Deal Terms in Takeovers

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PRELIMINARY DRAFT

Abstract

We study how non-price deal terms affect outcomes in merger contests. We construct a new dataset of 673 U.S. mergers completed between 2015 and 2021 that records, for each formal offer, the price, method of payment, and contractual terms—including financing contingencies, regulatory approval conditions, due diligence requirements, and exclusivity provisions. We document three patterns: (1) these contractual terms are pervasive in private bidding; (2) their use varies substantially between strategic and financial bidders; and (3) price alone does not determine the winning offer—indeed, in 21% of deals with more than one formal bid, the winning bidder did not submit the highest price. We then estimate a structural model to recover target valuations for non-price deal terms. Our estimates show that these terms have economically significant effects on target valuations and play a central role in determining which offers succeed.

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1 Introduction

The market for corporate control plays a central role in the allocation of productive assets and the governance of public corporations. Each year, mergers and acquisitions (M&A) reorganize trillions of dollars of enterprise value and determine which firms direct investment, innovation, and strategic oversight. Understanding how takeover contests are structured—and what determines which offers succeed—is therefore fundamental to evaluating the efficiency of this market.

Mergers and acquisitions are not standard auctions (Boone and Mulherin, 2007). A defining feature of takeover competition is that merger offers are not one-dimensional price bids. Instead, they take the form of multi-attribute contracts that specify financing and regulatory contingencies, due diligence requirements, exclusivity provisions, and other terms that govern the interim period between signing and closing. These contractual features allocate risk, shape bargaining power and incentives, influence information revelation, and affect the timing and probability of completion (Choi and Triantis, 2009). Yet despite their centrality in practice, we know comparatively little about their prevalence during competitive bidding, how their use varies across acquirer types, or how targets value them.

Public bidding outcomes underscore the importance of these non-price terms.[1] In a sample of 183 deals with competing public offers between 2002 and 2025, the lower-priced bid wins approximately 30% of the time, with an average discount of about 12% relative to the highest offer (Table 1). Termination fees and payment method explain only a small fraction of these differences. These systematic departures from simple price maximization suggest that non-price contractual terms frequently outweigh headline price in determining the winning bidder.

Anecdotal evidence points to a similar conclusion. The Dow–Rohm merger agreement did not include a financing condition. When the global financial crisis froze credit markets and Dow lost a major joint venture expected to fund the deal, it sought to delay closing. Rohm sued to enforce the contract, and Dow was ultimately forced to complete the acquisition at the original price by raising emergency capital. By contrast, Cerberus Capital Management included a financing contingency in its agreement to acquire United Rentals and exercised this option to walk away from the deal by paying the reverse termination fee.[2]

[1] It is well established that much of the competition for corporate control takes place during the *private phase* of the M&A process—before the initial merger agreement is publicly announced (Boone and Mulherin, 2007, Brown et al., 2022, Officer and Liu, 2019). Evidence from the public bidding phase merely provides motivation for our investigation.

[2] Cerberus cited deteriorating credit markets as the reason for withdrawal, but it was concurrent with a sharp decline in United's earnings. United sued to compel Cerberus to close the transaction, but the Delaware Chancery Court held that the merger agreement expressly limited the company's remedy to the

A more recent example comes from Elon Musk's acquisition of Twitter in 2022. Musk's unsolicited offer of $54.20 per share was explicitly not subject to financing or due-diligence conditions and included specific-performance rights enabling the target to compel closing. This seller-friendly structure signaled certainty and speed—attributes that likely held substantial value for Twitter's board given the contentious prelude to the final offer. When Musk later attempted to terminate the agreement, Twitter invoked specific performance and successfully sued to enforce the contract; Musk ultimately closed on the original terms. These examples illustrate how contractual structure—not simply price—can determine merger outcomes.

A systematic analysis of non-price terms presents two major challenges. The first is data availability. Commercial databases capture bid prices and a subset of non-price deal terms only for winning bids, but not for losing bidders or for the private-round bidding that typically precedes public disclosure. To address this challenge, we construct a new dataset of 673 U.S. mergers completed between 2015 and 2021 by hand-collecting every formal offer from proxy filings and Schedule 14D-9 disclosures. For each bid, we code the offered price, method of payment, contingent value rights (CVRs), and all observable contractual terms. We focus on four terms that are consistently disclosed and economically salient: (i) confirmatory due diligence requirements, (ii) exclusivity requests, (iii) financing contingencies, and (iv) antitrust and other regulatory approval conditions.

The second challenge is identification. We do not observe the target's valuations for a bid directly—only its decision to accept or reject an offer—creating a measurement problem. In addition, a target's valuation of a bid likely depends on unobservable characteristics of the bidder. Stronger bidders—those with higher synergies–may be less likely to attach restrictive terms and conditions. As a result, offer terms may be correlated with bidder strength, confounding their causal effect on target valuations.

To address the identification challenges, we estimate a structural model that jointly recovers target valuations for deal terms and bidder valuations for targets. Each formal offer in our data is characterized by a vector of observable attributes—price per share and multiple deal terms. From each merger contest, we infer a set of inequalities about the target's valuation of each bid without assuming a specific mechanism for the contest. For example, if bidder 1 is selected by the target as the winner, we infer that the target's valuation of the offer submitted by bidder 1 is higher than its valuation of offers from all other bidders as well as the target's standalone (or reservation) value. To estimate bidder valuations, we extend the approach of Gorbenko (2019), Gorbenko and Malenko (2014) from single-dimensional bids to multidimensional offers. Target and bidder valuations are estimated jointly using the

reverse termination fee.

Gibbs sampler. In addition to being computationally feasible, an advantage of this approach is that it enables us to use data augmentation to fill in missing deal terms (Korteweg, 2013).

Stylized Facts. Three empirical patterns emerge from the hand-collected data. First, non-price terms are pervasive: 66% of private-round formal bids include at least one of the four main terms. Due diligence (41%), exclusivity (28%), and regulatory approval conditions (28%) are most common; financing contingencies appear in 11% of bids. CVRs are rare (3.1%) but rising over time. Second, price alone often does not determine outcomes in the private-bidding phase: in 21% of contests with more than one formal offer, the winning bidder did not submit the highest price per share. In most such cases, all bids were all-cash, indicating that contractual features—rather than payment method—drove the outcome. The 2019 sale of Barnes & Noble provides a representative example: the board accepted a $6.50 bid from Elliott Management over a $7.00 competing bid because the latter included open financing conditions and demanded extended exclusivity. Third, the use of non-price terms varies meaningfully across bidder types and industries. Strategic bidders more frequently include regulatory conditions, while financial bidders more frequently include financing contingencies. Terms also vary systematically across industries: exclusivity is most common in technology, due diligence and CVRs in healthcare, and financing contingencies in retail.

Estimation Results. We next estimate how targets value these non-price terms. Several patterns stand out. First, financing contingencies carry large negative effects: conditional bids are valued 22–24% lower when made by strategic bidders and 40–53% lower when made by financial bidders. These differences reflect structural features of acquirer types. Strategic acquirers can substitute toward equity financing when credit markets tighten, whereas financial sponsors typically rely on debt financing and withdraw if funding is unavailable.

Second, due diligence requirements exhibit striking heterogeneity. When strategic bidders condition their offers on additional diligence, targets discount those offers by roughly 14–16%. In contrast, due diligence has no measurable effect for financial bidders. This asymmetry points to an important mechanism: diligence by strategic bidders (who are often direct competitors) exposes the target to proprietary information leakage and increases the risk that the bidder learns sensitive information and walks away. Diligence by financial bidders carries no such competitive threat and is thus largely benign from the target's perspective.

Third, regulatory conditions have a more nuanced impact. On average, bids subject to regulatory approval are valued roughly 11% higher when submitted by strategic bidders—consistent with targets anticipating greater synergies from acquirers that are more likely to trigger review. However, this premium turns negative (though insignificant) for large, mostly-cash deals and when the target has substantial market share, consistent with regulatory delay or divestiture risk outweighing expected synergies.

Mechanisms. Finally, we examine channels through which these contractual terms may affect target valuations. First, non-price terms affect expected time to completion. Financing contingencies and regulatory approval conditions increase time-to-completion by approximately 20% and 50%, respectively, whereas exclusivity reduces it by roughly 10%. These differences are economically meaningful given the option-like nature of the interim period and the exposure of both parties to valuation shocks. Second, non-price terms affect perceived completion risk. While our hand-collected sample contains only completed deals, market reactions to deal withdrawals in SDC indicate that targets' stock prices fall sharply—by 30% on average—when deals fail due to closing conditions or regulatory approval. These declines are large even relative to pre-announcement prices, suggesting that failure conveys negative information about the target's standalone prospects. A back-of-the-envelope calculation implies that the financing-contingency discount we estimate corresponds to a 5–10% increase in perceived failure probability. Other mechanisms—such as renegotiation, litigation, or moral hazard—may also play a role. We leave a more complete investigation of these mechanisms to future work.

Overall, our findings reveal that non-price terms play a central role in the market for corporate control. They are pervasive, vary systematically by bidder type, and exert economically meaningful effects on target valuations. The results also highlight the importance of bidder heterogeneity and illuminate mechanisms—such as information leakage through due diligence—that shape how targets evaluate competing offers. More broadly, the evidence suggests that takeover contests are multi-dimensional bidding environments rather than price-only auctions, and that allocative efficiency depends critically on the broader contractual structure of merger offers.

The remainder of the paper proceeds as follows. Section 2 reviews the related literature. Section 3 describes the data and summary statistics. Section 4 outlines the empirical methodology. Section 5 presents the estimation results. Section 6 discusses mechanisms. Section 7 concludes.

2 Related Literature

A large literature studies one central contractual dimension of mergers and acquisitions—the *method of payment*—and its implications for valuation, signaling, and risk sharing. Classic models show that acquirers choose between cash and stock offers to manage asymmetric information and incentive alignment: Myers and Majluf (1984) highlight signaling effects under private information; Hansen (1985) formalizes the risk-sharing and information trade-off; Fishman (1989) and Shleifer and Vishny (2003) emphasize bidder overvaluation motives;

and DeMarzo et al. (2005) generalize these ideas to security design under multidimensional private information.

Empirical work documents consistent patterns. Asquith et al. (1983) and Bradley et al. (1988) find large positive announcement returns for targets and near-zero returns for acquirers. Later studies show that cash offers are associated with higher completion rates and larger combined gains than stock offers (e.g., Fuller et al. 2002, Golubov et al. 2016, Moeller et al. 2005, Travlos 1987). Faccio and Masulis (2005) document tax and control considerations in the choice of method of payment, while Erel et al. (2012) examine cross-border differences. Heath (2023) show that cash-financed deals are more likely to fail in market downturns, when liquidity risk binds most tightly. Overall, this literature views payment form as a device for allocating risk and managing asymmetric information between acquirer and target.

We contribute to this literature by providing an estimate of how targets evaluate the method of payment. We find that targets attach a premium to cash offers, however the cash premium decreases with the bidder's valuation. Further, our paper extends the analysis beyond method of payment to a set of non-price contractual terms that are common in merger agreements. While the cash-versus-stock decision captures one aspect, merger contracts include many additional provisions—financing and regulatory conditions, due diligence, exclusivity, termination and reverse-termination fees, and contingent value rights—that serve other economic functions but have received little systematic empirical analysis in the finance literature.

One exception is Denis and Macias (2013), who study the impact of material adverse change (MAC) clauses on merger outcomes. They document that material adverse events (MAEs) are a key source of deal failure and renegotiation in a sample of 755 acquisitions between 1998 and 2007. They also find that acquisitions with fewer MAE exclusions are associated with higher offer premiums, suggesting that targets discount bids with fewer exclusions. On the theoretical side, Daley et al. (2024) explore the role of due diligence on merger outcomes. They show that a higher price is not necessarily better for the target because it can increase the risk of delays and deal failure. In equilibrium, stronger bidders win at lower prices, by competing with speed and minimal execution risk rather than on price.

A theoretical literature explores the trade-off between *auctions* and *negotiations* in corporate acquisitions. Models such as Bulow and Klemperer (1996, 2009) show that while auctions can generate higher expected revenues through stronger competition, negotiated sales may dominate when bidders differ in information, financing, or entry costs. Subsequent work introduces richer informational environments: Povel and Singh (2006) show that when some

bidders are better informed, sellers may optimally offer exclusivity to those bidders first, while Roberts and Sweeting (2013) demonstrate that selective entry by high-valuation bidders can improve efficiency. Empirically, however, the M&A process departs from standard auction formats. Sellers often conduct multiple private rounds, selectively disclose information, and balance competitive benefits against the risk of revealing proprietary information to potential rivals (Boone and Mulherin, 2007, Hansen, 2001).

We complement this literature by focusing not on the format or timing of the process, but on the structure of the offers themselves. One feature of our empirical approach is that we are able to remain agnostic about the underlying auction mechanism and instead extract information that is invariant to the format of the M&A process.

There is a related literature that studies scoring auctions, which are common in procurement settings, where the buyer has preferences over multiple dimensions (e.g., price and quality). In a scoring auction the buyer commits ex ante to a scoring rule that translates multi-attribute offers into a single scalar used to determine the winner. In this setting, the scoring rule is typically common knowledge and the emphasis is on recovering bidder's valuations or cost parameters consistent with equilibrium bidding under that rule (e.g., Asker and Cantillon, 2008, 2010, Branco, 1997, Che, 1993). In contrast to these studies, we examine an environment in which no explicit scoring rule exists. Rather than inferring bidder valuations given a posted rule, we recover how sellers (targets) implicitly weight non-price deal terms when evaluating bids.

3 Data and Summary Statistics

3.1 Data Description

We collect bid details for a sample of deals announced between January 1, 2015 and December 31, 2021. As outlined in Gorbenko and Malenko (2014), we begin with all deals in the SDC Platinum M&A database that satisfy the following criteria:

1. The target is a publicly traded, non-financial (SIC codes 6000–6999) U.S. company.
2. Bidders seek 100% of the target's shares.
3. The deal is not a spin-off, self-tender, recapitalization, exchange offer, repurchase, minority-stake purchase, acquisition of a remaining interest, or privatization.
4. Proxy statements (DEFM14A or SC-14D9) are filed by the target company with the SEC.

5. Deal value exceeds $10 million.

Details on bids are hand-collected from the 'Background of the Transaction' (or Merger/Offer) section of the target's proxy statements. For all deals, we collect information on the number of bidders, their type, whether they submitted a bid, and the deal terms associated with their formal bids in the later stages of the process, if any. We define "bidders" as participants who sign a confidentiality agreement with the target. We classify bidders into three types: strategic (operating companies in the same or related industry as the target), financial (primarily private equity firms), and portfolio companies of financial sponsors.

We consider a bid to be formal if it is for a dollar price per share and is submitted after the target solicits binding or final bids from shortlisted bidders. Not all deals follow a standard process of initial informal bids followed by final or binding offers. In such cases, we define a formal bid as any written proposal specifying a dollar price per share that is submitted after the bidder has signed a confidentiality agreement with the target, conducted some initial due diligence, and typically provided a markup of a merger agreement. In a minority of deals, the confidentiality agreement is signed *after* a bid has been selected as the winner; for these cases, we classify the winning bid as formal.

In many deals, the target conducts more than one round of formal bidding. Some bidders also submit revised bids after the initial deal announcement, either as part of a 'go-shop' period or as unsolicited bids. We collect details on all revised formal bidding rounds as well as bids submitted during the public phase of the deal, when available. Our main estimation methodology uses only the final formal bid from each bidder to recover target valuations for deal terms. In robustness checks, we use the full sequence of bid revisions to obtain more refined estimates.

For all formal bids, we collect data on the price per share offered, the mix of cash/stock or CVR, and any deal terms included in the bid. Specifically, we record:

- **Due Diligence:** whether the bid is subject to completion of additional due diligence by the bidder.
- **Exclusivity:** whether the bidder requests that the target negotiate exclusively with them for a specified period.
- **Financing:** whether the bid is conditional on the bidder arranging financing.
- **Antitrust and Regulatory:** whether the bid is subject to antitrust review or other regulatory approvals.

- **Contingent Value Rights (CVRs):** whether the offer includes a CVR component and the terms of such CVRs.

We collect data on the market value of the target (1) four weeks prior to the deal announcement and (2) one day prior to a press release or news leak regarding the potential transaction. If a leak or press release occurred at least four weeks but no more than one year prior to the announcement, we use the price from the day before the leak as the 'pre-announcement' market value. Prices are obtained from CRSP when available, and from Datastream otherwise.

We also collect the following target characteristics from quarterly Compustat (annual when quarterly data are unavailable): firm size (log of total assets), market leverage, average q-ratio, cash flow over the previous four quarters, cash and short-term investments, R&D expenditures, and intangible assets, all scaled by total assets. In addition, we construct an estimate of the target's industry market share by dividing the target's sales by total sales in its NAICS 6-digit industry using the most recent U.S. Economic Census data available prior to the announcement year.

Appendix A provides excerpts from the proxy filing of Barnes & Noble, acquired by Elliott Management in 2019, and Table 12 summarizes the bidding information extracted from this filing.

3.2 Summary Statistics

Table 2 summarizes deal terms by bidder type. Bidder type can be reliably inferred for 97% of bids in our sample. Strategic bidders account for 71% of all bids and win 78% of deals. Consistent with Gorbenko and Malenko (2014), financial bidders tend to offer lower premiums (price per share divided by the target's pre-announcement market value) than strategic bidders. Deals won by financial bidders attract, on average, seven more bidders and more formal bids per deal. Due diligence is the most prevalent deal term, appearing in 41.2% of bids, followed by exclusivity (28.1%) and regulatory conditions (27.5%). Bids by financial bidders are more likely to contain financing contingencies and less likely to include regulatory conditions. Termination fees in winning bids do not differ significantly across bidder types. While CVRs are uncommon overall, they are more frequently observed in bids by strategic bidders than by financial bidders.

Table 3 presents deal terms by the target's industry (Fama-French 5 industry classification). Targets in "HiTec" (business equipment, computers, software, telephone and television transmission) represent 36% of the sample, followed by "Hlth" (healthcare, medical equipment, and pharmaceuticals). A higher share of deals in HiTec are won by financial bidders,

while deals in Hlth and "Manuf" (manufacturing and utilities) are more often won by strategic bidders. Deals involving Hlth and Manuf targets also tend to have fewer bidders and fewer formal bids on average. Hlth targets receive higher bids, more bids with due-diligence conditions and CVRs, and fewer bids with financing contingencies than targets in other industries.

Table 4 presents summary statistics for target characteristics. The average size of targets in our sample is $2.7 billion, and the sample represents transactions involving $1.8 trillion in total assets. Strategic bidders tend to win auctions involving larger targets with lower leverage, higher q-ratios, higher cash holdings, and higher R&D expenditures than those acquired by financial bidders.

In our sample, 179 deals involve more than one formal bid. In 21% of these deals, the highest price-per-share bid does not win. Moreover, in 68% of such cases where the highest bid loses, both the winning and losing bids are all-cash, indicating that factors other than payment method—namely, contractual deal terms—play a decisive role. Table 5 compares bid features between the winning bidder and the losing bidder who submitted the highest price. On average, the highest losing bid exceeds the winning bid by 17 percentage points. The most common deal term possessed by the losing bidder—but not the winner—is a financing contingency.

4 Methodology

First, we show that unobservability of target valuations for bids can lead to regression bias if those are replaced with observable outcomes such as target decisions to accept or reject bids. Second, we introduce the methodology to recover information about target valuations from decisions and explain the estimation approach. Finally, we discuss other potential identification concerns: omitted and jointly determined variables.

4.1 Identification problem

To identify the impact of deal terms on target valuations for bids, ideally a researcher observes these valuations. Then, an OLS regression

$$v_{i,j} = b_{i,j} + X'_{i,j}\beta + \varepsilon_{i,j} \tag{4.1}$$

estimates the monetary value of deal terms. Here, $v_{i,j}$ is the (log) target valuation in auction i for bid j; $b_{i,j}$ is the (log) price per share offered for the target; $X_{i,j}$ is a vector of additional deal terms (such as due diligence, financing, and antitrust closing conditions) and their

interactions with deal and economy characteristics; and $\varepsilon_{i,j}$ is the noise term reflecting the target's preferences for a particular bidder (e.g., a shareholder with sufficient control may prefer to sell the firm to a strategic buyer rather than to a private equity fund). The coefficient of $b_{i,j}$ is one: in the absence of other deal terms and noise, a price per share offer of, e.g., \$20 should be valued by the target at \$20.[3] Coefficient β_k of deal term $X_{i,j,k}$ changes the value of the offer by $e^{X_{i,j,k}\beta_k} - 1$ percent: continuing the previous example, if $\beta_k = -0.2$ and $X_{i,j,k}$ is a binary variable equal to 1 (e.g., a bidder has conditioned its offer on completion of confirmatory due diligence) then the price per share offer of \$20 is discounted by 18.1% and is valued by the target at \$16.37.

In reality, the researcher is unable to observe valuations $v_{i,j}$. Instead, she observes binary target decisions $W_{bi,j}$ to accept or reject an offer. It may seem sensible to run an OLS regression

$$W_{i,j} = b_{i,j} + X'_{i,j}\beta + \varepsilon_{i,j} \tag{4.2}$$

to estimate the monetary value of deal terms. Unfortunately, this estimate will be biased because target decisions $W_{i,j} = \prod_{k \neq j} 1_{v_{i,j} > v_{i,k}}$ are complex functions of target valuations for all bids in the same auction, rather than one specific valuation. Formally, we can treat the estimation problem as one of measurement error in the dependent variable. Write $W_{i,j} = v_{i,j} + e_{i,j}$. In order for the OLS to deliver an unbiased estimate of β, it must be that $\mathbb{E}[e_{i,j}] = 0$ and $\mathbb{E}[e_{i,j}|X_i] = 0$, where X_i is the collection of deal terms and their interactions with deal and economy characteristics across all bidders in auction i. The first condition can always be satisfied by adding a constant to equation (4.2). Consider the second condition in the simplest auction with two bidders j and k and Normally distributed noise term $\varepsilon_{i,j}$ with volatility σ_ε:

$$\begin{aligned}
\mathbb{E}[e_{i,j}|X_i] &= \Pr(j \text{ wins}|X_i) - \mathbb{E}[v_{i,j}|X_i] \\
&= \Pr(\varepsilon_{i,j} - \varepsilon_{i,k} \geq b_{i,k} - b_{i,j} + (X_{i,k} - X_{i,j})'\beta|X_i) - (b_{i,j} + X'_{i,j}\beta) \\
&= \left(1 - \Phi\left(\frac{b_{i,k} - b_{i,j} + (X_{i,k} - X_{i,j})'\beta}{\sqrt{2}\sigma_\varepsilon}\right)\right) - (b_{i,j} + X'_{i,j}\beta).
\end{aligned}$$

This condition is generically not equal to zero, leading to a bias in the estimate of β. In simulations presented in Appendix B.1, we show that this bias can be substantial.

[3] In the U.S., in particular under Delaware law, in the absence of any closing conditions a bidder is subject to specific performance. If it attempts to withdraw its offer and thereby breach a merger agreement then the court compels it to either execute the deal (to perform) or, in exceptional situations and in cash deals only, pay monetary damages equal to the value of the takeover premium. See, e.g., "Dow's Bid for Rohm and Haas", HBS Case 9–211–020, May 20, 2014.

4.2 Empirical model

Before we formally introduce the empirical model, we illustrate via three simple examples how information can be extracted from a target's decisions $W_{i,j}$ to estimate the impact of deal terms on valuations. Consider equation (4.1), where the goal is to estimate β and σ_ε, the standard deviation of the noise term. In each of the examples, suppose that the sample of M&A deals has two bidders for each target company.

4.2.1 Examples

Example 1. Suppose that bidders in the same auction offer exact same deal terms $X_{i,j}$ and only differ in the price per share: high bidder k always offers a 10% higher premium over the market price to the target than low bidder j. Also, suppose that in the sample, low bidders are selected by targets with a 20% probability. Equation (1) implies that a low bidder wins against a high bidder when $v_{i,j} - v_{i,k} \geq 0$. Because there is no within-auction variation in $X_{i,j}$, this inequality can be re-written as $\varepsilon_{i,j} \geq \varepsilon_{i,k} - (b_{i,j} - b_{i,k}) = \varepsilon_{i,k} + 10\%$. We want to find a combination of β and σ_ε that matches the model-implied probability of a low bidder winning $\Pr(W_{i,j} = 1, W_{i,k} = 0) = \Pr(\varepsilon_{i,j} \geq \varepsilon_{i,k} + 10\%)$ with the empirical probability of 20%. No variation in $X_{i,j}$ in this sample means that β cannot be identified. However, a unique σ_ε can be found that matches the probabilities.[4]

Example 2. Suppose now that bidders in the same auction offer the same price per share and differ in exactly one deal term l (e.g., the due diligence closing condition): bidder k does not include this deal term and therefore $X_{i,k,l} = 0$, while $X_{i,j,l} = 1$ for bidder j. Also, suppose that in the sample, bidders that include term l are selected by targets with a 40% probability. Equation (4.1) implies that in the absence of within-auction variation in $b_{i,j}$, a bidder that includes term l wins when $\varepsilon_{i,j} \geq \varepsilon_{i,k} - (X_{i,j,l} - X_{i,k,l})\beta_l = \varepsilon_{i,k} - \beta_l$. We want to find a combination of β and σ_ε that matches the model-implied probability of such a bidder winning $\Pr(W_{i,j} = 1, W_{i,k} = 0) = \Pr(\varepsilon_{i,j} \geq \varepsilon_{i,k} - \beta_l)$ with the empirical probability of 40%. This immediately implies a negative β_l: the term makes a target apply a discount to offers. Fixing σ_ε, a unique β_l can be found that matches the probabilities.

Of course, if our sample includes deals in which there is within-auction variation in both prices per share and deal terms then both σ_ε and β can be identified by matching model-implied and empirical probabilities of various offers winning and losing.

[4] A low σ implies a high probability density of $(\varepsilon_{i,j}, \varepsilon_{i,k})$ around zero and therefore a low $\Pr(W_{i,j} = 1, W_{i,k} = 0)$; this probability grows with σ.

We also discuss estimation of standalone target values $v_{i,0} = \gamma + \varepsilon_{0,j}$, which targets use to filter out low bids.[5] These are not necessarily equal to market values. In the presence of standalone values, bidder j wins against bidder k when $v_{i,j} - v_{i,k} \geq 0$ and $v_{i,j} - v_{i,0} \geq 0$.

Example 3. Suppose, like in Example 1, that deal terms $X_{i,j}$ within the auction are the same, and that high bidder k always offers a 10% higher premium than low bidder j. Also, suppose that a fraction of the sample has high-premium offers, such that they are extremely unlikely to be below a target's standalone value; in this subsample, low bidders are selected by targets with a 20% probability. The model-implied probability of a low bidder winning a high-premium contest conditional on a successful deal is $\Pr(W_{i,j} = 1, W_{i,k} = 0 | W_{i,0} = 0) \approx \Pr(W_{i,j} = 1, W_{i,k} = 0) = \Pr(\varepsilon_{i,j} \geq \varepsilon_{i,k} + 10\%)$. Example 1 shows that σ_ε can be found to match this probability to 20%. Finally, suppose that the remaining fraction of the sample has low-premium offers, such that a target's standalone value is often above at least one offer; in this subsample, low bidders are selected by targets with a 13% probability. If noise term $\varepsilon_{i,j}$ is, e.g., Normally distributed then the model-implied probability of a low bidder winning a low-premium contest conditional on a successful deal is $\Pr(W_{i,j} = 1, W_{i,k} = 0 | W_{i,0} = 0) < \Pr(W_{i,j} = 1, W_{i,k} = 0)$.[6] This probability is decreasing in γ, which provides identification for this parameter. Figure 1 illustrates this example.[7]

4.2.2 Formal model

Our empirical model formalizes the intuition developed via the above three examples. As is clear from the description of the data, some M&A contests include multiple rounds of formal bids. The complexity of the empirical model hinges on the assumption of whether or not targets have commitment power to drop weak bidders between rounds. In the absence of such commitment power, the model is simple because only the final offer made by each bidder determines a target's choice of the winner $W_{i,j}$. Here, we present this simple version of the model; section B.2 presents a more complex version of the model in which bids across multiple rounds determine target choices.

[5] In the auction literature, standalone values are known as reservation values. See, e.g., Gentry and Stroup (2019) who estimate and discuss the impact of reservation values in the context of M&A.

[6] This result is true for many families of distributions as is therefore relatively nonrestrictive.

[7] While a subsample of deals with at least two bidders for each target company is necessary to identify standalone values from target decisions, these values of course impact recovery of valuations (and, in turn, other parameter estimates) in single-bidder deals, especially when offers are low. Moreover, once we incorporate bidder valuations into the model to address an omitted variable concern in section 4.4.1, bidder preferences in both single- and multiple-bidder deals contain additional information to sharpen identification of standalone values.

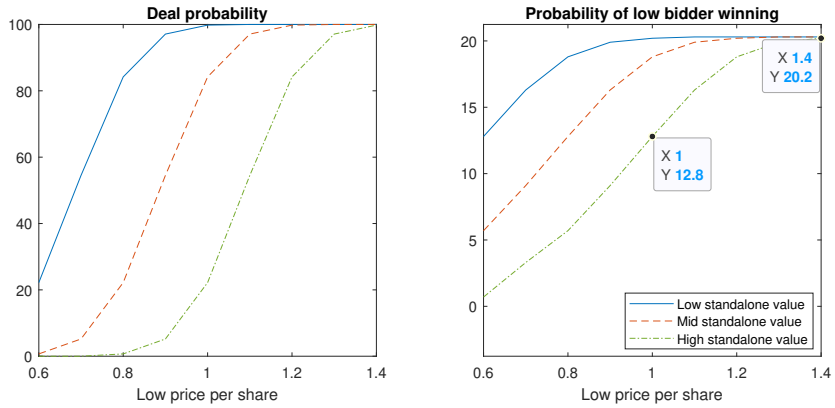

Figure 1: Probability of a successful deal and probability of a low bidder winning conditional on a deal in a two-bidder contest with a reservation value. The horizontal axis shows offer $b_{i,j}$ of the low bidder as a fraction of a target's market value. The high bidder makes a 10% higher offer. Bidders do not include any other deal terms: $X_{i,j} = 0$. Target valuations for bids are described by equation (4.1). The standalone target value is $v_{i,0} = \gamma + \varepsilon_{0,j}$. Noise term $\varepsilon_{i,j}$ is Normally distributed with standard deviation $\sigma_\varepsilon = 0.085$. Low, mid, and high values of expected reservation value $\gamma \in \{0.8, 1, 1.2\}$ correspond to different graphs.

Let target i's (log) valuation for bid j be

$$v_{i,j} = b_{i,j} + X'_{i,j}\beta_{t_{i,j}} + \varepsilon_{i,j}. \tag{4.3}$$

In contrast to equation (4.1), we allow for bidder type-specific value of deal terms $\beta_{t_{i,j}}$ where $t_{i,j} \in \{s, f\}$: deal backgrounds identify bidders as strategic or financial. Additionally, to make target valuations and bids comparable across deals, $v_{i,j}$ and $b_{i,j}$ are, correspondingly, the (log) target valuation and (log) price per share in the offer scaled by the unaffected market price per share of the target company.[8]

Next, let target i's standalone value be

$$v_{0,j} = Y'_i\gamma + \varepsilon_{i,0}. \tag{4.4}$$

Controls $Y_{i,j}$ include target and economy characteristics but not offer terms, as the target does not bid for itself to stay standalone.

[8]As explained in the data section, in the absence of an early press release or leak about ongoing deal negotiations, we select the market price per share 4 weeks before the announcement of the deal; otherwise, we use the market price per share 1 day before the market learns about the ongoing deal.

If bidder 1 is selected by the target as the winner, we infer that

$$v_{i,1} \geq v_{i,j},\ j > 1; \tag{4.5}$$

$$v_{i,1} \geq v_{i,0}. \tag{4.6}$$

First, the target values bidder 1's offer above any other offer; second, the target values it more than its standalone value, or else it has no reason to sell itself.

If bidder $j > 1$ is not selected by the target, we know that the target values its offer below the offer by bidder 1. However, we are unable to impose further ranking on losing offers.[9]

4.3 Estimation approach

One approach to recover β, σ_ε, and γ is to estimate the joint likelihood of all target decisions across deals via the Maximum Likelihood method. However, this approach is prohibitively computationally intensive. For example, even a single deal with n bidders involves calculation of $\Pr(v_{i,1} \geq v_{i,j}, v_{i,1} \geq v_{i,0}),\ j > 1$ in a $n+1$-dimensional space of valuations, and such probabilities must be computed for multiple deals and multiple sets of parameters while the Maximum Likelihood method searches for the best estimate. This computational problem is further exacerbated when we incorporate unobservable bidder valuations for targets as an omitted variable in section 4.4.1, leading to calculations in a $2n+1$-dimensional space of target and bidder valuations.

Instead, our approach is to use the Gibbs sampler. To assure convergence, we rescale and relabel equations (4.3) and (4.4) so that $v_{i,j} = X'_{i,j}B_{t_{i,j}} + \varepsilon_{i,j}$ and $v_{0,j} = Y'_{i,j}\Gamma + \varepsilon_{0,j}$. Here, $X'_{i,j}$ now includes price per share $b_{i,j}$; $B_{t_{i,j}}$ includes bidder type-independent coefficient B_0 of $b_{i,j}$; the standard deviation of the noise term is 1; and original parameters in equations (4.3) and (4.4) are $\beta_{t_{i,j}} = \frac{B_{t_{i,j}}}{B_0}$, $\sigma_\varepsilon = \frac{1}{B_0}$, and $\gamma = \frac{\Gamma}{B_0}$. Each iteration of the sampler sequentially draws target valuations for the winning bidder and losing bidders; standalone target value; and parameters $B_{t_{i,j}}$ and Γ. Formally:

1. We set the number of burn-in iterations N_b equal to 5,000, which is sufficient for the Gibbs sampler to start producing a stationary distribution of valuations and parameters. We also set the number of subsequent iterations N where draws are made from the stationary distribution, and can therefore be analyzed, equal to 50,000. We set initial target

[9] In the version of the model in which targets have commitment power to drop weak bidders between rounds of bidding presented in section B.2, we are able to impose a partial ordering on losing offers submitted in different rounds. Additionally, we tried to impose restrictions $v_{i,j} \geq v_{i,0},\ j > 1$ with the idea that any bidder who has made it into formal rounds of bidding is sufficiently highly valued by the target, but our estimation results were qualitatively unaffected.

valuations and standalone values $v_{i,j,-N_b}$ equal to zero; set initial parameters $B_{t_{i,j},-N_b}$ and Γ_{-N_b} equal to zero; and fix the standard deviation of the noise term at one. Finally, we use conventional diffuse priors for parameters $B_{t_{i,j}}$ and Γ.

2. In each iteration $k = -N_b + 1..N$:

   a. For each deal i, we sequentially draw:

      i. Target valuation $v_{i,1,k} = X'_{i,1} B_{t_{i,1},k-1} + \varepsilon_{i,1,k}$ for the winning bidder, where $\varepsilon_{i,1,k}$ is a truncated standard Normally distributed noise term such that $v_{i,1,k} \geq v_{i,j,k-1},\ j > 1$ and $v_{i,1,k} \geq v_{i,0,k-1}$;

      ii. Target valuations $v_{i,j,k} = X'_{i,j} B_{t_{i,j},k-1} + \varepsilon_{i,j,k},\ j > 1$ are truncated standard Normally distributed noise terms such that $v_{i,j,k} \leq v_{i,1,k}$;

      iii. Standalone target value $v_{i,0,k} = Y'_i \Gamma_{k-1} + \varepsilon_{i,0,k}$, where $\varepsilon_{i,0,k}$ is a truncated standard Normally distributed noise term such that $v_{i,0,k} \leq v_{i,1,k}$.

   b. We estimate:

      i. Coefficients from the OLS regression of simulated target valuations $\hat{B}_{t_{i,j},k} = (X'X)^{-1} X' v_{i,j,k},\ j \geq 1$;

      ii. Coefficients from the OLS regression of simulated standalone target values $\hat{\Gamma}_k = (Y'Y)^{-1} Y' v_{i,0,k}$.

   c. We draw:

      i. Parameters $B_{t_{i,j},k} = \hat{B}_{t_{i,j},k} + \eta_{B,k}$, where $\eta_{B,k}$ is a Normally distributed noise term with the mean of zero and the variance of $(X'X)^{-1}$;[10]

      ii. Parameters $\Gamma_k = \hat{\Gamma}_k + \eta_{\Gamma,k}$, where $\eta_{\Gamma,k}$ is a Normally distributed noise term with the mean of zero and the variance of $(Y'Y)^{-1}$.

3. For $k = 1..N$, we analyze distributions of $\beta_{t_{i,j},k} = \frac{B_{t_{i,j},k}}{B_{0,k}}$, $\sigma_{\varepsilon,k} = \frac{1}{B_{0,k}}$, and $\gamma_k = \frac{\Gamma_k}{B_{0,k}}$ to determine statistical significance and economic impact of deal terms on valuations.

4.4 Omitted variables

In addition to dealing with unobservability of target valuations for bids, which is our main focus, we address classic omitted variable issues. First, we link target valuations for bids and bidder valuations for targets. Second, we explain how deal terms that are observable for some but not all bidders can be incorporated into our analysis.

[10] Recall that the standard deviation of noise term $\varepsilon_{i,j,k}$ in rescaled valuations is fixed at one.

4.4.1 Target vs bidder valuations

Bidder valuations for targets can matter to targets beyond received offers. For example, in a stock offer, target shareholders become shareholders of a combined company, and therefore care about synergies from the deal. These synergies are captured by bidder valuations.

To recover bidder valuations in free-form M&A contests, we modify the approach of Gorbenko and Malenko (2014) and Gorbenko (2019). In the absence of hard rules and commitment on the part of participants, any formal model of an M&A contest designed to recover valuations from offers risks omitting or misspecifying important elements of a process. Instead, the informal approach is to come up with a few economic assumptions that are true across a wide spectrum of contests. Specifically, let (log) bidder j's valuation for target i be

$$u_{i,j} = Z'_{i,j}\delta_{t_{i,j}} + \eta_{i,j}. \tag{4.7}$$

Consistent with equation (4.3), the (log) bidder valuation is scaled by the unaffected market price per share of the target company. Controls $Z_{i,j}$ include target and economy characteristics. Finally, both coefficients $\delta_{t_{i,j}}$ and the standard deviation of the noise term $\tau_{t_{i,j}}$ are bidder type-specific.

Next, we impose three economic assumptions that hold for rational bidders and targets in a broad variety of M&A contests. First, bidders do not make formal offers that exceed their valuations. Second, bidders do not allow a rival to win at an offer they are willing to make, or else there are incentives to outbid the rival. Third, at least the winning bidder's valuation must be above the standalone target value, or else this offer will not be accepted.[11]

If bidder 1 is selected by the target as the winner, we infer that

$$u_{i,j} \geq b_{i,j},\ j \geq 1; \tag{4.8}$$

$$u_{i,j} \leq b_{i,j} + (v_{i,1} - v_{i,j}),\ j > 1; \tag{4.9}$$

$$u_{i,1} \geq v_{i,0}. \tag{4.10}$$

Inequalities (4.9) and (4.10) are different from Gorbenko and Malenko (2014) and Gorbenko (2019) because they do not analyze targets valuing additional deal terms. In our setting, to outbid the winning bidder, losing bidder j must increase its offer value to at least $v_{i,1} = b_{i,1} + X'_{i,1}\beta_{t_{i,1}} + \varepsilon_{i,1}$, but is mindful that it will be valued at $v_{i,j} = b_{i,j} + X'_{i,j}\beta_{t_{i,j}} + \varepsilon_{i,j}$. Equating the two target valuations, bidder j's price per share must be at least as high as $v_{i,1} - (X'_{i,j}\beta_{t_{i,j}} + \varepsilon_{i,j}) = b_{i,j} + (v_{i,1} - v_{i,j})$. Because bidder j does not outbid the winning

[11] Gorbenko and Malenko (2014) and Gorbenko (2019) impose the third assumption on all bidders with formal offers. Robustness checks show that this alternative assumption does not qualitatively change the results.

bidder, its valuation for the target must satisfy inequality (4.9). It simplifies to $u_{i,j} \leq b_{i,1}$ if additional deal terms and noise do not impact target valuations. Thus, in our setting not only can bidder valuations impact target valuations but also target valuations are important to recover bidder valuations from observable offers. Additionally, unlike in the earlier literature we estimate standalone target valuations instead of assuming that the market value of the target captures them, leading to inequality (4.10). Gorbenko (2019) explains identification of bidder valuations in informal models of asset sales.

Finally, we adjust the model of target valuations for bids. We continue using equation (4.3), but now controls $X_{i,j}$ can also include moments of bidder valuations given offers submitted by deal participants, such as, e.g., expected valuation $\mathbb{E}[u_{i,j}|b_i, v_i]$[12], as well as their interactions with deal terms and target and economy characteristics. We incorporate estimation of bidder valuations into step 2 of the Gibbs sampler estimation algorithm described in section 4.3.[13]

4.4.2 Partially observable deal terms

Some deal terms, e.g., termination fees are reported in deal backgrounds for winning bidders and only a subset of losing bidders. To study the impact of such terms on target decisions via OLS equation (4.2), we would need to drop bidders for whom these terms are not reported. Worse, to study the impact of such terms on target valuations via the model presented in section 4.2.2 and the Maximum Likelihood estimation method, we would need to drop entire deals, in which these terms are not reported for all bidders. MCMC and specifically the Gibbs sampler allows us to avoid this problem by adding a data augmentation step at the beginning of step 2 of the estimation algorithm described in section 4.3.

Let term l be a continuous non-negative variable that is observable for subset $(i, j) \in J$ of bidders. Step 2 of the Gibbs sampler now starts with estimating a predictive OLS regression for (log) term l in this subset:

$$\log X_{i,j,l} = S'_{i,j}\theta + \nu_{i,j}, \ \ (i, j) \in J, \tag{4.11}$$

where $S_{i,j}$ includes other deal terms, target and economy characteristics, and target decision $W_{i,j}$ to account for differences in the term offered by winning and losing bidders. In each iteration k, we use the estimates of coefficients $\hat{\theta}$ and the standard deviation $\hat{\sigma}_\nu$ to draw

[12] Because bidder valuations are private, targets have to infer posterior distributions of these valuations.

[13] In each iteration k, step 2.a of the algorithm concludes with draws of bidder valuations $u_{i,j,k}$ that respect inequalities (4.8)–(4.10) and evaluates moments of these valuations that later act as controls in the OLS regression of target valuations; step 2.b concludes with the OLS estimation of $\hat{\delta}_k$ and $\hat{\tau}_{t_{i,j},k}$; step 2.c concludes with draws of parameters δ_k and $\tau_{t_{i,j},k}$ to be used in the next iteration.

parameters θ_k and $\sigma_{\nu,k}$.[14] We then use these parameters to draw iteration-specific missing term l in subset $(i,j) \notin J$ of bidders:

$$\log X_{i,j,l,k} = S'_{i,j}\theta_k + \nu_{i,j,k},\ \nu_{i,j,k} \sim N(0, \sigma^2_{\nu,k}),\ (i,j) \notin J. \tag{4.12}$$

The remainder of the iteration described in step 2 of the Gibbs sampler remains the same, as we treat observable and simulated terms equally. Korteweg (2013) provides additional detail on the use of data augmentation to fill in missing data in finance.

5 Estimation Results

We begin by discussing the estimation results from the model without bidder-type heterogeneity, in which the coefficients on all deal terms are restricted to be identical across bidder types. Throughout, estimated coefficients are interpreted as percentage changes in the target's valuation of a bid relative to an otherwise identical offer that omits a given term. Table 6 summarizes these estimates. Columns (1)–(3) examine the effects of due diligence, financing, antitrust and other regulatory approval conditions, and exclusivity. All deal terms have statistically significant effects on target valuations, and the estimates are stable across specifications. Columns (4)–(6) incorporate additional terms: whether the bid includes a CVR component, the share of consideration paid in cash, and the termination fee.

Due diligence and financing conditions both reduce target valuations. In contrast, regulatory conditions and exclusivity have a positive effect. Based on column (3), due diligence reduces target valuation by 9–15%, financing conditions by 24–31%, regulatory conditions increase valuation by 13–16%, and exclusivity increases valuation by 10–12%.

Consistent with conventional wisdom, we find that targets value cash bids at a premium relative to equity-financed offers. A ten-percentage-point increase in the cash component raises the target's valuation by approximately 2.7%. CVRs are valued negatively, a pattern that reflects an accounting convention: reported offer prices include the CVR payment even though the payment is contingent on future events. Termination fees are weakly positive but statistically insignificant.

Tables 7 and 8 present results from the model in which coefficients are allowed to vary by bidder type. These specifications also estimate standalone target valuations and control for expected bidder valuations. Interaction terms are included to illuminate underlying

[14] First, we draw $(\sigma^2_{\nu,k})^{-1}$ from a one-Dimensional Wishart (Gamma) distribution with $N_J - N_S$ degrees of freedom (the number of observations in J minus the number of controls in S) and scale matrix $(\hat{\sigma}^2_\nu)^{-1}$. Second, $\theta_k = \hat{\theta} + \nu_k$ where ν_k is a Normally distributed noise term with the mean of zero and the variance of $\sigma^2_{\nu,k}(S'S)^{-1}$.

mechanisms. The bidder-type–specific estimates broadly mirror the baseline results but reveal several important refinements.

Due diligence reduces target valuations only when included by strategic bidders. This asymmetry likely reflects targets' reluctance to disclose sensitive information to potential competitors who retain an option to withdraw. The financing condition remains the most influential deal term, with valuation discounts of 20–22% for strategic bidders and 40–53% for financial bidders. The larger discount for financial sponsors is consistent with their more limited flexibility: strategic acquirers may substitute toward equity financing when credit conditions deteriorate, whereas private equity sponsors must abandon the transaction if debt financing becomes unavailable.

The premium associated with regulatory conditions remains positive for strategic bidders, although it is only marginally significant. Moreover, the premium is essentially zero for cash offers and becomes negative in transactions involving targets with both high market shares and high cash components. This pattern reflects two opposing forces. Regulatory conditions introduce uncertainty—delays, potential remedies, and the risk of failure—yet they also tend to arise in transactions involving significant consolidation and potentially large synergies. Targets capture a portion of these synergies when they retain an equity stake in the combined firm. Hence, in stock offers, the expected synergy gains offset regulatory risk, yielding a positive effect; in cash offers, particularly those involving targets with market power, the risk effect dominates, generating a negative premium.

Exclusivity clauses are valued positively for both strategic and financial bidders. This raises a natural question: if exclusivity increases valuation, why don't all bidders request it? The answer lies in the interaction between exclusivity and due diligence. Exclusivity is a bilateral commitment—it grants the bidder an opportunity to conduct deeper diligence but also subjects it to greater scrutiny and requires substantial managerial time. Only relatively high-quality bidders find it optimal to incur these costs. In this sense, exclusivity serves as a costly signal of bidder quality. Consistent with this interpretation, once exclusivity is interacted with due diligence and we control for bidder characteristics, the coefficient becomes insignificant for strategic bids (Table 7). For financial bidders, the exclusivity premium persists, but the combined premium associated with both exclusivity and due diligence is statistically indistinguishable from zero.

The premium for cash bids by strategic bidders remains positive but is only marginally significant. Moreover, the premium declines with the bidder's expected valuation, implying that targets prefer stock offers from high-valuation bidders. Because nearly all financial bids are all-cash, we cannot separately estimate a financial-bidder–specific coefficient on the cash component.

The bidder's expected valuation also affects target valuations. The coefficient of 0.189 in Table 7, together with the estimated volatility of the bidder's unobservable component (0.230), implies that—holding all deal terms fixed—a one-standard-deviation increase in the bidder's expected valuation increases the target's valuation by $e^{0.189\times 0.230} - 1 = 4.4\%$. Two mechanisms likely contribute to this effect. First, bidders with higher valuations are more committed to completing the transaction, reducing execution risk. Second, bidder valuation proxies for expected synergies, which targets partially capture in stock-financed transactions. Assuming that targets do not share in post-merger gains in all-cash deals, we isolate these effects by interacting bidder valuation with the method of payment. The negative interaction term accounts for roughly one-third of the total effect, suggesting that approximately two-thirds of the positive association reflects reduced execution risk rather than shared synergies.

6 Interpretation of Magnitudes

Our results show that price is only one dimension of what targets value in takeover bids. Non-price deal terms materially affect how targets evaluate competing offers, and the associated economic magnitudes are large. This section examines whether these magnitudes are reasonable in light of two key channels highlighted by our analysis: execution risk and the length of the interim period.

Risk of Deal Failure. We begin by examining the consequences of deal failure for target shareholders. Using SDC data for publicly announced mergers from 2012–2021, we identify 1,424 deals for which a termination reason is reported. In 85 cases (roughly 6%), the acquirer withdrew its bid. Thirty-three withdrawals occurred because the target accepted a superior proposal; 24 were due to antitrust or other regulatory issues; and 13 were attributed to closing conditions, a category that includes failure to secure financing, adverse economic conditions, material adverse effects, and pending litigation.

For each withdrawn deal, we compute the target's share-price response from announcement to withdrawal. Withdrawals due to closing conditions are associated with an average price decline of 38% relative to the post-announcement price and 29.6% relative to the unaffected price (defined as the price four weeks prior to announcement). Regulatory-related withdrawals produce smaller but still significant declines of 12% and 6%, respectively. To account for broader market movements, we also compute cumulative abnormal returns (CARs) from 20 days prior to announcement to one day after withdrawal. For closing-condition failures, the average CAR is -18.7%; for regulatory failures, it is -30.0%. These large losses

demonstrate that deal failure imposes substantial costs on targets, consistent with bidders demanding compensation for conditions that increase the likelihood of termination.

Implied Failure Probability. We next use these return patterns, together with our structural estimates, to infer the implied failure probability associated with contractual conditions. Suppose target shareholders have CRRA utility with coefficient $\gamma > 0$ and choose between a non-contingent bid with premium b_N and a contingent bid with premium $b_C = (1+m)b_N$. If the deal fails due to the contingency, the target earns a gross return of R_F. Let π_F denote the probability that the deal fails because of the contingency and π_0 the probability of failure for other reasons. Shareholder indifference implies

$$(1 - \pi_F - \pi_0)b_C^{1-\gamma} + \pi_F R_F^{1-\gamma} = (1 - \pi_0)b_N^{1-\gamma}.$$

Solving for π_F yields

$$\pi_F = \frac{\left[1 - (1+m)^{1-\gamma}\right](1 - \pi_0)}{\left(\frac{R_F}{b_N}\right)^{1-\gamma} - (1+m)^{1-\gamma}}.$$

Assume a 40% premium ($b_N = 1.4$) and note that failures due to closing conditions produce an average return of $R_F = 0.813$ relative to the unaffected price. Given the 21% valuation discount associated with a financing contingency for strategic bidders, the implied increase in failure probability is 0.096 for $\gamma = 4$ and 0.042 for $\gamma = 6$. For financial bidders, the estimated discount is 40%, corresponding to implied increases in failure probability of 0.134 and 0.054 for $\gamma = 4$ and $\gamma = 6$, respectively. These values fall well within the range of completion-risk estimates observed in practice.

Time to Completion. Even when deals are successfully completed, non-price terms affect the duration of the interim phase, imposing both direct and indirect costs on targets. Table 9 shows that deals involving any of the four conditions take significantly longer to close. In strategic acquisitions, due diligence provisions extend time to completion by an average of 24 days, financing contingencies by 61 days, and regulatory conditions by 82 days. The effects are directionally similar, though smaller, for financial acquisitions.

Table 10, which estimates the joint effect of each term, confirms these patterns: financing contingencies increase time to completion by 17–23%, and regulatory conditions by 52–55%. Exclusivity provisions reduce time to completion by 6–13%, consistent with the interpretation that exclusivity serves as a commitment device that mitigates delays and accelerates closing.

7 Conclusion

Using a new hand-collected dataset of 673 U.S. mergers (2015–2021) and a structural framework that recovers target and bidder valuations from observed bidding outcomes, we document that non-price deal terms have large and economically meaningful effects on target valuations. Financing contingencies and due-diligence requirements generate substantial discounts—particularly for financial sponsors and strategic bidders, respectively—while regulatory provisions produce positive premia in stock offers but not in all-cash bids. Bidder valuations also affect target valuations, especially when targets retain an equity stake, indicating that the interaction between bidder strength and payment method shapes how targets assess competing offers.

To interpret these magnitudes, we examine the channels through which deal terms operate. Financing and regulatory conditions are associated with significantly longer times to completion, whereas exclusivity shortens the interim period. Market reactions to withdrawn deals show sharp negative returns when transactions fail due to financing or regulatory conditions. Combined with these estimates, a back-of-the-envelope calculation implies that the valuation discount from a financing contingency corresponds to an increase in perceived failure risk of roughly 5–10% for strategic bidders and 10–13% for financial bidders.

Taken together, our results show that boards trade off price against certainty, timing, and information leakage, and that the allocative efficiency of corporate control depends on the full bundle of contractual provisions rather than on headline price alone. Price is only one dimension along which merger bids compete. The framework developed in this paper provides a tractable approach for evaluating multi-attribute offers without assuming a posted scoring rule or specific model of the takeover contest.

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8 Tables and Figures

Table 1: Evidence from Public Bidding

Panel A: Frequency of Competing Bids			
	Overall	Strategic	Financial
Total Deals	3,033	2,165	868
# w/ competing bids	183	122	61
	(6%)	*(6%)*	*(7%)*
# equal bids	5	3	2
	(3%)	*(2%)*	*(3%)*
# lower bid won	55	29	26
	(30%)	*(24%)*	*(43%)*
# first bidder won	99	60	39
	(54%)	*(49%)*	*(64%)*

Panel B: Deals Where Lower Bid Won					
Variable	Mean	SD	10%	Median	90%
Winning Deal Value ($mm)	2,428	5,481	70	386	6,806
Discount (%)	12.0	9.9	3.6	8.3	25.0
Termination Fee (%)	3.5	1.7	2.1	3.5	4.8
Reverse Term. Fee (%)	5.1	1.7	3.2	5.1	7.2
Number of Deals	55	55	55	55	55

Panel C: Deals Where Lower Bid Won and Bids were All Cash					
Variable	Mean	SD	10%	Median	90%
Winning Deal Value ($mm)	1,247	3,711	49	317	2,082
Discount (%)	11.2	9.1	3.5	7.2	21.1
Termination Fee (%)	3.8	1.9	2.3	3.7	4.6
Number of Deals	33	33	33	33	33

Notes: Deals details are from SDC for deals announced between Jan 2002 and 11 Jun 2025, with deal size > $10mm, where the target nation is US, target Industry is not the financial sector and the target is publicly listed, but not OTC or pink-sheet. Sample is restricted to deals where acquirer seeks to own 100% of the target after the acquisition. Panel A reports frequencies of competing public bids post-2002. Panel B summarizes characteristics of deals in which a lower-priced bid won. Panel C summarizes characteristics of deals were the lower-priced bid won and the consideration was all cash. All dollar values are in millions; percentages are relative to deal value.

Table 2: Deal terms by bidder type

	Strategic	Financial	PE Portfolio Co.	Unknown	Overall
No. of Deals	497	131	7	0	635
No. of Bids	617	211	12	26	866
Bidders/ Deal	6.149	13.229***	10.857		7.661
Formal Bids/ Deal	1.241	1.611	1.714		1.364
Formal Bid	1.457	1.308***	1.381	1.232	1.413
Winning Bid	1.465	1.299***	1.222		1.428
Diligence %	42	36	50	61.5	41.2
Financing %	8.1	15.6***	8.3	30.8	10.6
Antitrust/ Reg %	33.7	11.8***	25	7.7	27.5
Exclusivity %	27.9	28	33.3	30.8	28.1
All-cash bid %	63.7	97.6***	91.7	92.3	73.2
Avg. term. fee %	3.3	3	2.7		3.2
CVR %	3.6	1.9	8.3	3.8	3.2

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Summary of deal terms, including the proportion (%) of formal bids (winning or losing) for bidders of each type that have conditions pertaining to due diligence, financing, exclusivity, or antitrust concerns attached to them. Formal Bid and Winning Bid are scaled by unaffected market price. Avg. termination fee % are for the winning bids. Significance levels indicate whether the bids or proportions of deal terms for financial bidders are significantly different from those for strategic bidders. Deals where target exchange in SDC is listed as OTC or Pink sheet are excluded from this analysis.

Table 3: Deal terms by bidder type

	HiTec	Hlth	Manuf	Cnsmr	Other	Total
No. of Deals	228	127	108	87	85	635
No. of Bids	339	155	129	126	117	866
% won by Strategic	70.6***	92.1***	88**	77	67.1**	78.3
% won by Financial	29.4	7.9	12	23	32.9	21.7
Bidders/ Deal	8.272	5.205***	4.824**	10.816***	10.071***	7.661
Formal Bids/ Deal	1.487	1.22***	1.194**	1.448***	1.376***	1.364
Formal Bid	1.381	1.702***	1.34**	1.323***	1.301***	1.413
Winning Bid	1.394	1.707***	1.339**	1.33***	1.315***	1.428
Diligence %	43.7	48.4*	27.1***	42.1	39.3	41.2
Financing %	12.4	3.9***	4.7**	18.3***	12.8	10.6
Antitrust/ Reg %	23.6**	27.7	31.8	31.7	29.1	27.5
Exclusivity %	36***	26.5	17.8***	20.6*	26.5	28.1
All-cash bid %	78.8***	71	55***	86.5***	65.8*	73.2
Avg. term. fee %	3.2	3.4	3.2	3.1	3	3.2
CVR %	1.2**	13.5***	0**	1.6	0.9	3.2

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Summary of deal terms by industry. Formal Bid and Winning Bid are scaled by unaffected market price. Significance levels indicate whether the bids or proportions of deal terms for a particular column (industry) are significantly different from the average for other industries. Deals where target exchange in SDC is listed as OTC or Pink sheet are excluded from this analysis.

Table 4: Descriptive Statistics of Target Characteristics in all deals, and by bidder type

Category	Winning Bid	Size	Leverage	Q-Ratio	Cash Flow	Cash	R&D
All Deals	1.428	2,770	0.248	2.156	-0.037	0.237	0.09
	(1.332)	(703)	(0.188)	(1.42)	(0.046)	(0.124)	(0.015)
	[0.511]	[7,574]	[0.232]	[2.635]	[0.293]	[0.256]	[0.152]
Won by Strategic Bidder	1.465	3,037	0.236	2.265	-0.057	0.258	0.1
	(1.349)	(654)	(0.228)	(2.86)	(0.324)	(0.149)	(0.022)
	[0.556]	[8,421]	[0.228]	[2.86]	[0.324]	[0.27]	[0.165]
Won by Financial Bidder	1.298	1,871	0.296	1.757	0.032	0.161	0.048
	(1.269)	(1,164)	(0.243)	(1.536)	(0.109)	(0.081)	(0.008)
	[0.261]	[2,806]	[0.243]	[1.536]	[0.109]	[0.18]	[0.075]
Won by PE Portfolio	1.222	612	0.147	1.883	0.082	0.224	0.12
	(1.207)	(269)	(0.181)	(1.173)	(0.068)	(0.137)	(0)
	[0.086]	[622]	[0.181]	[1.173]	[0.068]	[0.208]	[0.173]
t-Statistic of Difference	4.917	2.59	-2.517	2.738	-5.128	4.857	5.247

Summary of target characteristics across M&A deals in our sample. Median and standard deviation are mentioned in round and square parentheses. Deals where target exchange in SDC is listed as OTC or Pink sheet are excluded from this analysis. *Size* is equal to book value in $ millions. *Leverage* is the ratio of book value of debt to sum of market value of equity and book value of debt. *Q-Ratio* is the ratio of sum of market value of equity and book value of debt to book value of assets. *Cash Flow* is the sum of the last four quarterly cash flows and *Cash* is the sum of cash, short-term investments and marketable securities scaled by total assets. *Cash, Cash flow* and *R&D* are scaled by total assets.

Table 5: When the Highest Bidder doesn't win

	Financial Winner	Strategic Winner	All Deals
N	19	19	38
Bidders/ Deal	14.95	14.84	14.89
Formal Bids/ Deal	2.42	2.53	2.47
Avg Winning Bid	1.25	1.51	1.38
Avg Highest (Losing) Bid	1.35	1.75	1.55
Winning Pure Cash Bids (N)	19	13	32
Losing Pure Cash Bids (N)	14	13	27
Highest bidder type			
Financial Type	7	6	13
Strategic Type	9	8	17
Unknown Type	3	5	8
Conditions highest bid had (winner didn't)			
Financing	6	7	13
Diligence	2	2	4
Regulatory	4	1	5
Post Announcement	4	3	7
Other	2	3	5
Exclusivity	2	0	2
Withdrew	2	4	6

Summary of differences in bid features between the winning bidder, and the highest bidder, for deals in our sample where the bidder with highest per share bid lost. 'Bidders' is the count of participants who signed a confidentiality agreement with the target. All bid values are scaled by unaffected market price. Analysis is restricted to 'formal bids'. Portfolio companies of financial sponsors are included in 'Financial' bidders for this analysis.

Table 6: Estimation Results without Bidder Type Interactions

	Deal Terms					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Due Diligence	-0.163^{***}	-0.096^{**}	-0.114^{***}	-0.166^{***}	-0.107^{**}	-0.119^{***}
Financing	-0.371^{***}	-0.269^{***}	-0.276^{***}	-0.362^{***}	-0.310^{***}	-0.316^{***}
Antitrust/Regulatory	0.125^{**}	0.150^{***}	0.149^{***}	0.124^{**}	0.153^{***}	0.148^{***}
Exclusivity	0.108^{**}	0.122^{***}	0.118^{***}	0.107^{**}	0.101^{**}	0.101^{**}
Option (CVR)				-0.513^{***}	-0.421^{***}	-0.462^{***}
Percentage Cash				0.010	0.314^{***}	0.268^{***}
Termination Fee				-0.006	0.028^{*}	0.021
Controls						
Target standalone valuation	No	Yes	Yes	No	Yes	Yes
Bidder valuation	No	No	Yes	No	No	Yes

$^{***}p < 0.025$, $^{**}p < 0.05$, $^{*}p < 0.1$.

This table presents the estimation results for the baseline model. CVR refers to contingent value rights and is a dummy variable taking value 1 if the bid includes a CVR component. Termination fees are measured as a percentage of the deal value.

Table 7: Estimation Results with Bidder Type Interactions

	Valuation Coefficients	
	× Strategic	× Financial
Deal Terms		
Due diligence	−0.166 ***	−0.084
	(0.007)	(0.241)
Financing	−0.241 ***	−0.546 ***
	(0.003)	(0.000)
Antitrust/Reg	0.263	0.309 **
	(0.130)	(0.026)
× Percentage Cash	−0.174	
	(0.235)	
Exclusivity	0.131 **	0.157 *
	(0.047)	(0.064)
Termination fees	0.020	0.055 *
	(0.204)	(0.056)
Option (CVR)	−0.437 ***	−0.169 *
	(0.014)	(0.078)
Percentage Cash	0.169	
	(0.204)	
× Bidder Val.	−0.064	
	(0.313)	
Other Variables		
Exp. bidder valuation	0.189 **	
	(0.048)	
Vol. unobservable component	0.230 ***	
	(0.000)	
Controls		
Target valuation	Yes	Yes
Bidder valuation	Yes	Yes

$^{***}p < 0.025$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Estimation results for bidder-type dependent coefficients including interaction terms for Antitrust/Reg x Percentage Cash and Percentage Cash x Bidder Valuation. CVR refers to contingent value rights and is a dummy variable taking value 1 if the bid includes a CVR component. Termination fees are measured as a percentage of the deal value.

Table 8: Estimation Results with Bidder Type Interactions: Robustness checks

	Valuation Coefficients		
Model:	(1)	(2)	(3)
Deal Terms			
Due Diligence × Strategic	-0.152^{***}	-0.158^{***}	-0.176^{***}
Due Diligence × Financial	-0.077	-0.075	0.015
Financing × Strategic	-0.250^{***}	-0.230^{***}	-0.231^{***}
Financing × Financial	-0.624^{***}	-0.538^{***}	-0.517^{***}
Antitrust/Reg. × Strategic	0.120^{*}	0.108	0.121^{*}
× Perc. Cash × MktShare			-0.28
Antitrust/Reg. × Financial	0.325^{*}	0.375^{**}	0.394^{**}
Exclusivity × Strategic	0.123^{*}	0.121^{*}	0.096
Exclusivity × Financial	0.102	0.145^{*}	0.260^{**}
Exclusivity × Diligence × Strategic			0.050
Exclusivity × Diligence × Financial			-0.241
Option (CVR) × Strategic	-0.419^{***}	-0.410^{***}	-0.423^{***}
Option (CVR) × Financial	-0.641^{*}	-0.585^{*}	-0.543^{*}
Term. Fee × Strategic	0.018	0.021	0.024
Term. Fee × Financial	0.018	0.055^{**}	0.049^{*}
Perc. Cash	0.559^{***}		
Perc. Cash × Strategic		0.156	0.169^{*}
Perc. Cash × Bidder Val.	-0.344^{***}	-0.080	-0.067
Other Variables			
Exp. bidder valuation	0.400^{***}	0.205^{**}	0.198^{**}
Vol. unobs. Comp.	0.229^{***}	0.228^{***}	0.225^{***}
Controls			
Target valuation	Yes	Yes	Yes
Bidder valuation	Yes	Yes	Yes

$^{***}p < 0.025$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Estimation results for bidder-type dependent coefficients. Column (1) interacts method of payment with bidder valuation. Column (2) estimates the method of payment coefficient for strategic bidders. Column (3) interacts the antitrust/reg condition for strategic bidders with percentage cash x market share, and includes the due diligence x exclusivity interaction for each bidder type. CVR refers to contingent value rights and is a dummy variable taking value 1 if the bid includes a CVR component. Termination fees are measured as a percentage of the deal value. Perc. Cash is the percentage of the bid that is cash.

Table 9: Average Time to Completion

	No. of Deals	All Deals won	No Conditions	Any Condition	Diligence	Exclusivity	Financing	Regulatory
Strategic	497	127	102	140***	126***	109	163**	184***
		(93)	(88)	(101)	(88)	(81)	(112)	(139)
		[104]	[66]	[116]	[106]	[90]	[120]	[135]
Financial	138	107	101	112	110	112	121	141**
		(90)	(84)	(93)	(85)	(88)	(100)	(134)
		[73]	[81]	[65]	[69]	[67]	[73]	[73]
All	635	123	101	135***	123***	109	152**	180***
		(92)	(88)	(98)	(87)	(82)	(106)	(138)
		[98]	[70]	[109]	[100]	[86]	[110]	[131]

Notes: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Time to completion is the number of days between the announcement date and the completion date of the deal. Deals where target exchange in SDC is listed as OTC or Pink sheet are excluded from this analysis. Portfolio companies of financial sponsors are included in 'Financial' bidders for this analysis. Significance levels indicate whether the time to completion for deals where the winning bid with a particular condition is significantly different from deals where the winning bid had no condition. Medians are in round parentheses, and standard deviations are in square parentheses. Note that conditions are not mutually exclusive; a deal may have multiple conditions simultaneously.

Table 10: Time to Completion - OLS results

Dependent Variable:	Log(Time to Completion)				
Model:	(1)	(2)	(3)	(4)	(5)
Constant	3.426***				
	(32.76)				
Due Diligence	-0.0239	-0.0249	0.0026	0.0216	0.0154
	(-0.4664)	(-0.4860)	(0.0525)	(0.4086)	(0.2522)
Exclusivity	0.0122	0.0124	-0.0207	-0.0236	-0.0616
	(0.2305)	(0.2352)	(-0.3919)	(-0.4594)	(-1.003)
Financing	0.1213	0.1238*	0.1030	0.1276*	0.1337
	(1.628)	(1.664)	(1.379)	(1.687)	(1.502)
Regulatory	0.4187***	0.4131***	0.4188***	0.4221***	0.4418***
	(7.852)	(7.629)	(7.870)	(7.797)	(7.696)
Target size	0.1551***	0.1557***	0.1412***	0.1392***	0.1371***
	(10.45)	(10.51)	(9.140)	(9.106)	(8.142)
Due Diligence × Financial Bidder					0.0454
					(0.3992)
Exclusivity × Financial Bidder					0.1831*
					(1.698)
Financing × Financial Bidder					-0.0681
					(-0.4230)
Regulatory × Financial Bidder					-0.1625
					(-0.9466)
Target size × Financial Bidder					0.0094
					(0.2347)
Fixed Effects					
Type of Bidder		Yes	Yes	Yes	Yes
Industry			Yes	Yes	Yes
Announcement Year				Yes	Yes
Fit Statistics					
Observations	635	635	635	635	635
R^2	0.29191	0.29224	0.32360	0.33483	0.33911
Within R^2		0.29015	0.26603	0.26363	0.26836

Heteroskedasticity-robust co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Constant terms absorbed by fixed effects in models 2-5.

Time to completion is the number of days between the announcement date and the completion date of the deal. Target size is the log of the book value of target's assets. Deals where target exchange in SDC is listed as OTC or Pink sheet are excluded from this analysis. Portfolio companies of financial sponsors are included in 'Financial' bidders for this analysis.

Table 11: Reasons for Deal Withdrawals

Reason	No. of Deals	Fin. Acquiror	CAR (Ann.) (%)	CAR (Withdrawal) (%)	Price Change vs. Ann. (%)	Price Change vs. 4-week prior (%)
Superior Proposal	33	12	41.6	70.1	34.8	86.2
Regulatory	24	4	20.2	-30.0	-12.3	-6.0
Closing Conditions	13	4	32.5	-18.7	-38.1	-29.6
Acquirer related	7	2	10.4	0.2	-10.1	2.2
Other	8	2	13.1	49.3	12.7	33.1
Total (Withdrawn)	85	24				
Total Announced Deals	1,424	431				

Summary of reasons for withdrawal of deals. Sample is all deals in the SDC Platinum database announced between 2012 and 2021, where the target was a listed US company, not in the financials sector, deal value is at least $10 mm, and a definitive agreement was signed. Fin. Acquirer refers to whether the Acquirer in the deal withdrawn was a financial sponsor. CAR (Ann.) is calculated over a [-20, +1] trading days event window around the announcement date. CAR (Withdrawal) is calculated over a window of 20 trading days prior to Announcement date to 1 day after Withdrawal date. An estimation window of [-270, -21] trading days prior to the announcement date is used for CAR analysis. Closing conditions refer to conditions related to financing, economic conditions, Material Adverse Effect, litigations, or other conditions related to closing, other than regulatory or acquirer related. Regulatory conditions cover failure to obtain antitrust or other regulatory approvals. Acquirer conditions refer to conditions related to acquirer shareholder approval, or the acquirer getting acquired. 'Other' reasons include failure to complete due to target shareholder approval, or other conditions not covered above.

A Example of Deal Background

This appendix provides extracts from the background of the sale process of Barnes and Noble, as described in the target's proxy statement (DEFM14A) filed with the SEC. The italicized text highlights relevant portion of the text, which is used to populate the fields in Table 12.

Beginning on February 6, 2019, as authorized and directed by the Special Committee, representatives of Evercore contacted each potential counterparty that had expressed interest in participating in the sale process, as well as a number of additional potential counterparties across a range of industries at the direction of the Special Committee, to assess their interest in acquiring the Company.

Of the 56 potential counterparties contacted by Evercore, a group that included 17 strategic buyers and 39 financial sponsors, 21 entered into confidentiality agreements with the Company in connection with evaluating a strategic transaction. *One of those potential bidders was Elliott, which executed a confidentiality agreement on February 25, 2019.* Among the other potential bidders were: Mr. Riggio, who executed a confidentiality agreement on February 25, 2019; *a privately held independent retail company ("Company A"), which on February 22, 2019 extended the term of its confidentiality agreement dated April 18, 2018; a privately held large chain retail company ("Company B"), which executed a confidentiality agreement on January 26, 2019; a privately held industry participant ("Company C"), which executed a confidentiality agreement on January 16, 2019*; a private equity firm ("Company D"), which executed a confidentiality agreement on February 15, 2019; another private equity firm ("Company E"), which executed a confidentiality agreement on February 21, 2019; and Company X, which had previously entered into a confidentiality agreement in February of 2018. To ensure all potential bidders were operating under materially similar restrictions, Baker Botts requested all bidders, including those who had executed confidentiality agreements prior to the formation of the Special Committee and who had expressed a continued interest in the Company, to execute new agreements. In connection with this request, Company X's financial advisor informed Evercore that it was not interested in participating in the strategic alternatives process or in pursuing a transaction involving the Company, and Evercore subsequently informed the Special Committee of Company X's decision.

On March 18, 2019, each of Elliott, Mr. Riggio, Company A, Company B, Company C, Company D and Company E (together, the "First Round Bidders") submitted written non-binding proposals to acquire all of the outstanding shares of the Company at all-cash prices ranging from $6.00 to $8.50 per share, with Elliott's initial indication specifying a $6.50 price per share. In addition, Elliott's initial indication contained an alternative proposal in which

Elliott would combine the Company with Waterstones for a combination of $5.50 per share in cash and an aggregate 19% equity interest in the combined company for the Company's stockholders. Elliott's bid was the only bid that contained an alternative to an all-cash transaction. All of the initial proposals were subject to customary conditions, including the completion of due diligence and the parties' negotiation of mutually acceptable definitive documentation.

The Company received written, all-cash proposals from Elliott and Company B on May 22, 2019 and from Company A and Company C on May 23, 2019. Elliott's proposal offered to acquire the Company for $6.00 per share (a $0.50 reduction from Elliott's initial indication of interest submitted in March as a result of certain due diligence findings), included fully-committed debt and equity financing and noted that it had very limited remaining due diligence which could be completed within one business day of receiving access to the information. Elliott's proposal indicated that the offer would expire if not accepted by May 27, 2019, as Elliott stressed the importance of consummating a transaction expeditiously in order to permit Elliott to have sufficient time to implement its strategy for the 2019 holiday season. *Company A offered $6.15 per share, but Company A did not provide evidence of committed financing and requested a 45-day exclusivity period to complete due diligence and secure financing. Company B offered $7.00 per share, however, Company B cited a number of significant open due diligence items that could take two to three weeks to satisfy and provided no specifics on its sources of equity financing, indicating that sourcing equity could take an additional amount of time beyond two to three weeks. Company C offered $6.00 per share, included debt financing commitments with a number of open conditions, and indicated that due diligence would be completed within ten business days of receiving access to the information requested.*

Over the course of the next several days, Evercore, at the instruction of the Special Committee, engaged in discussions with representatives of each of the bidders that had submitted final proposals to confirm additional details regarding financing sources, remaining due diligence requirements and timing considerations. Evercore informed Elliott's representatives that the May 27, 2019 expiration date for their proposal did not provide the Special Committee with sufficient time to consider the merits of the various proposals received, and that Elliott had not offered a compelling enough price for the Special Committee to proceed exclusively with Elliott.

On May 27, 2019, Elliott submitted a revised indication of interest at an increased price of $6.50 per share, an 8.3% increase over its previous offer of $6.00 per share. Additionally, the revised offer included a brief "keep shop" period during which the Company could continue discussions with other potential acquirers that had submitted indications of interest at higher

per Share prices to Elliott's revised proposal, for a period of two weeks following Elliott's deadline of May 30, 2019 to execute a definitive merger agreement per the terms of their proposal. During this "keep shop" period, if Elliott's merger agreement was terminated in order for the Company to enter into a definitive agreement with respect to a superior proposal with one of such other potential acquirers that had previously submitted an indication of interest at a higher per Share price than Elliott's, Elliott would be entitled to expense reimbursement up to a cap of $4 million. Following the expiration of the two-week keep-shop period, Elliott proposed that a termination fee of $20 million would be payable in the event of any such termination. Elliott indicated that the revised offer would expire on May 28, 2019 if not accepted.

In light of the limited due diligence performed by Company A, the conditions included in its bid, the absence of committed financing, the lower price and the significant amount of additional time requested to complete a transaction, taking into account the advice of its legal and financial advisors, the Special Committee unanimously determined that Company A be eliminated from consideration. Also taking into account the advice of its legal and financial advisors, the Special Committee unanimously determined that Company B and Company C should be invited to continue in the process, pending receipt of their best and final offers. The Special Committee requested that Evercore inform Company A that it was eliminated from the process. Company A was informed accordingly later on May 28, 2019.

On May 28, 2019, Company C orally raised its offer from $6.00 per share to $6.75 per share and subsequently confirmed this revised offer in writing to the Special Committee on May 31st. The revised offer was predicated on a proposed rollover of Mr. Riggio's equity and an additional cash investment from Mr. Riggio. The revised offer included committed debt financing that was subject to a number of non-customary conditions and did not include committed equity financing.

On May 31, 2019, Company B informed Evercore that it had been unable to identify sources of equity financing for a transaction, and Evercore subsequently informed the Special Committee of Company B's communication.

On June 1, 2019, Company C submitted a revised draft of the merger agreement originally submitted by Company C on May 22, 2019, which removed the termination right for failure of Company C to obtain necessary financing and added a termination fee payable to the Company in the event Company C were to terminate the agreement under certain circumstances, in addition to certain other proposed changes primarily related to the Company's obligations in connection with facilitating Company C's debt financing. The revised mark-up of the draft merger agreement did not include a "hell or high water" provision requiring Company C to undertake any actions required to obtain regulatory clearance,

notwithstanding the regulatory concerns regarding a combination between Company C and the Company that had previously been communicated to Company C's advisors.

Evercore then updated the Special Committee as to discussions with Company C that had taken place since the previous Special Committee meeting, noting that negotiations with Company C had focused on Company C's approach taken in its draft merger agreement to allocate risk with respect to antitrust approval and the debt financing conditions from Company C to the Company. The Special Committee discussed with Evercore and Baker Botts the regulatory risks, the financing conditionality and the absence of committed equity financing. The Special Committee also discussed with Evercore and Baker Botts that the draft merger agreement did not include a "hell or high water" provision and that *Company C and Company C's counsel could not rule out the possibility of an extended antitrust review, including a second request. Baker Botts noted that it had also discussed with Company C's counsel the high likelihood of a second request during antitrust review of the transaction*, as well as potential processes that would have required the engagement of third-party experts to prepare materials for submission in advance of or concurrently with the filing under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and the rules and regulations thereunder (the "HSR Act").

On the morning of June 7, 2019, before market open on the New York Stock Exchange, the Company and Elliott issued a press release announcing the execution of the Original Merger Agreement.

Table 12: Barnes & Noble Deal Data

	Bidders			
	Elliott	Company C	Company A	Company B
Bidder Type	Financial	Strategic	Strategic	Strategic
Bid $/share	6.5	6	6.15	7
Winner	1	0	0	0
NDA Date	25-Feb-19	16-Jan-19	22-Feb-19	26-Jan-19
Informal Bid	1	1	1	1
Pure Cash	1	1	1	1
		First Formal Bids		
Bid, $/Share	6	6	6.15	7
Cash Portion	100%	100%	100%	100%
Due Diligence	1	1	1	1
Due Diligence Days	1	10	45	21
Exclusivity	0	0	1	0
Exclusivity Days			45	
Financing	0	1	1	1
Antitrust	0	1	0	1
		Revised Formal Bids		
Bid, $/Share	6.5	6.75		
Cash Portion	100%	100%		
Due Diligence	0	1		
Exclusivity	0	0		
Financing	0	1		
Antitrust	0	1		

B Appendix

B.1 Measurement error problem in simulations

In section 4.1 we show that OLS regression (4.2) leads to a biased estimate of the monetary value of deal terms β. To illustrate the extent of this bias we estimate equation (4.2) on simulated data. We simulate 250 deals, in which the number of bidders is uniformly distributed between 2 and 5. Bidders offer prices per share $b_{i,j} = 1.3 + \xi_{i,j}$, where $\xi_{i,j}$ is Normally distributed with mean zero and standard deviation 0.4. These are typical numbers of bidders and price per share premiums (over and above a target's market value) in formal rounds of private M&A bidding. Bidders are also equally likely to include or exclude a binary deal term $X_{i,j}$ (e.g., a due diligence closing condition) into their offer. True target valuations for bids are $v_{i,j} = b_{i,j} + 0.1X_{i,j} + \varepsilon_{i,j}$, where $\varepsilon_{i,j}$ is Normally distributed with mean zero and standard deviation 0.25.

The first two rows of Table 13 show estimates of OLS regression (4.2) that excludes and includes the constant term. As explained in section 4.1, the regression without the constant term does not satisfy $\mathbb{E}[e_{i,j}] = 0$ and $\mathbb{E}[e_{i,j}|X_i] = 0$, where $e_{i,j} = W_{i,j} - v_{i,j}$, and leads to a heavily biased estimate of β. The regression with the constant term still does not satisfy $\mathbb{E}[e_{i,j}|X_i] = 0$, and leads to an insignificant estimate of β, such that the 95% confidence interval does not include the true value of 0.1.

The third row of Table 13 show estimates of our empirical model detailed in section 4.2. Because the model is designed to recover information about target valuations for all bids from its decisions via constraints on $v_{i,j}$, it leads to a statistically significant estimate of β that easily contains the true value of 0.1 within the 95% confidence interval.

B.2 Empirical model with two bidding rounds

If targets have commitment power to drop weak bidders between rounds of formal bidding, round-specific offers may possess additional information about target valuations for bids. Because targets have much flexibility in designing deal-specific criteria according to which bidders proceed into the next round, and these criteria are unobservable to the researcher, a formal model of multi-round bidding risks omitting or misspecifying important elements of a process. To deal with this issue, we impose minimal economic restrictions on information inferred from target decisions in multi-round contests. Let target i's (log) valuation for bid j in round r be

$$v_{i,j,r} = b_{i,j,r} + X'_{i,j,r}\beta_{t_{i,j}} + \sum_{r \leq R} \varepsilon_{i,j,r}. \tag{B.1}$$

Approach	$\hat{Const}$	95% conf. int.	$\hat{\beta}$	95% conf. int.	$\hat{\sigma}_\varepsilon$
OLS w/o constant			-0.971	[-1.047,-0.895]	
OLS with constant	-0.990	[-1.030, -0.950]	0.019	[-0.038, 0.075]	
Model			0.099	[0.023, 0.179]	0.248

Table 13: OLS versus the selection model on simulated data.

Here, $R \in \{1, 2\}$ is the number of formal rounds: in deal backgrounds, we distinguish between a "final" round of formal offers with a formal deadline, which often resembles an auction, and a subsequent "revision" round with the strongest remaining bidders, which resembles sequential negotiations. Some deals conclude after the first round; for them, $R = 1$ and the model in section 4.2.2 applies. For other deals, $R = 2$, and there are additional target decisions to consider. Specifically, if bidder 1 survives the first round of bidding and is eventually selected by the target as the winner of the second round, we infer that

$$v_{i,1,1} \geq v_{i,j,1}, \ j \in \text{losers of } r = 1; \tag{B.2}$$

$$v_{i,1,2} \geq v_{i,j,2}, \ j \in \text{survivors of } r = 1; \tag{B.3}$$

$$v_{i,1,2} \geq v_{i,0}. \tag{B.4}$$

First, the target values bidder 1's offer above any offer of a weak bidder who was dropped after the first round; second, the target values it above any offer of a strong bidder who survived the first round; third, the target values it more than its standalone value.

Next, if bidder $l > 1$ survives the first round of bidding but is not selected by the target as the winner of the second round, we infer that

$$v_{i,l,1} \geq v_{i,j,1}, \ j \in \text{losers of } r = 1; \tag{B.5}$$

$$v_{i,l,2} < v_{i,1,2}. \tag{B.6}$$

Finally, if bidder $l > 1$ is dropped after the first round, we know that the target values its offer below those of survivors of this round. Unlike the main model in section 4.2.2, in which we are unable to impose ranking among losing offers, assuming that the target is able to commit to drop weak bidders between rounds allows us to impose a partial ordering on target valuations for bids made by weak and strong bidders.