Inside the "Black Box" of Private Merger Negotiations

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Abstract

This paper provides a detailed look inside the "black box" of merger and acquisition (M&A) negotiations before the first public bid is announced. We find that bid revisions are very common in the pre-public phase of a deal, and that price revisions during the private negotiation window are associated with changes in the public-market values of the acquisition target. We further find that target firms' earnings releases during the private negotiation process have a significant impact on bid revisions. We also investigate whether the nature of the bid process has an impact on pre-public takeover price revisions and examine the strategic difference in bidding in deals that are initiated privately by a bidder other than the winning bidder. We interpret our results as consistent with the notion that the behavior of target managers in the private negotiation window appears congruent with shareholder wealth maximization (and inconsistent with systematic agency problems).

Introduction

In this paper we use unique, hand-gathered data to peer inside the "black box" that is private merger negotiations between publicly traded target firms and potential acquirers. These novel data allow us to form a perspective on what optimal negotiating strategies appear to be (on both sides of a potential deal), and how those strategies respond to external and internal influences. The main contribution of our paper is to document how biddings for a target's shares evolves during this pre-announcement period that is shielded from public scrutiny.[1]

Our paper builds on the seminal work by Boone and Mulherin (2007), which shows that while there is relatively little *public* competition to buy a given target,[2] there appears to exist a relatively robust competitive bidding environment in at least half of all M&A deals in what the authors of that paper call the "pre-public" period. This "pre-public" period is the window of time between when a bidder decides to approach a target, or a target decides to offer itself up for sale (commonly known in practice as "seeking strategic alternatives"), and when a deal is first announced to the market.

When considering a sale of their firm, no matter how such a consideration is initiated, the board of directors of a target firm has a fiduciary duty to get the best possible deal for their shareholders. In many instances, the way that target boards of directors fulfill this duty is by, effectively, conducting a private auction of their firm. In other cases, the target's board chooses to negotiate solely, or at least primarily, with a single bidder. This can also be consistent with fulfilling the board's fiduciary duty to get the optimal offer for their shareholders if the board feels either that their bargaining position with the specific acquirer would be weakened by seeking other

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[1] At least in real time: As described below (and in Boone and Mulherin, 2007, and Gorbenko and Malenko, 2014), after the fact we are provided quite a lot of detail about the pre-public phase of an M&A bid via Securities and Exchange Commission (SEC) filings on behalf of the target and/or acquirer.

[2] At least from the 1990s onward; there was more robust public competition between bidders in the 1980s and earlier (Schwert, 2000).

offers to buy the firm or that the target's strategic fit with the proposed bidder is so strong that no other offer could possibly be more advantageous.[3]

What we learn from the existing literature is that for many deals there *is* an active pre-public phase in the process by which firms are sold, but we do not learn much *about* that pre-public phase of M&A negotiations. This is the main contribution of our paper: looking inside the "black box" of pre-public merger negotiations and describing how, on average, bidding for the target evolves during this pre-public period. We hand-gather data from SEC filings about the pre-public deal process for 1,324 acquisitions from 1994 to 2016 and collect both the incidence and value of bids submitted for the target in this pre-public phase.

In the vast majority of deals in our sample, the bidder submits their (non-binding) first offer for their target after signing a confidentiality agreement, accessing confidential information about the target firm, and having had (on average) more than 100 calendar days to assess the target value using both public and private information. In other words, in most cases these bids, even though made in private and typically non-binding, are made following the opportunity for substantive analysis of the target by the bidder. A recent review article by Eckbo, Malenko, and Thorburn (2019) also provides evidence that bidders incur significant costs of gathering information, conducting due diligence, and submitting bids in the sale process.[4] We thus interpret the signing of a confidentiality agreement as an indication of the commitment of the bidder and the target to the sale process, and the resulting veracity of the submitted bids.[5]

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[3] Boone and Mulherin (2007) label the former cases as "auctions," and show that these happen in approximately half the deals that they examine in detail. The remaining cases are "negotiations" (the latter category).

[4] Theoretical studies argue that there are substantial search costs even before the deal initiation (e.g., Berkovitch, Bradley, and Khanna, 1989). Signing confidentiality/standstill agreement is costly because standstill provisions prevent potential buyers from announcing a bid without the target's prior consent, buying shares, or lunching a proxy contest for a period of time from the conclusion of the sale process (Sautter, 2012; Hwang, 2015). Finally, Daniel and Hirshleifer (2018) argue that submitting (or revising) a bid is costly.

[5] Consistent with the argument of costly participation, Boone and Mulherin (2007) rely on the number of bidders signing confidentiality agreement to indicate the commitment of the bidder and use it as a measure of private auction.

We start our analysis by showing a substantial bifurcation of the pre-public process in M&A deals. Similar to Boone and Mulherin (2007), we find that half of the targets are auctioned among multiple bidders, while the other half are sold through negotiations.[6] "Auctions" have significantly longer windows of time in the pre-public phase relative to "negotiations". Conversely, negotiations have longer windows of time between the first public announcement of a bid and the closing of the deal. This suggests that the bid processes in these two types of deals are very different: one type (auctions) spend longer behind closed doors, while the other (negotiations) play out for a longer period of time under the watchful eye of the markets. This is potentially caused by the dissolution of the board's fiduciary duty, which is more obvious following the private phase of an auction deal and therefore less time needs to be spent convincing shareholders that all possible price discovery has been exhausted.

To provide greater insight into bidding behavior in the pre-public phase of deals, we investigate how deal initiation is related to the breadth of bidder participation and the competitiveness of the takeover environment. We find deals initiated by target itself or by a bidder other than the eventual winner (which we call a third-party bidder) have the highest number of bidder participating. Furthermore, we find that bidder conversion from contact to moving on in the bid process (by signing a confidentiality agreement or submitting an actual bid) is significantly higher in third-party bidder initiated deals compared to target-initiated deals.[7] This is notable as it suggests that bidders are less likely to move on in the bid process if the target itself attempted to arrange its own sale, consistent with a tendency for lower-quality firms to "seek strategic

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[6] We follow Boone and Mulherin (2007) and Gorbenko and Malenko (2014) and define a deal as "auction" if two or more bidders signed a confidentiality agreement during the sale process.

[7] See Table 3, Panel B for more detailed information on bidder conversion for different initiation categories. In unreported results, we find that compared to third-party-initiated deals, target-initiated deals have significantly lower conversion ratios (at the 1% level) for all three measures in the table.

alternatives" and higher-quality firms to be initially approached by a third-party bidder (who we know, ex-post, does not win the auction).

Where our paper really begins to differentiate from the existing literature, however, is that we keep track of the prices offered by the various bidders at various points in the pre-public deal process. As discussed in prior literature, takeover price revisions during the *public* phase of bidding are relatively rare: we observe these in only 11% of cases in our sample (9% of observations show increases in deal prices while 2% have decreases).

The private negotiation window is very different, however. In the pre-public window, before bids are known to the market, we observe takeover price revisions for well over 80% of the deals in our sample (75% increases, 8% decreases). The magnitude of bid revisions in the private phase of negotiations is also much larger (9% on average) compared to the magnitude of price revisions after the first public bid is made for a target firm (1% on average). There is clearly substantial price discovery in the pre-public phase of a deal's life, which is somewhat surprising given that most bidders in our sample bid *after* having already being exposed to non-public information about the target firm (i.e., after signing a confidentiality agreement).[8]

We next investigate potential determinants of price revisions during the pre-public phase of a deal. We first consider whether changes in the public-market value of the target affect private bid revisions during this period when private negotiations over the acquisition of that firm are taking place. By the nature of our data, all our targets are publicly traded firms: thus we can measure changes in public-market values after the submission of the first private bid and before the public announcement of the deal. We find that price revisions during the private negotiation

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[8] Our conclusions about behavior in this *pre-public* window of negotiation are similar to the conclusions reached in Bates and Becher (2017) about bidding in the *public* window. Those authors argue that a principal motive for target managers to publicly resist bids (after initial public announcement) is hopes of price improvement.

window are significantly correlated with changes in target public-market values. In addition, we find that target industry returns are also significantly associated with private offer price revisions. While we acknowledge that in theory causality could go in either direction, we believe that the practicalities of the M&A market suggest a causal interpretation of this result. Because these bids are not generally known to market participants during this pre-public window, and markets usually react to the bid in a significant way when it is publicly announced, it is unlikely that changes in the public market value of the target's stock in this pre-public window are being driven by knowledge of the private bid process.[9]

When we further separate our sample into subsamples with positive/negative market value changes during the private period in the life of a bid, we find that positive market value changes significantly affect bid revisions, whereas negative market value changes have no impact on bid revisions during the private negotiation process. This evidence suggests that on average target firms are able to privately encourage their bidders to revise their bids upwards when the target's public-market stock price increases during the negotiation period, and are also able to deter their bidders from downwardly revising their bids following public-market stock price declines.

To further alleviate any concern about reverse causality, we form a subsample where the target firm has an earnings release and test whether and how bidders revise their bids surrounding public earnings releases during private merger negotiations.[10] We find strong evidence that public-

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[9] Prior studies show that insider trading on the private knowledge of a likely merger bid does get impounded into stock prices (e.g., Meulbroek, 1992; Meulbroek, 1997; Schwert, 1996). However, it is worth noting that our dependent variable in this analysis is not the likelihood of becoming a takeover target. Instead, it is private bid revisions themselves. Thus, the market is unlikely to have precise information on private takeover bids and how these bids are revised during the private process. If the market does systematically possess such information well in advance of the public announcement it is difficult to understand why a target's share price usually reacts so dramatically in the days around the eventual public announcement of the bid in question.

[10] See Section 3.3 and Figure 3 for a more detailed discussion on how we form this subsample and measure bid revisions surrounding earnings announcements.

market value changes around earnings release dates are associated with private bid revisions.[11] We find that both positive and negative earnings shocks appear to influence private bid prices offered by potential bidders: upward revisions in the case of positive earnings surprises and downward bid revisions in the case of negative earnings surprises.

Our interpretation of these results is that on average, bidders increase their private offer prices in response to positive changes in the target's stock price in the pre-public window. The evidence of bidders' inability to reduce their offer prices when target' stock price declines after the initial bid was submitted is consistent with evidence in the literature showing that after a merger is publicly announced the target can renege on the agreed deal terms when doing so favors its interests but the bidder is far more constrained in its ability to do so (Bhagwat, Dam, and Harford, 2016). Our evidence of bid revisions being related to returns associated with earnings announcements suggests that bidders use information from market prices to guide their bid revisions, consistent with the literature suggesting firms learn from prices when making real decisions.

Next, we investigate whether the nature of the bid process (auction vs. negotiation) has an impact on takeover price revisions in the pre-public phase of a deal. Interestingly, bids that are defined as auctions have significantly *lower* takeover price revisions (by three percentage points) in the private deal phase relative to bids that are defined as negotiations. Our interpretation of this evidence is that, even in bidding that is shielded from public view, bidders appear to bring competitive offers to the table for targets when they know the bidding process is competitive, and are therefore less likely to need to raise those offers in competition with other bidders. On the other

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[11] This result further increases our confidence that reverse causality is not likely to drive our results because the three-day public-market value change around an earnings release is almost surely driven by the earnings announcement (and not information about any private bids or revisions thereto).

hand, the nature of the bid process does not seem to significantly affect the public phase of the life of a deal: whether a deal is privately auctioned amongst multiple bidders or negotiated exclusively with only one bidder has no impact on any public price revision.

In the last part of our paper, we explicitly examine bids that are initiated privately by a bidder other than the winning bidder. These deal processes are relatively controversial in the academic literature. On one hand, these are amongst the most (privately) competitive deals we observe in our sample, as judged by number of bidders that the target's investment banker contacts and the proportion of those bidders that move on in a tangible way in the bid process. In traditional auction theory, greater competition results in higher bid prices, and so we might expect to observe higher publicly-revealed deal prices in these auctions. On the other hand, another stream of literature suggests that managerial entrenchment after 1990 frequently caused target managers to seek out "white knight" bidders to secure private benefits, in the process sacrificing takeover premiums for their shareholders (e.g., Bebchuk, Coates and Subramanian, 2002; Moeller, 2005).

We show that the effect of competition prevails in the private bid process. Specifically, we measure the difference between the takeover premium implied by the initial private bid for a target and the takeover premium implied by the first public bid. On average, takeover premiums measured using the first public bid price for a target are 23% higher than premiums measured using initial private bid prices in the auctions initiated by third-party (i.e., non-winning) bidders. More importantly, we find that bids initiated by these third-party bidders do have significantly greater *increases* in the bid price in the window prior to the first publicly-revealed ("accepted") bid compared to what we observe for other bids, suggesting that the process of finding an alternate bidder maximizes eventual realized offer premiums for target shareholders. These results are

inconsistent with the notion that target managers are systematically entrenched and seeking "white knight" bidders to meet their own preferences while sacrificing wealth for their own shareholders.

Our paper contributes to the literature on the private phase of the process leading to a takeover (Boone and Mulherin, 2007; Gorbenko and Malenko, 2014). Our research is also in a similar vein as Aktas, de Bodt, and Roll (2010), in that we aim to provide some insight into why takeover premiums appear so high despite the apparent lack of public competing bids. Rather than use broad proxies for implicit bid competition, as Aktas, de Bodt, and Roll do, we specifically examine the sequence and level of competing bids before an M&A deal is publicly announced.

1. Sample formation and key variables

1.1. Sample formation

To construct our sample, we begin with M&A transactions announced from 1994 to 2016 from the Thomson One Banker SDC database. We only include completed deals in which there is a winning bidder in each takeover contest. We further impose the following filters to obtain our final sample: 1) the deal is classified as a "Merger (stock or asset)"; 2) the target public status is "Public" and the share price one day prior to the announcement is higher than $5;[12] 3) the deal value reported by SDC is at least $1 million; 4) the acquirer holds less than 50% of the shares of the target firm before the deal announcement and seeks to purchase 50% or more of the shares of the target firm after the deal; and 5) the deal status is "completed." These steps yield a sample of 5,310 deals. We then merge these data with data from the Center for Research in Security Prices (CRSP) to obtain target-firm stock returns, and with data from Institutional Shareholder Service (ISS) to obtain information on poison pills and staggered boards. Finally, we require that merger

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[12] Removing firms with a stock price lower than five dollars ensures that the results are not driven by financially distressed target firms.

documents are available on the SEC's Electronic Data Gathering and Retrieval (EDGAR) website so that we can collect detailed information on the private sale process and bid price information. Table 1 lists the steps taken to form the final sample of 1,324 observations.

For each of the 1,324 observations, we read through the merger agreement to collect information on the date the deal was first initiated, the party that initiated the deal, the first bid price submitted by the winning bidder, the date the first bid price was submitted by the winning bidder, the number of potential bidders contacted during the negotiation process, the number of potential bidders that signed a confidentiality agreement, and the number of potential bidders that submitted a written indication of interest with a proposed acquisition price range for the target shares. For third-party-initiated deals (i.e., deals where the initiating bidder was not the winning bidder), we also collect the initial bid price submitted by the third-party bidder and the date the first bid price was submitted by the third-party bidder. In the Internet Appendix associated with this paper, Appendix IA5 details our data collection process from the merger documents.

1.2. Measuring premiums and price revisions

1.2.1. Calculating total premiums

We calculate total premiums as the final public offer price per share relative to the benchmark price, scaled by the benchmark price. Total premium is defined as:

$$Premium\ (total) = \frac{\text{Final public price} - \text{Benchmark price}}{\text{Benchmark price}} \tag{1}$$

where *benchmark price* is the target stock price one day prior to the private deal initiation date, and *final public price* is the final offer price reported by SDC. Prior studies show that the stock market is likely to incorporate merger-related information well before the date of a formal merger announcement (e.g., Asquith, 1983; Walkling, 1985; Dennis and McConnell, 1986; Jarrell

and Poulsen, 1989; Sanders and Zdanowicz, 1992; Houston and Ryngaert, 1997; Boone and Mulherin, 2011; Mulherin and Simsir, 2015; Eaton, Liu, and Officer, 2019), which is why we collect (from SEC documents) the date on which the target or bidder board of directors begins negotiating (or considering) the deal (which we call the "private deal initiation date").[13]

1.2.2. Decomposing total premiums

Figure 1 illustrates a representative timeline of bidding in an M&A deal from deal initiation to completion. To investigate bidding strategies during the negotiation process, we decompose the premium based on the initial public price (Premium (first public)) into two components: premium (first bid) and premium (private revision). Thus, the total premium includes three components: premium (first bid), premium (private revision), and premium (public revision):

$$Premium\ (first\ public) = \text{premium(first bid)} + \text{premium(private revision)} \quad (2)$$

$$Premium\ (total) = \\ \text{premium(first bid)} + \text{premium(private revision)} + \text{premium(public revision)} \quad (3)$$

where the three premium components are defined as:

$$Premium\ (first\ bid) = \frac{\text{First bid price} - \text{Benchmark price}}{\text{Benchmark price}} \quad (4)$$

$$Premium\ (private\ revision) = \frac{\text{Initial public price} - \text{First bid price}}{\text{Benchmark price}} \quad (5)$$

$$Premium\ (public\ revision) = \frac{\text{Final public price} - \text{Initial public price}}{\text{Benchmark price}} \quad (6)$$

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[13] Sanders and Zdanowicz (1992) also collect information on the private deal initiation date reported in proxy statements filed with the SEC and find that abnormal returns to the target's stock begin soon after this date. Liu, Mulherin, and Brown (2017), Mulherin and Womack (2015), and Eaton, Liu, and Officer (2019) argue that the standard fixed pre-announcement day of –63 (i.e., three calendar months) or –42 (i.e., three calendar months) used in the existing literature to measure benchmark (or unaffected) prices for acquisition targets likely underestimates the premiums paid to target shareholders in many circumstances because the target's share price begins to increase in anticipation of a deal well before those arbitrary dates. Following Sanders and Zdanowicz (1992), Liu, Mulherin, and Brown (2017), and Eaton, Liu, and Officer (2019), we use the target stock price the trading day prior to the private deal initiation date as a benchmark price.

Benchmark price and *final offer price* are defined in Equation (1). *First bid price* is the first private bid price submitted by the winning bidder and is obtained from merger documents filed with the SEC. *Initial public price* is the initial publicly observed offer price obtained from SDC.

Figure 2 graphically illustrates the measure of total premium and its three components. Using the merger between Hittite Microwave and Analog Devices detailed in the Internet Appendix associated with this paper (specifically, Appendix IA1) as an example, the deal was initiated in a phone call made by the CEO of the bidder (Analog Devices) on November 13, 2013. The stock price of the target (Hittite Microwave) on November 12, 2013 was $61.62. The parties executed a confidentiality agreement on December 22 and the bidder was granted access to confidential information of the target firm. After conducting due diligence, Analog Devices proposed acquiring Hittite Microwave's common stock for $74.00 per share on March 15th. The first publicly observed offer price after private negotiation was $78.00, which is the same as the final publicly observed offer price. In this example, the benchmark price is $61.62, the first bid price is $74.00, and both the initial public price and the final public price are $78.00. The total premium received by Hittite Microwave shareholders is 26.6% [($78.00-$61.62)/$61.62 = 26.6%]. The first bid premium is 20.1% [($74.00-$61.62)/$61.62 = 20.1%]. The private revision premium is 6.5% [($78.00-$74.00)/$61.62 = 6.5%] and the public revision premium is 0% [($78.00-$78.00)/$61.62 = 0%]. Note also that 20.1% + 6.5% + 0% = 26.6% (the three premium components sum up to the total premium).

1.3. Measuring deal initiation

The background section of the merger documents filed with the SEC reveals the party that initiates a deal and the private deal initiation date. A deal can be generally classified into one of two broad categories: bidder-initiated or non-bidder-initiated. We also separate bidder-initiated

deals into three sub-groups (*bidder (formal)*, *bidder (informal)*, and *bidder (third-party)*) and non-bidder-initiated deals into two sub-groups (*target-initiated* and *mutually-initiated*).

A deal initiation is defined as *bidder (formal)* if the winning bidder approaches the target privately and delivers a formal, written acquisition proposal within three days.[14] A bidder being able to submit a written acquisition proposal within three days after contacting the target likely indicates that the bidder had the proposal already prepared before approaching the target, since three days is likely not enough time for the bidder to be able to adequately evaluate the target firm, and estimate synergies, in order to submit the formal offer.[15] Using the merger between Thermo Fisher and Dionex detailed in the Internet Appendix associated with this paper (specifically Appendix IA2) as an example, the bidder approached the target and submitted a proposal almost immediately (within one day) after the private deal initiation date of October 13, 2010: therefore, this bidder-initiated deal is categorized in the *bidder (formal)* sub-group.

A deal initiation is defined as *bidder (informal)* if the winning bidder approaches the target and enquires about its willingness to engage in merger talks without immediately delivering an acquisition proposal. After a certain period of communication and exchange of information, the bidder submits a proposal (normally at the invitation of the target firm). This is the most common case in the deals that we examined for this research. We provide an example of a deal that fits into this sub-group in the Internet Appendix associated with this paper (specifically Appendix IA3). Berkshire Hathaway (the bidder) allowed its investment bank to approach Lubrizol (the target) in private to enquire whether the target CEO was interested in merger talks. The target was informed

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[14] This is the small segment of our sample (6.9% of the observations: see Table 2, Panel C) where bidders submit opening bids for their targets typically without having had the opportunity to conduct due diligence on the firm. All the results discussed in this paper are robust to the exclusion of these deals from the analysis.

[15] Our results remain robust if we use a one, two, or seven-day cutoff instead of a three-day cutoff. Unreported results show that among the *bidder (formal)* deals, most proposals are submitted either on the private deal initiation date itself or one day later.

that "Berkshire Hathaway does not engage in hostile transactions, and that Mr. Hambrick (the target's CEO) should understand that if they met and nothing came of the meeting, their meeting would remain confidential." The acquisition proposal was submitted about two months after the private deal initiation date of December 13, 2010, at the invitation of the target firm.

A deal initiation is defined as *bidder (third-party)* if a third-party bidder (instead of the winning bidder) initiates a deal. By construction, a third-party bidder must be a losing bidder in a takeover contest. We separate these deals from winning-bidder-initiated deals to investigate how the winning-bidder's bidding strategies are affected when the deal is initiated by a competing bidder. In the Internet Appendix associated with this paper (specifically Appendix IA4) we provide an example of a deal initiated by a third-party bidder. After being approached by a different private equity firm (with what appears ex-post to be a low-ball offer), Hilton Hotels (the target) and its financial advisor negotiated with the eventual winning bidder (Blackstone). The deal initiation date in this example is June 1, 2016.

For non-bidder-initiated deals, we separate these deals into two groups: target-initiated and mutually-initiated. We classify a deal as *target initiated* if the sale process is initiated by the target firm (or, more likely, their investment banker). We classify a deal as *mutually initiated* if neither bidder nor target exclusively starts discussions about a deal, but instead representatives from each firm meet during an industry conference (or other occasion) and mutually initiate discussions about the possibility of a business combination.

1.4. Sample overview and summary statistics

Table 2, Panel A presents the temporal distribution of our sample. Consistent with prior studies (e.g., Andrade, Mitchell and Stafford, 2001; Harford, 2005), we observe a large merger wave in the late 1990s / early 2000s. Panel B presents summary statistics for deal and firm

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characteristics. All variables are defined in Appendix A. The mean (median) deal value is $3.78 ($1.40) billion. About 22% of our deals are tender offers. Nineteen percent of the deals are financed entirely with stock and 44% of deals are financed entirely with cash. Seventy-six percent of deals have winning bidders that are publicly traded firms and less than 4% of bidders have a toehold prior to the merger announcement. Approximately 46% of targets have a poison pill in place and 55% of targets have staggered boards. Less than 3% of the deals are hostile and the average number of public bidders reported by SDC is only 1.1, indicating that for a super majority of the deals, there is only one publicly-disclosed bidder.[16] The low rates of bid competition and infrequent hostile deals are consistent with the prior studies discussed in the introduction. Overall, these summary statistics show that the intertemporal patterns and deal characteristics in our data mirror prior research using samples of publicly traded targets.

Table 2, Panel C presents summary statistics on deal initiation. Approximately 33% of the deals are initiated informally by the winning bidder. Seven percent of the deals are initiated by the winning bidder with a written acquisition proposal (i.e., bidder (formal)) and 13% of deals are initiated by a third-party bidder. The relatively smaller proportion of third-party initiated deals is consistent with models developed in Dimopoulos and Sacchetto (2014) and Gorbenko and Malenko (2018), which predict that initiating bidders on average are stronger and have a higher valuation for the target, suggesting that the majority of the bidders who initiate a deal should eventually be winning bidders. About 15% of deals in our sample are initiated mutually and 32% of the deals are initiated by the target firm, comparable to other studies investigating target initiation (Heitzman, 2011; Masulis and Simsir, 2018).

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[16] Note that a publicly-disclosed bidder can be a publicly traded firm or a private equity firm. A publicly-disclosed bidder does not imply that the bidder's public status is 'public.'

2. Descriptive Statistics on Private Negotiations, Premiums, and Price Revisions

2.1. Bidding behavior in the pre-public phase of deals

To investigate how deal initiation is related to the breadth of bidder participation and the competitiveness of the takeover environment, we hand-collect information on the number of bidders that participate in a takeover process, the number of bidders that sign a confidentiality agreement with the target firm, and the number of bidders that submit a written proposal with an indication of interest.

Table 3, Panel A reports summary statistics on bidder participation during the private negotiation process. On average, 9.2 bidders participate in a target firm's sale process, 4.5 of them sign a confidentiality agreement, and 2.2 submit a written indication of interest. The medians are all significantly smaller than the means, suggestive of a few large outliers in terms of number of bidders participating (i.e., suggesting that a small portion of target firms conducted full-scale auctions by reaching out a large number of bidders).[17] The results also show that bidder participation varies significantly by the type of deal initiation. Target-initiated deals (mean=15.9) and third-party-initiated deals (mean=14.3) have the highest number of bidders participating, while mutually-initiated deals have the lowest number of bidders participating (mean=1.78). As might be expected, this trend is similar for the number of bidders signing confidentiality agreements and indications of interest.

Table 3, Panel B examines bidder conversion ratios during private negotiations. Specifically, we calculate the ratio of the number of confidentiality agreements signed to the number of potential buyers contacted (*ratio (confidentiality/contact)*), the ratio of the number of indications of interest submitted to the number of potential buyers contacted (*ratio (indication of*

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[17] The maximum number of bidders contacted is 269 by Worldwide Rest Concepts Inc in 2004.

interest/contact)), and the ratio of the number of indications of interest submitted to the number of confidentiality agreements signed (*ratio (indication of interest/confidentiality)*). For the analysis of bidder conversion, we include only the 831 deals in which the number of bidders contacted is at least two (i.e., we exclude deals in which the target firm contacts only one bidder, for which the conversion ratio is tautologically 100% in completed deals). The summary statistics reported in Table 3, Panel B show that target-initiated deals have lower conversion ratios for all three measures, compared to third-party and mutually-initiated deals.[18] However, it is worth bearing in mind that the conversion ratios for mutually-initiated deals may be skewed by small denominators: in Panel A, mutually-initiated deals have the lowest rate of bidder participation.

Table 3, Panel C reports how the duration of the negotiation process differs by nature of the bid process. Specifically, following Boone and Mulherin (2007), we classify a deal as an "auction" if two or more potential bidders sign a confidentiality agreement with the target firm, and a "negotiation" if only one bidder sign a confidentiality agreement during the negotiation process. We find that on average, "auctions" take 199 days to negotiate in the pre-public phase and "negotiations" need only 135 days. Conversely, negotiations have longer windows of time between the first public announcement of a bid and the closing of the deal. This suggests that the bid processes in these two types of deals are very different: "auctions" spend longer behind closed doors, while the "negotiations" play out for a longer period of time under the watchful eye of the markets. This is potentially caused by the dissolution of the target board's fiduciary duty, which is more obvious following the private phase of an auction deal and therefore less time needs to be spent convincing shareholders that all possible price discovery has been exhausted.

2.2. Recent empirical evidence on deal premiums and proposed explanation

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[18] The differences for all three conversion ratios between target-initiated deals and third-party-initiated deals are statistically significant at the 1% level.

Recent studies report that on average, a substantial deal premium is received by target shareholders, yet public price revisions or competing public bids rarely happen. Dimopoulos and Sacchetto (2014) report that in a sample of M&A deals from 1988 to 2006, only 5% of deals have more than one public bidder. Similarly, Betton, Eckbo, and Thorburn (2008) report that 95% of their sample M&A deals receive only one bid. Krishnan, Masulis, Thomas, and Thompson (2012) report that for a sample of 2,512 M&A deals announced from 1999 to 2000, the average price revision is only 0.30% for 2,253 deals (90% of all their deals) without shareholder litigation.[19]

Using preemptive bidding theory, Dimopoulos and Sacchetto (2014) propose an explanation for the phenomenon of high premiums and low levels of public competition: An initial bidder can deter a potential rival bidder from entry by making a high initial bid in the presence of entry costs. The model developed in Dimopoulos and Sacchetto (2014) is an extension of Fishman (1988)'s model, which provides a rationale for bidders to make high premium initial bids, rather than making moderate initial bids and raising those bids when facing competition. Similarly, Betton and Eckbo (2000) suggest that a relatively high initial offer premium would be able to preempt target management opposition as well as rival bids.

2.3. High premiums: a result of preemptive bidding or arm's length bargaining?

Although preemptive bidding theories seem appealing when explaining limited public competition and few price revisions, these theories raise several questions. As argued in Dimopoulos and Sacchetto (2014), because initial bidders often have higher valuations than rival bidders, a relatively low initial bid (relative to its maximum valuation of the target) is sufficient to deter a rival from entry. The authors' argument implies that target firms would prefer a

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[19] For the rest (10%) of the deals with shareholder litigation, the average price revision is 2.4%.

simultaneous auction over preemptive bidding because preemptive bidding discourages competition, a prediction made in Bulow and Klemperer (2009). Fishman (1988) also argues that a preemptive bidder's gain is exactly offset by the target firm's loss; thus, target firms have a clear incentive to deter preemptive bidding. Furthermore, Khanna (1997) predicts that giving target management the power to resist reduces the effectiveness of pre-emptive bidding and improves target shareholders' welfare. Thus it would be surprising if preemptive bidding were still a prevailing strategy in the post-1990 period, when, at least relative to the 1980s, target boards are more empowered and in control of the sale process (Liu, Mulherin, and Brown, 2017).

In this section, we provide an alternate explanation for the seemingly puzzling phenomenon of low public competition/price revisions coupled with high deal premiums by documenting that a large number of price revisions occur during private negotiations and that the first public offer price already appears to be a result of arm's-length negotiations. The evidence presented in Table 4, Panel A confirms that the total premiums received by target shareholders are substantial, with a mean of 46% and a median of 37.7%. However, the average (median) initial bid premium offered is about 34.8% (29.4%) and target firms are able to improve the merger consideration by 8.5% on average through private negotiation. Relative to the initial bid premium of 34.8%, this 8.5% premium improvement represents an increase of 24.4%.[20] Consistent with prior studies, the public price revision observable by the market is only 1.1%.

Table 4, Panel B further shows that if we focus only on public price revisions, then close to 90% of deals do not receive any revisions, suggesting that a super majority of the deals receive a single bid based on publicly observable offer prices. However, price revisions during private negotiations paint a very different picture: 75% of deals receive positive price revisions prior to

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[20] The smaller number of observations for premium (first bid) and premium (private revision) is due to missing information on the first bid price. See Appendix IA5 for details about price collections from merger documents.

public announcements, with only 17% of deals receiving no price adjustments prior to public announcements. Negative price revisions, while uncommon, do occur; about 8% (2%) of deals receive a negative price revision during the private (public) negotiation process. Figure 4, Panel B visually illustrates the dramatic differences of the fraction of positive price revisions during the private and the public negotiation processes.

Table 4, Panel C further presents results on price revisions for auctions and negotiations. On average, bidders increase their offer price by 10% in the private phase of negotiated deals, compared to about 7% in the private phase of auctioned deals. On the other hand, the average initial bid premium is 37% for auctioned deals, compared to 31% in negotiated deals. These summary statistics provide initial evidence suggesting that even in bidding that is shielded from public view, bidders appear to initially bring competitive offers to the table for targets, resulting in a lower price revisions in auctioned deals. In contrast, public revisions average around only 1% in both auctioned and negotiated deals.

Figure 4, Panel A plots initial bid premiums, private revisions, and public revisions over time. Total premiums and private revisions appear stable over time. Panel A shows lower initial premiums as well as total premiums from 2004 to 2007 and during 2002 and 2008, possibly due to the second leveraged buyout boom from the mid-2000s to 2007, the Internet bubble crash in 2002, and the financial crisis in 2008.[21] Consistent with results presented in Table 4, Figure 4 provides visual evidence that private price revisions are substantially higher compared to the public price revisions.

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[21] Kaplan and Stromberg (2009) document that from the mid-2000s to 2007, a record amount of capital was committed to private equity, causing an unprecedented leveraged buyout boom. Bargeron, Schlingemann, and Stulz (2008) report that the average premium for target shareholders when the bidder is a public firm is 46.5%, while this average premium is reduced to 28.5% when the acquirer is a private equity firm. Similarly, Officer, Ozbas, and Sensoy (2010) report significantly lower premiums for deals involving private equity bidders or clubs of private equity bidders, compared to premiums paid by public bidders. Arcot, Fluck, Gaspar, and Hege (2015) investigate the efficiency of private equity investments and find that private equity sponsors have incentives to overinvest.

Collectively, evidence presented in Table 4 and Figure 4 suggests that target firms routinely resist initial private bids in hopes of improving merger terms during private negotiations. Assuming that the initial *public* offer price is the same as the first bid price submitted by a potential bidder would, in the vast majority of deals, be misleading. This is similar to the conclusions about price improvement reached, using strictly public bidding data, in Bates and Becher (2017): those authors argue that a principal motive for target managers to publicly resist bids (after initial public announcement) is to improve the offer price.

Our results also suggest that target firms have successfully eliminated a preemptive bidding strategy in most cases, as predicted in Fishman (1988) and Khanna (1997). Indeed, as noted in Hansen (2001) and Boone and Mulherin (2007), a typical early step during private negotiation is for the bidder to sign a confidentiality/standstill agreement with the target firm to receive nonpublic information.[22] Standstill provisions prevent potential buyers from announcing a bid without the target's prior consent, buying shares, or lunching a proxy contest for a period of time from the conclusion of the sale process (Sautter, 2012; Hwang, 2015). Since the 1990s, a majority of bidders have *contractually relinquished* the opportunity to publicly make a preemptive bid or a hostile offer by signing a standstill agreement in the private phase of a deal in exchange for confidential information from the target firm.

Although potential bidders are prevented from making a preemptive bid publicly after signing a confidentiality agreement, they can still attempt to make a preemptive bid for the target in private during the negotiation process. However, the strategy of making a preemptive bid in private is fundamentally different from the preemptive-bidding theory developed in Fishman (1988) and Dimopoulos and Sacchetto (2014). A key assumption in these studies is that a

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[22] In untabulated results, we find that over 90% of bidders signed a confidentiality agreement with the target firm during the private negotiation process.

preemptive bid must be made *publicly* by the initial bidder to signal a high valuation to rival bidders and thus deter them from competing. In their setting, the target firm has no control over the public preemptive bid, the main effect of which is to reduce takeover competition. In contrast, a preemptive bid made in private clearly has no such effect, since competing bidders do not observe the preemptive bid price. The target firm, at its own discretion, can choose whether or not to disclose this preemptive bid to other potential bidders as part of its negotiation strategy.

3. Target Stock Price Changes and Offer Price Revisions During Private Negotiations

3.1. Are target public-market value changes related to bid revisions?

Schwert (1996) investigates the causes of pre-bid runups and the associated effects on total takeover premiums and finds no evidence of substitution between pre-bid runups and post-bid markups. This implies that total premiums paid to target shareholders are higher if there is a large price runup before the public merger announcement. In contrast, Betton, Eckbo, and Thompson (2014) find that short-term toehold purchases that positively affect target stock price runups have no effect on offer premiums. The authors conclude that although short-term toehold purchases increase runups, the bidder identifies this effect and does not raise its offer in response.

Given the mixed empirical evidence reported in prior studies, in this section, we directly examine how changes in public-market values affect offer price revisions during the private phase of M&A negotiations. Indeed, Schwert (1996) calls for further research on how price runups affect negotiation outcomes and specifically suggests researchers track changes in the offers made by bidders as the market price of the target firm changes.[23] Our hand-collected data on private offer

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[23] In his conclusion (p. 189), Schwert (1996) states, "*If the market price of the target stock rises, how does that affect the bargaining strategies of the bidder and the target? Tracking the history of offers and counteroffers as the market price of the target firm changes would be an interesting way to examine this question…I am not aware of anyone who*

price revisions enable us to shed light on the question of how the outcome of takeover negotiations is affected by changes in the market value of the target. Specifically, we test how target firms' stock returns between the first bid date and one day prior to public merger announcement affect offer price revisions during the private negotiation period.[24]

In untabulated results, we find that the average (median) number of calendar days between the first bid date and the public announcement date is approximately 58 (36) days.[25] We compute the target firm's cumulative stock returns during this period and test whether this target stock price movement is related to private bid revisions. In addition to the target firm's return during the private bid revision period, we also measure, and include in our regressions, the market return and the target's (2-digit SIC code) industry return to examine whether market or industry performance affects private bid revisions. Our regression model is specified as:

$$Private\ revision = \alpha + \beta 1 RetTarget_{\text{(first bid,ann)}}$$
$$+\beta 1 RetMKT_{\text{(first bid,ann)}} + \beta 1 RetIND_{\text{(first bid,ann)}} + \varepsilon \qquad (7)$$

where $RetTarget_{\text{(first bid,ann)}}$ is the target firm's cumulative returns measured from the date the first bid was submitted to one day prior to the public deal announcement. $RetMKT_{\text{(first bid,ann)}}$ is the value-weighted market return measured during the same period. $RetIND_{\text{(first bid,ann)}}$ is the value-weighted industry return (based on the target firm's two-digit SIC code), also measured during the same period.

Table 5, Panel A reports summary statistics for target return, market return, and target's industry return. The average (median) target return during the private bid revision period is 7.3%

(4.7%). The average (median) market and industry return is 1.8% (1.1%) and 3.5% (2.0%), respectively.

Table 5, Panel B reports regression results for Eq. (7) above. Model (1) tests how private bid revisions are related to target returns, while Model (2) includes market returns and Model (3) includes both market and industry returns during the private bid revision period. Model (1) shows that offer price revisions for the target during private M&A negotiations are significantly associated with the target returns over this same interval. Specifically, a 1% increase in the target's return is associated with a 0.42% higher private offer price revision. The R-squared of Model (1) with only one explanatory variable is about 24%, suggesting that the changes in the target's public-market value explain a substantial portion of negotiating outcomes in our sample.

Model (2) shows that market returns during the private negotiation period do not have any marginal effect on private bid revisions. Model (3) shows that in addition to the target firm's return, the industry performance is also significantly associated with private offer price revisions. Specifically, a 1% increase in the target's industry return is associated with a 0.2% higher private offer price revision, about half the marginal effect that we observe for the target's own stock price performance.[26]

Columns (4) and (5) further separate the sample into positive/negative target firm returns to test whether bid revisions are similarly affected when target return is negative or positive. For the positive target return subsample, Models (4) shows even stronger results for both target and industry returns. However, Model (5) shows insignificant results for the negative target return subsample, suggesting that a negative offer price adjustment in the private negotiation window is not precipitated by a decrease in market value of the target after the first bid is received.

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[26] As demonstrated in the Internet Appendix associated with this paper (specifically Table IA1) these results are qualitatively unaffected by excluding deals announced during the internet bubble and financial crisis periods.

3.2. Interpreting the results in Table 5

The results in Table 5 suggest that the prices that acquirers offer in private negotiations to buy targets are significantly correlated with the target firm's stock price movement as well as returns to the target's industry. One possible interpretation of these results is that the supposedly-private bid prices are known to the market in advance, so that an anticipated bid revision drives the change in the target's public-market stock price. In this scenario, the regression results in Table 5 could reflect reverse causality. Using the merger between Analog Devices and Hittite Microwave discussed in Section 1.2.2 as an example, this assumption requires that the market knows that Hittite Microwave is the potential target firm (prior to public announcement). This assumption also requires that the market knows that the first bid price submitted by Analog Devices is $74 and the market is able to anticipate that the bidder will increase their bid up to $78.

We believe that this scenario is highly unlikely. Indeed, Schwert (1996) shows that the market generally does not know what the premium will be if a takeover occurs. Anticipating bid revisions is even more challenging. Our Table 4, Panel C shows that bid revisions are significantly larger in negotiated deals (about 10%), compared to auction deals (about 7%). If the market indeed could anticipate the magnitude of a bid revision and market prices reflected such information, then we should see that, on average, public-market target stock prices increase more in negotiated deals relative to auctions. In untabulated results, we find evidence inconsistent with this hypothesis. In fact, the average $RetTarget_{\text{(first bid,ann)}}$ is lower (although not statistically significant) for negotiated deals (6.7%), compared to auction deals (7.9%).

Collectively, we interpret the results in Table 5 as more consistent with the explanation that any public-market price runup after the first bid is submitted (privately) causes the bidder to upwardly revise their bid, and as less consistent with the reverse causality explanation. It is even

less likely (if not impossible) that the entire industry return is driven by the knowledge of private bid revisions for just one member of that industry. This evidence is consistent with the argument in Schwert (1996) that when neither bidders nor targets are certain about the causes of the runups, bidders may need to pay higher premiums if the market value of the target firm increases during the negotiation period. The insignificant relation between target market value changes and bid revisions for the negative return subsample is also consistent with the findings in Bhagwat, Dam, and Harford (2016), who show that bidders bear a much greater share of interim risk associated with changes in the public-market value of the target firm.[27]

3.3. Are target public-market value changes around earnings announcements related to bid revisions?

In this section, we test whether and how bidders revise their bids surrounding public earnings releases during private merger negotiations. To conduct this analysis, we form a subsample that satisfies two conditions: (1) There is an earnings release during the private negotiation period (i.e., from the date of the first bid submitted to public announcement); and (2) The same private bidder submits at least one bid prior to the earnings release and submits at least one revised bid after the earnings release. If there are multiple bids submitted prior and/or after an earnings release, we use the last bid submitted prior to earnings release and the first bid submitted after earnings release to calculate the bid revision around earnings release. We manually verify that each deal in this subsample of 284 observations satisfies the above two conditions, and manually collect the bid prices submitted surrounding the earnings announcement to calculate

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[27] Focusing on the deal renegotiation after the merger is publicly announced, Bhagwat, Dam, and Harford (2016) find that an increase in target firm value (proxied by target industry abnormal returns after merger announcement) is associated with a higher likelihood of a favorable (for the target) change in deal terms. On the other hand, a decrease in the target firm value has no effect on the probability of deal-term alteration.

Private revision around earnings release, as the change of private offer price surrounding an earnings release. Figure 3 provides a timeline and illustrates the calculation of the variable *Private revision around earnings release.*

After we form the above subsample, we investigate how target public-market value changes in the three days centered on an earnings announcement affect private bid revisions around the earnings release. This analysis has several advantages. First, it further addresses the potential reverse causality concern about the results in Table 5 because the market reaction to earnings surprises are very unlikely to be driven by potential knowledge of a private bid revision. Second, this analysis enables us to shed light on the question of whether and how public earnings announcements during the private negotiation process affect bid revisions.

Given that in the vast majority of cases bidders submit their first private bid after having had access to confidential information, one might expect bidders to already have (private) information about an upcoming earnings announcement, especially if the bid is submitted shortly before said announcement.[28] Therefore, to the extent that the bidder has more information than is reflected in the target's stock price, the bidder should ignore the target's price movement that occurs around an earnings announcement because the bidder's last bid price prior to the earnings release arguably already incorporates any information contained in the earnings announcement.

On the other hand, theoretical studies predict that real decision makers learn new information from secondary market prices and use this information to guide their real decisions (the "feedback" hypothesis).[29] Earnings announcements provide an ideal setting to test this

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[28] In unreported results, we find that the median number of calendar days between the earnings announcement and the last bid submitted prior to the announcement is 16 days, and the median days between the earnings announcement and the first bid submitted after the earnings announcement is 14 days.

[29] Khanna, Slezak, and Bradley (1994) predict that even informed managers can learn outside information contained in secondary market prices to improve resource allocation decisions. See Bond, Edmans, and Goldstein (2012) for a more complete survey on the stock price feedback effect.

hypothesis because an earnings release provides traders a clear source of public information concerning firm fundamentals. Through the trading activities of informed traders, a firm's stock price impounds opinions of a firm's future performance (Kim and Verrecchia, 1994; Goldstein and Yang, 2015). This feedback hypothesis predicts that around earnings announcements, many traders with different pieces of information, and different interpretations of the earnings release, trade with each other. Stock price movements around earnings announcement aggregates these diverse pieces of information and opinions, and reflect a rational assessment of a firm's future cash flows. Thus, bidders may learn from this information and use it to guide their bid revisions.

Empirically, we investigate how target public-market value changes in the three days centered on an earnings announcement affect private bid revisions around the earnings release. Our regression model is specified as:

$$Private\ revision\ around\ earnings\ release = \alpha + \beta 1 RET(earnings) + \varepsilon \qquad (8)$$

where $RET(earnings)$ is the target firm's cumulative return over the (-1, +1) window, where the earnings announcement date is day 0.

Table 6, Panel A reports summary statistics for target returns around earnings announcements. On average, the three-day target-firm return around an earnings announcement is 2.5%. About 60% of the target firms (170 out 284 observations) experience positive returns while 40% of target firms experience negative market value changes around earnings announcements. Table 6, Panel B reports the regression results. Model (1) shows strong evidence that target returns around an earnings announcement are significantly associated with private bid revisions surrounding the earnings release. Specifically, a 1% increase in target returns around an earnings announcement is associated with a 0.51% increase in private offer prices following the earnings release. Models (2) and (3) further separate the subsample with earnings releases by the sign of

the market's reaction to the earnings news: positive (2) negative (3). We do find similar bid revision elasticities for both positive and negative market reactions surrounding earnings announcement. Specifically, bidders appear to increase their offer prices following a positive market reaction to an earnings release and reduce their offer prices following negative market value changes around earnings announcements.

The results reported in Tables 6 provide strong evidence consistent with the feedback hypothesis. Bidders appear to learn from the capital market interpreting the target firm's earnings news and incorporate this information when making bid revisions. This undermines, however, the notion that an acquirer having signed a confidentiality agreement and conducted due diligence is then privy to a wealth of private information about the target that allows them to make offers based on a superior information set.

Our evidence is the first that we are aware of that documents the feedback effect in the setting of bid revisions surrounding earnings announcements during private negotiations. Our results complement the empirical literature about how firms learn from prices when making investment decisions (Chen, Goldstein, and Jiang, 2007; Bakke and Whited, 2010). As stated in Bond, Edmans, and Goldstein (2012): "Identifying these real effects is a challenging task," because a positive relation between stock prices and investment decisions could arise from an omitted variable. Those authors advocate that an important case in which decision makers may learn from prices is in the evaluation of a merger target. Our findings reported in Table 6 thus contribute to this literature by providing empirical evidence in the merger setting.[30]

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[30] Consistent with the feedback hypothesis, Luo (2005) and Kau, Linck, and Rubin (2008) find that the probability of deal cancellation is higher following low abnormal announcement returns. Edmans, Goldstein, and Jiang (2012) also report a causal effect of stock prices on takeover activities. Our evidence of bid revisions around earnings announcements is also related to a recent theoretical study by Daley and Green (2019), which models the bargaining game surrounding the release of public news.

4. Nature of the Bid Process and Price Revisions

4.1. Auctions and price revisions

In this section we examine how the nature of the bid process (auctions vs. negotiations) affects price revisions during the private phase of a deal using a regression framework. The results are reported in Table 7. We control for deal and firm characteristics and industry and year fixed effects in all regression models. For our regression analysis of the private price revision, we also control for the target and industry returns because of its significant impact documented in Table 5.

Consistent with summary statistics reported in Panel C of Table 4, the regression results in Table 7 show that auctions are associated with significantly lower private price revisions after controlling for deal and firm characteristics. The coefficients on the "Auction" explanatory variable in both Models (1) and (2) in Table 7 are about -3% and statistically significant at the 1% level, suggesting that in auctions bid increases during the private deal window are approximately 3% lower (than in one-on-one negotiations). In contrast, Model (3) shows that there is no significant difference between auctions and negotiations in terms of public offer price revisions.[31]

The results reported in Table 7 are consistent with the summary statistics reported in Table 4 that deals conducted as private auctions receive significantly higher initial bids, but lower private price revisions. The higher initial bid premiums observed in private auctions are consistent with Hansen (2001), who argues that sellers select bidders on the basis of their first-round bids, and thus bidders have incentives to submit relatively higher initial bids to make sure that they are selected to remain in an auction for the target firm (as auctions can proceed over multiple rounds).

Several of the other control variables in Table 7 appear to have significant effects on bid price revisions during the private phase of a deal's life. Larger target firms (measured as size prior

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[31] These results are qualitatively similar in method-of-payment based subsamples of deals: please see the Internet Appendix associated with this paper (specifically Table IA2).

to deal initiation) appear to experience lower private price revisions, as do targets of deals that become publicly hostile bid announcement (or, at least, that SDC codes as such). Public bidders revise their bids more than private bidders prior to public merger announcements.

In terms of variables influencing relatively-rare bid revisions after a deal has been publicly announced, one notable result from Table 7 is that bidders with a toehold make higher public price revisions. This result is potentially consistent with the fact that a toehold effectively entrenches a bidder and may make them reluctant to lose a bid no matter what price the offer escalates to, although a substantial toehold does also reduce the cost to the bidder of increasing their bid.

Consistent with Bates and Becher (2017), who show that the main motive for target managers to publicly resist bids is to improve the offer price, we observe that targets in deals that SDC codes as hostile at announcement receive significantly higher public revisions. Target resistance (via hostility) appears to shift some of the price discovery about the firm out of the private phase of a deal's life (lower private price revisions) and into the public negotiation window. Tender offers are associated with higher public bid revisions, consistent with Berkovitch and Khanna (1991), who predict that tender offers are made by bidders with higher synergy gains and give a target higher payoff. Finally, although prior studies (e.g., Bebchuk and Cohen, 2005; Comment and Schwert, 1995) show that a staggered board is a particularly powerful governance structure in terms of deterring hostile bid attempts, especially when combined with a poison pill, these governance features do not seem to affect negotiating outcomes.

4.2. Negotiations for third-party-bidder-initiated deals

In this section, we further explore third-party-initiated deals. These deals are different from the rest of deals in our sample because neither of the merging firms initiate the deal (while the rest of deals in our sample are initiated either by the acquired firm (target) or the acquiring firm (the

winning bidder)). By construction of our sample, a *bidder (third-party)* deal (see Section 1.3.) occurs when a target firm is approached by a third-party bidder, contacts other bidders, and ultimately sells itself to a different bidder.

Third-party-initiated deal processes are relatively controversial in the academic literature. On one hand, these are amongst the most (privately) competitive deals we observe in our sample, as judged by number of bidders that the target's investment banker contacts and the proportion of those bidders that move on in a tangible way in the bid process. In traditional auction theory, greater competition results in higher bid prices, and so we might expect to observe higher publicly-revealed deal prices in these auctions. On the other hand, another stream of literature suggests that managerial entrenchment after 1990 frequently caused target managers to seek out "white knight" bidders to secure private benefits, in the process sacrificing takeover premiums for their shareholders (e.g., Bebchuk, Coates and Subramanian, 2002; Moeller, 2005).

To enhance our understanding of the bidding strategies and the dynamics between the winning bidder and the competing bidder who first identified the target firm, we further hand-collect information on the first bid price submitted by the third-party initiating bidder and the date the first bid price was submitted by the third party. We then recalculate the first bid premium and private revision premium using the first bid price submitted by the third-party initiating bidder (instead of the previously used first bid submitted by the winning bidder). Specifically, we calculate *Premium (first bid)* for these third-party initiated deals as the first private bid price submitted by the third-party bidder relative to the target price prior to deal initiation. We calculate *Premium (private revision)* as the difference between the first public price offered by the *winning bidder* and the first bid price submitted by the *third-party bidder* to capture the target firm's gain from switching from the third-party bidder to the (eventual) winning bidder. These definitions are

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analogous to the definitions of the identically-named variables for the remainder of the sample (see Section 1.2.2. and equations (4) – (6) above) but allowing for the fact that a third-party bidder made the initial private bid for the target.

Table 8, Panel A reports summary statistics for *Premium (first bid)* and *Premium (private revision)* for all five categories of deals described in Section 1.3. The summary statistics show that, on average, the first bid submitted by third-party bidders is 29.1% above the target's pre-deal-initiation stock market price. This number is lower compared to the full sample average of 34.8% using winning bidders' first bid price reported in Panel A of Table 3 (and the lowest of all five deal categories reported in Table 8, Panel A). More importantly, our results suggest that target firms are able to induce the winning bidder increase the offer by 23.6% on average relative to the initial bid submitted by the third-party bidder (the average of *Premium (private revision)* for third-party initiated bids). This is clearly the highest average of private revisions for the deal types documented in Table 8, which suggests a pattern in third-party initiated bids: the (eventually-losing) third-party bidder's private initial bid is on average, trumped by a substantially increased offer from the eventually-winning bidder.

Table 8, Panel B reports the results of multivariate regressions intended to measure whether the univariate effects described above hold after controlling for the other determinants of premiums and revisions that we document in this paper. After controlling for deal and firm characteristics, the first bid premium submitted by a third-party bidder is not statistically different relative to the benchmark group (*bidder (informal)*). However, the coefficients on the *bidder (third party)* indicator variable remain strongly significantly positive after including other control variables in Models (2) and (3), suggesting that switching to a different bidder who can significantly outbid the initiating bidder likely contributes to a higher total premium. Overall these results indicate that

the main motivation for target firms to approach different bidders appears to be to maximize offer premiums, which is inconsistent with the managerial entrenchment (or agency costs) explanation.

The results reported in Table 8, Panel B, together with those reported in Table 3, Panel B, provide a more complete picture about third-party-initiated deals. Compared to target-initiated deals (the other major deal type in our sample that is not initiated by the winning bidder), third-party-initiated deals have significantly higher rates of conversion from initial contact to a signed confidentiality agreement to a written indication of interest, indicating a greater ability to attract acquisition proposals from the bidders that the target's investment bank contacts. On the other hand, the low conversion ratios in target-initiated deals suggest that either the target firm over-reaches bidders that are not seriously interested in an acquisition or the target firm is not attractive enough for the bidders to submit written indication of interest.[32]

An alternative explanation for the high premiums paid in third-party-initiated deals is that the winning bidder overpays for the target firm in those cases. For example, Roll (1986) suggests that bidders may bid too high for target firms in the interest of winning a competitive takeover contest because of management hubris. To investigate this alternative view, we examine bidder returns around merger announcements. If the higher premiums are caused by winning bidders' overpayment for target firms, then we should expect lower announcement returns for winning bidders in third-party-initiated deals. We report regression results for bidder abnormal announcement returns in the Internet Appendix associated with this paper (specifically, Table

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[32] The more efficient sale process (i.e., higher conversion ratios) and higher premiums in third-party-initiated (relative to target-initiated) deals are consistent with the theoretical study of information costs in Hansen (2001), which identifies "competitive information costs" as a cost of conducting an auction. Specifically, Hansen (2001) states that although releasing confidential information to potential buyers may help them more accurately evaluate relevant synergies and thus improve offer prices, such confidential information may include details on new products, product lines, research and development plans, and the like.

IA3), but find no evidence that winning bidders in third-party-initiated deals experience significantly lower returns, inconsistent with the overpayment explanation.

5. Further Analysis of Deals Initiated by Third-party Bidders

After documenting significantly higher bid revisions in third-party-initiated deals, in this section we further investigate how target characteristics affect the probability of observing a third-party initiated deal. To conduct this analysis, we first form a subsample that excludes target- or mutually-initiated deals so that this subsample only contains M&A deals that are initiated by winning or losing bidders. We further exclude deals where only one bidder participates in the sale process (i.e., winning bidder initiates and no other bidders were contacted). Our purpose of forming such a subsample is to identify a group most comparable to our third-party-initiated deals.

Target-initiated deals and mutually initiated deals might be very different from third-party initiated deals for a number of reasons. For target-initiated deals, the initiation decision is inevitably made by the target firm thus there is a potential selection issue. For mutually initiated deals, we earlier show that most of these are one-on-one negotiations, while for third-party-initiated deals there has to be at least two bidders participating in the sales process (i.e., the winning bidder and the initiating, but losing, bidder). Our subsample includes only target firms that are approached by potential bidders and that contacted at least two bidders: this subsample is more appropriate for us to investigate the question of what type of target firms are more likely to find a different bidder that outbids the initiating bidder. After being approached, if the target firm is able to find a different bidder that offers a higher premium, then the initiating bidder loses the contest and the deal is classified as a third-party-initiated deal. In contrast, if the target firm attempted to

find a different bidder (by contacting others) and yet failed to get a higher bid than one offered by the initiating bidder, then the deal is classified as bidder-initiated (and not third-party initiated).

We first confirm in the Internet Appendix associated with this paper (specifically, Table IA4) that third-party initiated deals have significantly higher price revisions during the private negotiation process for this subsample. Our results on the test of the likelihood of being a third-party-initiated deal (i.e., a deal initiated by the eventually-losing bidder) are reported in Table 9. We include target size, market-to-book ratio, pre-merger operating performance, pre-merger stock price performance, analyst coverage, analyst forecast dispersion, and governance measures as explanatory variables. Column (1) shows weak evidence that market-to-book ratio is negatively associated with the likelihood of being a third-party-initiated deal, but this effect disappears once other covariates are controlled for (in column (4)). Column (3) shows strong evidence that analyst forecast dispersion is significantly negatively associated the likelihood of the target firm finding a superior competing bid. In column (4), when all control variables are included in the model, the coefficient on the forecast dispersion variable remains highly significant.[33]

The results reported in Table 9 are consistent with the idea that analysts' disagreement about future earnings (captured with forecast dispersion) reflects fundamental uncertainty about the target firm which discourages potential bidders to aggressively compete with the initiating bidder. On the other hand, this strong result may also suggest that uncertainty about the firm's fundamentals exacerbates the winner's curse. That is, when analyst forecast dispersion is high the initial bidder bids too much because they share the opinion of the most optimistic analysts.

We investigate bidder announcement returns to test this hypothesis about the potential winner's curse. Specifically, for the subsample used in the analysis in Table 9, we calculate

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[33] Note that the models in columns (3) and (4) use a smaller sample because we require target firms to have at least two analysts making forecasts to calculate the forecast dispersion variable.

abnormal returns around the merger announcement for publicly traded bidders. We create an indicator variable that equals one if the target firm's forecast dispersion is above median and the target firm also fails to find another bidder that outbids the initiating bidder (i.e., the initiating bidder wins and the deal is defined as bidder-initiated). We label this indicator variable "winner's curse." We test whether this indicator variable is negatively related to bidder announcement returns and report the results in the Internet Appendix associated with this paper (specifically, Table IA5). We find that the bidder's abnormal announcement returns are significantly lower by 2.7%-3.5% over a three- or a five-day measurement window. However, the coefficient on this "winner's curse" variable is not statistically significant over the longest event window (initiation to completion, column (3) in the table), although the sign remains negative. Given the insignificant result over the long window, we are unable to definitively state that an initiating bidder who wins a target with higher fundamental uncertainty does suffer the winner's curse, but the short-window results make this conclusion appear likely.

6. Conclusion

The main contribution of this paper is to peer inside the "black box" of pre-public merger negotiations and describe how, on average, bidding for a target evolves during the period in the life of an M&A deal that is shielded from public scrutiny (at least in real time). We find that bid revisions are very common in the pre-public phase of a deal. Furthermore, price revisions during the private negotiation window are significantly associated with changes in the public-market values of a target (especially around an earnings announcement), an association which we attribute to bidders altering their private bids for takeover targets in response to changes in the public-

market values of their target firms in the pre-public windows in which negotiations over the acquisitions occur.

We also investigate whether the nature of the bid process has an impact on takeover price revisions in the pre-public phase of a deal, and find that bids with a greater number of potential acquirers involved in the bid process (i.e., auctions) have significantly *lower* takeover price revisions in the private deal phase but higher initial bid premiums relative to bids that would be defined as one-on-one negotiations.

Finally, we examine the strategic difference in bids that are initiated privately by a bidder other than the winning bidder (which we call third-party initiated; these are deals where the initial bidder was outbid by a competitor), and find that the effect of competition prevails over concerns about entrenchment in the private bid process: bids initiated by these third-party bidders have significantly greater increases in the bid price in the window prior to the first publicly-revealed ("accepted") bid than we observe for other bids. We interpret these results as consistent with the notion that the behavior of target managers in the private negotiation window appears congruent with shareholder wealth maximization.

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Figure 1. The timeline of a bidding process

This figure illustrates the timeline and dates of bids submitted by the winning bidder in a merger deal from deal initiation until deal completion.
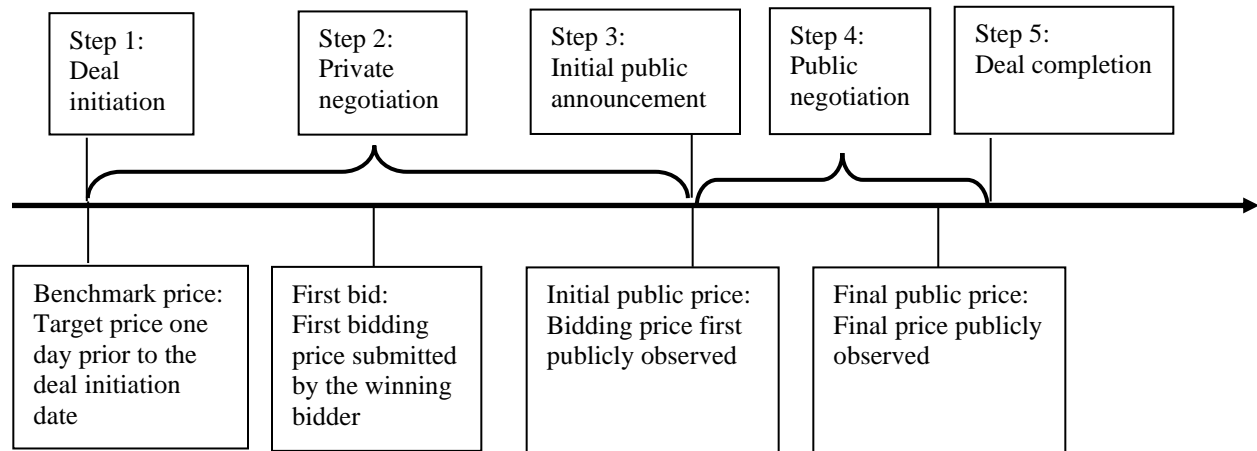
Figure 2. Measuring takeover premiums and price revisions

This figure illustrates how takeover premiums and price revisions are measured. Benchmark price is the target stock price one day prior to the deal initiation date. *First bid price* is the first private bid price submitted by the winning bidder. *Initial public price* is the initial publicly observed offer price obtained from SDC. *Final public price* is the final offer price reported by SDC.
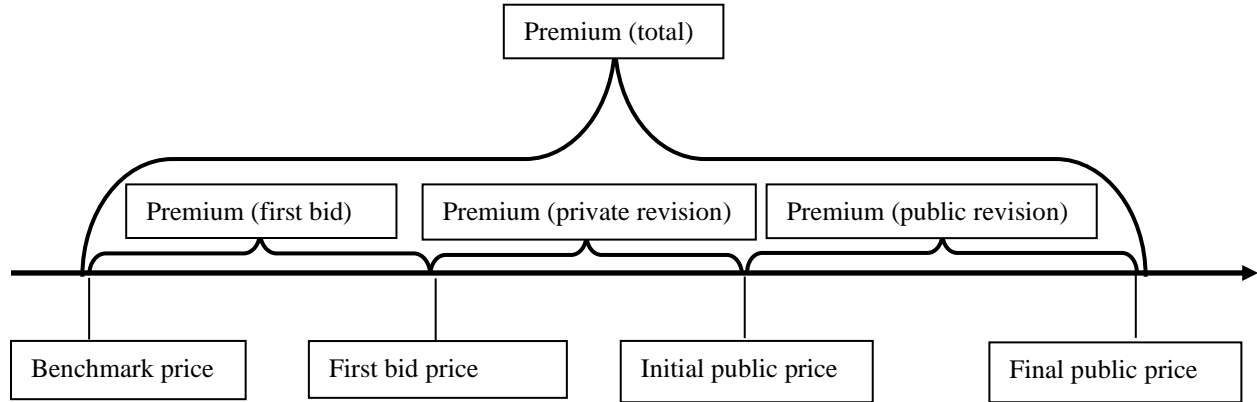
Figure 3. Measuring private bid revision around earnings announcements

This figure illustrates how private bid revisions around earnings releases are calculated. A deal has to meet the following two conditions for us to be able to calculate private revisions around an earnings release. (1) There is an earnings release during the private negotiation period; and (2) Bidders submit at least one bid price prior to the earnings release and submit at least one revised bid after the earnings release. For multiple bids submitted prior and after an earnings release, we use the last bid submitted prior to earnings release (i.e., the 2nd bid price showing on the timeline) and first bid submitted after earnings release (i.e., the 3rd bid price showing on the timeline) to calculate the bid revision around the earnings release. *Private revision around earnings release* is the difference between the last bid prior to the earnings release and the first bid immediately after the earnings release relative to the benchmark price. Benchmark price is the target stock price one day prior to the deal initiation date.
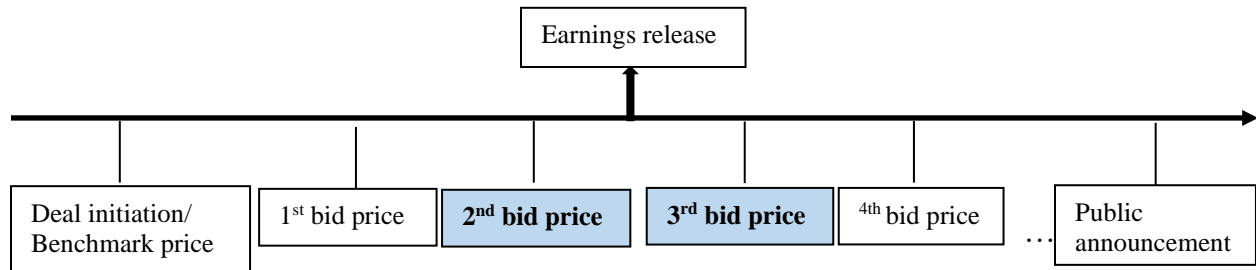
Figure 4. Takeover premiums and bid revisions

This figure plots target premiums and bid revisions. Panel A reports premiums based on first bids, private revisions, and public revisions by year. Panel B reports the fraction of positive, negative, and zero revisions during the private and public negotiation processes respectively. *Premium (first bid)* is the first private bid price obtained from merger document relative to the benchmark price (i.e., target stock price one day prior to the deal initiation). Specifically, *Premium (first bid)* = first bid price/benchmark price − 1. *Premium (private revision)* is the difference between the initial public offer price obtained from SDC and the first private bid price relative to the benchmark price ((initial public price - first bid price)/benchmark price). *Premium (public revision)* is the difference between the final public offer price obtained from SDC and the initial public offer price relative to the benchmark price ((final public price-initial public price)/benchmark price)). The sample includes deals announced between 1994 and 2016.

Panel A: Premiums based on first bids, private revisions, and public revisions.
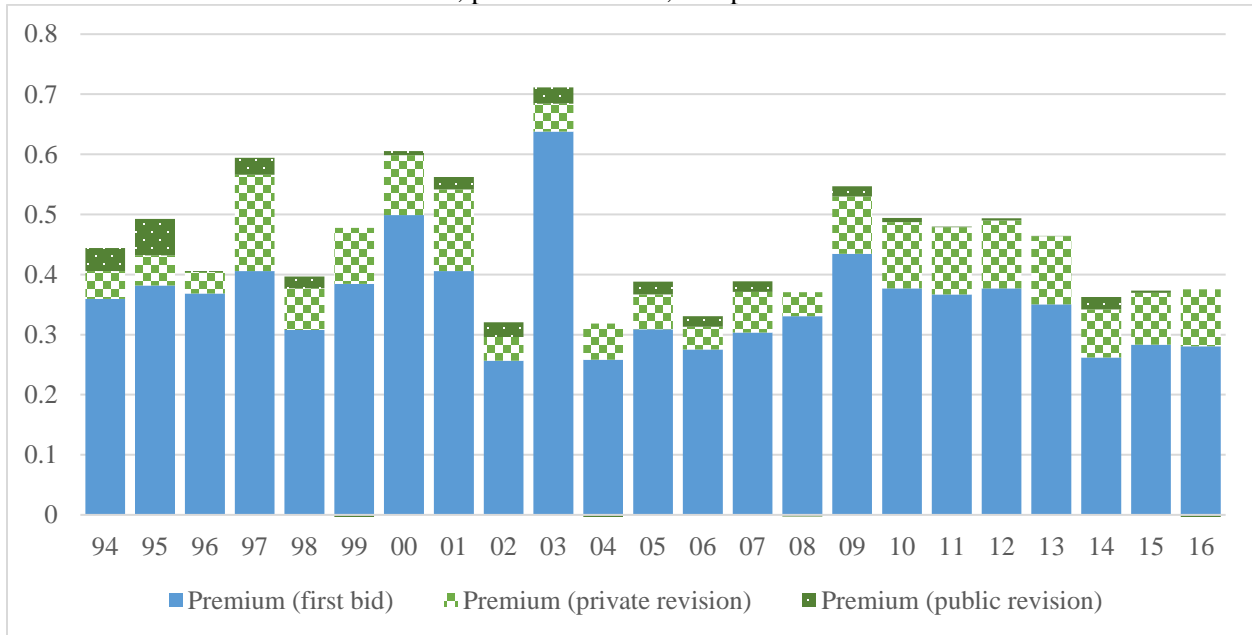
Panel B: Fraction of positive, negative, and zero revisions
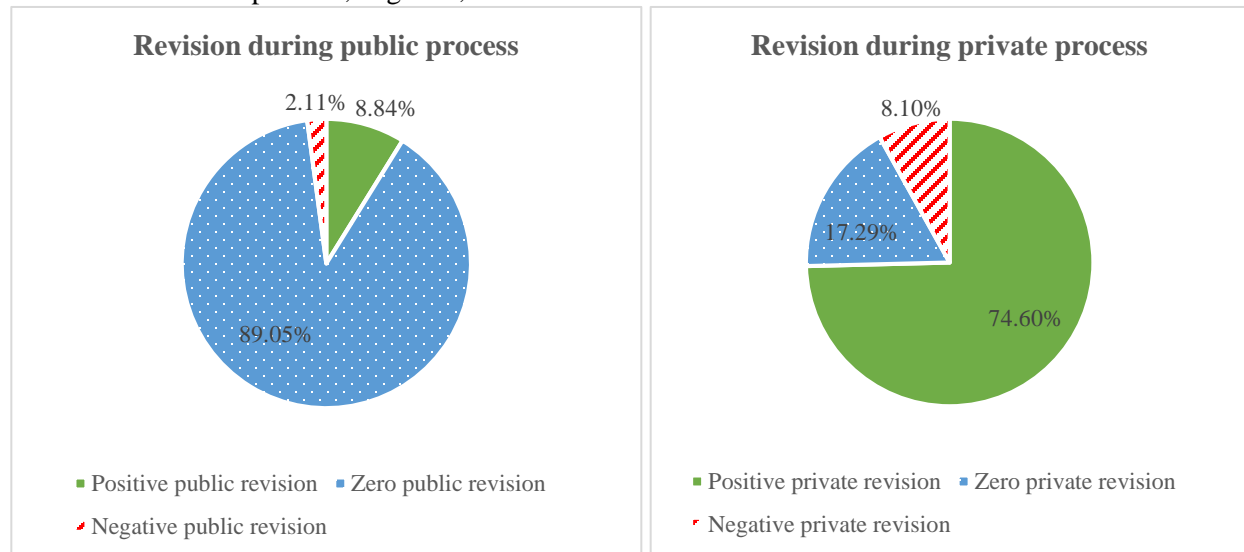
Table 1. Sample selection

This table describes the formation of our sample from SDC. We draw a sample of completed deals from the 1994 to 2016 time period, and we require that the form of the deal is coded as "merger". We require the targets to be public firms and the deal value reported by SDC to be greater than $1 million. We further require that bidders seek to purchase 50% or more of ownership of the target. We drop deals with a target stock price less than or equal to $5 the day prior to the public announcement date. We merge these SDC data with CRSP to obtain target price data prior to deal initiation. We drop deals without target price information on CRSP and poison pill/staggered board information from ISS (formerly IRRC). Finally, we drop deals for which merger documents are not available on the SEC's EDGAR website.

Sample filters	# of deals
Date announced: 1994 to 2016; Form of the deal: Merger (stock or asset)	41,066
Target Status: Public	11,957
Target share price one day prior to announcement > $5	7,351
Deal value: > $1 million	6,541
Percent of shares acquirer is seeking to purchase >= 50%	6,521
Deal status: Completed	5,504
Information of price per share paid to target shareholders is available on SDC	5,310
Target return on CRSP	4,887
Poison pill and staggered board information on ISS	1,596
Merger documents available on SEC EDGAR	1,324

Table 2. Sample distribution and summary statistics

This table presents sample distribution of deals by year and summary statistics. Panel A presents the temporal distribution for the full sample. Percent of deals in each year is calculated using number of deals announced during that year divided by total number of deals over the sample period. Panel B presents summary statistics for deal and firm characteristics. Panel C reports deals by different initiation types. We separate our sample into five mutually-exclusive categories based on deal initiation: (1) bidder-initiated informally (bidder (informal)); (2) bidder-initiated formally (bidder (formal)); (3) third-party-bidder-initiated (bidder (third party)); (4) target-bidder mutually-initiated; (5) target-initiated. A deal is defined as *bidder (informal)* if the publicly disclosed winning bidder initiates a deal without delivering an acquisition proposal within three days. A deal is defined as *bidder (formal)* if the publicly disclosed winning bidder initiates a deal and delivers an acquisition proposal within three days after the initiation. A deal is defined as *bidder (third party)* if a third-party-bidder (i.e., not the publicly reported winning bidder) initiates a deal. A deal is defined as *mutual initiation* if the bidder and the target mutually initiate a deal. A deal is defined as *target initiation* if the target firm initiates a deal. Definitions of all variables are provided in Appendix A. Deal value and target size are inflation adjusted. The sample consists of 1,324 completed deals announced between 1994 and 2016 from the Thomson One Banker SDC database.

Panel A: Sample distribution

Year	# of deals	% deals
1994	7	0.53%
1995	20	1.51%
1996	37	2.79%
1997	56	4.23%
1998	100	7.55%
1999	140	10.57%
2000	122	9.21%
2001	54	4.08%
2002	19	1.44%
2003	26	1.96%
2004	48	3.63%
2005	71	5.36%
2006	83	6.27%
2007	94	7.10%
2008	39	2.95%
2009	34	2.57%
2010	51	3.85%
2011	51	3.85%
2012	44	3.32%
2013	39	2.95%
2014	56	4.23%
2015	71	5.36%
2016	62	4.68%
Total	1,324	100.00%

Panel B: Summary statistics for deal and firm characteristics

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev
Deal value ($ million)	3,780.010	1,396.610	593.772	3,483.140	8,003.550
Target size ($ million)	2,560.600	868.677	353.319	2,124.810	5,602.840
Tender offer	0.216	0.000	0.000	0.000	0.412
All stock	0.192	0.000	0.000	0.000	0.394
All cash	0.437	0.000	0.000	1.000	0.496
Public bidder	0.760	1.000	1.000	1.000	0.427
Toehold	0.036	0.000	0.000	0.000	0.187
Number of public bidders	1.097	1.000	1.000	1.000	0.371
Hostile	0.026	0.000	0.000	0.000	0.158
Poison pill	0.461	0.000	0.000	1.000	0.499
Staggered board	0.546	1.000	0.000	1.000	0.498

Panel C: Deals by initiation type

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev
Bidder (informal)	0.329	0.000	0.000	1.000	0.470
Bidder (formal)	0.069	0.000	0.000	0.000	0.254
Bidder (third party)	0.131	0.000	0.000	0.000	0.339
Mutual initiation	0.147	0.000	0.000	0.000	0.354
Target initiation	0.324	0.000	0.000	1.000	0.468

Table 3. Deal initiation and bidder participation/conversion during private negotiation

This table examines the relation between deal initiation and number of bidders participating at different stages during the private negotiation process. Panel A reports summary statistics on bidder participation and Panel B reports bidder conversion during the private process. For Panel A, we report number of bidders contacted (*N(contact)*), number of bidders who signed confidentiality agreements (*N(confident)*), and number of bidders who submitted a written proposal with a price range proposed to buy target shares (*N(indication of interest*). For Panel B, we report three conversion ratios: *Ratio (Confidentiality/Contact)*, *Ratio (Indication of interest/Contact)*, and *Ratio (Indication of interest/Confidentiality)*. *Ratio (Confidentiality/Contact)* is the ratio of the number of confidentiality agreements signed to the number of potential buyers contacted. *Ratio (Indication of interest/Contact)* is the ratio of the number of indication of interest submitted to the number of potential buyers contacted. *Ratio (Indication of interest/Confidentiality)* is the ratio of the number of indication of interest submitted to the number of confidentiality agreements signed. For bidder conversion ratio analysis reported in Panel B, we only include observations in which the number of bidders contacted is at least two (in other words, we exclude deals in which the target firm was in contact with only one bidder, in which case the conversion ratio would always be 100%). We separate deals into five groups: *Bidder (informal), Bidder (formal), Bidder (third party), Mutual initiation,* and *Target initiation.* Definitions of all variables are provided in Appendix A. Sample period is from 1994 to 2016.

Panel A: Bidder participation during private negotiation

	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
N(contact)						
All deals	9.23	3.00	1.00	8.00	18.63	1,322
By initiation						
Bidder (informal)	4.70	1.00	1.00	4.00	12.34	433
Bidder (formal)	5.63	1.00	1.00	5.00	10.14	92
Bidder (third party)	14.30	6.00	3.00	16.00	20.12	175
Mutual initiation	1.78	1.00	1.00	2.00	2.62	193
Target initiation	15.86	7.00	3.00	17.00	25.01	429
N(confidentiality)						
All deals	4.53	1.00	1.00	4.00	8.28	1,319
By initiation						
Bidder (informal)	2.21	1.00	1.00	2.00	4.60	431
Bidder (formal)	2.62	1.00	1.00	3.00	3.48	92
Bidder (third party)	7.06	3.00	2.00	8.00	9.61	175
Mutual initiation	1.31	1.00	1.00	1.00	1.03	193
Target initiation	7.70	3.00	1.00	8.50	11.22	428
N(Indication of Interest)						
All deals	2.21	1.00	1.00	3.00	2.26	1,319
By initiation						
Bidder (informal)	1.48	1.00	1.00	1.00	1.30	431
Bidder (formal)	1.71	1.00	1.00	2.00	1.39	92
Bidder (third party)	3.34	3.00	2.00	4.00	2.26	175
Mutual initiation	1.17	1.00	1.00	1.00	0.48	193
Target initiation	3.06	2.00	1.00	4.00	3.02	428

Panel B: Bidder conversion during private negotiation

	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Ratio (Confidentiality/Contact)						
All deals	0.56	0.50	0.33	0.75	0.27	831
By initiation						
Bidder (informal)	0.51	0.50	0.30	0.67	0.28	184
Bidder (formal)	0.52	0.50	0.31	0.67	0.26	45
Bidder (third party)	0.62	0.60	0.40	0.88	0.28	174
Mutual initiation	0.65	0.67	0.33	1.00	0.31	50
Target initiation	0.54	0.50	0.33	0.69	0.26	378
Ratio (Indication of interest/Contact)						
All deals	0.41	0.33	0.20	0.50	0.29	831
By initiation						
Bidder (informal)	0.43	0.33	0.20	0.55	0.29	184
Bidder (formal)	0.39	0.33	0.20	0.50	0.25	45
Bidder (third party)	0.49	0.40	0.20	0.67	0.32	174
Mutual initiation	0.57	0.50	0.33	1.00	0.31	50
Target initiation	0.34	0.29	0.16	0.50	0.24	378
Ratio (Indication of interest/Confidentiality)						
All deals	0.77	0.80	0.43	1.00	0.46	831
By initiation						
Bidder (informal)	0.88	1.00	0.50	1.00	0.49	184
Bidder (formal)	0.78	0.75	0.50	1.00	0.38	45
Bidder (third party)	0.81	1.00	0.50	1.00	0.44	174
Mutual initiation	0.94	1.00	0.67	1.00	0.46	50
Target initiation	0.67	0.60	0.33	1.00	0.43	378

Panel C: The length of the private and public negotiation process

	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Private negotiation days (deal initiation, public announcement)						
All deals	168	136	85	222	125	1,324
Auction	199	168	112	259	138	679
Negotiation	135	110	67	177	99	645
Public negotiation days (public announcement, deal completion)						
All deals	148	120	81	185	100	1,324
Auction	139	112	77	172	96	679
Negotiation	157	129	86	197	104	645

Table 4. Price revisions and takeover premiums

This table presents summary statistics for price revision and takeover premiums. Panel A presents premiums and price revisions during the private and public negotiation processes. Panel B reports the portion of revisions that are positive, zero, and negative during the private and public negotiation processes, respectively. Panel C reports summary statistics for offer price revisions by auction versus negotiation. *Premium (total)* is the final public offer price obtained from SDC relative to the benchmark price (i.e., target stock price one day prior to the deal initiation). *Premium (total)* = final public price/benchmark price – 1. *Premium (first public)* is the first public price obtained from SDC relative to the benchmark price. *Premium (first public)* = first public price/benchmark price – 1. *Premium (first bid)* is the first private bid price obtained from merger document relative to the benchmark price. *Premium (first bid)* = first bid price/benchmark price – 1. *Premium (private revision)* is the difference between the initial public offer price obtained from SDC and the first private bid price relative to the benchmark price ((initial public price-first bid price)/benchmark price). *Premium (public revision)* is the difference between the final public offer price obtained from SDC and the initial public offer price relative to the benchmark price ((final public price-initial public price)/benchmark price)). Definitions of all variables are provided in Appendix A. Sample period is from 1994 to 2016.

Panel A: Summary statistics for premiums and revisions

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Premium (total)	0.460	0.377	0.222	0.600	0.460	1,324
Premium (first public)	0.449	0.363	0.215	0.586	0.457	1,324
Premium (first bid)	0.348	0.294	0.178	0.465	0.299	1,012
Premium (private revision)	0.085	0.053	0.000	0.127	0.147	1,012
Premium (public revision)	0.011	0.000	0.000	0.000	0.084	1,324

Panel B: Summary statistics for positive, zero, and negative price revisions

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Positive public revision	0.088	0.000	0.000	0.000	0.284	1,324
Zero public revision	0.890	1.000	1.000	1.000	0.312	1,324
Negative public revision	0.021	0.000	0.000	0.000	0.144	1,324
Positive private revision	0.746	1.000	0.000	1.000	0.435	1,012
Zero private revision	0.173	0.000	0.000	0.000	0.378	1,012
Negative private revision	0.081	0.000	0.000	0.000	0.273	1,012

Panel C: Summary statistics for offer price revisions by auction versus negotiation

	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Premium (first bid)						
Auction	0.375	0.311	0.183	0.502	0.334	594
Negotiation	0.309	0.277	0.171	0.410	0.236	418
Premium (private revision)						
Auction	0.073	0.046	0.000	0.107	0.137	594
Negotiation	0.101	0.062	0.011	0.151	0.158	418
Premium (public revision)						
Auction	0.012	0.000	0.000	0.000	0.094	679
Negotiation	0.009	0.000	0.000	0.000	0.073	645

Table 5. Stock performance and private bid revisions during private negotiations

This table reports the effect of target returns, market returns, and target industry returns on bidder private offer revisions during the private negotiation process. The dependent variable is *Private revision,* which is the difference between the initial public offer price obtained from SDC and the first private bid price. For the private revision analysis, we only include the 964 observations where the information on private price revision, target returns and industry returns are available. Our regression model is specified as follows:

$$Private\ revision = \alpha + \beta 1 RetTarget_{\text{(first bid,ann)}}$$
$$+\beta 2 RetMKT_{\text{(first bid,ann)}} + \beta 3 RetIND_{\text{(first bid,ann)}} + \varepsilon$$

where $RetTarget_{\text{(first bid,ann)}}$ is the target firm's cumulative returns measured from the date the first bid was submitted to one day prior to public deal announcement. $RetMKT_{\text{(first bid,ann)}}$ is the value-weighted market return measured from the date the first bid was submitted to one day prior to public deal announcement. $RetIND_{\text{(first bid,ann)}}$ is the value-weighted industry return (based on the target firm's two-digit SIC code) measured from the date the first bid was submitted to one day prior to public deal announcement. Panel A reports summary statistics. Panel B reports regression results. The sample includes deals announced between 1994 and 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: Summary statistics for target return, market return, and industry return during bid revision period

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev
RetTarget (first bid, announcement)	0.074	0.047	-0.010	0.141	0.155
RetMKT (first bid, announcement)	0.018	0.011	-0.010	0.043	0.071
RetIND (first bid, announcement)	0.037	0.020	-0.006	0.063	0.096

Panel B: OLS regression

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Private bid price revision					
Sample		All deals		Positive target return	Negative target return
RetTarget (first bid, announcement)	0.421***	0.410***	0.389***	0.503***	0.112
	(9.75)	(8.94)	(8.53)	(7.67)	(1.42)
RetMKT(first bid, announcement)		0.073	-0.107	-0.156	0.183
		(0.91)	(-1.03)	(-1.30)	(1.18)
RetIND(first bid, announcement)			0.201**	0.257***	-0.135
			(2.38)	(2.60)	(-1.20)
Constant	0.056***	0.055***	0.053***	0.029***	0.052***
	(15.24)	(15.00)	(14.27)	(4.29)	(8.15)
Observations	964	964	964	681	283
R-squared	0.237	0.238	0.248	0.279	0.021

Table 6. Private bid revisions and earnings announcements during private negotiation

This table reports the effect of the change of target public-market capitalization around target firms' earnings announcements on bidder private offer revisions during the private negotiation process. For this analysis, we only include a subsample of 284 observations that satisfy two conditions: (1) there is an earnings release during the private negotiation period; (2) bidders submitted a bid price prior to the earnings release and submitted a revised bid after the earnings release. We use the last bid submitted prior to earnings release and first bid submitted after earnings release to calculate bid revision around earnings release. The dependent variable is *Private revision around earnings release,* which is the difference between the last bid prior to the earnings release and the first bid immediately after the earnings release relative to the benchmark price. Our regression model is specified as follows:

$$Private\ revision\ around\ earnings\ release = \alpha + \beta 1 RET(earnings) + \varepsilon$$

where $RET(earnings)$ is the target firm's cumulative returns over the (-1, +1) window around an earnings announcement. Panel A reports summary statistics for $RET(earnings)$, positive earnings release, and negative earnings release, respectively. Panel B reports regression results. The sample includes deals announced between 1994 and 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: Summary statistics for change of target public-market values around earnings announcements

Variable	Mean	Median	25th Pctl	75th Pctl	Std Dev	t Value	N
RET(earnings)	0.025	0.010	-0.024	0.057	0.090	4.78	284
Positive RET(earnings)	0.073	0.046	0.022	0.101	0.083	11.43	170
Negative RET(earnings)	-0.045	-0.036	-0.062	-0.017	0.039	-12.21	114

Panel B: OLS regression

	(1)	(2)	(3)
Sample	All earnings announcements	Positive earnings release	Negative earnings release
RET(earnings)	0.514***	0.528***	0.786***
	(4.05)	(2.79)	(2.71)
Constant	0.047***	0.042***	0.064***
	(6.01)	(2.90)	(4.52)
Observations	284	170	114
R-squared	0.102	0.077	0.071

Table 7. Nature of the bid process and price revisions

This table examines the relation between the nature of the bid process (auction vs. negotiation) and price revisions during the private and public negotiation process. Dependent variables are *Premium (private revision)* and *Premium (public revision). Premium (private revision)* is the difference between the initial public offer price obtained from SDC and the first private bid price relative to the benchmark price ((initial public price-first bid price)/benchmark price). *Premium (public revision)* is the difference between the final public offer price obtained from SDC and the initial public offer price relative to the benchmark price ((final public price-initial public price)/benchmark price)). The main independent variable is *auction*, an indicator variable that equals one if the target firm contacts an auction during the private negotiation process, and zero otherwise. We exclude observations with total premiums higher than 200%. Definitions of all variables are provided in Appendix A. The sample includes deals announced between 1994 and 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

VARIABLES	(1)	(2)	(3)
	Premium (private revision)		Premium (public revision)
Auction	-0.030***	-0.030***	0.002
	(-3.76)	(-4.25)	(0.57)
Tender offer	0.012	0.007	0.008*
	(1.06)	(0.74)	(1.92)
Target size	-0.014***	-0.010***	0.000
	(-3.62)	(-2.91)	(0.04)
Poison pill	-0.006	-0.001	0.003
	(-0.65)	(-0.16)	(0.95)
Staggered board	-0.004	-0.003	-0.000
	(-0.49)	(-0.45)	(-0.00)
Public bidder	0.023**	0.025***	0.002
	(2.37)	(2.91)	(0.54)
Toehold	0.007	0.010	0.047***
	(0.31)	(0.50)	(3.16)
Hostile	-0.052***	-0.041***	0.159***
	(-2.97)	(-2.74)	(8.27)
RetTarget		0.358***	
		(8.17)	
RetIND		0.128**	
		(2.00)	
Constant	0.191***	0.092*	-0.058**
	(3.32)	(1.89)	(-2.10)
Industry and Year FEs	Yes	Yes	Yes
Observations	1,006	1,006	1,309
R-squared	0.175	0.352	0.267

Table 8. Third-party-bidder initiation and negotiation

This table examines the first bid premium and private bid revision by different types of deal initiation. For third-party-initiated deals, we use the first-bid price submitted by the third-party-bidder to measure first bid premium and the private bid revision. For all other types of deals, we use the first-bid price submitted by the winning bidder in the calculation. Panel A reports summary statistics of the first-bid premium and the private revision. Panel B reports OLS regression results. Specifically, for third-party-initiated deals, we calculate premium (first bid third-party) and premium (private revision third-party) as follows: *Premium (first bid third-party)* = third-party first bid price/benchmark price -1. *Premium (private revision third-party)* = (initial public price-third-party first bid price)/benchmark price. For Panel B, the independent variable $RetTarget$ and $RetIND$ are calculated over the window (third-party first bid date, public announcement date) for third-party initiated deals. The main independent variables are *Bidder (informal), Bidder (formal), Bidder (third party), Mutual initiation,* and *Target initiation.* The benchmark group is *Bidder (informal)*. Definitions of all other variables are provided in Appendix A. The sample includes deals announced between 1994 and 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: Summary statistics

	Mean	Median	25th Pctl	75th Pctl	Std Dev	N
Premium (private revision)						
Bidder (informal)	0.097	0.068	0.020	0.140	0.135	346
Bidder (formal)	0.122	0.079	0.000	0.186	0.184	92
Bidder (third party)	0.236	0.207	0.085	0.348	0.271	125
Mutual initiation	0.093	0.063	0.000	0.138	0.195	90
Target initiation	0.066	0.041	0.000	0.095	0.139	323
Premium (first bid)						
Bidder (informal)	0.319	0.286	0.187	0.391	0.236	346
Bidder (formal)	0.310	0.267	0.201	0.416	0.163	92
Bidder (third party)	0.291	0.266	0.184	0.387	0.192	125
Mutual initiation	0.302	0.251	0.102	0.448	0.339	90
Target initiation	0.362	0.294	0.162	0.490	0.366	323

Panel B: OLS regression analysis

Dependent variables:	(1) Premium (first bid third-party)	(2) Premium (Private revision third-party)	(3)
Bidder (formal)	-0.011	0.029	0.020
	(-0.45)	(1.38)	(1.19)
Bidder (third party)	-0.035	0.122***	0.082***
	(-1.53)	(6.25)	(4.79)
Mutual initiation	-0.035	-0.028**	-0.013
	(-1.03)	(-1.97)	(-0.95)
Target initiation	-0.003	-0.042***	-0.033***
	(-0.14)	(-4.27)	(-3.63)
Tender offer	0.022	0.008	0.011
	(0.99)	(0.67)	(0.96)
Target size	-0.040***	-0.016***	-0.010***
	(-5.22)	(-3.43)	(-2.74)
Poison pill	0.024	0.001	0.004
	(1.23)	(0.08)	(0.47)
Staggered board	0.016	-0.005	-0.000
	(0.93)	(-0.58)	(-0.00)
Public bidder	0.033*	0.025**	0.027***
	(1.80)	(2.46)	(3.00)
Toehold	-0.137***	-0.014	-0.003
	(-3.36)	(-0.52)	(-0.12)
Hostile	0.006	-0.107***	-0.088***
	(0.12)	(-3.84)	(-4.22)
RetTarget			0.396***
			(8.73)
RetIND			0.066
			(0.98)
Constant	0.845***	0.231***	0.111*
	(5.86)	(3.44)	(1.95)
Industry and Year FEs	Yes	Yes	Yes
Observations	970	970	970
R-squared	0.202	0.295	0.450

Table 9. Additional tests on third-party-bidder initiated deals

This table investigates how target firm characteristics affect the likelihood of the target successfully identifying a different bidder (other than the initiating bidder) and thus the deal is ex-post is classified as third-party-bidder initiated deal. For this test, we use a subsample that excludes target- or mutually-initiated deals (i.e., only includes deals classified as *Bidder (informal), Bidder (formal),* and *Bidder (third party))*. Further, we exclude deals where only one bidder participated in the sale process (i.e., the number of potential bidders contacted has to be at least two). The dependent variable is an indicator variable that equals one for *Bidder (third party),* and zero otherwise. Independent variables include target size, market to book ratio, pre-merger operating performance, stock performance, analyst coverage, analyst forecast dispersion, and target governance measures. Definitions of all variables are provided in Appendix A. The sample includes deals announced between 1994 and 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variable: Bidder (third party)				
Target size	0.008			0.002
	(0.31)			(0.05)
Market/Book	-0.019*			-0.014
	(-1.77)			(-1.25)
ROA		-0.380		-0.486
		(-1.02)		(-1.13)
Prior year stock return		0.102		0.030
		(1.02)		(0.30)
Analyst coverage			0.001	0.003
			(0.15)	(0.52)
Forecast dispersion			-0.132***	-0.150***
			(-3.46)	(-3.87)
Poison pill				-0.019
				(-0.29)
Staggered board				-0.092
				(-1.59)
Constant	0.123	0.131	0.456	0.463
	(0.32)	(0.38)	(1.06)	(0.99)
Industry and Year FEs	Yes	Yes	Yes	Yes
Observations	400	400	379	379
R-squared	0.221	0.219	0.270	0.286

Appendix A. Variable definitions

Variable	Definition	Data Source
A.1. Premium variables		
Premium (total)	The final public offer price obtained from SDC relative to target stock price 1 day prior to the deal initiation.	SDC, CRSP, merger documents
Premium (first pub)	The first public offer price obtained from SDC relative to target stock price 1 day prior to the deal initiation.	SDC, CRSP, merger documents
Premium (first bid)	The first private bid price obtained from merger document relative to target stock price 1 day prior to the deal initiation.	CRSP, merger documents
Premium (private revision)	The difference between the initial public offer price obtained from SDC and the first private bid price relative to target stock price 1 day prior to the deal initiation.	SDC, CRSP, merger documents
Premium (public revision)	The difference between the final public offer price obtained from SDC and the initial public offer price relative to target stock price 1 day prior to the deal initiation.	SDC, CRSP, merger documents
Positive public revision	An indicator variable that equals 1 if percent revision (public) is positive, and zero otherwise.	SDC, CRSP, merger documents
Zero public revision	An indicator variable that equals 1 if percent revision (public) is zero, and zero otherwise.	SDC, CRSP, merger documents
Negative public revision	An indicator variable that equals 1 if percent revision (public) is negative, and zero otherwise.	SDC, CRSP, merger documents
Positive private revision	An indicator variable that equals 1 if percent revision (private) is positive, and zero otherwise.	SDC, CRSP, merger documents
Zero private revision	An indicator variable that equals 1 if percent revision (private) is zero, and zero otherwise.	SDC, CRSP, merger documents
Negative private revision	An indicator variable that equals 1 if percent revision (private) is negative, and zero otherwise.	SDC, CRSP, merger documents
A.2. Sale process variables		
Bidder (informal)	An indicator variable that equals 1 if the publicly reported bidder initiates a deal without delivering an acquisition proposal within three days after the initiation, and zero otherwise.	Merger documents
Bidder (formal)	An indicator variable that equals 1 if the publicly reported bidder initiates a deal and delivers an acquisition proposal within three days after the initiation, and zero otherwise.	Merger documents
Bidder (third party)	An indicator variable that equals 1 if a third-party bidder (i.e., not the publicly reported bidder) initiates a deal, and zero otherwise.	Merger documents
Mutual	An indicator variable that equals 1 if the bidder and the target mutually initiate a deal, and zero otherwise.	Merger documents

Target initiation	An indicator variable that equals 1 if the target firm initiates a deal, and zero otherwise.	Merger documents
Private negotiation days	The number of calendar days between the private initiation date and the public announcement date.	Merger documents
Public negotiation days	The number of calendar days between the public announcement date and deal completion date.	SDC
N (contact)	The number of potential buyers that the target firm was in contact during the negotiation process.	Merger documents
N (confidentiality)	The number of potential buyers that signed a confidentiality/standstill agreement with the target firm.	Merger documents
N (indication of interest)	The number of potential buyers that submitted a written proposal with a price range proposed to buy target shares.	Merger documents
Ratio (Confidentiality/Contact)	The ratio of the number of confidentiality agreements signed to the number of potential buyers contacted.	Merger documents
Ratio (Indication of interest/Contact)	The ratio of the number of indication of interest submitted to the number of potential buyers contacted.	Merger documents
Ratio (Indication of interest/Confidentiality)	The ratio of the number of indication of interest submitted to the number of confidentiality agreements signed.	Merger documents
Auction	An indicator variable that equals 1 if two or more bidders signed a confidentiality agreement during the sale process (Boone and Mulherin, 2007), and zero otherwise.	Merger documents

A.3. Deal/firm characteristics

Hostile	An indicator variable that equals 1 if the deal is characterized as hostile or unsolicited by SDC	SDC
Tender Offer	An indicator variable that equals 1 if the deal is a tender offer, and zero otherwise.	SDC
Cash	An indicator variable that equals 1 if the method of payment is cash only, and zero otherwise.	SDC
Stock	An indicator variable that equals 1 if the method of payment is stock only, and zero otherwise.	SDC
Public bidder	An indicator variable that equals 1 if bidder public status is 'Public', and zero otherwise.	SDC
Toehold	An indicator variable that equals 1 if a bidder has an ownership stake of 5% or more in the target, and zero otherwise.	SDC
Target Size	The log value of the target market capitalization one day prior to the deal initiation.	CRSP
Poison pill	An indicator variable that equals 1 if the target firm has a poison pill in place at the time of the merger, and zero otherwise.	ISS, SDC

Staggered board	An indicator variable that equals 1 if the target firm has a staggered board at the time of the merger, and zero otherwise.	ISS, SDC
RetTarget (first bid, announcement)	The target firm's cumulative returns, measured from the date the first bid was submitted to one day prior to the public deal announcement.	CRSP
RetMKT (first bid, announcement)	The value-weighted market return measured from the date the first bid was submitted to one day prior to the public deal announcement.	CRSP
RetIND (first bid, announcement)	The value-weighted industry return based on the target firm's two-digit SIC codes measured from the date the first bid was submitted to one day prior to the public deal announcement.	CRSP
RET (earnings)	The three-day return of the target firm over (-1, +1) around earnings announcements made during the private negotiation process.	CRSP
ROA	Return on assets, measured as net income divided by the book value of assets.	Compustat
Market/Book	The ratio of the market value of equity divided by the book value of equity.	
Prior year stock return	The cumulative return in the year prior to the merger announcement minus the return on the CRSP value-weighted index over the same period	CRSP
Analyst coverage	The average number of analysts making annual earnings forecasts in the year prior to the merger announcement.	IBES
Forecast dispersion	The average dispersion in the year prior to the merger announcement. Following Diether, Malloy and Scherbina (2002), we define forecast dispersion as the standard deviation of analysts' current fiscal year annual earnings-per-share forecasts scaled by the absolute value of the mean earnings forecast.	IBES

Internet Appendix for
"Inside the "Black Box" of Private Merger Negotiations"

Abstract

This online appendix provides examples of deal initiation and private bid revisions, a description of our data collection process, and additional results for robustness tests described in "Inside the "Black Box" of Private Merger Negotiations."

Appendix IA1
An example of price revision during the private negotiation process

Target: Hittite Microwave Corp
Acquirer: Analog Devices Inc.
SEC filings: SC14D9[1]
Background of the merger (Simplified)

On November 13, 2013, Mr. Roche, the President and Chief Executive Officer of Analog Devices, called Mr. Hess, the Chief Executive Officer of Hittite Microwave, and informed him that a relationship with Hittite might be of interest to Analog Devices. They discussed a range of ways in which the two companies might work together, ranging from engaging in cooperative marketing efforts on one end of the spectrum to a potential acquisition of Hittite by Analog Devices at the other end of the spectrum.

On December 20, 2013, Mr. Roche called Mr. Hess and indicated a desire to conduct preliminary due diligence on us so that Analog Devices could gain a better understanding of our business. Mr. Roche proposed that we and Analog Devices enter into a confidentiality agreement and thereafter schedule a meeting with senior executives from both companies to discuss our business, products and markets. Mr. Roche explained that following that meeting he and other members of management would discuss with the Analog Devices board of directors the possibility of making an acquisition proposal.

On December 22, 2013, Mr. Roche sent to Mr. Hess an initial draft of a confidentiality and standstill agreement.

Between January 7, 2014 and January 14, 2014, representatives of Analog Devices and us negotiated the terms of a confidentiality and standstill agreement, which was executed on January 14, 2014.

On February 19, 2014, Mr. Roche met Mr. McAloon for dinner and discussed a broad range of topics. During this dinner, Mr. Roche expressed Analog Devices' possible interest in exploring an acquisition of us, subject to further due diligence and further discussions with the Analog Devices board of directors.

On March 15, 2014, Mr. Roche telephoned Mr. Hess to inform him that a written proposal would be forthcoming from Analog Devices, and later that day Mr. Hess received a letter from Analog Devices proposing to acquire us for cash in the amount of $74.00 per share.

On March 18, 2014 our Board of Directors met by telephone to discuss the Analog Devices proposal. Between March 18, 2014 and March 27, 2014 we and Deutsche Bank negotiated the terms of an engagement letter.

The representatives of Deutsche Bank presented a preliminary analysis of the standalone value of our company, using various valuation approaches including public company comparables, precedent transactions and discounted cash flow ("***DCF***") analyses, to derive a range of valuations. Regarding the DCF analysis, they said that using the Management Downside Case yields a range of per share values lower than $74.00, while using the Management Base Case yields a higher range of values, some significantly above $74.

At the conclusion of their discussion, the Directors agreed that the $74.00 offered by Analog Devices was inadequate and that we were not for sale at that price, but that since the proposal appeared to be serious, and given Analog Devices' apparent level of motivation and financial capability, further exploration to see whether a higher offer could be forthcoming from Analog Devices or from another party would be in the interest of our stockholders.

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[1] The full document is available at
https://www.sec.gov/Archives/edgar/data/1130866/000119312514244685/d745183dsc14d9.htm

The Board also directed management to communicate to Analog Devices that the $74 offer was not acceptable and failed to recognize the potential value of our company. They suggested that management offer to provide Analog Devices with additional high-level information, including 5-year projections, with a view to encouraging Analog Devices to increase its offer.

On March 31, 2014, Mr. Hess called Mr. Roche and communicated to him that we were not for sale at $74, but that he was authorized to meet with representatives of Analog Devices and share more detailed information on our growth prospects with the expectation that it would enable Analog Devices to materially increase its offer.

On April 18, 2014, Mr. Roche called Mr. Hess, and informed him that Analog Devices was willing to increase its offer to $75.50 per share, while noting that Analog Devices' valuation assumptions had not changed as a result of the April 10 meeting and that Analog Devices was stretching in making this offer. Mr. Hess promptly informed the other Directors of the revised Analog Devices proposal by e-mail.

On April 22, 2014, our Board of Directors met to discuss the revised Analog Devices proposal.

The Directors discussed possible responses to the revised Analog Devices offer, and also discussed whether to reach out to other potentially interested parties. The representative of Foley Hoag discussed with the Directors their fiduciary duties in connection with a possible sale of control of our Company. The representatives of Deutsche Bank said that Analog Devices and its financial advisor Credit Suisse had stated that their increased $75.50 offer was at or very near their limit. The representatives of Deutsche Bank stated that if the $75.50 offer were in a range that the Board would be prepared to consider, they would recommend that at this point we also contact other parties who might be willing to make a competitive offer. The Directors agreed that the $75.50 offered by Analog Devices was high enough that further negotiation to see whether a higher offer could be forthcoming would be in the best interest of our stockholders. They considered that the Deutsche Bank analysis comparing the $75.50 offer to various benchmarks supports a conclusion that the offer is in a range that would be attractive to our stockholders. The Board considered that countering with too high a price, or responding that the $75.50 is unacceptable without providing some type of price guidance, would carry a significant risk of causing Analog Devices to disengage.

The Directors concluded, after considering all these factors, that it would be advisable to respond to Analog Devices' revised proposal with a counteroffer of $78.00, and that it would be in the best interest of our stockholders to sell the company in an all cash transaction if that price could be obtained.

On April 29, 2014, Deutsche Bank sent a presentation to Credit Suisse reiterating that the $75.50 price was insufficient, identifying certain revenue and cost synergies they expected to be available and suggesting that $78.00 per share was the minimum amount that our Board would consider sufficient to continue discussions regarding a potential transaction. Thereafter a representative of Deutsche Bank telephoned Mr. Zinsner and reiterated the points made in the presentation and confirmed our Board's view that a price of at least $78.00 per share was required to continue discussions.

Also on April 30, 2014, Mr. Roche telephoned Mr. Hess and informed him that Analog Devices would be willing to increase its offer to $76.50 per share. Mr. Hess stated that this price was unacceptable.

On May 2, 2014, Mr. Roche called Mr. Hess and indicated that the Analog Devices board had authorized an increase of its offer to $78.00 per share, and Mr. Hess confirmed that the Hittite board was prepared to continue discussions at that price.

On May 7, 2014, Mr. Roche sent to Mr. Hess a written non-binding offer by Analog Devices to acquire us for $78.00 per share in cash.

On June 5, 2014, the independent Directors unanimously authorized counsel to proceed to finalize the merger agreement with Analog Devices at the price of $78.00 per share.

On June 9, 2014, prior to the opening of trading on the Nasdaq Global Market, Analog Devices and we issued a joint press release announcing the merger.

Appendix IA2
An example of a formal initiation by the winning bidder

Target: Dionex Corporation
Acquirer: Thermo Fisher Scientific Inc.
SEC filings: SC14D9[2]
Background of the merger (Simplified)

On October 13, 2010, Marc Casper, Chief Executive Officer of Thermo Fisher, had a telephone conversation with Dr. Witney in which Mr. Casper conveyed Thermo Fisher's interest in acquiring Dionex. On October 14, 2010, Mr. Casper delivered a letter to Dr. Witney that made an offer by Thermo Fisher to acquire all outstanding shares of Dionex's common stock for $106.50 per share in cash (the "Proposed Transaction"). Dr. Witney indicated that he would consider the matter and discuss it with the Dionex Board.

The Dionex Board determined to ask Goldman, Sachs & Co. ("Goldman Sachs") to prepare a financial analysis to assist the Dionex Board in its consideration of the Proposed Transaction and to continue the Dionex Board's discussion at a special meeting of the Dionex Board on October 18, 2010.

On October 26, 2010, the Dionex Board held a regular meeting at which all members of the Dionex Board were present. At the meeting, representatives of Goldman Sachs provided additional financial analysis of the terms of the Proposed Transaction.

On November 12, 2010, in a telephone conversation between Dr. Witney and Mr. Casper, Mr. Casper indicated Thermo Fisher would be willing to increase the offered price from $106.50 to $111.50.

On November 13, 2010, the Dionex Board held a meeting. After full discussion, the Dionex Board unanimously determined to reject Thermo Fisher's latest offer.

After subsequent discussion between Dr. Witney, Mr. McCollam and representatives of Goldman Sachs on November 14, 2010, and after obtaining the concurrence of Mr. Pigliucci, on November 15, 2010, Dr. Witney conveyed to Mr. Casper by telephone that Dionex was unlikely to consider a potential sale at a price level that was not significantly greater than the indicative price level most recently expressed by Thermo Fisher.

On November 16, 2010, in a telephone conversation between Dr. Witney and Mr. Casper, Mr. Casper indicated Thermo Fisher would be willing to increase the offered price to $114.00 and that it was unlikely Thermo Fisher would be able to offer any higher price.

On November 17, 2010, the Dionex Board held a meeting at which all members of the Dionex Board, Mr. McCollam, Ms. Christopher, representatives of Goldman Sachs and representatives of Cooley were present. The Dionex Board engaged in a full discussion regarding the range of potential responses to Thermo Fisher's latest offer. After full discussion, the Dionex Board unanimously determined to reject Thermo Fisher's latest offer and reiterate to Thermo Fisher that it was unlikely that the Dionex Board would consider a sale unless Thermo Fisher increased its indicative pricing level.

On November 23, 2010, Mr. Casper conveyed to Dr. Witney by telephone a willingness to begin negotiations based on a revised proposal of $118.50 per share, subject to Dionex's willingness to enter into a confidentiality agreement that provided for a limited period of exclusive negotiations.

On November 24, 2010, the Dionex Board held a meeting at which all members of the Dionex Board (other than Mr. McGeary), Mr. McCollam, Ms. Christopher, representatives of Goldman Sachs and representatives of Cooley were present. The Dionex Board engaged in a full discussion regarding the range of potential responses to Thermo Fisher's latest offer, including whether any other potential acquirors might be interested in acquiring Dionex for a

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[2] The full document is available at
https://www.sec.gov/Archives/edgar/data/708850/000095012310114843/f57681sc14d9.htm

price in excess of that being proposed by Thermo Fisher and Thermo Fisher's requests related to commencing due diligence as described above. The Dionex Board determined, after reviewing a list of potential acquirors of Dionex and the high trading multiples of Dionex's common stock, that of the few potential acquirors that might have an interest in acquiring Dionex, none of them would reasonably be expected to offer a price approaching the price being proposed by Thermo Fisher, and that it was in the best interests of Dionex and its stockholders to pursue the Proposed Transaction at a price of $118.50 per share.

On December 10, 2010, the Dionex Board held a meeting at which all members of the Dionex Board, Mr. McCollam, Ms. Christopher, representatives of Goldman Sachs and representatives of Cooley were present. Representatives of Goldman Sachs presented its financial analysis and delivered Goldman Sachs' oral opinion to the Board, which opinion was subsequently confirmed in writing that, as of the date of the written opinion, and based upon and subject to the factors and assumptions set forth therein, the $118.50 in cash per share to be paid to the holders (other than Thermo Fisher and its affiliates) of Dionex common stock pursuant to the Merger Agreement was fair from a financial point of view to such holders.

On December 12, 2010, the Dionex Board held a telephonic meeting at which all members of the Dionex Board, Mr. McCollam, Ms. Christopher, representatives of Goldman Sachs and representatives of Cooley were present. The Dionex Board unanimously (i) determined that the Merger Agreement is advisable, (ii) determined that the Merger Agreement and the transactions contemplated thereby, including the Offer and the Merger, taken together, are in the best interests of Dionex and the holders of shares of Common Stock, and (iii) approved the execution, delivery and performance of the Merger Agreement and the transactions contemplated thereby, including the Offer and the Merger. Later that same day, Dionex, Thermo Fisher and Purchaser executed the Merger Agreement.

On December 13, 2010, Thermo Fisher and Dionex issued a joint press release announcing the transaction and their execution of the Merger Agreement.

Appendix IA3
An example of an informal initiation by the winning bidder

Target: The Lubrizol Corp.
Acquirer: Berkshire Hathaway Inc.
SEC filings: DEFM14[3]
Background of the merger (Simplified)

During the Fall of 2010, David L. Sokol was the Chairman, President and Chief Executive Officer of NetJets and the Chairman of MidAmerican Energy Holdings Company, two subsidiaries of Berkshire Hathaway. From time to time, Mr. Sokol met with various investment banking firms, including Citi, to discuss capital-raising and transaction ideas. In the course of general discussions between Mr. Sokol and Citi, Mr. Sokol requested more information regarding possible transactions in several industries, including the chemical industry. Using publicly available information, Citi generated a list and descriptions of 18 companies, including Lubrizol, in the chemical industry.

On December 13, 2010, Mr. Sokol and Citi met to discuss the list of companies. During the course of the meeting, Mr. Sokol said that the only company on Citi's list that he found interesting was Lubrizol. When Mr. Sokol learned from Citi's representatives that Citi had an investment banking relationship with Lubrizol and its Chairman, President and Chief Executive Officer, Mr. James L. Hambrick, he asked one of the Citi representatives to inform Mr. Hambrick that he was interested in speaking with him and discussing Berkshire Hathaway and Lubrizol, if Mr. Hambrick were available. Mr. Sokol also advised Citi that Berkshire Hathaway does not engage in hostile transactions, and that Mr. Hambrick should understand that if they met and nothing came of the meeting, their meeting would remain confidential.

On January 6, 2011, the Board convened a special meeting. During the course of the special meeting, Mr. Hambrick outlined Berkshire Hathaway's possible interest as he understood it from his conversation with Citi. The Board engaged in an extensive and thorough discussion about Berkshire Hathaway's possible interest. The Board determined that it needed to retain outside legal counsel and financial advisors to assist it in connection with any response to Mr. Sokol, including the process that the Board should undertake in connection with its review of Berkshire Hathaway's possible interest in acquiring Lubrizol. The Board decided to engage Jones Day and Evercore to assist it.

On January 12, 2011, the Board formally engaged Evercore to evaluate potential strategic and financial alternatives.

On January 14, 2011, Mr. Sokol and Mr. Hambrick had a telephone conference during which they generally discussed the corporate cultures and philosophies of both Berkshire Hathaway and Lubrizol, and arranged to have an in person meeting on January 25, 2011.

On January 25, 2011, Mr. Sokol and Mr. Hambrick met in Cleveland, Ohio. Mr. Hambrick also offered to have a follow-up meeting with Mr. Sokol and Mr. Buffett if Mr. Sokol thought that such a meeting would be helpful to Berkshire Hathaway.

On February 8, 2011, Mr. Hambrick met with Mr. Buffett in Omaha, Nebraska. Mr. Hambrick provided Mr. Buffett with an overview of Lubrizol's corporate culture, philosophy and operations. Mr. Hambrick also discussed Lubrizol's overall business and financial performance and described Lubrizol's publicly available past results and publicly available forecasts through fiscal year 2013. Mr. Hambrick gave his views on the future of the specialty chemicals manufacturing industry and general industry dynamics. At this meeting, Mr. Buffett responded to a question from Mr. Hambrick about price by saying that Berkshire Hathaway would like to make an offer to buy all of the outstanding shares of Company common stock for **$135.00 per share in cash**. Mr. Hambrick told Mr. Buffett that he would relay Berkshire Hathaway's proposal to the Board, but that he did not know whether or not the Board would be inclined to recommend the offer.

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[3] The full document is available at
https://www.sec.gov/Archives/edgar/data/60751/000119312511127281/ddefm14a.htm

On March 2, 2011, Evercore's Chairman called Mr. Buffett to inform him that the Board was willing to support a transaction by which Berkshire Hathaway would acquire all of the outstanding shares of Lubrizol for $140.00 per share in cash. Mr. Buffett told Evercore's Chairman that Berkshire Hathaway was unwilling to raise its offer beyond $135.00 per share.

On March 3, 2011, the Board convened a special meeting. Evercore and Jones Day participated in the meeting. Jones Day provided the directors with another overview of its fiduciary duties. Evercore described for the Board the March 2, 2011 discussion between Evercore's Chairman and Mr. Buffett. There was additional discussion about Evercore's various valuation analyses. Evercore also indicated that, in its view, contacting other potential purchasers was unlikely to result in an offer being made for Lubrizol in excess of Berkshire Hathaway's $135.00 per share cash offer. Evercore also noted that Berkshire Hathaway generally does not participate in auctions and that if Lubrizol contacted other potential parties, Berkshire Hathaway might withdraw its offer. After more discussion among the directors, the Board determined to pursue negotiations with Berkshire Hathaway toward a possible transaction for $135.00 per share in cash.

On March 12, 2011, the Board convened a special meeting to consider the proposed transaction. At this meeting, Jones Day summarized certain merger agreement obligations, conditions and termination rights relating to obtaining regulatory approvals, as well as the provisions and termination fee applicable in situations in which the transaction was made the subject of competitive bids from third parties or in which the Board withdrew its recommendation of the transaction. The directors asked a variety of questions of Jones Day about those and other matters. Citi and Evercore indicated that they performed their respective financial analyses independently. Evercore then reviewed with the Board its financial analyses of the $135.00 per share cash consideration, which are described under "—Opinion of Evercore Group L.L.C." below, and rendered to the Board an oral opinion, confirmed by delivery of a written opinion dated March 12, 2011, to the effect that, as of that date and based on and subject to the various assumptions and limitations set forth in its opinion, the $135.00 per share cash consideration to be received in the merger by Lubrizol shareholders was fair, from a financial point of view, to such holders.

During the early morning on March 14, 2011, Berkshire Hathaway and Lubrizol announced the signing of the merger agreement through a joint press release.

Appendix IA4
An example of a third-party bidder initiation

Target: Hilton Hotels Corporation.
Acquirer: BH Hotels LLC.
SEC filings: DEFM14A[4]
Background of the merger (Simplified)

From time to time Stephen Bollenbach, our co-chairman and chief executive officer, and other members of management had been approached by various parties about possible transactions, including, among others, in June 2006, an informal approach to Mr. Bollenbach by a principal of **a private equity firm** who indicated an interest in a possible acquisition of the Company at a price in the **low $30s per share**.

Mr. Bollenbach indicated that the Company would not be interested in pursuing a transaction at that price. Thereafter, Mr. Bollenbach was contacted by a principal of a real estate investment firm who stated that he had heard rumors of the prior indication of interest and expressed an interest in considering a transaction at the price levels indicated by the other firm. Mr. Bollenbach informed UBS Securities LLC, which we refer to as UBS, of these indications of interest. UBS regularly acts as a financial advisor to the Company.

On August 2, 2006, Mr. Bollenbach, together with a representative of UBS, met with Jonathan Gray, a senior managing director of Blackstone. Blackstone had previously interacted with the Company when it had proposed partnering with the Company in its acquisition of Hilton International due to Blackstone's interest in purchasing the hotel properties of Hilton International and the Company's interest in operating those hotel properties and uniting the Hilton brand. At this meeting, Mr. Gray discussed Blackstone's interest in a transaction involving an acquisition of the Company or a significant portion of its real estate assets. Mr. Bollenbach informed Mr. Gray that, at the right price, the Company would consider a potential transaction.

Between September 12, 2006 and September 14, 2006, the board held an offsite retreat at which, among other things, it conducted a thorough review of the Company's business and financial strategies, including expectations of future earnings and cash flows, and an internal valuation prepared by management. This valuation suggested that the Company had a standalone value of approximately $42 per share and that the Company's stock price in the mid $20s per share did not fully reflect the Company's value.

Mr. Bollenbach also reviewed with the board Blackstone's indication that it was interested in pursuing a transaction with the Company at a price in the high $30s per share.

Mr. Bollenbach conveyed to Mr. Gray that the Company would not be interested in pursuing a transaction that did not involve a price per share in the $40s.

On May 30, 2007, Mr. Bollenbach and Mr. La Forgia met with Mr. Gray and Kenneth Caplan, a senior managing director of Blackstone. The Blackstone representatives returned to the meeting and indicated that Blackstone would be willing to increase their proposed price to $45 per share. Mr. Bollenbach responded that the $45 price was still insufficient.

The Blackstone representatives then asked Mr. Bollenbach at what price the Company would be willing to accept a transaction assuming the definitive agreement contained the provisions that were requested by Blackstone. Based on his previous discussions with the board, Mr. Bollenbach informed the Blackstone representatives that a price of $48 per share was a price he could recommend to the board.

On June 24, 2007, Mr. Gray communicated to a representative of our financial advisors that Blackstone would offer a price of $47.50 per share. Mr. Gray also indicated that the costs of any potential acquisition had increased

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[4] The full document is available at
https://www.sec.gov/Archives/edgar/data/47580/000110465907059886/a07-20270_1defm14a.htm

significantly since Blackstone's last offer due to worsening conditions in the credit markets. Mr. Gray also noted that the stock price of the Company's common stock had decreased to $34.72 per share since the time of Blackstone's last offer and that a price of $47.50 per share represented a substantial premium to the stockholders of the Company.

During a lengthy discussion, the board members considered, among other things, their view that Blackstone's offer of $47.50 per share was a compelling price, their belief that Blackstone was in the best position of possible purchasers to provide the maximum value to the Company's stockholders due to synergies that Blackstone could achieve as a result of its existing lodging assets, Blackstone's ability to secure the necessary financing to complete the transaction and Blackstone's proven track record of completing large acquisition transactions on agreed terms.

After discussing all of the foregoing, the board determined that the price offered by Blackstone was compelling and authorized our management and legal and financial advisors to move forward with negotiations at the price of $47.50 per share.

From June 28, 2007 through July 3, 2007, members of the Company's management and representatives of Blackstone, together with their respective legal advisors, negotiated the terms of the merger agreement and ancillary documents, including the limited guarantee of Parent's payment obligations under the merger agreement provided by Blackstone Real Estate Partners VI L.P. and Blackstone Capital Partners V L.P. and equity and debt commitment letters.

On July 3, 2007, the board, together with the Company's management and legal and financial advisors, met to review the proposed transaction. At the meeting, the Company's board discussed various aspects of the proposed transaction, including the proposed merger consideration and the terms of the merger agreement. Sullivan & Cromwell presented a summary of the terms of the merger agreement and discussed various legal issues with the board. UBS reviewed with the board its financial analysis of the merger consideration of $47.50 per share and UBS delivered to our board its opinion, dated July 3, 2007, to the effect that, as of that date and based on and subject to the various assumptions, matters considered and limitations described in its opinion, the merger consideration of $47.50 per share to be received by the holders of Company common stock was fair, from a financial point of view, to such holders.

Following the approval of the merger by the board, the parties executed the merger agreement and publicly announced the execution of the merger agreement.

Appendix IA5
Our data collection process

To capture the detailed negotiation process and offer price revisions prior to the public merger announcement, we manually collect the following information: the date on which the deal was initiated, the party who initiated the deal, the number of participants in contact with the target firm during the private sales process, the number of participants who signed confidentiality agreement with the target firm, the number of indications of interest submitted, the first offer price submitted by the winning bidder and the third-party bidder (in third-party initiated deals), the date on which the first offer price was submitted, and pre-event activities of 13d filings and merger rumors prior to the public merger announcement.

IA5.1. Data sources

We obtain merger documents from the Securities and Exchange Commission's (SEC's) EDGAR website. The SEC requires that firms publicly listed on US stock exchanges disclose all material information when they issue proxy statements soliciting shareholder votes. Since almost all mergers require a shareholder vote from target shareholders, we are able to collect the relevant information for our analysis. For tender offers (where the target shareholders do not vote), the target firm is still required to file form SC14D1/SC14D9 and to make a recommendation statement to their shareholders with respect to the tender offer, which is pursuant to Section 14(d)(4) of the 1934 Securities Exchange Act.

SEC filings we use to obtain the detailed information on price revisions and the sale process include S-4, S-4/A, DEFM 14, DEFM 14/A, SC14D1, SC14D9, DEF 14A, DEFS 14A, PRES14A, SC 13E3, and PRER14A. Most of the time, detailed information on private negotiation is available in the section titled "Background of the Merger." Occasionally, it also appears in the section titled "Board Deliberations."

IA5.2. Collecting bid prices

The "Background of the Merger" section often describes the iterations during which the target firm and the (later) publicly disclosed bidder reach an agreement on the merger consideration. We collect the first bid price from the background information whenever this information is available. In most cases, collecting the first bid price is straight forward. For example, for the deal presented in Appendix B.1., the first bid price submitted by the bidder (Thermo Fisher Scientific Inc) is $106.50 and the date the first price submitted is on October 14, 2010. In the example presented in Appendix B.2., the first bid price submitted by the bidder (Berkshire Hathaway) is $135.00 on February 8, 2011.

In stock deals in which the method of payment is bid shares, the target firm and the bidder negotiate the exchange ratio that specifies the number of bidder shares to be exchanged for each target share when the merger is completed. For example, in the merger between Provident Financial Group (target) and National City Corp. (bidder) announced in 2004, the announced exchange ratio is 1.135 shares which allows each share of Provident common share to be converted into 1.135 common shares of National City.[5] The background information shows that the original proposed exchange ratio by the bidder was 1.04 and after negotiations, the bidder agreed to increase the exchange ratio to 1.135. In stock mergers, SDC calculates price per share consideration based on the bidder stock price on the last trading day prior to the public announcement. Price per share consideration reported by SDC is $40.17 based on the bidder stock price of $35.39. In this example, we calculate the first bid price as $40.17/1.135*1.04 = $36.81.

Sometimes the initial bid price is not disclosed in the merger background. For example, the merger between Storage Technology Corp. and Sun Microsystems, Inc. announced in 2005, the background information states "On May 3, 2005, Mr. Martin and Mr. Schwartz met in person in California. During this meeting, Mr. Schwartz indicated that Sun was prepared to offer *a price per share in cash that was less than the merger consideration of $37.00 per share* that was later agreed… On May 15, 2005, Sun *increased its proposed purchase price to $37.00 per share* of cash

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[5] The full document is available at
http://www.sec.gov/Archives/edgar/data/69970/000095015204002214/l06460asv4.txt

consideration."[6] In this example, we define the first bid price as *unknown*. The first bid premium and premium (private revision) cannot be calculated because of the missing information on the first bid price. Note that this example differs from the example provided in Appendix B.2 in which the first bid price ($135) is known and the public offer price is also $135. In the latter example, the first bid premium can be calculated and premium (private revision) is zero.

Occasionally, the initial proposal submitted by the bidder indicates a price range instead of a specific price. For example, in the merger between Coventry Health Care and First Health announced in 2004, the background information states "On September 16, 2004, Coventry submitted a preliminary, non-binding indication of interest to acquire First Health at a price in the range of $17.00 to $19.00 per share, consisting of approximately 60% Coventry common stock and 40% cash… On October 8, 2004, Coventry submitted a definitive proposal to acquire First Health at a price of $18.10 per share (the "October 8th Proposal"), consisting of 60% Coventry common stock and 40% cash…On October 10, 2004, Mr. Wolf stated that Coventry would increase its offer price to $18.75 per share (the "Final Proposal")." In the cases in which a price range is first proposed, and then followed by a refined specific price, we use the specific price as the first bid price. In this example, the first bid price is $18.10 and the private price revision is $18.75 - $18.10 = $0.65.

IA5.3. Collecting deal initiation and initiation dates

For each observation, we also obtain detailed information on deal initiation and the initiation date from the Background section of merger documents. The specifics of deal initiation and initiation dates follow Eaton, Liu and Officer (2019), and the below information is mainly from their Internet Appendix IA.1.

A deal is classified as "target initiated" if the sale process is initiated by the target firm. A deal is classified as "bidder initiated" if the target is approached by the bidder. A deal is classified as "mutually initiated" if the background information says that representatives from each firm meet on a certain date and discuss a possibility of business combination without specifying which party took the initiative in the sale process. A deal is classified as "third-party-initiated" if it is initiated by a third party (i.e., a potential bidder without its identity being disclosed in the merger documents).

In target-initiated deals, we define deal initiation dates as the days on which the target board (or CEO) contacts their investment banker to initiate a sale of the firm. For example, in the merger between Plenum Publishing Corp (the target) and Wolters Kluwer NV (the bidder), the Background section states, "on February 24, 1998 the Company retained Salomon Smith Barney to render financial advisory and investment banking services to the Company in connection with the sale of the Company. The Company instructed Salomon Smith Barney to initiate a process to explore the sale of the entire equity interest in the Company through an auction process." In this example, we classify that the deal is initiated by the target firm, and the initiation date is February 24, 1998.[78] Sometimes, a merger process is discontinued for various reasons and then resumed after a considerable amount of time has passed. The deal initiation classification and initiation dates are based on the most recent merger process.

For non-target-initiated deals, we use the first reported date on which a bidder approached a target firm and initiated merger discussions. For example, in the merger between Extended Stay America Inc (the target) and Blackstone Group LP (the bidder), the Background section states, "On Friday, January 23, 2004, Mr. Jonathan D. Gray, Senior Managing Director of The Blackstone Group (bidder), called Mr. George D. Johnson, Jr., Chief Executive Officer of the Company (target), to inquire about the Company's interest in considering a possible acquisition of the Company by Blackstone." we classify this deal as a bidder-initiated deal and the initiation date is January 23, 2004.[9]

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[6] The full document is available at
https://www.sec.gov/Archives/edgar/data/94673/000103570405000382/d26147dedefm14a.htm#133
[7] The full document is available at https://www.sec.gov/Archives/edgar/data/79166/0001047469-98-024319.txt
[8] Target firms sometimes first have a board meeting and decide to pursue a sale of the firm and later formally hire a financial advisor. In those cases, we use the date of the board meeting as the deal initiation date (assuming that such date is included in the SEC filing).
[9] The full document is available at:
https://www.sec.gov/Archives/edgar/data/1002579/000104746904011431/a2133112zdefm14a.htm

Table IA1
Excluding internet bubble and financial crisis period from the sample used in Table 5

This table replicates the stock performance and private bid revision analysis in Table 5 by excluding the internet bubble and financial crisis period. Specifically, we remove deals announced during 2000-2002 (i.e., internet bubble period) and deals announced during 2008-2009 (i.e., financial crisis period). Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Private bid price revision					
Sample		All deals		Positive target return	Negative target return
RetTarget (first bid, announcement)	0.424***	0.400***	0.388***	0.508***	0.092
	(8.22)	(7.43)	(7.24)	(6.48)	(1.12)
RetMKT (first bid, announcement)		0.133	-0.068	-0.084	0.046
		(1.47)	(-0.60)	(-0.63)	(0.28)
RetIND (first bid, announcement)			0.193**	0.250**	-0.162
			(1.97)	(2.08)	(-1.39)
Constant	0.055***	0.053***	0.051***	0.027***	0.050***
	(14.12)	(13.52)	(12.87)	(3.45)	(8.00)
Observations	780	780	780	552	228
R-squared	0.242	0.245	0.251	0.287	0.024

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Table IA2
Separating cash versus stock deals in the sample used in Table 7

This table replicates the nature of bid process (auction vs. negotiation) and price revisions analysis in Table 7 by separating cash versus stock deals. The cash deal subsample includes deals that are financed by 100% cash. Stock deals include deals that use all or some stock as method of payment. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

VARIABLES	(1) Premium (private revision)	(2) Premium (private revision)	(3) Premium (public revision)	(4) Premium (private revision)	(5) Premium (private revision)	(6) Premium (public revision)
Sample	All cash deals			Stock deals		
Auction	-0.030**	-0.027**	0.003	-0.025**	-0.028***	0.003
	(-2.32)	(-2.39)	(0.76)	(-2.24)	(-2.77)	(0.53)
Tender offer	0.029*	0.009	0.013**	-0.005	0.009	0.010
	(1.90)	(0.69)	(2.36)	(-0.28)	(0.53)	(1.22)
Target size	-0.014**	-0.012**	0.001	-0.012**	-0.006	-0.001
	(-2.21)	(-2.38)	(0.70)	(-2.40)	(-1.47)	(-0.46)
Poison pill	-0.008	0.004	-0.001	0.001	-0.001	0.004
	(-0.61)	(0.31)	(-0.20)	(0.10)	(-0.10)	(0.79)
Staggered board	-0.000	0.001	-0.001	-0.009	-0.010	-0.000
	(-0.03)	(0.11)	(-0.28)	(-0.71)	(-0.91)	(-0.00)
Public bidder	0.028**	0.027**	0.004	0.007	0.016	-0.004
	(2.30)	(2.51)	(1.10)	(0.34)	(0.83)	(-0.58)
Toehold	0.020	0.014	0.059***	0.006	0.017	0.034
	(0.64)	(0.62)	(2.83)	(0.16)	(0.45)	(1.64)
Hostile	-0.075***	-0.039	0.127***	-0.016	-0.023	0.178***
	(-3.29)	(-1.53)	(5.25)	(-0.69)	(-0.98)	(6.80)
RetTarget		0.401***			0.298***	
		(6.23)			(5.38)	
RetIND		0.101			0.143	
		(1.19)			(1.58)	
Constant	0.219**	0.126*	-0.062	0.096	0.060	-0.051*
	(2.53)	(1.75)	(-1.51)	(1.59)	(1.16)	(-1.85)
Industry/Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	540	540	576	466	466	733
R-squared	0.216	0.393	0.469	0.313	0.443	0.262

Table IA3
Deal initiation and bidder announcement returns

This table reports regression results of deal initiation on bidder merger announcement returns for a subsample that includes only public bidders so that announcement returns can be calculated. Dependent variables are *Bidder CAR (-1, +1), Bidder CAR (-2, +2)*, and *Bidder CAR (initiation, completion). Bidder CAR (-1, +1)* is cumulative abnormal return in a 3-day window surrounding the merger announcement using market-adjusted returns from the CRSP value-weighted index. *Bidder CAR (-2, +2)* is cumulative abnormal return surrounding a 5-day window and *Bidder CAR (initiation, completion)* is cumulative abnormal return from deal initiation until deal completion. Bidder market capitalization prior to deal initiation is included as an additional control variable. The main independent variables are *Bidder (informal), Bidder (formal), Bidder (third party), Mutual initiation,* and *Target initiation.* The benchmark group is *Bidder (informal).* Definitions of all other variables are provided in Appendix A. Sample period is from 1994 to 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Dep. Var.	(1) Bidder CAR (-1, +1)	(2) Bidder CAR (-2, +2)	(3) Bidder CAR (initiation, completion)
Bidder (formal)	0.029**	0.025**	-0.006
	(2.48)	(2.09)	(-0.12)
Bidder (third party)	-0.000	0.004	0.037
	(-0.03)	(0.46)	(0.94)
Mutual initiation	0.004	0.007	-0.008
	(0.51)	(0.85)	(-0.24)
Target initiation	0.004	0.003	0.032
	(0.63)	(0.46)	(1.20)
Tender offer	0.013*	0.020***	-0.109***
	(1.85)	(2.65)	(-3.68)
Bidder size	0.001	0.002	-0.019**
	(0.64)	(0.83)	(-2.28)
Target size	-0.009***	-0.009***	0.007
	(-3.55)	(-3.47)	(0.61)
Poison pill	0.005	0.006	-0.028
	(0.79)	(1.03)	(-1.13)
Staggered board	-0.009*	-0.011**	0.003
	(-1.65)	(-1.96)	(0.14)
Toehold	0.012	0.010	-0.077
	(0.77)	(0.61)	(-1.03)
Hostile	-0.020	-0.014	0.141***
	(-1.39)	(-0.83)	(2.64)
Constant	0.100**	0.102**	0.458***
	(2.15)	(2.38)	(2.98)
Industry and Year FEs	Yes	Yes	Yes
Observations	855	855	855
R-squared	0.183	0.188	0.184

Table IA4
Premiums for bidder and third-party initiated deals

This table examines the first bid premium and price revisions for a subsample that only includes bidder initiated or third-party initiated deals. We further exclude deals where only one bidder participates in the sale process (i.e., the winning bidder initiates and the target firm does not reach out to other potential bidders during the sales process). For third-party-initiated deals, we calculate premium (first bid) and premium (private revision) as follows: *Premium (first bid)* = third-party first bid price/benchmark price -1. *Premium (private revision)* = (initial public price-third-party first bid price)/benchmark price. Definitions of all other variables are provided in Appendix A. Sample period is from 1994 to 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)
Dep. Var.	Premium (first bid)	Private revision	
Third-party	-0.005	0.112***	0.076***
	(-0.20)	(4.44)	(3.34)
Tender offer	0.058*	0.034	0.047*
	(1.86)	(1.23)	(1.91)
Target size	-0.014	-0.011	-0.006
	(-1.25)	(-1.07)	(-0.81)
Poison pill	-0.033	0.002	-0.007
	(-1.13)	(0.05)	(-0.33)
Staggered board	0.003	-0.005	0.011
	(0.10)	(-0.23)	(0.61)
Public bidder	0.012	0.032	0.039**
	(0.47)	(1.36)	(2.03)
Toehold	-0.054	-0.085**	-0.050*
	(-0.80)	(-2.24)	(-1.69)
Hostile	-0.022	-0.157**	-0.122***
	(-0.44)	(-2.56)	(-2.74)
RetTarget			0.571***
			(8.14)
RetIND			-0.026
			(-0.20)
Constant	0.313*	0.549**	0.324
	(1.92)	(2.20)	(1.70)
Industry and Year FEs	Yes	Yes	Yes
Observations	333	333	333
R-squared	0.373	0.372	0.584

Table IA5
Bidder announcement returns for bidder and third-party initiated deals

This table reports regression results on bidder merger announcement returns for a subsample that only includes bidder initiated or third-party initiated deals. We further exclude deals where only one bidder participates in the sale process (i.e., the winning bidder initiates and the target firm does not reach out to other potential bidders during the sales process). Dependent variables are *Bidder CAR (-1, +1), Bidder CAR (-2, +2)*, and *Bidder CAR (initiation, completion). Bidder CAR (-1, +1)* is cumulative abnormal return in a 3-day window surrounding the merger announcement using market-adjusted returns from the CRSP value-weighted index. *Bidder CAR (-2, +2)* is cumulative abnormal return surrounding a 5-day window and *Bidder CAR (initiation, completion)* is cumulative abnormal return from deal initiation until deal completion. Bidder market capitalization prior to deal initiation is included as an additional control variable. The main independent variable is *Winners curse*, an indicator variable that equals 1 if the target firm's forecast dispersion is above median, and the target firm also fails to find another bidder that outbids the initiating bidder (i.e., the initiating bidder wins and the deal is defined as bidder initiated deal), and zero otherwise. Definitions of all other variables are provided in Appendix A. Sample period is from 1994 to 2016. Robust t-statistics using heteroscedasticity-consistent standard errors are reported in parentheses. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Dep. Var.	(1) Bidder CAR (-1, +1)	(2) Bidder CAR (-2, +2)	(3) Bidder CAR (initiation, completion)
Winner's curse	-0.027*	-0.035**	-0.072
	(-1.69)	(-2.00)	(-1.17)
Tender offer	0.012	0.021	-0.124*
	(0.61)	(0.97)	(-1.82)
Bidder size	0.001	0.000	-0.018
	(0.22)	(0.03)	(-0.90)
Target size	-0.015**	-0.017**	0.027
	(-2.25)	(-2.31)	(0.97)
Poison pill	0.016	0.034*	-0.100*
	(1.04)	(1.70)	(-1.71)
Staggered board	-0.001	0.001	0.024
	(-0.06)	(0.08)	(0.36)
Toehold	0.001	0.008	-0.091
	(0.04)	(0.30)	(-0.44)
Hostile	0.004	0.002	0.030
	(0.20)	(0.11)	(0.22)
Constant	0.059	0.079	0.852***
	(0.90)	(1.01)	(2.63)
Industry and Year FEs	Yes	Yes	Yes
Observations	219	219	219
R-squared	0.281	0.295	0.340