier to attest. Column (1) of Panel A, Table 5 indicates that *Prior excess return of activist funds* significantly (at the 1% level) predicts activist emergence shortly after deal announcement. The Cragg-Donald (1993) Wald F-statistic for weak instrument is 17.4, based on which we reject the hypothesis that the instrument is weak with a maximum relative bias (relative to the OLS estimate) of 10% at the 5% significance level. Intuitively, if an M&A deal is announced at a time activist funds

[14]Using "supply side" capital shocks as instruments for "demand side" outcomes has been standard in the literature on similar settings. See, for example, Jiang, Li, and Wang (2012), Phillips and Zhdanov (2013), and Gantchev and Jotikasthira (2015).

have been doing well in the recent past, then it is easier for an activist fund to commit new capital to the announced deal presumably because the hedge fund investor flows follow past performance (Getmansky, Liang, Schwarz, and Wermers (2015)) and because funds themselves are more ready to build on prior success.

[Insert Table 5 here.]

The first two columns of Panel A reports the simultaneous estimation of the *Deal completion* equation and the *Activist arbitrage* equation, taking into account that *Activist arbitrage* is an endogenous variable in the first equation, where *Deal completion* is restricted to deals consummated with the announced buyer. The key coefficient is the one on *Activist arbitrage* in column (2). It turns out to be positive and significant (at the 5% level), entailing a marginal probability of 17.5%. Recall that Table 4, Panel C shows that on average the completion probability in the activist-involved subsample is 72.5%. Taking the the numbers at their face value, the instrumented result implies that the average "inherent" deal completion probability, in the absence of an activist intervention, would have been 90.2%, higher than the average of the non-activist subsample (85.7%). This is consistent with our earlier discussion that activists select deals that are, *ex ante*, unlikely to fall through for other reasons.

The last two columns of Panel A adopts the alternative definition of deal completion to include all targets that were eventually sold to any acquirer within one year from the initial announcement. The marginal effect of *Activist arbitrage* drops to -14.6% (significant at the 10% level). The difference between the two columns reflects the fact that a substantial number (21) of targets in our sample were sold to activist-recommended third-parties.

The interpretation of the results in Panel A, Table 5 hinges on the validity of the instrumental variable, which cannot be "proved." We, however, are able to provide a diagnostic test on the premise that the prior NAV returns of the activist funds in our sample affect

M&A deal closure only through the involvement of these activists. Figure 2 shows that activist arbitrage activities before 2005 were unimportant (appearing in fewer than 5% of the announced M&A deals). Hence, *Prior excess return of activist funds* should not be correlated with *Deal completion* during this period because there is no direct channel between the two. On the other hand, *Prior excess return of activist funds* should be negatively correlated with *Deal completion* due to the indirect channel via activist arbitrage.

Such a contrast is confirmed in Panel B, Table 5, in which we run reduced-form probit regressions of *Deal completion* on *Prior excess return of activist funds*, controlling for the same covariates as in Table 4 (the endogenous variable *Activist arbitrage* is excluded), separately for the 2000-2005 and 2006-2014 periods. In the first period a one percentage point increase in *Prior excess return of activist funds* is associated with a 38 basis point decrease in *Deal completion* (t-statistic = -0.94); while that in the second period the same marginal effect is 77 basis points (t-statistic = -4.09). During the period with very low activist arbitrage activities, the (reduced-form) effect of the instrumental variable was both economically small and statistically insignificant, suggesting that the variable does not directly contribute to the probability of deal completion.

4.2.2 Separating selection and treatment effects: A direct approach

In an attempt to identify a causal relationship, researchers often resort to an instrumental variable because they observe the "input" and "output" but not exactly the process in which the former affects the later. This prevents them from concluding causation when selection of not random. In our context, there is more information on how a deal was withdrawn from its original course and what roles activists play. We hence supplement the instrumental variable analysis presented in the previous section with a more direct approach, namely, making a direct assessment on whether activists play a key role in terminating a deal based on legal filings, disclosures, and news searches.

More specifically, we classify a deal failure as "caused by an activist" if at least one of the following is true: (1) The activist's vote is pivotal in a negative voting outcome. (2) The voting outcome is negative after ISS issues a recommendation supporting the activist. (3) Management withdraws the deal due to activist dissention, and there is no other concurrent public campaign against the deal. (4) The firm is sold to an activist-recommended third-party.

We classify a deal failure as "likely caused by an activist" if at least one of the following is true: (1) There is a negative voting outcome after activist public campaign. (2) Management withdraws the deal citing general lack of shareholder support, and there is no other concurrent public campaign (in addition to that led by the activist) against the deal. (3) The firm is sold to a third-party (under better terms) with evidence of shareholder pressure. Finally, we classify a deal failure as "not caused by an activist" if at least one of the following is true: (1) The deal is cancelled due to a "material adverse change" (MAC). (2) The deal is cancelled due to antitrust of other regulatory challenges.

Column (1) of Panel C, Table 5 reports the detailed classifications under the three broad categories for a total of 70 failed deals with activist presence. The subcategories are not mutually exclusive; however, the percentage reported to each of the three main categories reflects the net number. It turns out that in 72.9% of the failed deals with activist presence one can reasonably conclude that activism was the cause. Give that the deal failure rate is 27.5% for this sample, activists contributed to an incremental deal failure probability of 20.0%, a number that is on the same order of magnitude as the estimate from columns (1)-(2) of Panel A, Table 5. If we exclude targets sold to third-parties from failed deals, then activists contributed to an incremental deal failure probability of 11.8%, corresponding to the estimate reported in columns (3)-(4) of Panel A, Table 5.

5 Returns from Activist Arbitrage

After showing that activists incur higher deal failure risk, it is important to demonstrate that losses from the incremental deal risk are more than compensated by improved deal terms among the survivors, so that we can address the fundamental questions as whether and when activist risk arbitrageurs can create value for target shareholders and abnormal returns for themselves. To this end, we compute abnormal returns at the target companies over a variety of time windows, and we compare the abnormal returns for deals involving activist arbitrageurs, passive arbitrageurs, and no disclosed arbitrageurs.

5.1 Returns for merger targets: Pre- and post-arbitrage

Following Schwert (2000) and Hsieh and Walkling (2005), the total takeover premium received by a target company is estimated as the merger target's cumulative abnormal return from 54 trading days prior to the first bid announcement to deal resolution. The long window pre-announcement incorporates the well-documented "run-up" in M&A target companies' stock prices. Importantly, the full range of the return premium is not "tradeable" from the perspective of an arbitrageur (activist or passive), who initiates a position only after the public announcement. We thus separate the full window into multiple sub-windows in order to assess the profitability of the activist arbitrage strategy.

First, we single out the arbitrageurs' cumulative abnormal returns ("CAR") measured over the [+2, resolution] window. Daily abnormal returns ("AR") are calculated for each stock using the Fama-French plus momentum four-factor model, with an estimation window of 255 days up to 54 days prior to announcement. CAR is the sum of daily ARs. For deals also involving appraisal petitions by activists, we further add the "appraisal return," which is calculated as the difference between the appraisal value granted by the court and

the stock price on the last trading day scaled by the latter.[15] As we noted in Section 2, the appraisal returns accrue only to the appraisal petitioning shareholders – a subset of the activist arbitrageurs – and not to other shareholders. For this reason, we provide analysis including and excluding appraisal arbitrages to calibrate returns to target shareholders in general and those to the activist arbitrageurs.

Following the literature (e.g., Gaspar, Massa, and Matos, 2005), we also separately estimate "run-up" and "markup," which are the CAR over trading days [-54, -1] and over [-1, resolution], respectively.

5.1.1 Returns from long-only in the targets

Given that activist arbitrageurs usually do not disclose their holdings in acquirers and that only 45 of 233 deals targeted by activist arbitrageurs are stock or hybrid deals (out of the 255 deals, 233 have stock price information), the target long-only returns are a suitable measure of gains for most of the deals in our sample. Panel A of Table 6 presents cumulative abnormal returns for investors who hold long positions in target companies over the various time windows.

[Insert Table 6 here.]

Comparing the total takeover premiums (over the window of [-54, resolution]), Panel A of Table 6 shows that the takeover premium for deals involving activist arbitrageurs is about 26.0%, significantly (at the 1% level) lower than the average of 31.7% for deals targeted by passive arbitrageurs, and slightly (insignificant) lower than the average of 29.9% for deals involving no disclosed arbitrageurs. The differences corroborate our earlier finding that activist arbitrageurs tend to target deals with lower announcement premiums. Indeed, breaking down the total premium into various time windows, we find that the differences are

[15] Appraisal prices granted by a Delaware State judge are available for five deals targeted by activist arbitrageurs. We calculate an appraisal return using the same factor loadings for the stock.

almost fully accounted for in the "markup" and not in the "run-up," there does not appear to be any difference between deals involving activist and passive arbitrageurs (6.4% vs. 5.9%, the difference of which is far from significant). Such a pattern suggests that activist arbitrageurs do not rely on superior private information (whether through sophisticated takeover prediction models or insider information) prior to the deal announcements. In fact, activist arbitrageurs launch their campaigns after deal announcements and aim for superior returns from post announcement to deal resolution.[16] It is worth noting that the results are similar regardless of whether we include or exclude deals in which activist arbitrageurs only seek appraisal petitions without engaging in other campaign tactics. The similarity suggests that, by and large, activist arbitrageurs' endeavors constitute a "public good" for all shareholders who hold their shares in the target companies beyond the announcement date.

We now explicitly examine whether activist arbitrageurs are able to generate superior post-arbitrage abnormal returns in target companies, compared to passive arbitrageurs. As the information associated with the first bid usually has already been incorporated in stock prices by the end of the first full day of trading after the merger announcement, we focus on the CAR over the [+2, resolution] window to gauge activist arbitrageurs' ability to generate extra returns by campaigning against the merger under the currently stated terms. The average [+2, resolution] CAR (including failed deals) is 5.9% for deals involving activist arbitrageurs, greater than the average of 2.2% for those targeted by passive arbitrageurs and the average of -2.3% for those involving no disclosed arbitrageurs. However, only the difference with the latter is significant (at the 1% level). In annualized terms, the difference amounts to 19.2% vs. 5.3% (this difference is significant at the 5% level). It is worth noting that deal duration plays little role in annualizing the difference as the median durations of the two groups are close at 124 and 117 calendar days, respectively. The differences in the

[16]Thus, the strategy we study is critically different from that analyzed in Dai, Massoud, Nandy, and Saunders (2013), where speculators trade on private information before the M&A announcement date.

median abnormal returns are of comparable magnitude. The median CAR is 2.0% for deals targeted by activists, while it is close to zero (0.4%) for passive arbitrageurs. The difference in the medians between these groups indicates that cumulative positive returns after the first full day of trading only occur at the deals involving activists.

Activist arbitrageurs take positions at different times. We thus also examine their "tradeable returns" using time windows calibrated to their possible actual investment horizons. More specifically, we set the starting time as $max(+2, disclosure - 10)$, the latter of day +2 and 10 (calendar) days before an activist arbitrageur's disclosure of a large equity stake in the target company in its Schedule 13D filings.[17] The securities law allows ten (calendar) days between when an investor crosses the 5% ownership threshold and when the investor must file a Schedule 13D if the investor intends to influence corporate policies or control (which an activist arbitrageur clearly does). Thus, this return window identifies a portion of the run-up returns which the arbitrageurs could capture.[18] Using this measure, the average CAR during the [max(+2, disclosure−10), resolution] window is 6.2%, slightly higher than our main return measure, and significantly higher than the same measure for the passive arbitrage (at the 10% level) and the no-arbitrage (at the 1% level) subsamples.

For completeness, the table also presents short-term target stock returns around activist arbitrageurs' disclosure dates. Using a 20-day window around their disclosure dates, the average and median CARs are about 2.6% and 1.6%, respectively (both are significant at the 1% level), suggesting that the market revised up the total premium expected upon the emergence of the activist arbitrageurs. Excluding deals involving appraisal appeals only, the order of magnitude is similar.

[17]For disclosures through press releases, we set the starting time as $max(+2, disclosure)$, the latter of day +2 and an activist arbitrageur's disclosure of his stakes.

[18]In our sample, 54 of the 210 disclosures by activist arbitrageurs are not through Schedule 13D filings. For these days we just use the disclosure date without subtracting the ten days.

5.1.2 Returns from long-short strategies

For stock deals, risk arbitrageurs often simultaneously take a long position in the target and a short position in the acquirer where the ratio of the long-short positions is set to be equal to the stock exchange ratio. In such a strategy, an arbitrageur locks in the spread and profits from its full convergence if the deal goes through as planned. When activist arbitrageurs decide to attack the merger target, they can apply the private information to short the acquirer stock. Indeed, for stock and hybrid deals, we find rapid increases in short interest right before the activist announcement. On average, short interest as a percentage of the acquirer's outstanding shares jumps from 3.5% 10 tradings before activist announcement to 4.5% one day before the announcement.[19] For cash deals, however, there is no noticeable trend for short interest in the acquirer stock.

It turns out that fewer stock deals are targeted by activist arbitrageurs (45 out of 233 deals), while about 31.5% of deals involving passive arbitrageurs are stock deals. Panel B of Table 6 reports the long-short portfolio returns for the same set of time windows as those in Panel A. Earlier research documents that the long-short abnormal returns are typically higher than long-only returns because acquirers' stock prices tend to decrease after deal announcements (Mitchell, Pulvino and Stafford, 2004). Despite the small sample, it turns out that the long-short CAR for activist arbitrageurs is larger than those enjoyed by the passive arbitrageurs (although the difference is not significant) and than returns incurred in deals with no disclosed arbitrageurs (the difference is significant at the 5% level).

5.1.3 Returns for completed and withdrawn deals

To further identify the sources of post-arbitrage returns generated by activist arbitrageurs, we examine completed and withdrawn deals separately. Panel C presents long-only

[19]Daily short interest is proxied by the quantity of shares loaned, provided by Markit/DataExplorer. According to Markit/DataExplorer, 85%-90% of shares borrowed are for shorting purposes. See Aggarwal, Saffi, and Sturgess (2014) for details.

abnormal returns in the targets for completed mergers. Target firms involving activists on average have lower total takeover premiums and markups than those involving passive or no disclosed arbitrageurs, consistent with the findings in Table 2 as well as those in Panel A of Table 6. Importantly, the average CAR over the [+2, resolution] window for deals targeted by activists more than doubles that for deals involving passive arbitrageurs (8.8% vs. 3.3%, the difference of which is significant at the 10% level). This larger spread, relative to that in Panel A, is a strong indication that activist arbitrageurs are capable of pushing for higher bids for deals that are eventually successful.

Returns for withdrawn deals are reported in Panel D of Table 6. As expected, the total takeover premiums, run-ups and markups for both types of arbitrage are significantly lower than those for successful deals. The takeover premium is consistent with that in Boyson, Gantchev, and Shivdasani (2015), although they include a shorter run-up period and examine only cash deals. The takeover premium and markup for deals targeted by activists are again lower than those involving passive arbitrageurs. Interestingly, the average CAR for the [+2, resolution] window for deals involving activist is much larger than that for deals with passive arbitrageurs (-0.6% vs. -6.0%, the difference of which not significant due to the sample sample size). The same average return for no-arbitrage deals is even lower, and the differences are are significant at the 1% level. Therefore target shareholders still fare better with activists even conditioning on deal failure. Moreover, the average shorter-term return during the time window of activist emergence, i.e., the CAR over [max(+2, disclosure−10), disclosure+10], is of similar magnitude to the successful deals (about 2.9%, significant at the 5% level), indicating that the market has expected a positive effect of activist arbitrageurs' involvement even for ex post failed deals.

The combined evidence suggests that activists generate higher premium revisions for target shareholders in successful deals, but do not cause any losses if deals fail. Taking into account the probability of deal failure, the average post-announcement return is about 4.8%.

Hence, the news of their emergence invites positive market responses, with the expectation of a heightened risk of deal failure.

6 Activist Arbitrage in Acquirers

For completeness, we supplement the analysis of arbitrage on the target companies with the same analysis for publicly traded acquiring firms. Following the procedure detailed in Section 2, we identify 47 cases where activists act in accordance with their rights as shareholders of the acquirers. The following subsections provide a brief report on the characteristics of acquiring firms involving activist arbitrageurs as well as the returns from their endeavors.

6.1 Characteristics of deals involving activist arbitrageurs

Similar to Table 2, Table 7 reports the characteristics of deals in which activists attempt to change the course of an announced deal from the acquirer side (column (1)), and compares the average statistics with those from all deals involving no activists (column (2)) and a one-to-many matched sample (column (3)). The matched company for each acquirer targeted by activists is assigned from the same year, same SIC three-digit industry, and same deal-size decile.

[Insert Table 7 here.]

Relative to deals involving no such investors, deals targeted by activist arbitrageurs on average are much larger and are more likely to involve multiple bidders. This suggests that activist arbitrageurs are more likely to descend on an acquirer when the deal may be perceived to be more risky and the acquiring firm could overpay substantially due to bidding wars. Performance of these acquirers is also worse as measured by their return on assets. Importantly, deals held by activists have a large negative revision return (-5.8%) on

average (significantly lower than control samples at the 5% level), indicating that activist arbitrageurs are often successful in forcing the acquirer to lower its bid, if the deal still goes through. On the other hand, for deals targeted by activist arbitrageurs, deal duration is significantly longer, and the completion rate is much lower (both significant at the 1% level). Thus, activists tend to block mega-deals by attempting to lower the bids, increasing the risk of losing the deal altogether. Such actions could benefit acquirer shareholders if a substantial portion of the M&A deals are value destroying for acquirer shareholders (Moeller, Schlingemann, and Stulz, 2005). This is confirmed by the return analysis in the section to follow.

6.2 Returns from activist arbitrage in acquirers

We would like to re-emphasize that the positions activist risk arbitrageurs take in the acquirers tend to be the opposite of those taken by the passive risk arbitrageurs. In a conventional passive risk arbitrage, an investor shorts the acquirer as part of the strategy built on spread convergence. However, the activist arbitrageurs in acquirers are actually long the acquirer and hope to advocate, as shareholders, for modifications to the announced deals in the hope of lowering the bids or blocking the over-paying deals (both of which lead to value improvement for the acquirers).[20] Such a difference makes activist risk arbitrage a novel addition to the strategy space as well to the literature.

Table 8 reports abnormal returns for activist investors who long acquiring firms and campaign against the deals in their current forms. For the run-up, we do not find much of a difference between deals held by activists and other deals. As expected, activist arbitrageurs earn a much higher average return, compared to investors in other deals, in the post-deal announcement time period. The average CAR over the [+2, resolution] window is 4.2%

[20]This is not to be confused with activist arbitrageurs in target companies who may take auxiliary short positions in acquirers for stock deals.

for the activists, greater than a -3.4% return for investors in other deals (the difference is insignificant at the 10% level) and a -1.8% for those investing in matched deals. For robustness, we also calculate CAR over the $[max(+2, disclosure\text{-}10), resolution]$ period for activist arbitrageurs and other investors, in which *disclosure* denotes the date activists disclose their positions in the acquirer. The results are consistent with our main findings. The difference in the average CARs for activists and other investors is 10.9%, significant at the 5% level. Relatedly, the market reaction to the disclosure of activist involvement is positive: the average CAR of the acquirer stocks measured over the 20-day window around the disclosure date is 3.9%, significantly different from zero at the 5% level.

[Insert Table 8 here.]

On an annualized basis, the average return accrued to the activist arbitrageurs is 10.5% from post-deal announcement to resolution, smaller than the average returns received by activists who intervene in merger targets. In contrast, acquirer shareholders in deals without activist intervention receive substantially negative returns post deal announcement.

7 Conclusion

We provide the first study on a relatively new phenomenon of "activist risk arbitrage," in which activist shareholders wield their influence over corporate control changes by blending shareholder activism into an M&A arbitrage strategy. More specifically, the activist arbitrageurs attempt to block an announced M&A deal through public campaigns in order to extract better terms. Compared to the conventional (passive) risk arbitrage, activist arbitrageurs are more likely to select deals that are more susceptible to managerial conflicts of interest, including going-private deals (especially management buy-outs), "friendly" deals (in which the boards endorse preferred buyers), and deals with lower announcement premiums. Activists decrease the probability that deals will be completed with the current bidder.

However, their presence increases the probability that deals welcomed by the market will be completed. Finally, activist risk arbitrage yields significantly higher returns than passive arbitrage, taking into account the incremental deal risk. Overall, evidence suggests that activist risk arbitrage plays a positive role in guarding investor interests in corporate control events, while delivering good returns for themselves.

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Figure 1: Stock Performance for Targets Involving Activist and Passive Arbitrageurs

This figure illustrates the typical path of activist arbitrage in the target company of an M&A transaction from initial deal announcement to resolution, and compares it with that of a passive arbitrage.

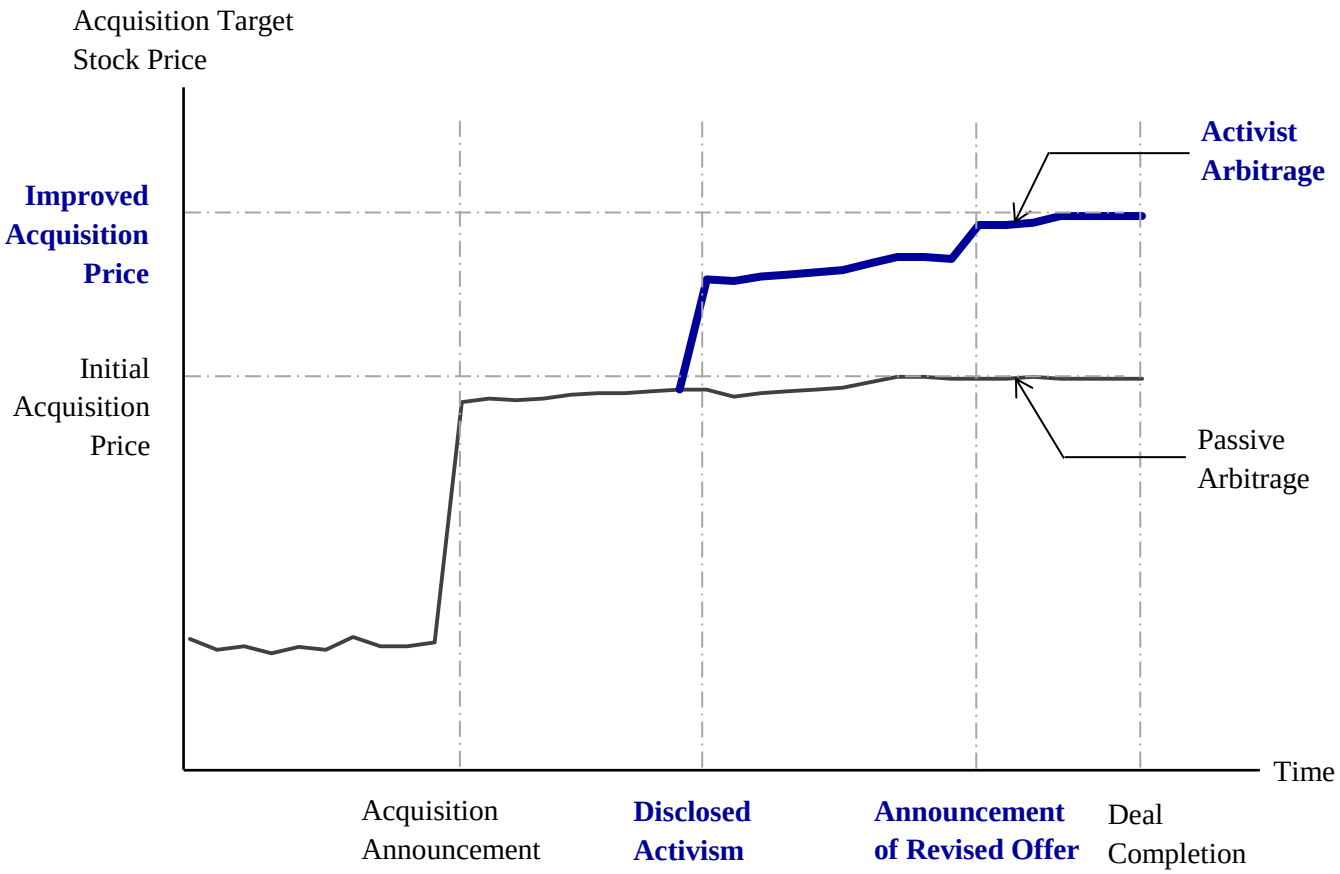

Figure 2: M&A Transactions and Activist Arbitrageur Activities, 2000-2014

This figure shows the annual volume of M&A transactions and activist arbitrage activities from 2000 to 2014. The blue bars (left axis) plot the number of annual M&A transactions in each year. The red line (right axis) plots the number of merger targets that are held by activist arbitrageurs. Data sources include the Securities Data Company ("SDC"), SharkRepellent, Schedule 13D filings, and Factiva. Section 2 provides detailed information about the sample and data.

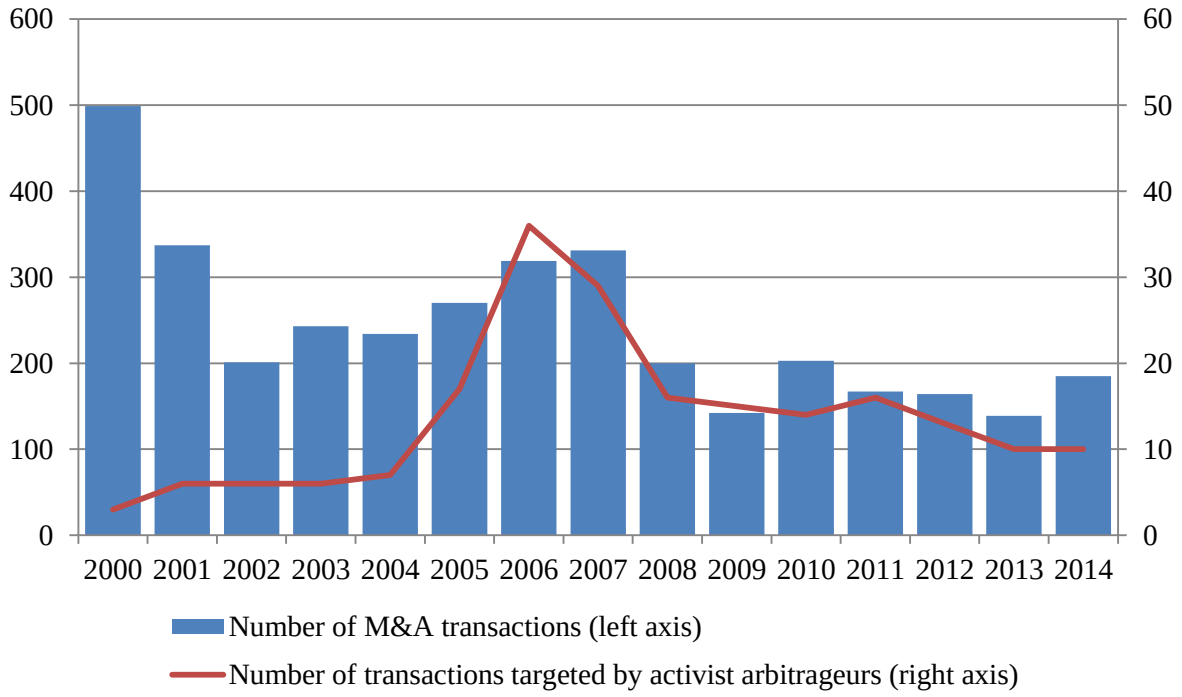

Table 1: Activist Risk Arbitrageurs' Capital Commitment and Investment Horizon

Columns (1) and (2) of this table report the summary statistics of the size of activist risk arbitrageurs' stakes in merger targets at the time of disclosure, both in dollar values and as a percentage of outstanding shares of the target companies. The "Initial" columns report the stakes that the lead activist risk arbitrageur holds in a merger target when it files the initial Schedule 13D or issue the first press release. The "Maximum" columns report the maximum stakes activist arbitrageurs attain during the event. Columns (3) and (4) report the number of days between the deal announcement and initial disclosure of arbitrageur stakes, and that between the initial disclosure and deal consummation/withdrawal. The sample size is 233 deals from 2000 to 2014.

	(1)		(2)		(3)	(4)
	Value of invested capital ($millions)		% Ownership		Days between deal announcement and initial disclosure	Days between initial disclosure and resolution
	Initial	Maximum	Initial	Maximum		
Mean	110.0	144.0	8.7%	11.1%	47.4	105.1
Std. Dev.	289.9	327.7	8.2%	9.5%	65.9	84.9
5th Percentile	1.4	1.9	0.5%	0.5%	2	18
25th Percentile	6.9	7.8	4.8%	5.2%	6	45
Median	25.3	29.4	7.0%	8.9%	25	83
75th Percentile	79.3	118.3	9.9%	14.8%	64	136
95th Percentile	504.6	710.2	20.1%	26.2%	169	273

Table 2: Deal Characteristics

This table reports characteristics of 204 deals involving activists, and compares them to 2,549 deals with passive-only arbitrageurs and 881 deals with no disclosed arbitrageurs, respectively. Our sample includes all cash, stock and hybrid deals from 2000 to 2014. Activist arbitrageurs are identified through their schedule 13D filings or press releases. A two-step procedure developed in Hsieh and Walkling (2005) identifies passive risk arbitrageurs, the details of which are described in Section 2. *Announcement premium* is calculated as $(P_{Offer} - P_{-1})/P_{-1}$, where P_{Offer} and P_{-1} are the initial offer price and previous-day close of the target firm's stock price. *Deal value ($ million)* is the total value of consideration paid by the acquirer, excluding fees and expenses. *Return on assets* (ROA) is defined as the ratio of earnings before interest, tax, depreciation and amortization (EBITDA) scaled by lagged assets. *Revision return* is calculated as $(P_{Final} - P_{Offer})/P_{-1}$, where P_{Final} is the final deal price. *Completion rate* is the ratio of announced deals that are eventually completed. *Deal duration* is measured as the number of calendar days between the first takeover announcement and the announced resolution of the deal. *Going private* is a dummy variable equal to one if the acquisition involves a publicly traded company being converted into a private entity, usually by insider-led buyouts. *Acquirer toehold* is the percentage of target shares held by the acquirer prior to the announcement. *Multiple bidders* is a dummy variable equal to one if multiple bidders compete for the target. *Friendly* is a dummy variable with a value of zero if the target company resists or receives an unsolicited offer as reported in the Securities Data Company (SDC). *Defense* is a dummy variable equal to one if the target firm has used defensive tactics against the acquisition as determined by the SDC. *Tender offer* is a dummy variable equal to one if the bid takes the form of a tender offer. *Same industry* equals to one if the target and acquirer are in the same three-digit SIC industry. Finally, *Institutional ownership and Insider ownership* are the proportion of shares held by institutional investors and company insiders, respectively, as reported by the Thomson Reuters Ownership Database. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Ex ante deal characteristics

	Merger targets held by activist risk arbitrageurs			Difference with targets by passive-only arbitrageurs		Difference with targets with no disclosed arbitrageurs	
	Average (1a)	Median (1b)	Std. Dev. (1c)	Diff. in Avg. (2a)	*t*-stat. of Diff. (2b)	Diff. in Avg. (3a)	*t*-stat. of Diff. (3b)
Announcement premium	18.9%	14.5%	23.4%	-13.8%***	-7.55	-18.5%***	-8.00
Deal value ($ million)	2,559.3	479.6	6,061.9	356.4	0.80	1,740.0***	3.89
Return on assets (ROA)	2.9%	9.0%	62.3%	-2.1%	-0.48	2.3%	0.49
% Going private	43.6%	0	49.7%	19.5%***	5.43	16.6%***	4.38
% Stock deal	12.3%	0	32.9%	-10.3%***	-4.20	-11.0%***	-4.07
% Acquirer toehold	2.2%	0	8.0%	0.9%	1.62	0.4%	0.67

	Merger targets held by activist risk arbitrageurs			Difference with targets by passive-only arbitrageurs		Difference with targets with no disclosed arbitrageurs	
	Average	Median	Std. Dev.	Diff. in Avg.	*t*-stat. of Diff.	Diff. in Avg.	*t*-stat. of Diff.
	(1a)	(1b)	(1c)	(2a)	(2b)	(3a)	(3b)
% Friendly	95.6%	1	20.6%	2.0%	1.30	3.5%**	2.07
% Defense	1.5%	0	12.1%	-2.5%***	-2.72	-2.0%*	-1.95
% Tender offer	14.7%	0	35.5%	0.7%	0.27	0.3%	0.11
Same industry	36.8%	0	48.3%	-10.1%***	-2.87	-4.3%	-1.15
Institutional ownership	56.2%	55.2%	28.5%	3.7%*	1.77	34.8%***	16.28
Insider ownership	19.0%	9.1%	24.2%	-1.5%	-0.85	-1.3%	-0.70

Panel B. Ex post deal characteristics

	Merger targets held by activist risk arbitrageurs			Difference with targets by passive-only arbitrageurs		Difference with targets with no disclosed arbitrageurs	
	Average	Median	Std. Dev.	Diff. in Avg.	*t*-stat. of Diff.	Diff. in Avg.	*t*-stat. of Diff.
Deal characteristics	(1a)	(1b)	(1c)	(2a)	(2b)	(3a)	(3b)
% Multiple bidders	27.0%	0	44.5%	20.3%***	6.42	14.9%***	4.52
Revision return	4.6%	0	12.4%	3.6%***	3.99	3.4%***	3.40
Completion rate	72.5%	1	44.9%	-14.6%***	-4.58	-6.5%*	-1.89
Deal duration	148.4	124.5	101.3	12.5*	1.71	5.0	0.63

Table 3: Determinants of Activist Risk Arbitrageurs' Involvement in Merger Targets

This table examines the determinants of activist risk arbitrageurs' involvement in merger targets. All independent variables are as defined in Table 2, and are measured at the date of announcement. Columns (1) and (2) of Panel A report results from fitting an unordered choice (multinomial logit) model using the full sample of all mergers from 2000 to 2014. The base outcome is a merger target that does not involve disclosed arbitrageurs (category = 0). Panel B applies a probit model on the subsample that excludes category = 0. The dependent variable is a dummy variable equal to 1 if the deal is targeted by activist arbitrageurs, and 0 if it involves only passive arbitrageurs. In each column we report probit coefficients, their heteroscedasticity-robust *t*-statistics, and the marginal probability change induced by a one unit change in the value of a specific covariate from its sample average. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

Panel A. Determinants of activist arbitrage among all M&A deals using the unordered multinomial logit model

Deal characteristics	Deals with activist arbitrageurs (category=1) (1a)	*t*-stat. (1b)	Marg. Prob. (1c)	Deals with passive arbitrageurs (category=2) (2a)	*t*-stat. (2b)	Marg. Prob. (2c)
Announcement premium	-2.03***	-5.85	-10.7%	-0.07	-0.62	8.1%
Going private	0.83***	4.21	4.1%	0.08	0.68	-2.4%
Friendly	1.26***	2.93	4.0%	0.62***	3.00	4.7%
Institutional ownership	4.49***	10.83	5.5%	4.18***	15.06	49.2%
Deal value (log $ million)	0.27***	4.12	0.4%	0.24***	5.97	2.8%
Acquirer toehold	2.07*	1.91	6.5%	1.05*	1.69	8.1%
Insider ownership	0.64*	1.75	1.5%	1.09***	5.24	15.2%
Same industry	-0.11	-0.60	-1.0%	0.08	0.80	1.9%
Return on assets (ROA)	-0.03	-0.08	-0.4%	0.04	0.27	0.8%
Stock deal	-0.34	-1.21	-2.7%	0.19	1.45	4.7%
Defense	-0.63	-0.94	-3.6%	0.04	0.14	3.5%
Tender offer	-0.10	-0.39	0.7%	-0.26*	-1.87	-3.9%
Observations	3,180					
Pseudo R-squared	0.19					
% (Dep variable = 1)	6.1%			71.7%		

Panel B. Determinants of activist arbitrage conditional on the presence of any arbitrageurs

Dependent variable: Dummy for activist arbitrageurs	Probit			Linear Probability Model	
	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.
Deal characteristics	(1a)	(1b)	(1c)	(2a)	(2b)
Announcement premium	-0.93***	-4.79	-11.6%	-0.05***	-3.96
Going private	0.37***	4.14	5.2%	0.03**	2.16
Friendly	0.27	1.42	2.8%	0.06***	3.70
Institutional ownership	0.15	0.84	1.8%	0.03	1.24
Deal value (log $ million)	0.01	0.22	0.1%	0.01**	2.49
Acquirer toehold	0.48	0.89	5.9%	0.06	0.65
Insider ownership	-0.20	-1.23	-2.4%	-0.02	-1.13
Same industry	-0.10	-1.19	-1.2%	-0.01	-0.85
Return on assets (ROA)	0.01	0.01	0.1%	-0.01	-1.27
Stock deal	-0.23*	-1.89	-2.6%	-0.04***	-4.12
Defense	-0.31	-1.16	-3.1%	-0.02	-1.17
Tender offer	0.09	0.78	1.1%	0.02	1.46
Observations	2,473			1,921	
Pseudo R-squared	0.07				
Adj. R-squared				0.42	
Investor fixed effects	No			Yes	
% (Dep variable = 1)	7.6%			7.1%	

Table 4: Deal Resolution and Activist Risk Arbitrage

This table relates merger deal completion to the involvement of activist arbitrageurs and ex ante prospects of deal completion. It also analyzes the relation between deal duration and the presence of activist risk arbitrageurs. All variables unless otherwise specified are as defined in Table 2. The sample consists of all M&A deals between 2000 and 2014. Panel A reports the effects of activist arbitrageurs' presence (*Activist arbitrage*) and other covariates on the probability of deal consummation. In column (1), the dependent variable is a dummy variable equal to 1 if a deal is sold to the initial bidder, 0 if withdrawn. In column (2), *Alternative deal completion* is an indicator equal to 1 if a deal is sold to the initial bidder or a third-party within one year after the first formal takeover announcement, 0 otherwise. Panel B relates time duration to deal resolution to activist arbitrageurs' involvement. Columns (1) and (3) report results of an OLS model where the dependent variable is the logarithm of deal duration, i.e., the number of days between the merger announcement and the announced resolution of the deal. Columns (2) and (4) apply a Cox proportional hazards model to estimate the hazard rate on a daily frequency for deal resolution. In columns (1) and (2), deal resolution refers to the completion or withdrawal of the current deal; while in columns (3) and (4), deal resolution extends to the sale of the target to any acquirer within one year from the initial announcement. Panel C compares the determinants of deal completion between deals with and without arbitrageurs. The key independent variable ex-ante completion rate is proxied by $(P_{+1}- P_{-1})/(P_{\text{Offer}} - P_{-1})$, in which P_{Offer} is the initial offer price and P_{-1} (P_{+1}) is the target firm's closing stock price one day prior to (after) the deal announcement date. In each column we report probit coefficients, their heteroscedasticity-robust *t*-statistics, and the marginal probability change induced by a one unit change in the value of a specific covariate from its sample average. Hazard ratios (or exponentiated coefficients) are also reported where applicable. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Deal completion

Dependent variable:	Deal completion			Alternative deal completion		
	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)
Activist arbitrage	-0.18*	-1.66	-3.5%	-0.16	-1.52	-2.9%
Announcement premium	-0.13	-1.63	-2.5%	-0.10	-1.14	-1.4%
Deal value (log $ million)	0.07***	3.07	1.3%	0.05**	2.27	0.7%
Going private	-0.46***	-6.19	-9.9%	-0.41***	-5.34	-7.7%
Stock deal	-0.16*	-1.83	-3.1%	-0.16*	-1.87	-2.8%
Acquirer toehold	-0.65	-1.48	-12.2%	-0.95*	-1.90	-15.7%
Friendly	2.19***	19.35	70.7%	1.78***	17.34	55.2%
Tender offer	0.59***	5.07	8.6%	0.52***	4.63	6.9%
Defense	-0.35**	-2.35	-8.0%	-0.45***	-3.23	-9.3%
Same industry	0.14**	2.06	2.6%	0.11*	1.69	2.0%
Return on assets (ROA)	0.01	0.01	0.1%	0.01	0.04	0.3%
Institutional ownership	-0.03	-0.20	-0.5%	0.04	0.28	1.1%
Insider ownership	0.67***	4.05	12.7%	0.87***	4.41	14.8%
Observations	3,180			3,180		
Pseudo R-squared	0.26			0.22		
% (Dep variable = 1)	84.9%			87.4%		

Panel B. Deal duration

Dependent variable	# Days to the resolution of the current deal				# Days to any resolution			
	OLS		Cox model		OLS		Cox model	
	Coefficient	*t*-stat.	Coefficient	*t*-stat.	Coefficient	*t*-stat.	Coefficient	*t*-stat.
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Activist arbitrage	0.07	1.52	-0.17*	-1.91	0.06	1.20	-0.14*	-1.81
Announcement premium	-0.02	-0.85	0.06	1.26	0.07	1.37	0.05	1.06
Deal value (log $ million)	0.05***	6.23	-0.09***	-7.16	0.02**	1.96	-0.09***	-7.17
Going private	0.02	0.79	-0.06	-1.30	0.31***	5.98	-0.08*	-1.77
Stock deal	0.13***	5.62	-0.16***	-3.26	0.21***	5.07	-0.14***	-3.03
Acquirer toehold	1.29***	8.39	-2.35***	-7.72	1.08***	3.64	-2.33***	-7.65
Friendly	-0.04	-0.73	0.29***	3.90	-1.10***	-10.36	0.42***	5.67
Tender offer	-0.48***	-17.14	0.81***	15.39	-0.54***	-9.69	0.84***	15.88
Defense	0.19***	3.08	-0.45***	-4.48	0.29***	3.00	-0.47***	-4.62
Same industry	0.02	1.17	-0.02	-0.60	0.05	1.19	-0.02	-0.55
Return on assets (ROA)	0.11**	2.50	-0.21***	-3.35	0.23***	2.96	-0.20***	-3.28
Institutional ownership	-0.22***	-5.07	0.46***	5.56	-0.31***	-4.04	0.46***	5.55
Insider ownership	-0.18***	-4.51	0.32***	4.49	-0.35***	-4.53	0.33***	4.65
Observations	3,180		432,418		3,180		442,500	
R-squared	0.16				0.13			
Wald Chi-squared			260.35				306.75	

Panel C. Deal completion, activist arbitrage, and market signals

Dependent variable: Deal completion	Deals with activist arbitrageurs			Deals without activist arbitrageurs			
	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.	*t*-stat. for the diff. between (1a) and (2a)
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	
Ex ante completion probability	1.25***	4.56	34.3%	0.53***	5.44	9.3%	2.46**
Deal value (log $ million)	0.28***	3.98	5.3%	0.05**	2.34	1.0%	3.03***
Going private	-0.61***	-2.74	-23.7%	-0.39***	-5.08	-8.2%	-0.91
Stock deal	0.44	1.15	5.8%	-0.07	-0.76	-1.2%	1.29
Acquirer toehold	-1.82	-1.47	-7.5%	-0.55	-1.21	-10.2%	-0.96
Friendly	1.51***	2.98	52.5%	2.15***	18.88	69.4%	-1.23
Tender offer	0.92***	3.53	25.5%	0.50***	4.23	7.4%	1.47
Defense	-0.34**	-2.26	-7.7%	-0.33**	-2.24	-7.3%	-0.04
Same industry	0.13	0.54	4.8%	0.17**	2.55	3.1%	-0.19
Return on assets (ROA)	0.09	0.64	5.1%	-0.06	-0.42	-1.2%	0.75
Institutional ownership	-1.28***	-2.72	-22.0%	0.08	0.53	1.4%	-2.75***
Insider ownership	0.52	1.27	9.2%	0.62***	3.81	11.5%	-0.22
Observations	194			2,986			
Pseudo R-squared	0.23			0.26			
% (Dep variable = 1)	72.5%			85.7%			

Table 5: Deal Completion and Activist Arbitrage: Selection and Treatment Effect

This table separates activists' treatment effect from the selection effect on deal completion. All variables unless otherwise specified are as defined in Table 2, and are measured at the date of announcement. Panel A reports the results from a bivariate probit model consisting of two simultaneous equations, for deal completion and activist participation, respectively. The instrumental variable, *Prior excess return of activist funds* (in percentage points), is the excess monthly return from the CAPM model of the 74 activist funds in our sample that appear in the Lipper TASS and CISDM databases during the [*t*-6, *t*-1] month window, where *t* is the month of deal announcement. In columns (1) and (2), deal completion refers to a successful sale of the target to the announced acquirer; while columns (3) and (4) define deal completion as a successful sale to any acquirer within one year from the initial announcement. The table reports bivariate probit coefficients, their heteroscedasticity-robust *t*-statistics, and the marginal probability change induced by a one unit change in the value of a specific covariate from its sample average. Panel B reports the reduced form regressions of *Deal Completion* on *Activist arbitrage* (and control variables) separately for the 2000-2005 (when activist involvement was scant) and 2006-2014 (when such activities were more common). Panel C reports the manual classifications of the underlying causes of deal failures based on the SEC filings, other disclosures, and new search. The sample includes all 70 failed deals with activist presence. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

Panel A. Selection in deal completion: Bivariate probit model

	Equation 1: Activist arbitrageurs' presence			Equation 2: Deal completion			Equation 1: Activist arbitrageurs' presence			Equation 2: Alternative deal completion		
	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
Activist arbitrage				-0.94**	-2.28	-17.5%				-0.85*	-1.86	-14.6%
Announcement premium	-0.91***	-5.01	-10.1%	-0.10	-1.34	-2.2%	-0.90***	-5.12	-10.0%	-0.11	-1.25	-1.7%
Deal value (log $ million)	0.03	1.18	0.4%	0.02	1.16	0.5%	0.04	1.33	0.4%	0.05*	1.91	0.7%
Going private	0.38***	4.58	4.3%	-0.25***	-3.52	-5.5%	0.38***	4.47	4.2%	-0.39***	-4.73	-6.3%
Stock deal	-0.19	-1.57	-2.1%	-0.16*	-1.91	-2.6%	-0.19	-1.56	-2.1%	-0.16*	-1.92	-2.7%
Acquirer toehold	0.47	0.98	5.3%	-0.41	-1.00	-9.1%	0.48	0.97	5.3%	-0.90*	-1.88	-14.8%
Friendly	0.42**	2.27	4.6%	1.93***	17.75	43.1%	0.38**	2.13	4.3%	1.78***	17.36	29.1%
Tender offer	0.04	0.34	0.4%	0.34***	3.72	7.5%	0.05	0.52	0.6%	0.53***	4.74	8.7%
Defense	-0.25	-0.95	-2.8%	-0.35**	-2.30	-5.9%	-0.27	-1.02	-3.0%	-0.44***	-3.16	-7.3%
Same industry	-0.09	-1.19	-1.0%	0.07	1.21	1.6%	-0.10	-1.20	-1.1%	0.11*	1.70	1.9%
Return on assets (ROA)	-0.35**	-2.14	-3.9%	0.04	0.33	0.8%	-0.35**	-2.20	-3.9%	-0.01	-0.08	-0.2%
Institutional ownership	0.39***	2.45	4.4%	-0.05	-0.36	-1.0%	0.40**	2.48	4.5%	0.09	0.58	1.4%
Insider ownership	-0.10	-0.64	-1.1%	0.62***	4.54	13.8%	-0.09	-0.55	-0.9%	0.88***	4.49	14.4%
Prior excess return of activist funds (%)	0.02***	2.68	0.3%				0.02**	2.39	0.2%			
Observations	3,180						3,180					
Wald F-statistic for weak instrument	17.4						17.3					
$\hat{\rho}$	0.45	2.33					0.43	2.15				

Panel B. Deal completion and prior excess return of activist funds

	Dependent variable: Deal completion					
	2000-2005			2006-2014		
	Coefficient	*t*-stat.	Marg. Prob.	Coefficient	*t*-stat.	Marg. Prob.
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)
Prior excess return of activist funds (%)	-0.020	-0.94	-0.37%	-0.028***	-4.09	-0.77%
Other control variables	Yes			Yes		
Observations	1,266			1,914		
Pseudo R-squared	0.21			0.27		
% (Dep variable = 1)	84.4%			85.2%		

Panel C. Direct classification of the causes of deal failures

	Deals involving activist risk arbitrageurs	
Causes	# Cases	% of withdrawn deals
1. Activists cause deal failure	**51**	**72.9%**
1.A. Activist's vote pivotal	3	4.3%
1.B. Negative vote due to ISS's support for the activist	4	5.7%
1.C Managerial withdrawal due to activist dissention & no other concurrent campaign	25	35.7%
1.D Firm sold to an activist-recommended third-party	21	30.0%
2. **Activists or other investors cause deal failure**	**6**	**8.6%**
2.A. Other negative voting outcome	3	4.3%
2.B. Managerial withdrawal due to general lack of shareholder support	2	2.9%
2.C. Firm sold to a third-party due to shareholder pressure	1	1.4%
3. **Activists do not cause deal failure**	**13**	**18.6%**
3.A. Material adverse change	11	15.7%
3.B. Antitrust and other regulatory challenges	2	2.9%

Table 6: Cumulative Abnormal Returns and Activist Risk Arbitrage

This table reports cumulative abnormal returns ("CAR") for deals held by activist or passive arbitrageurs and those lacking arbitrageurs. *Run-up* is defined as the Fama-French-Carhart four-factor CAR of the target's stock during the [-54, -1] trading day window relative to the date of the first bid. *Markup* is calculated as the four-factor CAR of the target's stock during the [-1, resolution] window where resolution can be either effective deal completion or withdrawal. *Takeover premium* is the sum of *Run-up and Markup*. *Market premium [-1, +2]* is the CAR from one trading day before the deal announcement till the second trading day after the deal announcement. *CAR [+2, resolution]* is the CAR from the second trading day after deal announcement to resolution. *CAR [max(+2, disclosure-10), resolution]* is the CAR from the latter of ten calendar days before an activist arbitrageur's Schedule 13D filing or two days post deal announcement to deal resolution. CARs are measured by using the four-factor model with an estimation window of 255 days up to 54 days prior to announcement. The identification of passive arbitrageurs follows the Hsieh and Walkling (2005) algorithm based on changes in quarter-end institutional holdings (13F) before and after the deal announcement.

The calculation of risk arbitrage returns follows Hsieh and Walkling (2005). For cash deals, arbitrageurs' daily total return is the merger target's stock return on day *t*. For stock deals, arbitrageurs' daily total return equals the difference between the stock daily return and $(P_{t-1}^A/P_{t-1})\delta[(P_t^A + D_t^A)/P_{t-1}^A - 1)]$ where δ is the exchange-rate of the stock offer, and P_t^A and D_t^A are the acquirer's stock price and dividend payment on day *t*, respectively. For deals involving appraisal petitions by activists, the "appraisal return" is further added to the total return, where the appraisal return is calculated as the difference between the appraisal value and the stock price on the last trading day scaled by the latter. In each column we report the summary statistics and the associated *t*-statistics or Wilcoxon *z*-statistics (in brackets). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Cumulative abnormal returns: Long merger targets

	Deals with activist arbitrageurs				Deals with only passive arbitrageurs (n=2,536)			Deals without disclosed arbitrageurs (n=844)		
	Excluding return from appraisal rights (n=233)		Including return from appraisal rights (n=233)							
	(1a) Mean	(1b) Median	(1c) Mean	(1d) Median	(2a) Mean	(2b) Median	(2c) Diff. b/t (1c) & (2a)	(3a) Mean	(3b) Median	(3c) Diff. b/t (1c) & (3a)
Takeover premium [-54, Resolution]	24.8%***	20.8%***	26.0%***	20.9%***	31.7%***	26.4%***	-5.7%*	29.9%***	31.0%***	-3.9%
	[8.39]	[8.03]	[8.12]	[8.03]	[27.50]	[28.90]	[-1.68]	[10.94]	[13.96]	[-0.92]
Run-up [-54, -1]	6.4%***	3.5%***	6.4%***	3.5%***	5.9%***	3.6%***	0.5%	7.7%***	5.0%***	-1.3%
	[3.66]	[3.33]	[3.66]	[3.33]	[10.06]	[10.51]	[0.26]	[6.21]	[7.02]	[-0.61]
Market premium [-1, +2]	14.7%***	12.7%***	14.7%***	20.8%***	24.4%***	19.3%***	-9.7%*	25.1%***	19.3%***	-10.4%***
	[12.11]	[11.49]	[12.11]	[11.49]	[41.23]	[39.91]	[-7.19]	[21.92]	[21.34]	[-6.25]
Markup [-1, Resolution]	19.4%***	17.8%***	20.6%***	18.0%***	26.7%***	21.9%***	-6.1%**	23.1%***	22.9%***	-2.4%
	[8.64]	[8.32]	[7.95]	[8.25]	[28.75]	[30.72]	[-2.20]	[10.77]	[14.00]	[-0.73]

	Deals with activist arbitrageurs				Deals with only passive arbitrageurs (n=2,536)			Deals without disclosed arbitrageurs (n=844)		
	Excluding return from appraisal rights (n=233)		Including return from appraisal rights (n=233)							
	(1a) Mean	(1b) Median	(1c) Mean	(1d) Median	(2a) Mean	(2b) Median	(2c) Diff. b/t (1c) & (2a)	(3a) Mean	(3b) Median	(3c) Diff. b/t (1c) & (3a)
CAR [+2, Resolution]	4.7%** [2.40]	2.0%** [2.22]	5.9%** [2.49]	2.0%** [2.30]	2.2%*** [3.34]	0.4%** [2.44]	3.7% [1.49]	-2.3% [-1.30]	-1.1% [-1.06]	8.2%*** [2.78]
CAR [max(+2, Disclosure – 10), Resolution]	5.0%*** [2.79]	2.4%*** [2.78]	6.2%*** [2.79]	2.4%*** [2.77]	2.2%*** [3.34]	0.4%** [2.44]	4.0%* [1.70]	-2.3% [-1.30]	-1.1% [-1.06]	8.5%*** [3.00]
CAR [max(+2, Disclosure – 10), Disclosure + 10]	2.6%*** [3.59]	1.6%*** [3.74]	2.6%*** [3.59]	1.6%*** [3.74]						

Panel B. Cumulative abnormal returns: Long-short strategies for stock deals (including hybrid deals)

	Deals with activist arbitrageurs (n=45)		Deals with passive arbitrageurs (n=800)		Deals without disclosed arbitrageurs (n=232)			
	(1a)	(1b)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
	Mean	Median	Mean	Median	Diff. b/t (1a) & (2a)	Mean	Median	Diff. b/t (1a) & (3a)
CAR [+2, Resolution]	8.8% [1.62]	6.5% [1.46]	6.0%*** [3.21]	3.9%*** [5.44]	2.8% [0.49]	-6.6% [-1.20]	-0.3% [-0.31]	15.4%** [1.99]
CAR [max(+2, Disclosure – 10), Resolution]	7.8% [1.53]	2.9% [1.51]	6.0%*** [3.21]	3.9%*** [5.44]	1.8% [0.33]	-6.6% [-1.20]	-0.3% [-0.31]	14.4%* [1.92]
CAR [max(+2, Disclosure – 10), Disclosure + 10]	5.3%** [2.47]	2.1%** [2.48]						

Panel C. Cumulative abnormal returns for completed deals: Long merger targets

	Deals with activist arbitrageurs				Deals with only passive arbitrageurs (n=2,235)			Deals without disclosed arbitrageurs (n=679)		
	Excluding return from appraisal rights (n=162)		Including return from appraisal rights (n=162)							
	(1a) Mean	(1b) Median	(1c) Mean	(1d) Median	(2a) Mean	(2b) Median	(2c) Diff. b/t (1c) & (2a)	(3a) Mean	(3b) Median	(3c) Diff. b/t (1c) & (3a)
Takeover premium [-54, Resolution]	27.7%***	20.9%***	29.4%***	21.3%***	33.6%***	27.4%***	-4.3%	35.2%***	34.2%***	-5.9%
	[7.92]	[7.36]	[7.52]	[7.35]	[28.00]	[28.86]	[-1.05]	[12.28]	[14.20]	[-1.22]
Run-up [-54, -1]	7.1%***	5.6%***	7.1%***	5.6%***	6.0%***	3.8%***	1.1%	8.2%***	4.7%***	0.7%
	[3.35]	[3.15]	[3.35]	[3.15]	[9.83]	[10.21]	[0.51]	[5.92]	[6.51]	[0.21]
Markup [-1, Resolution]	21.5%***	19.4%***	23.2%***	19.6%***	28.5%***	22.8%***	-5.3%	28.1%***	26.3%***	-4.9%
	[8.33]	[7.58]	[7.31]	[7.49]	[29.59]	[30.77]	[-1.61]	[12.79]	[14.86]	[-1.27]
CAR [+2, Resolution]	7.1%***	2.0%**	8.8%***	2.1%***	3.3%***	0.7%***	5.5%*	0.6%	-0.5%	8.2%**
	[3.11]	[2.56]	[2.96]	[2.66]	[5.01]	[3.65]	[1.79]	[0.32]	[-0.11]	[2.41]
CAR [max(+2, Disclosure – 10), Resolution]	7.5%***	2.4%***	9.2%***	2.4%***	3.3%***	0.7%***	5.8%**	0.6%	-0.5%	8.6%***
	[3.51]	[3.15]	[3.23]	[3.13]	[5.01]	[3.65]	[2.00]	[0.32]	[-0.11]	[2.61]
CAR [max(+2, Disclosure – 10), Disclosure + 10]	2.5%***	1.6%***	2.5%***	1.6%***						
	[2.72]	[2.95]	[2.72]	[2.95]						

Panel D. Cumulative abnormal returns for withdrawn deals: Long merger targets

	Deals with activist arbitrageurs (n=71)		Deals with passive arbitrageurs (n=301)			Deals without disclosed arbitrageurs (n=165)		
	(1a)	(1b)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
	Mean	Median	Mean	Median	Diff. b/t (1a) & (2a)	Mean	Median	Diff. b/t (1a) & (3a)
Takeover premium [-54, Resolution]	18.4%***	20.2%***	17.7%***	18.3%***	0.7%	7.7%	13.4%***	10.7%
	[3.33]	[3.51]	[4.69]	[5.32]	[0.10]	[1.07]	[2.78]	[1.17]
Run-up [-54, -1]	4.6%	2.3%	5.1%**	2.0%***	-0.5%	5.6%**	5.7%***	-1.0%
	[1.52]	[1.27]	[2.59]	[2.74]	[-0.14]	[2.03]	[2.63]	[-0.25]
Markup [-1, Resolution]	14.8%***	16.6%***	13.1%***	11.4%***	1.8%	2.5%	7.5%*	12.3%*
	[3.34]	[3.65]	[4.29]	[5.28]	[0.33]	[0.42]	[1.67]	[1.66]
CAR [+2, Resolution]	-0.6%	1.8%	-6.0%**	-4.6%**	5.4%	-13.9%**	-5.1%**	13.3%**
	[-0.17]	[0.13]	[-2.26]	[-2.45]	[1.16]	[-2.54]	[-2.04]	[2.00]
CAR [max(+2, Disclosure – 10), Resolution]	-0.5%	1.8%	-6.0%**	-4.6%**	5.5%	-13.9%**	-5.1%**	13.4%**
	[-0.14]	[0.27]	[-2.26]	[-2.45]	[1.29]	[-2.54]	[-2.04]	[2.09]
CAR [max(+2, Disclosure – 10), Disclosure + 10]	2.9%**	1.5%**						
	[2.43]	[2.34]						

Table 7: Characteristics of Acquirers with and without Activist Arbitrageurs

This table reports the characteristics of the 43 acquiring companies involving activists that can be matched to the SDC database, and compares them to the 13,837 deals with no disclosed arbitrageurs, and a matched sample of 372 deals, respectively, from 2000 to 2014. Activist arbitrageurs are identified through their Schedule 13D filings and press releases. The matched companies for each acquirer targeted by activists is assigned from the same year, same SIC three-digit industry, and same deal-size decile. All independent variables are as defined in Table 3. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Merger acquirers targeted by activist risk arbitrageurs			Difference with deal without disclosed arbitrageurs		Difference with the matched sample	
	Average	Median	Std. Dev.	Diff. in Avg.	*t*-stat. of Diff.	Diff. in Avg.	*t*-stat. of Diff.
Ex ante characteristics	(1a)	(1b)	(1c)	(2a)	(2b)	(3a)	(3b)
Announcement premium (when the target is public)	23.3%	21.9%	22.5%	-3.8%	-1.01	-4.0%	-0.77
Deal value ($ million)	3,365.2	2004.0	5,322.0	2,663.4***	3.28	--	--
Return on assets (ROA)	3.9%	8.5%	15.7%	1.6%	0.26	10.2%	1.33
% Stock deal	35.9%	0	37.9%	26.9%***	3.57	27.7%***	3.60
% Acquirer toehold	0.4%	0	2.0%	-0.1%	-0.49	-0.1%	-0.30
% Multiple bidders	13.8%	0	38.7%	12.2%**	2.07	11.4%*	1.91
% Friendly	96.6%	100%	18.6%	-1.7%	-0.61	-2.9%	-1.02
% Tender offer	6.9%	0	25.5%	4.0%	1.02	3.9%	0.99
% Defense	3.4%	0	18.6%	2.4%	0.86	3.4%	1.22
Same industry	58.6%	100%	50.1%	10.2%	1.33	--	--
Institutional holdings	39.5%	35.5%	38.9%	-7.5%	-1.26	-7.1%	-1.14
Ex post outcomes							
Revision return (when the target is public)	-5.8%	0	17.5%	-6.8%**	-2.53	-7.2%**	-2.53
Completion rate	58.6%	100%	50.1%	-36.1%***	-4.72	-37.1%***	-4.81
Deal duration	185.5	147.0	118.0	98.8***	5.48	111.2***	5.98

Table 8: Cumulative Abnormal Returns from Activist Arbitrage on Acquirers

This table reports CARs of acquirers held by activist arbitrageurs, and compares them to the 13,837 deals with no disclosed arbitrageurs, and a matched sample of 372 deals, respectively. *Run-up* is defined as the four-factor CAR of the acquirer's stock during the [-54, -1] trading day window relative to the date of the first bid. *Markup* is calculated as the four-factor CAR of the acquirer's stock during the [-1, resolution] window where resolution could be either effective deal completion or withdrawal. *Market reaction [-1, +2]* is the CAR from one trading day before the deal announcement till the second trading day after deal announcement. *CAR [+2, resolution]* is the CAR from the second trading day after deal announcement to resolution. *CAR [max(+2, disclosure-10), resolution]* is the CAR from the latter of ten calendar days before an activist arbitrageur's Schedule 13D filing or two days post deal announcement to deal resolution. CARs are measured by using the four-factor model with an estimation window of 255 days up to 54 days prior to announcement. In each column we report the summary statistics and the associated *t*-statistics or Wilcoxon *z*-statistics (in brackets). *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Acquirers held by activist arbitrageurs (n=43)		Other deals (n=13,837)			Matched deals (n=372)		
	(1a)	(1b)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
	Mean	Median	Mean	Median	Diff. b/t (1a) & (2a)	Mean	Median	Diff. b/t (1a) & (3a)
Run-up [-54, -1]	-1.7%	-0.5%	-1.2%***	-0.8%***	-0.5%	-2.0%*	-2.2%	0.2%
	[-0.78]	[-0.42]	[-5.02]	[-6.81]	[-0.24]	[-1.74]	[-1.13]	[0.09]
Market reaction [-1, +2]	-5.2%***	-4.6%	0.9%***	0.2%***	-6.1%***	1.1%***	0.5%**	-6.4%***
	[-3.50]	[-3.19]	[8.90]	[7.96]	[-4.09]	[19.29]	[2.30]	[-4.02]
Markup [-1, Resolution]	-0.3%	-1.0%	-2.5%***	-0.6%***	2.3%	-0.8%	-0.6%	0.6%
	[-0.05]	[-0.30]	[-8.25]	[-7.31]	[0.47]	[-0.56]	[-0.55]	[0.11]
CAR [+2, Resolution]	4.2%	3.3%*	-3.4%***	-0.9%***	7.6%	-1.8%	-1.1%*	5.9%
	[0.90]	[1.75]	[-11.80]	[-12.25]	[1.63]	[-1.30]	[-1.65]	[1.23]
CAR [max(+2, Disclosure – 10), Resolution]	7.4%	5.8%**	-3.4%***	-0.9%***	10.9%**	-1.8%	-1.1%*	9.2%*
	[1.52]	[2.18]	[-11.80]	[-12.25]	[2.22]	[-1.30]	[-1.65]	[1.81]
CAR [max(+2, Disclosure – 10), Disclosure + 10]	3.9%**	2.1%*						
	[2.06]	[1.89]						

Appendix

A: An Example of Activist Risk Arbitrage in Acquirers

JANA Partners LLC and Charles River Laboratories International, Inc.

On April 26, 2010, Charles River Laboratories International, Inc. ("Charles River"), a U.S. drug research firm, agreed to buy WuXi PharmaTech Inc. ("WuXi"), a Chinese rival, in a cash and stock transaction valued at approximately $1.6 billion or $21.3 per share, a premium of 28.2% over WuXi's pre-announcement price. Charles River's stock dropped to $33.55 that day, a decline of 15.7%, reflecting investors' dissatisfaction with the deal, although part of the decline was due to a somewhat weak earnings release issued on the same day. On June 7, 2010, JANA Partners LLC reported a 7.0% stake in Charles River in a Schedule 13D filing, disclosing its intention to vote against the issuance of shares to complete the transaction. The company's stock jumped nearly 4.0% upon the disclosure. JANA believed the proposed price of 16x EBITDA, compared to 8x for Charles River, was not justified given WuXi's declining margins and slowing growth.

On June 14, 2010, Charles River sent a letter to JANA, explaining that the acquisition would create value for its shareholders because of WuXi's high growth rate. On June 16, JANA replied, arguing that because the acquisition lacked synergies, Charles River stockholders could invest in WuXi directly without paying a control premium, if they believed in the growth story. Then on June 17, Neuberger Berman LLC, a 6.3% holder in Charles River, disclosed its opposition to the acquisition. On June 18, Relational Investors LLC, a 4.0% owner, did the same. Charles River closed at $36.85, up 3.7% from two days ago.

In a July 16 letter to Charles River's board, JANA pointed out that the company could increase shareholder value by repurchasing shares or selling the company or certain assets. On July 26, Institutional Shareholder Services, Inc. and Glass Lewis, two leading proxy advisory firms, recommended

that Charles River shareholders reject the proposed combination. The stock jumped 2.5%, following the news.

On July 29, 2010, Charles River terminated its acquisition agreement with WuXi in response to shareholders' concerns, requiring it to pay WuXi a break-up fee of $30 million. Charles River also announced a new $500 million stock repurchase program. The stock closed at $31.95. Although Charles River's investors had lost 4.8% since the announcement, it stock performance had far exceeded the S&P 500 index, which suffered a decline of 8.4% during the same period.

B: Top Players in Activist Risk Arbitrage

This table lists the players in our sample that invested in at least four merger targets (excluding appraisal appeals) during 2000-2014. Collectively they participated in 21.2% of all the deals.

Activist Risk Arbitrageur	Frequency	Rank
GAMCO Investors, Inc.	9	1
Ramius LLC	7	2
Millennium Management LLC	6	3
Elliott Associates, LP	5	4
SAC Capital Advisors	5	4
Dolphin Limited Partnership I, LP	5	4
First Eagle Investment Management	5	4
Carl C. Icahn	4	8
Carlson Capital, LP	4	8
Marathon Partners LP	4	8