Essays on Mergers and Acquisitions

by

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To my parents

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ABSTRACT

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This dissertation examines two important issues of mergers and acquisitions. The first chapter structurally estimates acquiring managers' private benefits in takeovers. It shows that acquiring managers overvalue targets by 63% of target capitalization. As a result, acquiring managers pick targets that provide no synergy gains in 17% of takeovers and overbid by 13% of target capitalization in the rest. Private benefits sought by acquiring managers amount to $9 million on average and vary substantially across firms. Agency problems are more severe for larger bidders that have greater free cash flows and chase larger targets. However, an independent board can reduce private benefits and mitigate agency conflicts for acquiring firms.

The second chapter examines the impact of financial sponsor competition on corporate buyers. It shows that corporate acquirers who purchase targets that financial buyers also bid on outperform corporate acquirers who buy targets bid on by corporate firms only. Deals characteristics, acquirer abilities, and observable target characteristics cannot explain this difference in returns. Corporate acquirers have higher returns when they follow a first bid by a financial buyer rather than a first bid by another corporate buyer. The results suggest that financial buyers identify targets with high potential for value improvement and winning corporate bidders are competent in exploiting this potential.

CHAPTER I

Structural Investigation of Acquiring Managers' Incentives in Takeovers*

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Abstract

This paper quantifies the degree of agency conflicts in acquiring firms. By estimating managerial valuations using a structural method and calculating shareholder valuations from stock market reactions to takeovers, I find that acquiring managers overvalue targets by 63% of target capitalization. As a result, acquiring managers pick targets that provide no synergy gains in 17% of takeovers and overbid by 13% of target capitalization in the rest. Private benefits sought by acquiring managers amount to $9 million on average and vary substantially across firms. Agency problems are more severe for larger bidders that have greater free cash flows and chase larger targets. However, an independent board can reduce private benefits and mitigate agency problems for acquiring firms.

Keywords: Mergers, Acquisitions, Private Benefits, Overvaluation, Overbidding, Structural Estimation

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1.1 Introduction

Mergers and acquisitions (M&As) exhibit intense agency conflicts. Though M&As are the largest firm investments, they generate slightly positive returns for acquiring shareholders at best (e.g., Andrade, Mitchell, and Stafford, 2001; Betton, Eckbo, and Thorburn, 2008, 2009). Managerial incentives to pursue private benefits are believed to be responsible for such poor acquisition outcomes (Morck, Shleifer, and Vishny, 1990; Shleifer and Vishny, 1989), and this argument is supported by various empirical studies (e.g., Grinstein and Hribar, 2004; Masulis, Wang, and Xie, 2007). Yet, several basic questions still remain unanswered: What is the magnitude of private benefits in M&As? How large are agency costs? And, how do they vary across firms? The obstacle to answering these questions is the unobservability of managerial incentives. This paper investigates managerial incentives of acquiring firms using a structural estimation approach and provides direct answers to these fundamental questions.

Due to private benefits, acquiring managers tend to value a target more than their shareholders. Unlike other agency conflicts, the features of M&As make it possible to estimate both managerial and shareholder valuations for acquiring firms. Managerial valuations of targets are the basis of actions taken by acquiring firms (e.g., premium offers) because managers make the decisions. With a structural method, I estimate the relation between the unobserved managerial valuations and the observed premiums and further use this relation to recover managerial valuations. Meanwhile, I calculate net payoffs to acquiring shareholders from stock market reactions to takeovers since all gains and costs to shareholders are reflected in stock prices. Adding the observed premium offers to the net payoffs to acquiring shareholders recovers shareholder valuations. I then calculate the managerial overvaluation as the difference between managerial valuations and shareholder valuations.

The major challenge with estimation of managerial valuations is that a structure is needed to establish the relation between takeover premiums and managerial valuations. I follow the preemptive idea of Fishman (1988) and specifically the modification of Bhattacharyya (2000) to build a takeover model that predicts an equilibrium relation (i.e., bidding function) between takeover premiums and managerial valuations. This model is consistent with two important facts in the data. First, most takeovers involve only one publicly announced bidder but have multiple unmanifested potential bidders (Boone and Mulherin, 2007). The endogenous entry feature of this model allows the number of observed bidders to be endogenously determined. Second, seemingly without public challenge, bidders still offer high premiums to targets. In this model, bidders use high premiums to signal their valuations and deter potential competitors with relatively lower valuations. This signaling effect establishes the relation between valuations and premiums, which is the basis of the structural estimation.

Similar to Laffont, Ossard, and Vuong (1995), I take a parametric approach and esti-

mate the specific form of the equilibrium bidding function using a non-linear least squares (NLS) criterion that minimizes the distance between the observed premiums and the expectation of the model-predicted premiums. In the parameterization, I allow for heterogeneity by assuming that managerial valuations vary with target and bidder characteristics. After estimating the bidding function, I invert it and plug in takeover premiums to recover managerial valuations. Furthermore, I estimate the abnormal returns around takeover announcements and calculate net payoffs to acquiring shareholders. Acquiring shareholder valuations are estimated as the summation of net payoffs and the prices offered to targets.

The estimation results show that acquiring managers on average (at median) value targets 97% (77%) over target capitalization prior to takeovers. High managerial valuations justify high premiums, 49% (39%) on average (at median). Acquiring managers offer high premiums because they think that the targets are worth more. These results also highlight the necessity of estimating managerial valuations since using premiums alone greatly underestimates managerial valuations as well as the severity of agency problems. In contrast to managerial valuations, shareholder valuations are conservative. On average (at median), acquiring shareholders value targets 36% (33%) above target capitalization before takeovers. Using shareholder valuations as benchmark, acquiring managers on average (at median) overvalue targets by 63% (42%) of target capitalization. In dollar term, the average (median) managerial overvaluation is $389 million ($63 million). The large managerial overvaluation is the reflection of agency tension in M&As.

One advantage of structural analysis is that it enables the quantitative assessment of agency costs in M&As. Having estimated both managerial and shareholder valuations, I run a counterfactual analysis to answer the question: What would takeover outcomes have been if there were no managerial overvaluation? I find that 17% of takeovers have shareholder valuations smaller than target capitalization prior to takeovers, implying pure value destruction. Therefore, without agency conflicts, these takeovers should not have taken place. For the remaining takeovers, managerial overvaluation can induce overbidding, i.e., the difference between the observed premium and that desired by acquiring shareholders. With the estimation of the bidding function, the desired premium is estimated as the bid predicted by the bidding function with the managerial valuation replaced by the shareholder valuation as if acquiring shareholders decided the bid based on their own valuation. The results indicate that the premium desired by acquiring shareholders is on average (at median) 36% (21%). The comparison between the desired premium and the observed premium indicates that acquiring managers on average (at median) overbid by 13% (17%) of target capitalization. The average (median) overbidding in dollar term is $160 million ($24 million). These agency costs (investment in negative NPV projects as well as overbidding) let acquiring shareholders suffer poor acquisition returns.

Due to imperfect alignment of managerial incentives to shareholder preferences, private benefits have different (in fact larger) weight from (than) that of shareholder gains in the utility of acquiring managers. In other words, the managerial overvaluation is determined by private benefits inflated by their weight in the managerial utility. Specifically, this weight is the inverse of the sensitivity of managerial wealth to shareholder wealth. Therefore, managerial private benefits can be estimated as the product of managerial overvaluation and the wealth sensitivity. I use managerial shareholdings as an approximation for the wealth sensitivity and estimate that average (median) managerial private benefits from takeovers amount to 1.8% (0.2%) of target capitalization, or $9 million ($0.4 million) in dollar term. This estimate of private benefits is about 48% of the annual total managerial compensation.

The estimated private benefits exhibit substantial and highly skewed variation across acquiring firms. More than half of acquiring managers have private benefits less than $\$500,000$. The general picture of private benefits is dominated by the top quartile. These results suggest that agency conflicts affect acquiring firms differently – they are severe for some and mild for most acquiring firms. To understand the cross-sectional variation of the severity of agency problems, I relate private benefits to characteristics of acquiring firms. I find a significant size effect. Private benefits increase in bidder size. Private benefits also increases in relative size, suggesting an empire building tendency. These findings can partly explain the adverse size effect on the returns to acquiring shareholders documented by Moeller, Schlingemann, and Stulz (2004). Bidder M/B is negatively associated with private benefits, suggesting that growth firms are less subject to agency problems. The results also indicate a positive association between free cash flows and private benefits, which is consistent with the free-cash-flow argument of Jensen (1986).

In addition to firm characteristics, I also examine if corporate governance measures can mitigate agency problems in M&As. In particular, I regress private benefits on board independence, GIM index, and institutional shareholdings. The results indicate that managers of acquiring firms with independent boards seek significantly lower private benefits, suggesting that board independence is an effective in mitigating agency problems in M&As. I confirm these findings using the subsamples with high and low private benefits. I find that the pattern of private benefits' cross-sectional variation is the same or stronger in the subsample of firms with high private benefits and are tiny and insignificant in the subsample of firms with low private benefits.

Next, I extend the model to incorporate target resistance. In reality, target management often resists takeover attempts, and about 15% of takeover attempts ultimately fail. With target resistance, bidders are more aggressive so their bids are closer to their valuations. Failure to incorporate this effect may result in overestimating managerial (over)valuations. I model target resistance using a target reservation value whose distribution varies with target characteristics. This extension is not only a robustness check,

but it also allows for the study of target behaviors. The results indicate that target reservation values are high when targets have more cash holdings and are more profitable. The results also suggest that the bargaining power of a target is weakened by its financial leverage. As expected, although the estimated overvaluation, overbidding, and private benefits are still large, they become smaller than those estimated from the base model. However, the basic pattern remains unchanged.

Finally, I conduct robustness checks to address potential concerns. I show that the estimation of private benefits are not driven by the use of a short event window in estimating shareholder valuation. Using only public sample in the bidding function estimation, I show that the analysis is robust to alternative samples. To investigate potential impacts of payment methods and merger waves, I include them in both the bidding function estimation and regressions of private benefits and show that this changes neither the estimation or the analysis. In the end, to address the concern of underestimating private benefits using managerial shareholdings as the approximation of managerial wealth sensitivity, I construct an alternative measure, *delta*, following Core and Guay (2002) and Edmans, Gabaix, and Landier (2008). With this new measure, the estimated private benefits are indeed larger but the pattern of cross-sectional variation remains unchanged.

This paper contributes to the empirical literature on agency problems in corporate finance. To my knowledge, this paper is the first to provide a *direct* estimate of managerial private benefits and a *quantitative* assessment of agency costs. Following the seminal work of Jensen and Meckling (1976), the agency theory is widely studied in various contexts such as capital structure (e.g., Bradley, Jarrell, and Kim, 1984; Titman and Wessels, 1988), corporate cash holdings (e.g., Dittmar and Mahrt-Smith, 2007; Harford, Mansi, and Maxwell, 2008; Nikolov and Whited, 2010; Opler et al., 1999), payout policies (La Porta et al., 2000), and so on. Particularly in the literature on M&As, many papers study the implications of agency conflicts on acquiring firms (e.g., Grinstein and Hribar, 2004; Lee, Shakespeare, and Walsh, 2009; Masulis, Wang, and Xie, 2007; Morck, Shleifer, and Vishny, 1990). Likewise, agency problems are found important for target firms (e.g., Fich, Cai, and Tran, 2011; Hartzell, Ofek, and Yermack, 2004; Walkling and Long, 1984). Different from this paper, the previous research establishes the *qualitative* importance of agency problems.

My study adds to the emerging literature on the structural study of M&As. Ivaldi and Motis (2007) also estimate acquirer valuations. However, their focus is not agency conflicts. Dimopoulos and Sacchetto (2009) take a structural approach to estimate the entry costs and distributions of bidder valuations. Their empirical evidence provides support for the preemptive model of Fishman (1988). Additionally, Gorbenko and Malenko (2010) employ a structural model to investigate the difference between strategic and financial bidders in takeovers.

Additionally, my work is related to the empirical auction literature. The estimation

method of this paper is inspired by Laffont, Ossard, and Vuong (1995). However, this paper explicitly deals with the parameter-dependent support problem (see, e.g., Chernozhukov and Hong, 2004; Donald and Paarsch, 1993, 2002; Hirano and Porter, 2003) by augmenting the NLS criterion with the constraints imposed by this problem and implementing the NLS estimation using the Markov Chain Monte Carlo (MCMC) approach proposed by Chernozhukov and Hong (2003).

The rest of the paper is organized as follows. Section 1.2 sets up a takeover model and presents the equilibrium bidding function. Section 1.3 discusses the empirical methodology. Section 1.4 demonstrates the sample construction, and Section 1.5 presents and discusses the results. I extend the model to incorporate target resistance in Section 1.6, and I conduct robustness checks in Section 1.7. Finally Section 1.8 concludes.

1.2 Model

Agency problems stem from deviation of managerial preferences from shareholder interests. In M&As, acquiring managers often have different considerations about takeovers other than synergy gains. For instance, managers enjoy the privilege of managing a larger firm ("*empire building*"); they pursue takeover related bonuses, awards, and perquisites; they obtain more opportunities of tunneling assets and/or cash flows in the process of takeovers; acquisitions also allow managers to diversify their human capital; and, some specific acquisitions may be used to secure their job positions, etc., (see, e.g., Grinstein and Hribar, 2004; Lee, Shakespeare, and Walsh, 2009; Morck, Shleifer, and Vishny, 1990; Shleifer and Vishny, 1989). Moreover, these benefits are exclusively enjoyed by acquiring managers and are not accessible to acquiring shareholders. Due to these private benefits, acquiring managers tend to value the targets more than their shareholders, causing managerial overvaluation and agency problems in M&As.

The valuation structure for acquiring firms is demonstrated in Figure 1.1. Assume that acquiring shareholders value the target as V_s and that acquiring managers can get private benefits w from the acquisition. The sensitivity of the managerial wealth to the shareholder wealth is $\delta \in (0,1)$, meaning that managers' wealth increases by δ dollars for one dollar increase in shareholder wealth. Thus, the monetary utility of acquiring managers from the takeover is given by:

$$u_m = \delta(V_s - b) + w = \delta\left(V_s + \frac{w}{\delta} - b\right), \tag{1.1}$$

where b is the price offered to the target. This simple model indicates that shareholders enjoy the gains (V_s) and bear the costs (b) of the acquisition, and these gains and costs affect the managerial utility up to the sensitivity δ. Meanwhile, acquiring managers exclusively enjoy the private benefits w. In the eyes of acquiring managers, private benefits have a much larger weight than that of the gains and costs to the shareholders. When

evaluating the target, acquiring managers not only add private benefits w into the overall valuation, but also inflate w in accordance with the (inverse) of the wealth sensitivity. As shown in Equation (1.1), the managerial valuation of the target is $V_m = V_s + w/\delta$, and the managerial overvaluation is given by $\Delta_V = w/\delta$.

Private benefits are usually unobservable, which hinders the direct study of agency problems in M&As. However, this difficulty can be circumvented if both the managerial valuation V_m and the shareholder valuation V_s are available. In the remainder of this section, I set up a takeover model that establishes a link between the managerial valuation V_m and premium offers, which can be used to recover the unobserved managerial valuations. Shareholder valuations can be estimated from stock market reactions to takeovers, which is discussed in detail in Section 1.3.2.

1.2.1 Setting

I set up the takeover model following the preemptive or deterring-bidding idea of Fishman (1988) and Bhattacharyya (2000). This type of model assumes sequential entry of bidders in takeovers and emphasizes the signaling effect of the initial bid by the first bidder. That is, the first bidder uses her bid to signal her valuation; the potential competitor infers this information from observation of the first bidder's bid and makes entry decision based on the inference. When the second bidder observes a high bid by the first bidder, she infers that the first bidder has high valuation and the winning prospect for the second bidder is low, making it unprofitable to enter and compete. Therefore, a high premium offered by the first bidder can deter the entry of the potential second bidder (see, Bhattacharyya, 2000). In addition, Fishman (1988) assumes that bidders incur cost to learn their valuations. A high premium offered by the first bidder hence makes the second bidder think that it is not even profitable to learn her own valuation in the first place, especially when her cost of valuation investigation is high. In this sense, the first bidder can preempt the potential competitor by offering a high premium. The empirical study of Dimopoulos and Sacchetto (2009) shows that the initial cost is relatively low, which seems to suggest that the signaling effect alone plays a bigger role in deterring the potential competitor. Thus, I focus on the signaling effect in this paper. The setting of the model is as follows.

There are two firms (bidders), B_1 and B_2, interested in acquiring a third firm (the target), T. The restriction on the number of potential bidders up to two is for simplicity of analysis. In the data, less than 5% of takeovers have more than two bidders. More importantly, as documented by Hansen (2001), target firms tend to restrict the number of bidders due to the considerations of cost control and protection of their confidential corporate information.

I assume that shareholders delegate corporate decisions to managers.[1] Therefore,

[1] Though it looks like that this assumption is made for public corporate firms, a private bidder also fits in

managers of acquiring firms decide which firm to acquire and how much to pay. Hereafter, whenever there is no ambiguity the bidder valuation represents the valuation by bidder managers, i.e., V_m.

Before the takeover, the two bidders learn their valuations of the target, V_1 and V_2, privately and independently. The independent private valuation represents idiosyncratic synergy gains and private benefits across acquiring firms and managers. Indeed, in practice, there may be a common-value component in valuations. However, this private-value setting can be understood as one special case in which the common-value component is observed by all bidders and by the market so that the market value of the target has already incorporated this information. Thus, what matters is only the idiosyncratic private-value component.

The takeover process unfolds in two stages as demonstrated in Figure 1.2. Bidder one takes the first move by making an initial offer, b_1, to the target. This initial bid is observed by the potential second bidder, B_2. Bidder two then assesses her winning prospect and makes the decision of whether to challenge bidder one. If B_2 decides to stay away from the competition, the takeover concludes with B_1 taking over the target at the premium b_1. Otherwise, the takeover enters the second stage and an open English auction is conducted to decide the acquirer and the payment. In the English auction, the premium is raised continuously until one bidder gives up and drops out. The remaining bidder (winner) acquires the target at the dropout premium of the loser.

Some additional assumptions are needed to complete the model setting. First, as shown in the takeover timing structure, bidder one makes her initial bid being aware of the potential competition and hence she needs to bid based on her belief about the unrevealed competitor's valuation. I assume that this belief is characterized by the continuous probability distribution of B_2's valuation, $G(\cdot)$, whose density is given by $g(\cdot)$. Second, all players (managers and shareholders) are risk neutral. Lastly, bidders do not hold initial shareholdings (toeholds) of the target. This assumption is made because the monotonic bidding strategy fails to exit in the first stage due to the complex payoff structure associated with toeholds. Without the monotonicity, most empirical analysis in this paper cannot be carried out. Nevertheless, this restriction does not fundamentally change the results or pose questions of representativeness because Betton, Eckbo, and Thorburn (2009) find that only 13% of bidders have toeholds during the period 1973-2002, and toehold bidding has declined dramatically and is now rare.

This model has two important features consistent with the facts documented in the literature. First, the number of bidders in a takeover is endogenously determined. Boone and Mulherin (2007) show that for most seemingly single-bidder takeovers, there are actually multiple potential bidders with interest in the target in the private initiation stage. Moreover, even though a takeover is conducted through a one-to-one negotiation, it can-

this general framework since it allows managers and shareholders to be the same people.

not be exclusive and must be open to other bidders.[2] The sequential entry feature of this model is suitable for characterizing such a fact. Second, bidders offer high premiums even when they are the only bidder and the signaling effect of the preemptive or deterring bids of this model is consistent with such a phenomenon. The potential competitor sitting in the shadow provides the target bargaining power and gives the revealed bidder incentive to signal her valuation with a high premium.[3]

1.2.2 Equilibrium

The equilibrium of the takeover game described in the previous subsection can be summarized in a set of decision rules used by the two bidders: $\{\beta(V_1), e(V_2, b_1), q_1(V_1), q_2(V_2)\}$, where $\beta(\cdot)$ is the initial bid of B_1, $e(\cdot)$ is B_2's entry decision, and $q_i(\cdot)$ is the dropout premium of B_i should the English auction be conducted, meaning that B_i decides to exit from the competition if the premium has reached q_i, $i = 1, 2$. An equilibrium exists and is given in the following proposition.

Proposition I.1. *The first bidder sets her initial bid as the conditional expectation of the potential second bidder's valuation as if her valuation exceeded the potential rival's valuation:*

$$\beta(V_1) = \int_0^{V_1} \frac{xg(x)}{G(V_1)} \mathrm{d}x = \mathbb{E}[V_2 | V_2 \leqslant V_1], \tag{1.2}$$

where $G(\cdot)$ is the cumulative probability distribution of the unmanifested competitor's valuation and $g(\cdot)$ is its density function. The initial bid of bidder one is strictly increasing in her valuation, i.e., $\beta'(V_1) > 0$.

After observing the initial bid of bidder one, b_1, bidder two enters if and only if her valuation exceeds the perceived bidder one's valuation. That is, $e(V_2, b_1) = 1$ if and only if $V_2 > \beta^{-1}(b_1)$.

In the English auction, bidders drop out at their own valuation, i.e., $q_i(V_i) = V_i$ for $i = 1, 2$.

Proof. See Appendix A. ∎

The equilibrium initial bidding function (1.2) is the same as the equilibrium bidding strategy in a sealed first-price auction. A direct implication is that the expected profits of bidders in this dynamic takeover game are the same as in the scenario of a direct English auction.[4] The direct English auction is equivalent to the case in which bidder one offers a

[2] Betton, Eckbo, and Thorburn (2008) have a brief review of the requirements by the Delaware case law on a merger agreement: "... must include a fiduciary out clause enabling the target board to agree to a superior proposal if one is forthcoming from a third party. As a result, the target board cannot give its negotiating partner exclusive rights to negotiate a control transfer: it must remain open to other bidders along the way."

[3] Aktas, de Bodt, and Roll (2010) investigate the latent competition pressure for the acquisitions seemingly without competition and find that the premium increases in the one-to-one negotiations with higher competition pressure.

[4] The standard auction formats (first-price, second-price, and ascending English, etc.) with independent private values generate the same expected revenue for the seller and the same expected profits for the bidders ex ante.

zero initial bid, inviting the potential second bidder to enter and compete with her. This result is another manifestation of the famous Revenue Equivalence Theorem of Myerson (1981) and Riley and Samuelson (1981). The theorem says that two selling mechanisms generate the same expected revenue to the seller if: (i) they result in the same allocation of the item for sale; and (ii) the expected surplus of the bidder with the lowest value is the same between two selling mechanisms. It is easy to show that these two conditions hold for the two-stage takeover game and the standard English auction.

The same-expected-payoff bidding strategy of bidder one serves as a credible signaling device to convey information about her valuation to the potential competitor. In this way, a potential competitor with valuation lower than V_1 is deterred. Bidder one gains from the deterrence of a potential second bidder with relative high valuation ($V_2 \in (\beta(V_1), V_1]$) since she would have paid higher premium (V_2) if an English auction were provoked. However, bidder one loses from the deterrence of a potential second bidder with relative low valuation ($V_2 < \beta(V_1)$). On average bidder one pays the same as in the English auction from the ex-ante perspective. There are various reasons for bidders and also targets to prefer the two-stage takeover mechanism to standard auction formats. A competition prolongs the takeover process which is costly and results in corporate information leakage. This is not desirable for either party of the takeover. In most cases, an informative initial bid deters potential competitors and the takeover is completed within a short period of time.

The monotonicity of the bidding function is important since it makes the initial bid fully informative about bidder one's valuation. Bidder two hence can infer bidder one's valuation without confusion. It is also important for the empirical analysis as the estimation of bidder valuations requires inverting the bidding function which is possible only when it is monotonic.

The equilibrium results regarding other decisions of bidders are intuitive. The entry decision of bidder two reflects her perception of the winning prospect in the competition and she chooses to enter only when she believes that she can beat bidder one. Lastly, the equilibrium results of dropout premiums are standard for English auctions (see, Milgrom and Weber, 1982).

1.3 Empirical Methodology

In this section, I discuss the structural method of estimating the unobserved managerial valuations as well as the event study method of estimating shareholder valuations.

1.3.1 Method of Estimating Bidding Function

In the empirical analysis, I focus only on the initial bids of first bidders and the equilibrium bidding function (1.2) for the following reasons: The equilibrium prediction regard-

ing the dropout premium of bidder two is useful only when she loses in the competition. But takeovers in which a second bidder actually appearers in a competition comprise less than 5% of the data. Among them, the cases in which bidder two enters and loses are even rarer. In other words, little information about the second bidder's valuation can be extracted from the subsample of second bidders. Nevertheless, the analysis based on the bidders does not suffer the loss of generality or representativeness because they are the super majority of the sample.

To be consistent with the premium measure of takeover bids, I define the valuation in terms of net percentage of the dollar value over target capitalization prior to the takeover. In particular, let target capitalization prior to the takeover be P_0, and bidder B_i's dollar valuation of the target be P_i, then the valuation used in the analysis is defined as $V_i = (P_i/P_0 - 1) \times 100$, $i = 1, 2$. The scaling makes the interpretation of the valuation less subject to the effect of deal size. One can imagine that a profit of \$10 million means much differently in a takeover with size of \$100 million from that in a takeover with size of \$1 billion.

I estimate the bidding function with a parametric approach.[5] In particular, I assume that the bidder valuations V_1 and V_2 both follow exponential distributions. Let $F(\cdot)$ and $G(\cdot)$ be the cumulative distribution functions of V_1 and V_2, with $f(\cdot)$ and $g(\cdot)$ being the respective density functions. That is,

$$F(V_1) = 1 - \exp(-\lambda_1 V_1), \text{ and } G(V_2) = 1 - \exp(-\lambda_2 V_2), \tag{1.3}$$

where $\lambda_1 > 0$ and $\lambda_2 > 0$ are the parameters that define the exponential distributions. The above distributional choice is made because the cross-sectional variation of takeover premiums exhibits some characteristics of the exponential distribution. Moreover, the empirical analysis below involves intensive numerical computation. The exponential distribution is the simplest distribution with a positive support that permits an analytic form for the equilibrium bidding strategy (1.2). This assumption is critical for the whole analysis to be completed in reasonable time.

I allow for asymmetry in distributions of bidder valuations across takeovers and bidders, and the heterogeneities are incorporated through the parameters, λ_1 and λ_2. Note that $G(\cdot)$ is the belief of bidder one about the distribution of the yet unrevealed second bidder's valuation. It hence can be only conditioned on target characteristics. I specifically assume that λ_2 is determined in the following way:

[5] Many empirical auction papers take the nonparametric apporach (e.g., Athey and Haile, 2002, 2007; Campo, Perrigne, and Vuong, 2003; Guerre, Perrigne, and Vuong, 2000; Li, Perrigne, and Vuong, 2000, 2002). Compared to the parametric approach, it imposes fewer distributional assumptions on the structure. However, it is not friendly to heterogeneities from targets or bidders. The inclusion of a small heterogeneity requires large amount of data in order to identify it. Therefore, though the nonparametric approach is good for the study of formal and well organized auctions, it may not be suitable for M&As. One example of using the nonparametric method in M&A research is Ivaldi and Motis (2007). They assume independent and identical distribution for bidder valuations.

$$\log(\lambda_2) = \mathbf{a}_2'\mathbf{z},$$

where $\mathbf{z}$ is an $N_2 \times 1$ vector of target specific characteristics, and $\mathbf{a}_2$ is a vector of coefficients for $\mathbf{z}$. In addition to the information about the takeover, the distribution of the already revealed first bidder's valuation can be conditioned on her bidder specific characteristics. I assume that λ_1 is determined in the following specific format:

$$\log(\lambda_1) = \mathbf{a}_1'\mathbf{x} + \mathbf{a}_2'\mathbf{z},$$

where $\mathbf{x}$ is an $N_1 \times 1$ vector of bidder specific characteristics, and $\mathbf{a}_1$ is a vector of coefficients for $\mathbf{x}$. The choice of such a specification for λ_1 is based the idea that target information affects bidders' valuations in a similar way, which is reflected in the same coefficients $\mathbf{a}_2$ for target characteristics in λ_1 and λ_2. Indeed, this specification is a special case of a more general one in which $\mathbf{z}$ is free to have different coefficients in determination of λ_1 and λ_2. The advantage of this restriction is that it greatly reduces the number of parameters to be estimated under a reasonable argument. Together this yields a $(N_1 + N_2) \times 1$ vector of structural parameters: $\mathbf{a} = (\mathbf{a}_1', \mathbf{a}_2')' \in \mathcal{A} = \mathbb{R}^{N_1+N_2}$, among which $\mathbf{a}_2$ are the parameters that determine the equilibrium bidding function (1.2).

Similar to Laffont, Ossard, and Vuong (1995), I estimate these structural parameters using a non-linear least squares (NLS) criterion that minimizes the distance between the observed takeover premiums and the expectation of premiums predicted by the model. Suppose that there are L takeovers in the sample; for takeover l, b_1^l is the initial bid of the first bidder, $\mathbf{z}_l$ is the vector of target characteristics, and $\mathbf{x}_l$ is the vector of characteristics specific to the first bidder, $l = 1, 2, \ldots, L$. Then the NLS estimator is given by:

$$\hat{\mathbf{a}} = \arg\min_{\mathbf{a}\in\mathcal{A}} \sum_{l=1}^{L} \left\{ b_1^l - \mathbb{E}\left[\beta(V_1; \mathbf{a}_2, \mathbf{z}_l) | \mathbf{a}, \mathbf{z}_l, \mathbf{x}_l\right] \right\}^2, \tag{1.4}$$

where $\beta(V_1; \mathbf{a}_2, \mathbf{z}_l) = \frac{1}{\lambda_2^l} - \frac{V_1}{\exp(\lambda_2^l V_1) - 1}$ with $\lambda_2^l = \exp(\mathbf{a}_2'\mathbf{z}_l)$. This analytic form for the equilibrium biding function (1.2) is derived from the above parametric assumptions.

Though the equilibrium bidding function has an analytic form, the expectation of the model-predicted bid in the objective function (1.4) does not, and I calculate it using a simulation method. As pointed out by Gouriéroux and Monfort (2002) and Laffont, Ossard, and Vuong (1995), the NLS estimator is not consistent with a fixed finite number of simulations. The bias is introduced through the variability of simulations, and I follow their solution to correct the bias by subtracting this variance from the NLS objective function. The detail of the simulation as well as the bias correction can be found in Appendix B.1.

A more important challenge is the notorious parameter-dependent support problem that commonly haunts the empirical auction research. Note that the equilibrium bidding

function (1.2) implicitly imposes a restriction on the support of the bid allowed by the model. That is, raising V_1 to infinity gives the upper bound of the bid: $\beta(V_1) \leqslant \mathbb{E}[V_2]$. Under the above parameterization, it is equivalent to a series of constraints on the coefficients $\mathbf{a}_2$:

$$b_1^l \leqslant \frac{1}{\lambda_2^l} = \exp(-\mathbf{a}_2'\mathbf{z}_l), \text{ for } l = 1, 2, \ldots, L. \tag{1.5}$$

As argued by Chernozhukov and Hong (2004) and Hirano and Porter (2003), these constraints are very informative regarding the coefficients $\mathbf{a}_2$. In many cases, the constrained minimization of the objective function is achieved on the boundary. This means that failure to incorporate these constraints leads to an inconsistent estimator. However, inclusion of these constraints also introduces additional difficulties both in computation and inferences. The computational difficulty is easy to see since regular optimization techniques (e.g. Gauss-Norton method) may not work with these many constraints. Moreover, since these constraints contain additional information of $\mathbf{a}_2$, the distributions of the estimators of $\mathbf{a}_2$ converge asymptotically faster than those of the estimators of other structural parameters ($\mathbf{a}_1$ and α). It turns out that the convergence rate of $\hat{\mathbf{a}}_2$ is L, much faster than the regular rate of $\sqrt{L}$. In other words, the inferences about $\hat{\mathbf{a}}_2$ based on the regular asymptotic theory do not work any more.

Chernozhukov and Hong (2003, 2004) propose a Quasi-Bayes estimation (QBE) method to address this problem. The NLS-QBE estimator is constructed by setting up the quasi-posterior of the parameters using the objective function of the NLS estimation under constraints (1.5) and producing a sequence of draws $(\mathbf{a}^{(1)}, \mathbf{a}^{(2)}, \ldots, \mathbf{a}^{(K)})$ whose marginal distribution is given by the quasi-posterior. A Markov Chain Monte Carlo (MCMC) method can be used to produce such a sequence. With a quadratic penalty function in the Bayesian estimation, the NLS-QBE estimator is the mean of the quasi-posterior: $\hat{\mathbf{a}} = \sum_k \mathbf{a}^{(k)}/K$. Moreover, estimators of quantiles of the distribution of the parameters can be obtained from the empirical quantiles of this sequence. Inferences based on the 90% or 95% confidence interval constructed using these quantiles are valid. The detail of the NLS-QBE estimation is provided in Appendix B.2.

Having estimated the structural parameters, I recover the valuation of the first bidders as: $\hat{V}_1^l = \beta^{-1}(b_1^l; \hat{\mathbf{a}}_2, \mathbf{z}_l)$, for $l = 1, 2, \ldots, L$.

1.3.2 Method of Estimating Shareholder Valuations

Managerial valuations alone are still not enough to assess the severity of agency problems in M&As. As a benchmark, the shareholder valuation, V_s, has to be estimated. In fact, shareholder valuations can be obtained from the analysis of stock market reactions to takeovers. Shareholders as the ultimate owners fully bear costs of takeover transactions, and meanwhile enjoy gains and suffer losses generated in acquisitions. To the extent that the stock market is weakly efficient, these costs, gains, and losses should be reflected

in stock prices of acquiring firms. The widely used event study methods can be used to recover the net gains to acquiring shareholders which in turn are used to estimate shareholder valuations.

The estimation of shareholder valuations requires stock market data. Thus, the estimation can be done only for public firms whose stock information is available. However, it is not a problem to rule out private bidders since they are less likely to suffer agency problems. In many cases, the managers and shareholders of private firms are the same people. In addition, private firms have better governance structures that align managerial incentives to shareholder interests.

To estimate shareholder valuations for acquiring firms, I first calculate the abnormal dollar returns (similar to, e.g., Ahern, 2010; Bradley, Desai, and Kim, 1988; Malatesta, 1983; Moeller, Schlingemann, and Stulz, 2004). In particular, I estimate the abnormal percentage returns using the Fama-French three-factor model as the benchmark over the $[-1, 1]$ three-day window around the initial bids of the first bidders. With the daily abnormal percentage returns, I then calculate the daily abnormal dollar returns by multiplying the abnormal percentage returns by the market capitalization of the bidder on the prior day. Finally, I get the cumulative abnormal dollar returns by summarizing the daily abnormal dollar returns over the three-day window.

This cumulative abnormal dollar return is the net payoff to acquiring shareholders. To get shareholder valuations, I add net payoffs to the dollar values of takeover bids since the costs of transactions are carried by shareholders of acquiring firms. This estimates of shareholder valuations are further converted to the percentage format of premiums discussed in the previous subsection. That is, shareholder valuations are measured as net percentages over target capitalization prior to takeovers. This scaling makes it easier to compare with premiums and managerial valuations in percentage term. Likewise, the dollar bids and managerial valuations are also calculated for comparison with shareholder valuations in dollar term.

Shareholder valuations are conducted only for winning first bidders because valuation is a conditional concept that reflects the assessment of the value of a target for a bidder *after* acquisition. Still, there is little loss of representativeness caused by this restriction since the majority of the takeover data involves only one bidder and the losing first bidders appear only in a small part of the subsample with two bidders.

1.3.3 Assessment of Agency Costs

Having estimated the shareholder valuation $\hat{V}_s$, I can assess whether a takeover is a positive NPV project for acquiring shareholders. A takeover generates synergy gains only when $\hat{V}_s > 0$. Another type of agency costs for acquiring firms can be calculated using a counterfactual experiment. Specifically, I calculate premium offers desired by acquiring shareholders by plugging shareholder valuations into the estimated bidding

function: $\hat{b}_s = \hat{\beta}(\hat{V}_s)$, and the difference between $\hat{b}_s$ and the observed premium shows the overbidding caused by managerial overvaluation.

1.4 Data

The base sample is pulled from Security Database Company (SDC). From the M&A database, I use the deals for U.S. public targets announced from January 1986 through December 2010. I exclude the following types of deals: spinoffs, recapitalization, self-tenders, exchange offers, repurchases, privatizations, and divestitures.

The SDC database is recorded chronologically and its basic unit is a deal announcement. However, the basic unit of observations in the empirical analysis of this paper is a takeover that consists of one or more bidders with one or more bids. Although ultimately the estimation requires only the initial bids of first bidders, it is still necessary to classify takeovers to avoid confusing a bid from a second bidder or a second bid from the first bidder with the initial bid in a new takeover. Following the method of Betton, Eckbo, and Thorburn (2008), I collect the deals that belong to the same takeover process into a group (takeover contest). In order to study control right takeovers only, I keep the deals in which bidders hold less than 50% of target shares and seek to hold the majority (more than 50%) of target shares after the transactions. Such deals are called *qualified* takeover deals. The control right takeover contests are classified as follows:

- A takeover contest starts from a qualified takeover bid for a target that has no other qualified bids in the past 6 months.
- The contest continues until a bidder successfully acquires the target or there has been 6 months since the last takeover bid.
- During the proceeding of the takeover contest, the search window rolls over for another 6 months whenever a new qualified takeover bid occurs.

After the takeover classification, I keep takeovers with up to two bidders. Because toeholds are not allowed in my empirical analysis, I drop takeover contests in which one or more bidders have initial shareholdings of the target. All targets and public bidders are required to be in COMPUSTAT and CRSP and have non-missing stock and financial information. The market capitalization of a target prior to the takeover is defined as the market value of its stock 4 weeks before the first takeover bid. The premium is defined as the net percentage of the price per share offered to a target over the stock price of the target 4 weeks prior to the first takeover bid. I retrieve the CPI index from Bureau of Labor Statistics and convert all variables with dollar unit to the dollar values in year 2000.

I collect corporate financials from COMPUSTAT for targets and public bidders at the end of the fiscal year prior to the takeover. I also retrieve the institutional holdings data

from Thomson Reuters.[6] The detailed variable definitions are provided in Appendix D. The calculation of managerial private benefits requires information about managerial shareholdings in acquiring firms, which I obtain from ExecuComp. Finally, I collect board independence and the GIM index of Gompers, Ishii, and Metrick (2003) from Risk Metrics. The ExecuComp and Risk Metrics databases have less coverage on firms and a short data period. For example, ExecuComp covers firms in the S&P 1500 index and is available from 1992 to 2010. Therefore, the sample is smaller in the analysis of managerial incentives than the one used for the estimation of managerial valuations, and the sample size varies depending on the specific variables used in the analysis.

The final sample consists of 4,434 takeover contests, 3,785 of which ultimately end with successful acquisitions of the targets. Table 1.1 presents a summary of the distribution of these takeover contests. Similar to what is found in the literature (for example, Dimopoulos and Sacchetto, 2009), the majority of the takeover contests involve only one publicly revealed bidder, and a second bidder enters only in 133 takeovers (103 in the successful subsample). Of course, the observed number of bidders cannot represent the actual competitiveness. Both the findings by Boone and Mulherin (2007) about potential bidders in the initiation stage of M&As and the fact that bidders offer high premiums even in the single-bidder takeovers suggest that the threat of challenge from other potential bidders plays an important role in M&As.

The overview of the sample is given in Table 1.2 which presents summary statistics of important characteristics of the deals, targets as well as (public first) bidders. Overall, this sample is similar to those used in the empirical M&A literature. As widely documented, premium offers are generous, 47% on average and 37% at the median. The relative size indicates that bidders are usually bigger than targets, more than twice as large. Almost all takeover deals are full-acquisition attempts that seek to purchase all the target shares. Targets on average are not profitable, suffering a return on assets of negative 1.6%. The data also shows that acquiring managers hold a very small percentage of shares in their firms, less than 3% on average, indicating a large separation of ownership and control. Finally, in addition to the difference in size, targets and bidders also differ in other dimensions. For instance, bidders tend to have higher M/B suggesting that they are more likely to be growth firms, and targets have higher financial leverage.

1.5 Results and Analysis

This section presents and analyzes the results of empirical analysis based on the base model described in Section 1.2 and the empirical methodology discussed in Section 1.3. In this section, all analyses use only successful takeovers since the base model is built to end in an acquisition either by the first bidder or by the second bidder. Later, in Section 1.6, I

[6] It is often believed that large investors can enchance corporate governance because of their ability and motivation to monitor the management (Shleifer and Vishny, 1986).

modify the model to incorporate target resistance so that the analysis can be extended to cover unsuccessful takeovers as well.

1.5.1 Equilibrium Bidding Function

The estimation of the equilibrium bidding function (1.2) is the basis of all empirical analysis below. Under the parameterization given in Section 1.3.1, the structural parameters come from two elements: the parameter of the distribution of V_1, λ_1, and that of the distribution of V_2, λ_2. I allow these parameters to depend on target and bidder characteristics. In particular, I assume that λ_2 can vary in target characteristics commonly controlled for in the study of corporate decisions, such as size, M/B, profitability (ROA), and leverage. In addition, λ_2 can be dependent on the cash holdings of the target since a cash-rich target may be more attractive to bidders. The distribution of the revealed first bidder's valuation not only incorporates the information about the target, but also depends on bidder characteristics. I assume that the distribution of V_1 is different for private and public bidders, and for same-industry and cross-industry acquisitions. For public bidders, I further allow the distribution to depend on relative size and bidder M/B. I also include a corporate governance measure, the institutional shareholdings, to control for the possible regulatory effect of governance on bidder valuations.[7]

The estimation results for these structural parameters are presented in Table 1.4. Panel A reports the effects of target characteristics on valuation distributions, and Panel B reports the effects of bidder characteristics on the distribution of the first bidder's valuation. Note that an exponential distribution with parameter λ as specified in (1.3) has a mean of $1/\lambda$. So positive coefficients of the variables in Table 1.4 should read as negative effects on the distribution and vice versa. As discussed in Section 1.3, the regular asymptotic inferences based on t-statistics do not apply and the estimated 90% confidence intervals are used instead. The quantiles are obtained from the posteriors of the NLS-QBE estimators illustrated in Figures 1.3 and 1.4.

The results for the parameters of λ_1 reveal valuation heterogeneity in bidder characteristics. Panel B of Table 1.4 clearly shows that private bidders have significantly lower valuations than public bidders and a high M/B bidder also values targets significantly lower than a low M/B bidder. Lower valuations by private bidders are consistent with Gorbenko and Malenko (2010), who find that financial bidders on average have lower valuations than strategic bidders. This result also echoes the findings of Bargeron et al. (2008), who document that private bidders pay much lower premiums than public bidders. Similarly, in Table 1.3 which presents the correlation coefficients between initial bids and target and bidder characteristics, I find that bids are negatively associated with

[7] There are other governance measures such as GIM index and board independence. However, as discussed in Section 1.4, the data coverage of these variables is much smaller. The concern of sample size loss is the most important reason for the choice of the institutional shareholdings.

private status. Lower valuations by private bidders can be understood in two ways. First, many private bidders are financial sponsors such as private equities,[8] and they have lower or none operating synergy gains with targets. Secondly and more importantly, private bidders suffer less managerial overvaluation since they have better governance structures. Bargeron et al. (2008) document that gains to target shareholders are high when the acquirer has low managerial shareholdings. In other words, a bidder with highly concentrated ownership such as a private bidder tends to have a lower valuation and is willing to pay less. This evidence suggests that agency problems affect the determination of bidder valuations.

The negative effect of bidder M/B also can be explained by the agency theory. A low M/B bidder is likely to be a mature firm which, in turn, is more likely to have an entrenched management. Therefore, such a bidder may suffer more agency problems and hence has a higher valuation. Indeed, there is an alternative explanation: This negative effect of bidder M/B is driven by the reduction of synergy gains. Lang, Stulz, and Walkling (1989) and Servaes (1991) find that bidder returns are high when bidder M/B is high. If bidder M/B reduces synergy gains, bidder returns need to have a negative relation with bidder M/B. However, the positive relation between bidder returns and bidder M/B is not inconsistent with the agency argument because the reduction of managerial overvaluation implies lower premiums, which results in higher bidder returns.[9]

Other bidder characteristics are not statistically significant as shown in Panel B of Table 1.4. However, the confidence intervals do not reveal the complete picture, and one can learn more from the posteriors of the coefficients in Figure 1.4. This figure shows that bidder valuations are lower for same-industry acquisitions since the posterior of its coefficient leans largely to the right of zero. Diversified acquisitions are identified by Morck, Shleifer, and Vishny (1990) as one of bad acquisitions caused by managerial agency problems. An acquiring manager with the *empire building* motive likes to do more cross-industry acquisitions and she values such targets more than targets in the same industry as her firm. The relative size is also negatively associated with bidder valuations similar to the effect of target size on the bidder valuation. Finally, the posterior of the coefficient of institutional shareholdings has most of its mass to the right of zero as well. This indicates that higher institutional holdings in bidder firms reduce bidder valuations. Because institutional shareholdings are believed to have governance effect, this negative association much likely comes from the reduction of the managerial overvaluation. The correlations between these three bidder characteristics and the initial bid provided in Table 1.3 indirectly confirm their effects on bidder valuations.

[8] In my sample, about 58% of private bidders are financial buyers.

[9] Table 1.3 shows a positive correlation between bids and bidder M/B, seemingly inconsistent with the estimation results for the bidding function regarding bidder M/B. However, as also shown in Table 1.3, bidder M/B is positively associated with bidder size that in turn is negatively associated with bids. Hence the negative correlation between bids and bidder M/B may reflect the negative correlation between bids and bidder size.

The estimation results do not indicate strong valuation heterogeneity in target characteristics. As shown in Panel A of Table 1.4, λ_2 is dominated by the intercept term since the intercept is the only term that has a statistically significant coefficient. The dominance of the intercept term can be understood by the constraints (1.5). These constraints impose strong restrictions on the coefficients of target characteristics in the determination of λ_2. Since each inequality in the constraints (1.5) has to be satisfied, the coefficient of the intercept term is almost driven by the highest initial bid in the sample. The variation of the other target characteristics moves (the logarithm of) λ_2 away from the intercept but these deviations cannot violate any of these inequalities. This strong requirement hence weakens the effects of the other target characteristics in the determination of λ_2. Despite of the weak significance of target characteristics, the posteriors of their coefficients still reveal some weak heterogeneity in target characteristics. For example, the posterior of target size leans more towards the right side of zero, indicating that managerial valuations are more likely to be negatively associated with target size. Similarly, the posterior of target M/B leans more towards to the left hand side of zero, suggesting a weakly positive association between managerial valuations and target M/B.

1.5.2 Managerial Overvaluation

The estimation of the bidding function makes it possible to recover the unobserved managerial valuations. This recovered valuations then can be compared with shareholder valuations and the difference is the measure of managerial overvaluation. Shareholder valuations are estimated from stock market reactions to takeover announcements using a study event method.

As shown in Panel A of Table 1.4, the standard deviations of the estimated coefficients of the target characteristics that determine λ_2 are large relative to the magnitude of the coefficients. This makes the estimates statistically insignificant. One might be concerned about the precision of the estimated bidder valuations since the calculation uses the very set of parameters of λ_2. To address this concern, I construct the 95% confidence interval of the estimated valuations for 100 randomly selected acquiring firms in the sample. In particular, for each firm I calculate the bidder valuation with $1,000$ coefficient vectors randomly selected from the NLS-QBE draws. The 95% interval is constructed using the top and bottom 2.5th percentiles of these $1,000$ values. I plot the valuations and their 95% confidence intervals of these 100 acquiring firms in Figure 1.5. The figure shows that the bidder valuation estimates have a tight 95% confidence interval, indicating good precision of the estimation.

The recovered managerial valuations, the estimates of shareholder valuations, as well as the managerial overvaluation are presented in Panel A of Table 1.5. Managerial valuations are indeed higher than premium offers. On average, acquiring managers value targets 97% more than their current market values, about twice as the average premium

offer, 49%. High managerial valuations are consistent with high premium offers. It is because acquiring managers think that the targets are worth more that they are willing to pay high premiums to targets. In contrast, acquiring shareholders are much less aggressive. On average, they are only willing to pay a premium up to 36% that is even lower than the average premium. Naturally, the net payoff to acquiring shareholders is poor.

It is always a problem for acquiring firms to offer high premiums but realize tiny or negative returns. Grossman and Hart (1980) give an explanation that the free-riding behavior of target shareholders forces the acquirer to offer all synergy gains. However, a rational acquirer should anticipate this outcome and find it not profitable to start a takeover in the first place. The agency theory breaks the tie of acquiring shareholders and their managers. Rational acquiring managers maximize their own profit instead of that of the shareholders. While a target is worth for acquiring managers, it is not necessarily so for acquiring shareholders. This estimation results for managerial valuations and shareholder valuations hence provide direct supporting evidence for such an argument.

The comparison between managerial valuations and shareholder valuations shows that acquiring managers overvalue targets by 63% of the current market values of targets. In dollar term, this managerial overvaluation amounts to $387 million. An important feature of the results is that the dollar overvaluation is highly skewed. Its 75% quantile ($238 million) cannot even match its average value. The overvaluation in percentage of target market capitalization is less skewed. This suggests that the managerial overvaluation is mainly driven by the bidders with very high overvaluation, especially when chasing large targets. It also implies that agency problem does not uniformly affect acquiring firms.

As predicted by agency theory, managerial overvaluation in M&As has serious consequences, causing agency costs for acquiring shareholders. Specifically, there are two types of agency costs. The first is that managers pick targets that generates no synergy gains or even net loss. In other words, managers may invest in negative NPV projects in order to pursue their private benefits. A second type of agency costs is that even when there are positive synergy gains, acquiring managers overbid for targets because they have higher valuations than their shareholders.

The first undesirable consequence can be directly measured from shareholder valuations. A takeover is a negative NPV project if it generates net loss for acquiring shareholders before payment. In the sample, about 17% of takeover deals fall in this category (see the last line of Panel A in Table 1.5). This is the worst among all possible takeover outcomes. Acquiring managers in such takeovers pursue their own benefits with the resources of their firms without generating any payoff to their shareholders. Additionally, these takeovers may cause the loss of efficiency in the economy since negative synergy gains imply that the value of the combination of the two firms is even less than the total value of two separate firms.

Having estimated the bidding function, I run a counterfactual analysis and calculate

the second type of agency costs, i.e., overbidding. Specifically, for takeovers with positive synergy gains I calculate the premium desired by acquiring shareholders as the bid predicted by the equilibrium biding function (1.2) when the bidder valuation is replaced by the shareholder valuation. The results are provided in Panel B of Table 1.5. On average, acquiring shareholders want to offer a premium of 36%. In this subsample of takeovers with positive synergy gains, the average shareholder valuation (in net percentage) is 66%. If the bidder offers the premium desired by the shareholders and wins, there is a substantial positive net payoff for acquiring shareholders, about 30% of target capitalization or \$191 million in dollar term.[10] The change from such favorable results to the poor takeover outcomes for acquiring shareholders in reality is due to overbidding by acquiring managers. The comparison of the desired premiums with the observed premiums indicates that on average acquiring managers offer a premium more than its desired level by about 13% of target capitalization. In dollar term, the overbidding is \$160 million, leaving a net payoff to acquiring shareholders about only 17% of target capitalization or \$33 million. This overbidding together with the first undesirable consequence of picking targets with no or negative synergy gains produces poor returns for acquiring shareholders observed in the data.

In summary, the results so far show that acquiring managers often have higher valuations than their shareholders. The managerial overvaluation induces them to invest in negative NPV projects and to overbid. Together, these agency costs can explain the poor announcement returns to acquiring shareholders.

1.5.3 Private Benefits

Managerial incentives to purse private benefits is at the root of agency problems in M&As. As discussed in Section 1.2, the existence of private benefits w causes the managerial valuation V_m to deviate from the shareholder valuation V_s, resulting in the managerial overvaluation. Because acquiring managers as agents make decisions on behalf of their shareholders and managers do so based on their own assessment of target values, the managerial overvaluation in turn leads to undesirable consequences in M&As. Therefore, to investigate agency problems in M&As, it is necessary to study private benefits of acquiring managers.

As shown by the agency model in Section 1.2, the managerial overvaluation Δ_V is determined by two factors: managerial private benefits w and the wealth sensitivity δ, i.e., $\Delta_V = w/\delta$. In other words, private benefits can be calculated as the multiplication of the managerial overvaluation by the wealth sensitivity: $w = \delta \cdot \Delta_V$. To calculate private benefits of acquiring managers in M&As, I use managerial shareholdings in acquiring

[10] Of course, this premium does not guarantee winning, and the potential competition from the second bidder can raise the ultimate premium in the winning cases. However, this net payoff for acquiring shareholders can be seen as its upper bound.

firms as the approximation for the wealth sensitivity of acquiring managers.[11]

The results of private benefits calculation are presented in Panel C of Table 1.5. Overall, acquiring managers seek sizable private benefits in M&As. On average managerial private benefits amount to 1.82% of target capitalization, or $9 million in dollars. For comparison, I also report the annual total managerial compensation of acquiring firms in the last line of Panel C in Table 1.5. The statistics in this last line show that the average annual total managerial compensation is about $18.7 million, so managerial private benefits amount to 48% of the annual total compensation of acquiring managers.[12]

However, the average private benefits do not reveal the entire picture of agency problems in M&As. Similar to the managerial overvaluation, private benefits are highly skewed in the cross-section, both for the percentage and dollar estimates. For example, the dollar estimate of private benefits is no more than $500,000 for half of the takeovers in the sample, and its 75th percentile ($2.3 million) is even smaller than the average ($9 million). Relatively small private benefits for most of acquiring firms show that agency conflicts are not very severe for them. Yet, on average agency problems are still important in M&As. Clearly, the average picture is mainly driven by the bidders with extremely large private benefits. The large skewness hence makes it crucial to learn how the severity of agency problems varies across acquiring firms.

1.5.4 Agency Problems in Cross-Section

So far the empirical evidence shows that agency problems affect acquiring firms differently. Agency conflicts are not severe for most of acquiring firms and the average pattern is driven by those with the most severe agency problems. To understand how these two types of acquiring firms are different, I divide the sample into two groups according to managerial private benefits. One group of acquiring firms have private ben-

[11] Of course, this approximation is subject to underestimating the wealth sensitivity. The estimate of private benefits hence is the lower bound. An alternative measure is to include both the managerial shareholdings and the stock option deltas (see, Core and Guay, 2002). As shown by Kim and Lu (2011), this latter measure is slightly larger. In their sample, the mean and median of this alternative sensitivity is 3.2% and 0.8%. Moreover, they find that this sensitivity is small and skewed.

[12] Lee, Shakespeare, and Walsh (2009) find that a CEO who churns (acquire and divest) assets during his/her tenure on average earn an extra $4 million during his/her time in office. Compared with their estimate, the average private benefits of $9 million in one takeover are clearly not trivial. One potential concern of comparing private benefits in takeovers to annual managerial compensation is that private benefits are supposed to be one-time benefits for most acquiring managers while managerial compensation is a repeated flow of benefits as long as the managers remain on their positions. To address this concern, one can compare private benefits to the present value of managers' compensation during their years remaining in the firm. For simplicity, I make a similar assumption as taken by May (1995) that managerial compensation grows at a rate of 3.5% annually (based on the findings of Murphy (1985) on the managerial salary growth rate) but at the same time the compensation is invested to return 3.5% as well (this hence eliminates the need to discount future compensation). In the sample, the average age of top managers of acquiring firms is 53. I further assume that they remain in the firm till 65 and then retire. If one executive leaves her position or leaves the firm, a new executive with similar characteristics takes the position and follows the same path to retirement. Based on these simplified assumptions, I calculate that private benefits on average amount to 4% of the present value of managers' compensation during their years remaining in acquiring firms.

efits higher than the 75th percentile of the private benefits in the cross-section, which I call the *high-P.B.* bidders. The other group of bidders have private benefits lower than the 75th percentile, and I call them the *low-P.B.* bidders. To see their differences, I collect and report the summary statistics of their bidder characteristics in Table 1.6.

Table 1.6 shows that high-P.B. bidders are larger firms. The deals that high-P.B. firms make are also larger since not only their firm size is larger, but the relative size (ratio of deal value to bidder size) is also larger. These comparisons suggest that large acquiring firms chasing large targets are more likely to be subject to agency problems. A second observation is that high-P.B. firms have higher M/B ratios. However, this does not necessarily mean that growth firms suffer more agency problems since M/B is positively associated with firm size. Table 1.6 also shows that high-P.B. firms have a higher leverage ratio but the difference is very small. The difference in free cash flows of these two groups of acquiring firms is also negligible. Though on average high-P.B. firms have slightly lower free cash flows, their median free cash flows are instead slightly higher. The comparison of these two groups of bidders in their relation with the targets indicates that high-P.B. acquiring firms on average make more same-industry takeovers, seemly inconsistent with the empire building perception. However, the same-industry indicator is positively associated with relative size (see, Table 1.3).[13] Therefore, a clear conclusion cannot be drawn by a simple univariate comparison.

In addition to corporate financials, I also compare three governance measures (board independence, GIM index, and institutional shareholdings) with the idea that corporate governance measures can mitigate agency problems. Table 1.6 shows that low-P.B. firms are more likely to have independent boards: 84% of low-P.B. bidders have independent boards, higher than the group of high-P.B. bidders by 11 percentage points. This is consistent with the idea that a more independent board can better monitor managers and hence reduces the severity of agency problems.[14] The GIM index does not appear much different between the high-P.B. and low-P.B. bidders. Similarly, the average institutional shareholding of low-P.B. firms is a little higher, but the difference is very small. The small differences of the GIM index and institutional shareholdings suggest that these two governance measures may not play big roles in mitigating agency problems in M&As.

Next, I further investigate the cross-sectional variation of managerial private benefits in multivariate regressions. The results are presented in Table 1.7. In the first two columns I start the analysis with both low-P.B. and high-P.B. acquiring firms, and I include all the three corporate governance measures in the regressions. The difference between the two specifications is that in column (2) I also control for the year fixed effects. Consistent with the findings from the univariate comparisons in Table 1.6, private benefits significantly

[13] The untabulated results within the subsample in which the study of private benefits is conducted also show a strongly positive association between the same-industry indicator and relative size.

[14] However, if managers are able to influence the composition of the board, this result could also be due to that managers are more willing to accept an indepedent board when their private benefits are smaller.

increases in bidder size. The increase of bidder size by one standard deviation is associated with a $10 million increase in private benefits, about 35% of the standard deviation of the private benefits in the sample.[15] Moeller, Schlingemann, and Stulz (2004) document a strong size effect for the announcement returns to acquiring shareholders: shareholders of large bidders suffer negative acquisition returns and lose $25 million on average upon announcement. The results of the size effect on private benefits in Table 1.7 can partly explain their findings. Because managers of large bidders have larger private benefits, they also tend to overvalue targets more. The consequences are that they are more likely to pick targets with no or negative synergy gains and that they overbid more as well. As a result, the acquisition returns to their shareholders are low and even negative. The regressions also show a significantly positive association between private benefits and the deal relative size. The elasticity of private benefits to relative size is about 0.22. That is, one standard deviation increase in relative size implies a increase of private benefits by 0.22 standard deviations. To some extent, this effect of relative size manifests the empire building tendency of acquiring managers. They chase large targets mainly because such targets bring more private benefits for them.

The regressions show a negative association between bidder leverage and private benefits, consistent with the argument that debt has governance function. The increase of bidder leverage by one standard deviation is associated with a decrease of aquiring managers' private benefits by 0.12 standard deviations. Jensen (1986) argues that a firm with more free cash flows is more prone to suffer agency problems. Consistent with this argument, free cash flows have a weakly positive association with private benefits though not statistically significant in these specifications. The coefficient of the same-industry indicator is also statistically insignificant. This hence indicates that the difference of the same-industry acquisition between low-P.B. and high P.B. firms found in Table 1.6 is probably due to its correlation with other factors such as relative size.

The particularly interesting finding is that board independence has a strong and negative association with private benefits. The effect of board independence is both statistically and economically significant: the change from an non-independent board to an independent board is associated with a reduction of $18 million in private benefits, about 0.64 standard deviations of the private benefits in the sample. Table 1.6 does not show much differences in the GIM index and institutional shareholdings between the high-P.B. and low-P.B. bidders. As expected, these two governance measures do not have significant effects on private benefits in the multivariate regressions.

Since the GIM index and institutional shareholdings do not have significant effects on private benefits, I exclude them from the following regressions. As discussed in Section 1.4, inclusion of the GIM index greatly reduces the sample size because of its limited coverage. By excluding the GIM index form the analysis, the sample size increases by 66%.

[15] The calculation of economic elasticiities uses the statistics of the corresponding variables in Table 1.6.

In columns (3)-(4), I repeat the same regressions as in columns (1) and (2) without these two insignificant governance measures. The results are very similar to those reported in columns (1) and (2) with a difference that free cash flows appear to have a statistically significant effect with an economic elasticity being 0.06.

Panel C of Table 1.5 shows high skewness in private benefits across acquiring firms, suggesting that low-P.B. bidders and high-P.B. bidders may be different. The high-P.B. acquiring firms are more likely to be subject to agency problems than the low-P.B. firms. In other words, if bidder characteristics affect the cross-sectional variation of private benefits, their effects should be stronger for the high-P.B. firms. To test this argument, I repeat the regression in column (4) in the high-P.B. group and the low-P.B. group separately. The results are presented in columns (5) and (6) of Table 1.7, respectively.

As reported in column 5, the regression results for the high-P.B. subsample show that the coefficients of bidder size, leverage and board independence are almost doubled from those in column (4). However, because the standard deviation of private benefits in the high-P.B. subsample is also doubled, their economic significance remains about the same. Free cash flow is again found to have a significantly positive association with private benefits in the high-P.B. subsample. Moreover, the coefficient of free cash flows increases about seven times from column (4). This means that free cash flows have an economic elasticity 3.5 times as large as the one in the whole sample. This evidence is consistent with the argument of Jensen (1986) on the agency problem driven by free cash flows. The same regression is repeated in column (6) for the low-P.B. subsample. As expected, all coefficients become very tiny, and except for bidder size and relative size the coefficients of all other variables are statistically insignificant. The comparison of columns (5) and (6) suggests: because agency problems are severe for the high-P.B. firms, the effects of firm characteristics arguably affecting agency problems such as free cash flows become larger; and meanwhile the governance measures such as leverage and board independence appear to play more important roles in mitigating agency conflicts. In contrast, agency problems are mild in the low-P.B. subsample and private benefits do not have much variation across firms. Therefore, firms characteristics concerning agency problems such as free cash flows no longer have significant impacts on the cross-sectional variation of private benefits and the governance functions of board independence and leverage become unimportant as well.[16]

In summary, on average acquiring firms do suffer agency problems caused by managerial private benefits. However, the severity of agency problems is not uniform across firms. Instead, it varies substantially and is concentrated in part of acquiring firms. At-

[16] The recent work by Kang, Kim, and Lu (2011) argues that corporate governance measures are not designed to solve all agency problems. Instead, one measure is designed to solve one or several specific types of agency problems. For example, the board of directors can monitor the manager's activities and interfere when there are misbehaviors. However, the board is not effective in solving the problem caused by idling management that enjoys quiet life. In other words, one should expect the governance measures to function only when they are supposed to.

tention needs to be paid to large bidders that have large free cash flows and low leverage, and chase large targets. Nevertheless, corporate governance measures, particularly board independence, can mitigate agency problems in M&As, especially when agency conflicts are severe.

1.6 Target Resistance and Bidder Valuations

So far I used only successful takeovers in the estimation of the equilibrium bidding function, which is based on one implicit assumption that targets are passive in the whole process and is ready to accept the highest offer. If a target takes actions against takeover attempts, the takeover may fail as observed in the data. The reaction of targets may have material impact on bidding strategies of bidders. In particular, facing target resistance, bidders become more aggressive and bid more of their valuations. The estimation of the bidding function might be biased without incorporating target resistance.

There are various reasons for targets to react to takeover attempts, one of which is agency conflicts in targets. Target managers have private benefits of control. The acquisition often causes target managers to lose their jobs as well as the attached private benefits (Walkling and Long, 1984). Similar to the situation of acquiring firms, target managers attach their (inflated) private benefits to their assessment of the value of their own firms. As a result, target management often resists takeover attempts even when premiums are satisfactory for their shareholders. Taking the effect of target resistance into account, bidders need to adjust their bidding strategy accordingly.

In order to address this concern, I extend the base model in Section 1.2 to incorporate target resistance by introducing a target reservation value. I assume that the target insists on a minimum premium, V_0^*. Any offer below V_0^* is not acceptable. This reservation value is not known at the beginning by either of the bidders and is revealed to them only in the interaction with the target. However, bidders know that V_0^* follows a continuous probability distribution $H(\cdot)$ with a density function $h(\cdot)$. The basic structure of the takeover process still consists of two stages. The only difference is the additional interaction between bidders and the target. The principle of the takeover is that with only one bidder it is organized as a negotiation, but if a second bidder steps in, an open English auction is provoked. This extended structure is depicted in Figure 1.6.

At the beginning, two bidders learn their private valuations, V_1 and V_2. Bidder one approaches the target and starts a takeover negotiation by an initial offer $b_{1,0}$. In the negotiation, the target reservation value V_0^* is revealed to bidder one. If the initial bid is lower than the reservation value, bidder one has the option to revise her bid and top up the reservation value. A tentative agreement is reached if either the initial bid has surpassed the reservation value or bidder one revises her bid to satisfy it. Otherwise, bidder one withdraws from the takeover process.

Observing the outcome of the negotiation between bidder one and the target, bidder two makes her entry decision. If the negotiation between bidder one and the target succeeds and bidder two decides to stay away, bidder one acquires the target as per the tentative agreement. A second scenario is that bidder two enters to challenge the tentative agreement between bidder one and the target. Then, an English auction is used to decide who may acquire the target and the premium. There is a third case in which the negotiation between bidder one and the target fails and bidder two also decides to stay away. This leads to a failure of the takeover and the target remains independent. Finally, after a failed negotiation between bidder one and the target, bidder two can step in and pick up the negotiation. Then, the same negotiation process repeats. Bidder two needs to place an initial offer, and once the reservation value is revealed to her, bidder two has the option to revise her bid and satisfy the reservation value if her initial offer is lower than the reservation value. An acquisition can be undertaken only when the target reservation value is satisfied; otherwise, the takeover fails.

The incorporation of target resistance clearly complicates the model. Nevertheless, the equilibrium of such a takeover model still exists. The equilibrium of this takeover game is summarized as a set of decision rules taken by the two bidders: $\{\beta_1(V_1),\, r_1(V_1, V_0^*),\, e(V_2, b_{1,0}),\, q_1(V_1),\, q_2(V_2),\, \beta_2(V_2, b_{1,0}),\, r_2(V_2, V_0^*)\}$, where $\beta_i(\cdot)$ is the initial offer in the negotiation between B_i and T, $r_i(\cdot)$ is a binary decision rule which equals one if the initial offer is revised in the case of $b_{i,0} < V_0^*$ and zero otherwise, $e(\cdot)$ is a entry decision of B_2 which is also a binary variable with one indicating entry and zero otherwise, and $q_i(\cdot)$ is the dropout premium of B_i should the English auction be conducted indicating that B_i will exit from the competition if the premium has reached q_i, $i = 1, 2$. The equilibrium can be characterized in the following proposition:

Proposition I.2. *The initial bidding function $\beta_1(V_1)$ of bidder one in the negotiation with the target is implicitly defined in the following equation:*

$$\int_0^{\beta_1(V_1)} H(x)\mathtt{d}x = \int_0^{V_1} \left[\int_0^x H(s)\mathtt{d}s\right] \frac{g(x)}{G(V_1)}\mathtt{d}x, \tag{1.6}$$

where $G(\cdot)$ is the cumulative distribution function of the valuation of a unmanifested competitor with $g(\cdot)$ being its density function, and $H(\cdot)$ is the cumulative distribution function of the target reservation value. The initial bid of bidder one is strictly increasing in her valuation, i.e., $\beta_1'(V_1) > 0$. In the negotiation with the target, bidder one revises her initial bid, i.e., $r_1(V_1, V_0^*) = 1$, and tops up V_0^* if $b_{1,0} < V_0^*$ and $V_1 \geqslant V_0^*$.

After observing the outcomes of the negotiation between bidder one and the target, bidder two enters if and only if her valuation exceeds the perceived bidder one's valuation. That is, $e(V_2, b_{1,0}) = 1$ if and only if $V_2 > \beta_1^{-1}(b_{1,0})$.

In the case where the English auction is provoked, bidders drop out at their own valuations. That is, $q_i(V_i) = V_i$ for $i = 1, 2$. And if bidder two ends up in a negotiation with the target, she

sets her initial bid as the perceived bidder one's valuation, i.e., $\beta_2(V_2, b_{1,0}) = \beta_1^{-1}(b_{1,0})$*; and she revises her bid, i.e.,* $r_2(V_2, V_0^*) = 1$*, and tops up* V_0^* *if* $b_{2,0} < V_0^*$ *and* $V_2 \geqslant V_0^*$*.*

Proof. See Appendix C. ∎

All equilibrium results are intuitive except of for the equilibrium initial bidding function (1.6). Similar to Equation (1.2), this equation is the basis of the extended empirical analysis. An equivalent modification of Equation (1.6) is useful to reveal its economic intuition:

$$\begin{aligned}\int_0^{\beta_1(V_1)} H(x)\mathrm{d}x &= \mathbb{E}\left[\int_0^{V_2} H(x)\mathrm{d}x \,\middle|\, V_2 \leqslant V_1\right] \\ &= \mathbb{E}\left[\int_0^{V_2} H(x)\mathrm{d}x \,\middle|\, \int_0^{V_2} H(x)\mathrm{d}x \leqslant \int_0^{V_1} H(x)\mathrm{d}x\right],\end{aligned}$$

where the second equality holds because the transformation $\int_0^y H(x)\mathrm{d}x$ is strictly increasing in y. Redefine the bid and valuation using this transformation: $\beta_1^*(V_1^*) = \int_0^{\beta_1(V_1)} H(x)\mathrm{d}x$, and $V_i^* = \int_0^{V_i} H(x)\mathrm{d}x$, for $i = 1, 2$. Then, the equilibrium bidding function in this extended model resembles the familiar form of Equation (1.2):

$$\beta_1^*(V_1^*) = \mathbb{E}\left[V_2^* | V_2^* \leqslant V_1^*\right]. \tag{1.7}$$

This transformation aims to eliminate the impact of the target reservation value.[17] Naturally, after the transformation, everything looks the same as in the base model. The first bidder makes her initial bid credible by offering the expectation of her potential competitor's valuation under the condition as if she were to win over her rival.

Again, only the initial bids of first bidders and the new equilibrium bidding function (1.7) are used in the estimation. I take the following two-step procedure to estimate the equilibrium bidding function as well as managerial valuations:

First, estimate the distribution of the target reservation value, $H(\cdot)$. I make additional parametric assumptions that V_0^* follows an exponential distribution with parameter $\lambda_0 > 0$: $H(V_0^*) = 1 - \exp(-\lambda_0 V_0^*)$ and $\log(\lambda_0) = \mathbf{a}_0'\mathbf{z}_0$, where $\mathbf{z}_0$ is an $N_0 \times 1$ vector of target specific characteristics, and $\mathbf{a}_0$ is its coefficient vector. Note that a takeover is successful only when the highest bid (from either bidder one or bidder two) exceeds the target reservation value. With this idea, the structural parameters $\mathbf{a}_0$ can be estimated using a simple MLE method similar to the binary choice models:

$$\hat{\mathbf{a}}_0 = \arg\max \sum_{l=1}^{L} \left\{ I_l \cdot \log(1 - \exp(-\lambda_0^l b_l)) + (1 - I_l) \cdot \log(\exp(-\lambda_0^l b_l)) \right\},$$

where I_l is a binary variable that equals one if the takeover succeeds and zero otherwise, and $b_l = \max\{b_1^l, b_2^l\}$, that is, the highest bid in takeover l, for $l = 1, 2, \ldots, L$.

[17] One can draw an analog to the transformation from the P-measure to the Q-measure in asset pricing.

Second, estimate the other structural parameters. With the estimates of $H(\cdot)$, I transform the initial bids $b_{1,0}$ to $b^*_{1,0}$. Instead of making parametric assumptions for the raw valuations as in (1.3), I make similar parametric assumptions for the distributions of V^*_1 and V^*_2. Then, following the same methodology described in Section 1.3, I estimate the structural parameters that define the equilibrium bidding function (1.7). The estimation of managerial valuations also consists of two steps: First, recover the transformed valuation V^*_1 from the transformed initial bid $b^*_{1,0}$. Then, reverse the transformation to get bidder valuations. Having recovered managerial valuations, other empirical analyses such as the calculation of the managerial overvaluation, the counterfactual analysis for overbidding, the calculation of the private benefit as well as the study of its cross-sectional variation are conducted in the same way described in Sections 1.3 and 1.5.

The results for the parameters governing the equilibrium bidding function (1.7) are provided in columns 2-5 of Table 1.8. Overall, these results are similar to those in Panels A and B of Table 1.4. Private bidders are found to have lower valuations, and mature bidders tend to have higher valuations.

The estimation of the distribution of target reservation values reveals several characteristics of target behaviors. Panel C indicates that a target with more cash has higher bargaining power. Also, a target firm with high M/B resists less, suggesting that managers of growth firms are less entrenched so that they are less likely to overstate the reservation value. Intriguingly, both leverage and institutional shareholdings are negatively associated with target resistance, indicating that these governance measures can mitigate the overresistance problem for target firms.

Target resistance makes bidders more aggressive in their bidding strategies. A bidder facing target resistance is willing to use up more of her valuation, so her bid is closer to her valuation. As a result, for a given observed premium, the recovered managerial valuation is *smaller* than that based on the base model. Meanwhile, given a shareholder valuation, the desired premium is *higher* than that based on the base model. With the extension of target resistance, the estimated overvaluation is *smaller* and so are the overbidding and private benefits. The findings presented in Panel A of Table 1.10 confirm these predictions. The overvaluation and overbidding are still substantial, but they are smaller than those reported in Table 1.5. The estimated private benefits are \$7.7 million on average, about 2/5 of the annual managerial compensation. The basic pattern remains unchanged. Private benefits are highly skewed in the cross-section, and the top quartile drives the big picture.

I repeat the regressions of private benefits on firm characteristics. The results are reported in columns (1)-(2) of Table 1.11. The basic findings are unchanged: There is significant size effect. Large takeovers are associated with higher private benefits. Board independence has a strong negative relation with private benefits. Also, private benefits are found to increase in free cash flows and decrease in leverage. Of course, the magnitude of all the coefficients become smaller compared to those based on the base model.

1.7 Robustness

This section addresses several potential concerns about the estimation and shows robustness of the results. First, I show that the results are not favored by the use of a short event window in shareholder valuations estimation. Second, I show that the results are robust for alternative samples used to estimate the bidding function. Then, I incorporate the potential effects of payment methods and show that the results are robust with this variation. Next, I consider the possible impact of merger waves and again show the robustness of the results. And finally, I employ an alternative measure of managerial wealth sensitivity, *delta*, in the calculation of managerial private benefits to address the potential underestimation of private benefits due to the underestimation of managers' wealth sensitivity using managerial shareholdings.

1.7.1 Event Window and Shareholder Valuations

As explained in Section 1.3, I estimate the net gain for acquiring shareholders in a short event window, (-1, +1), around the announcements of first bids. Two concerns may be raised for this short window. First, the information about the profitability of the deal is not symmetric between managers and the market. In a short period of time, the market may not fully understand the value of the deal as managers do. Therefore, shareholder valuations based on a short window may be underestimated, which favors relatively large estimates for managerial private benefits. Second, in such short time, most acquisitions have yet been completed and shareholder valuations so estimated are subject to the adjustment of the market expectation about the winning prospect. Again, shareholder valuations may be underestimated because of this attenuation effect, which introduces an upward bias for the estimation of managerial private benefits.

If the first argument is valid, with a longer window allowing the market to digest the information, the market should catch up the valuation by acquiring managers and we should see better market reactions with elapsing of time. In addition, with a longer event window, more deals are completed within the searching period so that the attenuation bias is less a concern. In other words, better market reactions in a longer window are indications of possible overestimation of managerial private benefits. Thus, to address these two concerns, I calculate cumulative abnormal returns for the public bidders in event windows with different length: (-1, +1), (-1, +20), and (-1, +180).[18] With longer event windows, it could be argued that buy-and-hold returns are more appropriate. So I also calculate buy-and-hold returns (with Fama-French benchmark) for these bidders in the three event windows.[19]

[18] As shown in Table 1.2, more than 75% of the deals are completed within 180 calendar days. Within 180 trading days, most deals are completed.

[19] I do not repeat the same procedure of calculating cumulative dollar returns in longer event windows because it involves multiplication and summation of a series of acquirer market capitalizations which are far

The results are given in Table 1.9. Column 2 reports the mean cumulative abnormal returns. It shows that with a short (-1, +1) window, on average shareholders of these acquirers lose about 1.84%. When the event window is lengthened to (-1, +20), the return for shareholders of these acquirers is worsened since they suffer a larger loss, -3.06%. The market reaction continues to deteriorate when the event window gets longer. With a (-1, +180) window, the mean cumulative abnormal return reaches -12.53%. The pattern of buy-and-hold returns is the same, as shown in column 3 of Table 1.9. This evidence therefore suggests that the choice of a short event window does not bias the estimation to generate large managerial private benefits. On the contrary, it might lead to conservative estimates.

In addition to the concerns regarding the short event window, one might also question whether shareholder valuations could be underestimated if there is information leaking prior to one day before the announcement. If so, utilizing the event window starting one day prior to the announcement would result in overestimating managerial overvaluation as well as private benefits. To address this concern, similarly, I extend the event window backwards to 20 days prior to announcements and calculate cumulative abnormal returns and buy-and-hold abnormal returns for the bidders. The results are also presented in Table 1.9. With a (-20, +1) event window, the average cumulative abnormal return is only slightly better than that estimated using a (-1, +1) window. The buy-and-hold abnormal return, however, is worse under the (-20, +1) event window. Further extending the event window to (-20, +180) generates similar results as for (-1, +180) event window. These results hence suggest that the estimation of private benefits are not driven by such concerns.

1.7.2 Alternative Sample for Bidding Function Estimation

In the estimation of the bidding function (1.2), I employ the sample that includes both public and private bidders. Later when I calculate shareholder valuations and managerial private benefits, because of data availability I restrict the calculation and analysis within public bidders only. Using a wider sample for the bidding function has two advantages. First, it is not subject to sample selection; and second, by including private bidders, it allows me to explore the difference in valuation between private and public bidders. However, one might be concerned about the unnecessary heterogeneity introduced by pooling these two types of bidders as private bidders are believed to be much different from public bidders in many aspects such as motives, means, and consequences in M&As.

To test whether the sample choice makes difference in the bidding function estimation and the subsequent analysis of managerial overvaluation, overbidding, and private ben-

more volatile and less stationary than percentage returns. And this noise cumulates and rises dramatically with the length of the event window. This is also one of the reasons that I choose to estimate shareholder valuations in a short event window.

efits, I exclude private bidders and repeat the estimation of the bidding function using only public bidders. The results are reported in columns 6-9 of Table 1.8. Clearly, the estimates closely resemble those reported in Table 1.4 except that of course there is no longer a coefficient for private dummy. The comparison of the estimates of structural parameters with alternative samples indicates that the bidding function estimation is robust to inclusion/exclusion of private bidders.

I then use this set of parameters estimated within public bidders to recover acquiring managers' valuations and calculate managerial overvaluation, overbidding as well as private benefits. Similar to Table 1.5, I report their statistics in Panel B of Table 1.10. Naturally, they look very close to those presented in Table 1.5 that are based on the estimation using both public and private bidders. I further explore the cross-sectional variation of managerial private benefits estimated based the estimation using public sample, which is shown in columns (3)-(4) of Table 1.11. Again, there is no material difference in how private benefits are associated with characteristics of acquiring firms from those reported in Table 1.7. Overall, all these suggest that the whole analysis is not affected by the inclusion or exclusion of private bidders in bidding function estimation.

1.7.3 Methods of Payment

In my analysis, I have not included the discussion of methods of payment because the choice of payment methods is a simultaneous decision that acquiring firms have to make together with their evaluation of the target. The ideal way is to construct and estimate a fully structural model that predicts bidding and payment methods simultaneously. One can imagine that it would be too complicated to carry out. Nonetheless, methods of payment still have important implications in M&As, including taxation (e.g., Gilson, Scholes, and Wolfson, 1988), information (e.g., Berkovitch and Narayanan, 1990; Eckbo, Giammarino, and Heinkel, 1990; Fishman, 1989; Hansen, 1987), capital structure (e.g., Harris and Raviv, 1988), and corporate governance (e.g., Jensen, 1986; Stulz, 1988). Thus it is natural to think that methods of payment may carry some information about acquiring managers' valuations of the target. To investigate this possibility, though it is not the best way, I include methods of payment in the bidding function estimation and also regressions of managerial private benefits estimated in such a specification. Specifically, on the basis of the specification discussed in Subsection 1.7.2, I add two dummy variables *Pure Cash* and *Mixed Payment* into the determination of $\log(\lambda_1)$ as well as the regressors in the multivariate regressions of private benefits. *Pure Cash* indicates if the deal is offered in pure cash, and *Mixed Payment* indicates if the deal is offered as a mixture of cash and equity.

The estimation results for the structural parameters in the specification with payment methods included are shown in columns 10-13 of Table 1.8. Two points are worth noting. First, inclusion of methods of payment in the estimation does not have impact on other

parameters, indicating the robustness of the estimation of the bidding function. Second, *Pure Cash* has a positive and slightly statistically significant coefficient and the coefficient of *Mixed Payment* is positive though not significant statistically, suggesting that compared to pure equity deals, those deals offered at least partly with cash are associated with relatively *lower* managerial valuations. There are two explanations for this negative relation – deals offered with cash are associated with lower shareholder valuations and cash deals are associated with lower managerial private benefits – since managerial valuations are determined by these two elements. The first explanation, lower shareholder valuations, does not seem consistent with findings in the literature as cash deals are found to have better acquirer returns (e.g., Eckbo, Giammarino, and Heinkel, 1990; Eckbo and Thorburn, 2000). Meanwhile, using cash as a payment method drains free cash of acquiring firms that is widely believed to be connected with managerial agency problems (Jensen, 1986) so managers are willing to offer cash when there are relatively lower private benefits. In addition, cash deals are more likely to be financed with debt, which increases leverage of acquiring firms. As financial leverage is also regarded as one of the governance measures, agency conflicts in cash deals can be controlled through the increase of leverage. Therefore, the second explanation seems more likely.

To have a further exploration on this matter, I calculate managerial private benefits using the bidding function estimated in this specification and summarize the statistics according to payment methods. The results are presented in Panel C of Table 1.10. This panel shows that indeed pure-cash deals are associated with relatively lower private benefits (throughout the distribution) compared with pure-equity deals. However, this univariate result is not conclusive since methods of payment are also found to be associated with many firm and deal characteristics. In columns (5)-(6) of Table 1.11, I put payment methods into multivariate regressions of private benefits. The results do not support this negative relation with the control of other bidder and deal characteristics. Neither of the coefficients of the two dummy variables for payment methods is statistically significant. Moreover, inclusion of payment methods in the regressions does not affect coefficients of other variables. In all, the whole analysis is again robust to methods of payment and I do not find strong impacts of payment methods on managerial private benefits in M&As. However, this insignificance result should be read with caution since payment method decision is endogenous. It is yet conclusive until a more structural test is conducted that simultaneously predicts valuations and payment methods.

In addition to payment methods, I also explore the possible impact of other aspects of takeover deals such as the difference between mergers and tender offers.[20] Untabulated results show that the inclusion of a tender offer dummy does not affect the other coefficients in the estimation of the bidding function, and though estimated private benefits are

[20] For example, one may argue that managerial valuations could be different between mergers and tender offers. And, mergers are more likely to be subject to information leakage since there are ususally contacts between acquirers and targets before the formal announcement.

smaller for tender offers in univariate comparison, it is not statistically significant once put into a multivariate analysis.

1.7.4 Merger Waves

Mergers activities are found to cluster in time ("merger waves"). These waves could be driven by economic shocks (such as abundant liquidity) that facilitate mergers and acquisitions (Harford, 2005). And merger waves may be contemporaneous with weaker corporate governance like reduced monitoring (Duchin and Schmidt, 2012), fostering agency-driven acquisitions. Therefore, managerial valuations as well as private benefits may vary in time with merger waves.

To address this question, I follow the method outlined by Harford (2005) to identify industry merger waves. In particular, I split the sample of all U.S. takeovers in SDC with transaction value of at least $50 million into three decades: the 1980s, the 1990s, and the 2000s. Then I identify an industry merger wave candidate as the 24-month period highest merger concentration for each decade and each industry. Industry classification is based on Fama and French (1997) 48 industries. I then simulate 1,000 distributions of the occurrences of merger activities over each 120-month period in each industry by randomly assigning each occurrence to a month in the decade with probability of 1/120. Finally, an industry merger wave candidate is validated if its merger concentration is higher than the 95th percentile from the simulated empirical distribution over the decade in the industry. In the end, I find 71 merger waves in 38 industries from 1981 to 2010. With this industry merger wave identification, I define a dummy variable *In Wave* that equals one if either the bidder or the target is in an industry that is experiencing a merger wave at the time of deal announcement.[21]

Similar to the analysis of payment methods, I include *In Wave* into the estimation of the bidding function and private benefits regressions to explore its impact on managerial valuations and private benefits. The estimation results for the bidding function under this specification are shown in columns 14-17 of Table 1.8. The inclusion of the wave dummy does not seem to substantially change the other coefficients. The wave dummy itself has a positive though insignificant coefficient, suggesting that managerial valuations are in fact relatively lower in merger waves. Given findings that acquisition performance is worse for in-wave deals and corporate governance of in-wave acquirers is weaker (Duchin and Schmidt, 2012), this relation is probably driven by lower shareholder valuations in merger waves.

I also calculate and summarize statistics of private benefits under this specification according to whether the deal is in or out of a merger wave, presented in Panel D of Table 1.10. It is interesting to find that while the percentage term private benefits are not much different between in-wave and out-of-wave bidders, the dollar term private

[21] There is not much difference if *In Wave* is defined only on the bidder side.

benefits for in-wave bidders are higher than those for out-of-wave bidders. This indicates that bidders in merger waves chase larger targets. The larger in-wave private benefits seems to be consistent with the argument of more severe agency problems in merger waves. However, since deal and firm characteristics also vary in time with merger waves, a multivariate analysis is needed to assess whether this difference is indeed associated with merger waves. In columns (7)-(8), I add *In Wave* into the regressions of private benefits with other control variables. The results show that once deal and firm characteristics are controlled, the coefficient of this wave dummy becomes statistically insignificant. This may suggest that agency conflicts in and out of merger waves are probably not reflected in the amount of private benefits sought by acquiring managers but other aspects. For example, untabulated results indicate that out-of-wave premiums are higher than in-wave premiums,[22] but deal size is larger in merger waves. This seems to suggest that acquiring managers take different strategies of pursuing private benefits in time. Out of waves they offer high premiums to increase the probability of successful takeovers and in waves they chase larger targets. Additionally, the results also show that inclusion of wave dummy in the regressions does not have impact on other coefficients. Therefore, it again confirms the robustness of the analysis.

1.7.5 Alternative Measure of Wealth Sensitivity

In all of the previous analysis, I use acquiring managers' shareholdings in acquiring firms to approximate the wealth sensitivity of acquiring managers, δ. With stock options being commonly used to provide additional incentives for managers, this approximation is clearly subject to underestimating managerial wealth sensitivity. And in turn, given managerial overvaluation estimated separately from wealth sensitivity, private benefits are also likely to be underestimated.[23]

To investigate how much this underestimation could be, and to check if the cross-sectional variation pattern of private benefits is affected by this underestimation, I construct an alternative measure, *delta*, of managerial wealth sensitivity following the method suggested by Core and Guay (2002) and the implementation procedure detailed by Edmans, Gabaix, and Landier (2008) (see their Appendix B for detail). This *delta* indicates the dollar change in managers' wealth as a portfolio of both shares and stock options of acquiring firms for every dollar change in the market value of acquiring firms' equity. Due to data availability, this *delta* is only calculated from 1992 through 2006.

I recalcuate managerial private benefits using this alternative measure and report the results in Panel E of Table 1.10. In the same panel, I also present the summary statistics of *delta*. From the comparison with the statistics of managerial shareholdings in acquiring

[22] This is also why *In Wave* has a positive coefficient in the bidding function estimation.

[23] Recall that overvaluation is determined by managerial private benefits scaled by wealth sensitivity: $\Delta_V = w/\delta$. Given Δ_V, larger private benefits w are needed to justify a certain overvaluation for a larger wealth sensitivity δ.

firms reported in the last line of Table 1.2, it is clear that as expected, *delta* is larger not just at mean but also for each percentile. Naturally, the estimated managerial private benefits using this alternative measure of the wealth sensitivity are also larger than those reported in Table 1.5 and other panels in Table 1.10. With *delta* as the wealth sensitivity, the estimated private benefits on average amount to about 2.5% of target market capitalization, or $18 million in dollar term. This shows that the estimation of private benefits is indeed affected by the choice of the measure of managerial wealth sensitivity and the estimates based on managerial shareholdings are in fact rather conservative.

I further feed private benefits estimated using *delta* in the multivariate regressions to see if the cross-sectional variation is affected by the change of the wealth sensitivity measure. As shown in the last two columns of Table 1.11, the magnitude of coefficients in general becomes larger under the alternative estimates. This is natural since the magnitude of private benefits estimated using *delta* is larger. However, the variation pattern is not changed. Managerial private benefits are still significantly and positively associated with bidder size, relative size, and free cash flows, and are significantly and negatively associated with leverage and board independence. Therefore, the basic conclusion about private benefits remains unchanged.

1.8 Conclusion

Managerial incentives play an important role in shaping takeover outcomes. Acquiring managers pursuing private benefits overvalue targets, which often results in undesirable consequences. Using a structural method, I establish and estimate the relation between the unobserved managerial valuations and the observed premiums. I then use this relation to recover managerial valuations from premiums. In addition, I estimate shareholder valuations from stock market reactions to takeovers. Using shareholder valuations as benchmark, I document a large managerial overvaluation in takeovers. A counterfactual analysis shows that acquiring managers pick targets that provide no synergy gains in 17% of takeover deals and overbid by 13% of target capitalization in the rest. Further investigation shows that acquiring managers seek sizable private benefits in takeovers. Managerial private benefits are highly skewed and exhibit large variation in the cross-section. Agency problems are more severe for larger bidders that have more free cash flows and chase larger targets. However, an independent board can effectively mitigate agency conflicts in M&As by reducing managerial private benefits.

This paper is the first to present a direct *quantitative* estimate of managerial private benefits and their implications, providing a complete portrait of the agency explanation regarding the poor outcomes for acquiring firms. It complements the empirical literature that establishes the *qualitative* importance of agency problems in M&As. Though this paper is built on a rational basis, the estimation of managerial valuations can be applied

in the investigation of behavioral explanations of M&As such as CEO overconfidence. In future work, I can test the rational agency theory and the behavioral explanations using the same framework. Additionally, the managerial overvaluation can be used as a direct measure of the disagreement between managers and shareholders. In this sense, this estimation also has applications in the literature on disagreement and implications in corporate finance.

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Appendices

A Proof of Proposition I.1

I prove Proposition I.1 using a backward induction. First, suppose an English auction is provoked. It is a weakly dominant strategy for bidders to drop out at their valuations, which is a well established result for private-value English auctions (see Milgrom and Weber, 1982).

Now move backward to the first stage. Having observed the initial bid by the first bidder, given the bidding strategy of bidder one, bidder two infers that bidder one's valuation is $\beta^{-1}(b_1)$. If bidder two enters and an English auction is provoked, she expects to win only when her valuation is higher than her perceived bidder one's valuation since bidders drop out at their valuations in an English auction. That is, bidder two should enter only when $V_2 > \beta^{-1}(b_1)$.

And finally I need to show that the bidding strategy of bidder one in Equation (1.2) is the best response given the entry strategy of bidder two. Since this is a private-value auction game, the revelation principle applies. Let $\pi(y)$ denote the profit of bidder one who has valuation V_1 but pretends to have valuation y. This profit can be written as:

$$\pi(y) = G(y) \cdot (V_1 - \beta(y)) + \int_y^{V_1} (V_1 - x) \mathtt{d}G(x), \tag{1.A.1}$$

where $G(\cdot)$ is the cumulative distribution function of V_2. This formula indicates that if bidder one pretends to have valuation y instead of V_1, she deters a potential second bidder with valuation lower than y. In this case she pays her bid $\beta(y)$ and gets profit $V_1 - \beta(y)$. A potential second bidder with valuation higher than y enters and bidder one wins in the English auction only when $V_1 > V_2$. The expected profit of bidder one in this case is given in the second term of (1.A.1). Bidder one chooses y to maximize $\pi(y)$ and the revelation principle requires that the maximum of $\pi(y)$ is reached at V_1. In other words, $\pi'(V_1) = 0$. That is,

$$\pi'(V_1) = g(V_1) \cdot (V_1 - \beta(V_1)) - G(V_1) \cdot \beta'(V_1) = 0. \tag{1.A.2}$$

Define $M(V_1) = G(V_1)\beta(V_1) - \int_0^{V_1} x g(x) \mathtt{d}x$. Then, it is easy to show that $M'(V_1) = \pi'(V_1) = 0$. This implies that $M(V_1)$ is a constant. Also note that $M(0) = 0$ provided the fact $\beta(0) = 0$. Therefore, $M(V_1) = 0$ for all $V_1 \in \mathbb{R}_+$, which in turn implies

$$\beta(V_1) = \int_0^{V_1} \frac{x g(x) \mathtt{d}x}{G(V_1)} = \mathbb{E}[V_2 | V_2 \leqslant V_1].$$

Finally, I should verify that this equilibrium bidding function is indeed strictly increasing in V_1. This can be shown from the first order condition (1.A.2):

$$\beta'(V_1) = \frac{g(V_1) \cdot (V_1 - \beta(V_1))}{G(V_1)} > 0,$$

where the inequality holds because $\beta(V_1) < V_1$ for all $V_1 > 0$ since $\beta(V_1) = \mathbb{E}[V_2 | V_2 \leqslant V_1]$. ■

B Implementation of NLS-QBE Estimator

B.1 Evaluation of NLS Objective Function and Simulations

The evaluation of the objective function (1.4) requires the calculation of the expectation of the equilibrium bid with respect to the distribution of V_1. But the analytic form of this expectation is not available. I circumvent this difficulty with a simulation method. In particular, for a given set of parameters $\mathbf{a} \in \mathcal{A}$, for each takeover I simulate 200 values of V_1 from the exponential distribution $\text{Exp}(\lambda_1(\mathbf{a}, \mathbf{z}_l, \mathbf{x}_l))$: $\{v_1^l, v_2^l, \ldots, v_{200}^l\}$, $l = 1, 2, \ldots, L$. And the expectation can be approximately calculated as:

$$\mathbb{E}\left[\beta(V_1; \mathbf{a}_2, \mathbf{z}_l) | \mathbf{a}, \mathbf{z}_l, \mathbf{x}_l\right] \approx \frac{\sum_{s=1}^{200} \beta(v_s^l; \mathbf{a}_2, \mathbf{z}_l)}{200}, \text{ for } l = 1, 2, \ldots, L.$$

The simulation of the valuation is conducted as follows. For each takeover, I first draw 200 psudo random numbers $\{u_1^l, u_2^l, \ldots, u_{200}^l\}$ from the uniform distribution on $[0, 1]$, and then get the simulations of the values of V_1 from the exponential distribution $\text{Exp}(\lambda_1(\mathbf{a}, \mathbf{z}_l, \mathbf{x}_l))$ as:

$$v_s^l = -\frac{\log(1 - u_s^l)}{\lambda_1(\mathbf{a}, \mathbf{z}_l, \mathbf{x}_l)}, \; s = 1, 2, \ldots, 200, \text{ and } l = 1, 2, \ldots, L.$$

The uniform random numbers $\{u_1^l, u_2^l, \ldots, u_{200}^l\}_{l=1}^L$ are fixed for each simulation of the values of V_1 when the parameters $\mathbf{a}$ change.

As shown by Gouriéroux and Monfort (2002) and Laffont, Ossard, and Vuong (1995), with a fixed number of simulations, the NLS estimator is inconsistent as

$$\begin{aligned} & \lim_{L \to \infty} \frac{1}{L} \sum_{l=1}^{L} \left[b_1^l - \frac{1}{S} \sum_{s=1}^{S} \beta(v_s^l; \mathbf{a}_2, \mathbf{z}_l) \right]^2 \\ = \; & \mathbb{E}\left\{ \left[b_1^l - \mathbb{E}\left[\beta(V_1; \mathbf{a}_2, \mathbf{z}_l) | \mathbf{a}, \mathbf{z}_l, \mathbf{x}_l\right] \right]^2 \right\} + \frac{1}{S} \mathbb{E}\left\{ \text{Var}\left[\beta(v_s^l; \mathbf{a}_2, \mathbf{z}_l) \right] \right\}, \end{aligned}$$

where S is the number of simulations of the values of V_1 (in this context $S = 200$). The second term is the asymptotic bias which vanishes only when S approaches infinity. Since this bias arises from the volatility of the simulations, it is straightforward to correct the bias by subtracting the variance term from the NLS objective function:

$$Q_{L,S}^u(\mathbf{a}) = \sum_{l=1}^{L} \left\{ \left[b_1^l - \frac{1}{S} \sum_{s=1}^{S} \beta(v_s^l; \mathbf{a}_2, \mathbf{z}_l) \right]^2 \right.$$

$$-\frac{1}{S(S-1)}\sum_{s=1}^{S}\left[\beta(v_s^l;\mathbf{a}_2,\mathbf{z}_l)-\frac{1}{S}\sum_{s=1}^{S}\beta(v_s^l;\mathbf{a}_2,\mathbf{z}_l)\right]^2\Bigg\}.$$

To impose the constraints given in (1.5), I assign a very large number (10^{10}) as the value of the NLS objective function if any of the constraints is violated. Finally, for any vector of the parameters $\mathbf{a}\in\mathcal{A}$ the NLS objective function is defined as:

$$Q_{L,S}(\mathbf{a})=\begin{cases} Q_{L,S}^{u}(\mathbf{a}) & \text{if constraints (1.5) are satisfied,}\\ 10^{10} & \text{otherwise.}\end{cases} \tag{1.B.1}$$

B.2 NLS-QBE Estimator and MCMC Implementation

The parameter-dependent support problem arises from the constraints (1.5). Chernozhukov and Hong (2003, 2004) show that a quasi-Bayes estimation (QBE) method is a solution to the difficulties in computation and inferences caused by the inclusion of these constraints. Similar to the regular Bayes estimator, the QBE estimator is constructed as: $\hat{\mathbf{a}}=\arg\inf_{\mathbf{a}\in\mathcal{A}}\int_{\mathcal{A}}m(\mathbf{a}^*-\mathbf{a})p(\mathbf{a}^*)\mathtt{d}\mathbf{a}^*$, where $\mathbf{a}^*$ denotes the true value of the structural parameters, $m(\cdot)$ is a convex penalty function, and $p(\mathbf{a}^*)$ is the quasi-posterior of the parameters. As shown by Chernozhukov and Hong (2003), $p(\mathbf{a})\propto\exp(-Q_{L,S}(\mathbf{a}))p_0(\mathbf{a})$, where $Q_{L,S}(\mathbf{a})$, as given in Equation (1.B.1), is the NLS objective function under the constraints (1.5), and $p_0(\mathbf{a})$ is the prior. Unlike the regular Bayes estimation, the posterior is not constructed using the likelihood but a likelihood analogue $\exp(-Q_{L,S}(\mathbf{a}))$ established using the NLS objective function. Nevertheless, this quasi-Bayes estimator has similar properties as the regular Bayes estimator and the computational techniques of Bayesian estimation apply to the QBE estimation as well.

With a quadratic penalty function, the QBE estimator is the mean of the quasi-posterior. The posterior mean does not have an analytic form but can be calculated using a numerical method. The key is to draw a Markov chain, $\{\mathbf{a}^{(k)}\}_{k=1}^{K}$, that has a stationary distribution given by the quasi-posterior. This sequence can be produced with an MCMC method. Specifically, I employ the Metropolis algorithm and the detailed steps are as follows:

1. Choose an initial vector of parameters from $\mathcal{A}$, $\mathbf{a}^{(0)}$, that satisfy the constraints (1.5).
2. Generate $\boldsymbol{\theta}^{(k+1)}$ using the transition rule: $\boldsymbol{\theta}^{(k+1)}=\mathbf{a}^{(k)}+\mathbf{e}^{(k+1)}$, where $\mathbf{e}^{(k+1)}\sim\mathcal{N}(\mathbf{0},\boldsymbol{\Sigma})$ and $\boldsymbol{\Sigma}$ is a positive diagonal matrix, $k=0,2,\ldots,K-1$. And calculate the relative importance ratio function:

$$\rho(\mathbf{a}^{(k)},\boldsymbol{\theta}^{(k+1)})=\frac{\exp(-Q_{L,S}(\boldsymbol{\theta}^{(k+1)}))}{\exp(-Q_{L,S}(\mathbf{a}^{(k)}))},$$

where $Q_{L,S}(\cdot)$ is defined in Equation (1.B.1).

3. Update $\mathbf{a}^{(k+1)}$ from $\mathbf{a}^{(k)}$ for $k = 0, 2, \ldots, K-1$, using the following updating rule: $\mathbf{a}^{(k+1)} = \boldsymbol{\theta}^{(k+1)}$ if $\rho(\mathbf{a}^{(k)}, \boldsymbol{\theta}^{(k+1)}) \geqslant 1$, and otherwise,

$$\mathbf{a}^{(k+1)} = \begin{cases} \boldsymbol{\theta}^{(k+1)} & \text{with probability} \quad \rho(\mathbf{a}^{(k)}, \boldsymbol{\theta}^{(k+1)}), \\ \mathbf{a}^{(k)} & \text{with probability} \quad 1 - \rho(\mathbf{a}^{(k)}, \boldsymbol{\theta}^{(k+1)}). \end{cases}$$

In the execution, I update one element of the vector $\mathbf{a}$ each step until all elements in the vector are sequentially updated once. Lets call each round of such updates of all the elements in $\mathbf{a}$ one vector update. In total, I make $100,000$ vector updates in the above method. This hence requires to evaluate the objective function (1.B.1) for total of $K = (N_1 + N_2) \times 100,000$ times. That is why the analytic form of the equilibrium bidding function is so important. Without it, the integral in the bidding function has to be calculated numerically, and this additional computational burden dramatically increases the time needed for the computation.

Following the suggestion of Chernozhukov and Hong (2003, 2004), I adjust the variance $\boldsymbol{\Sigma}$ every 500 vector updates to make sure an appropriate acceptance rate, avoiding $\boldsymbol{\theta}^{(k+1)}$ being alway accepted or alway rejected. And finally, I discard the first $70,000$ vector updates and keep only the last $30,000$ draws to ensure that the sequence really gets stationary. The sequence of each element in the vector $\mathbf{a}$ is a sequence of draws from the stationary marginal (posterior) distribution of the corresponding parameter, and can be used to construct the NLS-QBE estimator (the posterior mean) and the quantiles for inferences.

C Proof of Proposition I.2

Again, the proposition can be proved with a backward induction. The equilibrium dropout premiums in an English auction are standard results. In the negotiation with the target, it is the best response for a bidder to revise her bid and top up the reservation value if her valuation is higher than the reservation value. By doing so, she remains in the takeover process and her expected payoff is positive since her valuation exceeds the reservation value. Given these results, it is the best response for bidder two to enter whenever she perceives that her valuation is higher than that of bidder one. This entry strategy is proved in Appendix A for the case in which bidder one reaches a tentative agreement with the target. For the case following the withdrawal of bidder one, note that bidder two should never enter if her valuation is lower than the perceived bidder one's valuation because she is not able to match the target reservation value since even bidder one fails to do so. On the contrary, if her valuation is higher than the perceived bidder one's valuation, she should enter because she always has the option to opt out and hence her expected payoff is non-negative. Moreover, when she enters to pick up the failed negotiation, she should start with the lowest possible initial offer which is simply

her perception of the first bidder's valuation.

And finally, I need to show that the equilibrium initial bidding strategy of bidder one satisfies Equation (1.6). Similarly, using the revelation principle, let $\pi(y)$ be the expected payoff of bidder one with valuation V_1 but pretending to have valuation y. Then,

$$\begin{aligned}\pi(y) &= \int_0^y\int_0^{V_1}(V_1 - \max\{\beta_1(y), x\})\mathtt{d}H(x)\mathtt{d}G(s) + \int_y^{V_1}\int_0^{V_1}(V_1 - \max\{x, s\})\mathtt{d}H(x)\mathtt{d}G(s) \\ &= \underbrace{\int_0^{V_1} G(y)(V_1 - \max\{\beta_1(y), x\})\mathtt{d}H(x)}_{\pi_1(y)} + \underbrace{\int_y^{V_1}\int_0^{V_1}(V_1 - \max\{x, s\})\mathtt{d}H(x)\mathtt{d}G(s)}_{\pi_2(y)},\end{aligned} \tag{1.C.1}$$

where x is for the target reservation value, and s is for B_2's valuation. The second line indicates: When B_2's valuation exceeds the perceived B_1's valuation, y, B_1's payment is the higher of y and x and her expected payoff is given by $\pi_2(y)$. And, if B_2 is deterred when $s < y$, B_1's payment is the higher of $\beta_1(y)$ and x, in which B_1's expected payoff is given by $\pi_1(y)$.

In order for $\beta_1(y)$ being the equilibrium initial bidding function, $\pi(y)$ needs to achieve its maximum at V_1. The necessary condition is: $\pi'(V_1) = 0$. First look at $\pi_2'(y)$:

$$\pi_2'(y)\big|_{y=V_1} = -\int_0^{V_1}(V_1 - \max\{x, V_1\})h(x)g(V_1)\mathtt{d}x = 0,$$

where the last equality holds because $x \leqslant V_1$ in the integrand. Therefore, The optimual conditional solely depends on $\pi_1(y)$ which can be further simplified as following:

$$\pi_1(y) = G(y)\left[H(V_1)V_1 - H(\beta_1(V_1))\beta_1(V_1) - \int_{\beta_1(y)}^{V_1} x\mathtt{d}H(x)\right] = G(y)\int_{\beta_1(y)}^{V_1} H(x)\mathtt{d}x, \tag{1.C.2}$$

where the last equality holds through integration by parts. With this simplification, the first order condition for $\pi(y)$ can be derived as:

$$\pi'(V_1) = \pi_1'(V_1) = g(V_1)\int_{\beta_1(V_1)}^{V_1} H(x)\mathtt{d}x - G(V_1)H(\beta_1(V_1))\beta_1'(V_1) = 0. \tag{1.C.3}$$

Define an auxiliary function $M(V_1)$ as:

$$M(V_1) = G(V_1)\int_{\beta_1(V_1)}^{V_1} H(x)\mathtt{d}x - \int_0^{V_1} G(x)H(x)\mathtt{d}x.$$

It is straightforward to see that $M'(V_1) = \pi'(V_1) = 0$. This implies that $M(V_1)$ is a constant. Also note that $M(0) = 0$ given $\beta_1(0) = 0$. So $M(V_1) = 0$, and the equilibrium

initial bidding function needs to satisfy the implicit function:

$$G(V_1)\int_{\beta_1(V_1)}^{V_1} H(x)\mathrm{d}x = \int_0^{V_1} G(x)H(x)\mathrm{d}x. \tag{1.C.4}$$

Add $G(V_1)\int_0^{\beta_1(V_1)} H(x)\mathrm{d}x$ on both sides of Equation (1.C.4) and rearrange terms to get the equilibrium bidding function (1.7):

$$\int_0^{\beta_1(V_1)} H(x)\mathrm{d}x = \int_0^{V_1}\left[1-\frac{G(x)}{G(V_1)}\right]H(x)\mathrm{d}x = \int_0^{V_1}\left[\int_0^x H(s)\mathrm{d}s\right]\frac{g(x)}{G(V_1)}\mathrm{d}x, \tag{1.C.5}$$

where the last equality is from integration by parts.

Moreover, from Equation (1.C.3) it is straightforward to show that

$$\beta_1'(V_1) = \frac{g(V_1)}{G(V_1)}\cdot\frac{\int_{\beta_1(V_1)}^{V_1} H(x)\mathrm{d}x}{H(\beta_1(V_1))} > 0,$$

where the inequality holds because $\beta_1(V_1) < V_1$ for all $V_1 > 0$. To see this, note that in Equation (1.C.5) the integrand of the left-hand side is always greater than that of the right-hand side, $H(x) > [1 - G(x)/G(V_1)]H(x)$, because $G(\cdot)$ is strictly increasing and $x < V_1$ in the integrand. To make the equality in Equation (1.C.5) hold for all V_1, it has to be true that $\beta_1(V_1) < V_1$ for all V_1. The monotonicity of $\beta_1(V_1)$ means that the initial bid of B_1 is strictly increasing in her valuation. ■

D Variable Definitions

Without specific explanation, all variables are calculated at the end of the fiscal year prior to the takeover announcement.

Board Independence: A binary variable that equals one if the percentage of independent directors exceeds 50% and zero otherwise. (Source: Risk Metrics)

Cash: Cash and short-term investments scaled by total assets. (Source: COMPUSTAT)

GIM Index: Defined as in Gompers, Ishii, and Metrick (2003). (Source: Risk Metrics)

Free Cash Flow: Operating income before extraordinary items minus interest expense, capital expenditure, and income taxes, and then divided by total assets. (Source: COMPUSTAT)

Institutional Shareholdings: The number of shares held by institutional investors divided by the total number of shares outstanding, calculated at the end of the quarter prior to the bid. (Source: Thomson Reuters and CRSP)

Leverage: The summation of total long-term debt and total short-term debt divided by total assets. (Source: COMPUSTAT)

M/B: Total assets plus market capitalization of the stocks 4 weeks prior to the first bid minus the book value of equity, and then scaled by total assets. (Source: COMPUSTAT and CRSP)

Managerial Compensation: Total annual compensation for the top executives of the firm, including salary, bonus, other annual (e.g. annual perquisites and other personal benefits), total value of restricted stock granted, total value of stock options granted (priced using Black-Scholes), long-term incentive payouts and all other total compensation (e.g. severance payments, 401K contributions, signing bonuses, life insurance premiums). (Source: ExecuComp)

Managerial Shareholdings: The number of shares held by the top executives divided by the total number of shares outstanding. (Source: ExecuComp and CRSP)

Premium: The offered price per share divided by the stock price of the target 4 weeks prior to the announcement of the first bid. (Source: SDC and CRSP)

Relative Size: The ratio of the transaction value to the market value of the acquiring firm 4 weeks before the bid. (Source: SDC and CRSP)

ROA: Operating income before extraordinary items divided by total book assets. (Source: COMPUSTAT)

Same Industry: A binary variable that equals one if the bidder and the target have the same 4-digit SIC code. (Source: SDC)

Size: Logarithm of the market capitalization of the firm 4 weeks prior to the bid. (Source: CRSP)

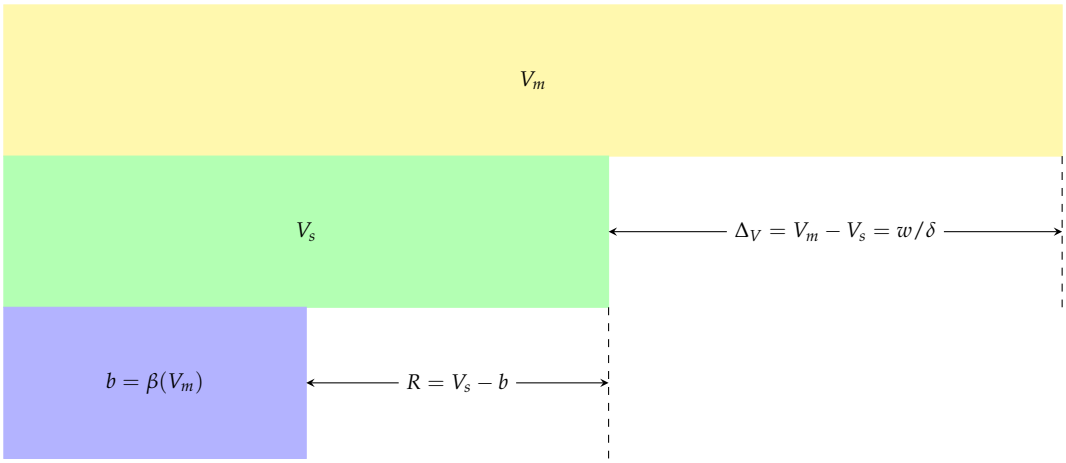

Figure 1.1 : Valuation Structure for Acquiring Firms and Research Design.

The target is worth V_s for acquiring shareholders. Acquisition of the target brings private benefits w to acquiring managers. The sensitivity of managerial wealth to shareholder wealth is $\delta \in (0,1)$. Therefore, the utility of acquiring managers from the takeover is: $u_m = \delta \cdot (V_s - b) + w = \delta \cdot (V_s + w/\delta - b)$, where b is the premium offered to the target. From the perspective of acquiring managers, the target is worth $V_m = V_s + w/\delta$. The managerial overvaluation, i.e., the difference between the managerial valuation V_m and the shareholder valuation V_s, is driven by managerial private benefits: $\Delta_V = V_m - V_s = w/\delta$. Since managers make decisions on behalf of their shareholders, the premium b is made based on the managerial valuation V_m and is determined by the bidding function: $b = \beta(V_m)$. This bidding function can be estimated using a structural approach. With the bidding function, the managerial valuation can be recovered from the observed premiums: $V_m = \beta^{-1}(b)$. Meanwhile, the net payoff for acquiring shareholders, i.e., $R = V_s - b$, is reflected in the stock market reaction to the takeover, which can be estimated using an event study method. Since premium offers are observable, the shareholder valuation can be calculated by adding the premium offer b to the estimated net payoff R. Finally, with both managerial valuations and shareholder valuations, the calculation of the managerial overvaluation and private benefits is straightforward.

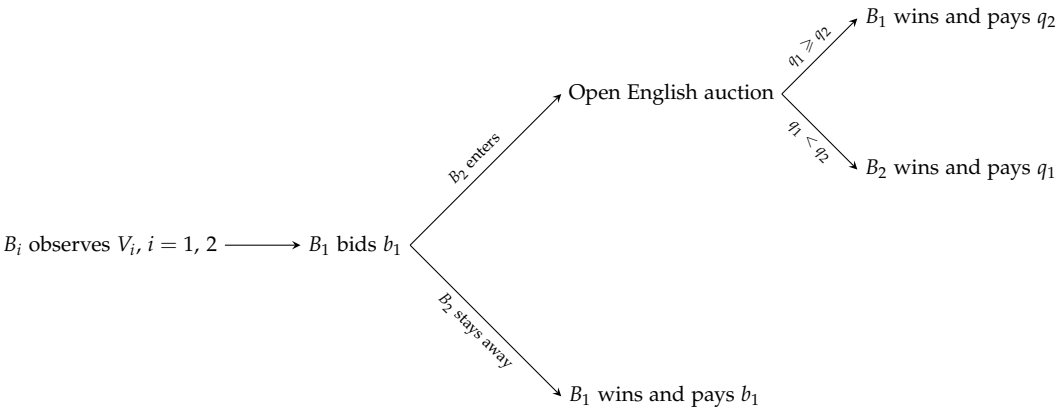

Figure 1.2 : Timing of the Takeover Process.

Two bidders, B_1 and B_2, are interested in acquiring the target, T. B_1 initiates the takeover by offering a premium b_1 to the target. Having observed b_1, B_2 decides whether or not to compete with B_1. If B_2 stays away, B_1 takes over the target at b_1. And if B_2 enters and competes with B_1, an open English auction is conducted in which the premium is raised continuously until one bidder drops out. The remaining bidder wins and pays the dropout premium of the loser. q_i denotes the dropout premium of B_i, $i = 1, 2$.

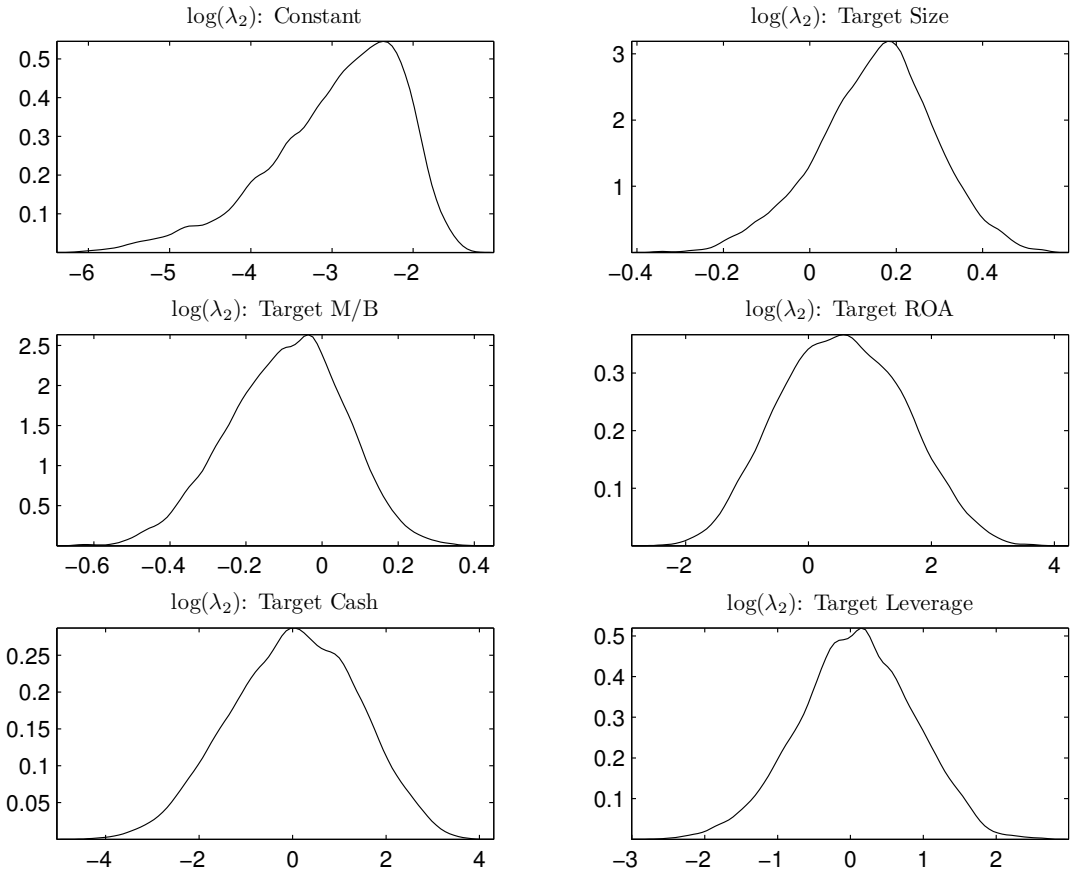

Figure 1.3 : Posteriors of NLS-QBE Estimators of Structural Parameters for Target Characteristics.

This figure illustrates the posteriors of NLS-QBE estimators of the parameters that determine the distribution of the potential second bidder's valuation: $V_2 \sim \text{Exp}(\lambda_2)$, and $\log(\lambda_2) = \mathbf{a}_2'\mathbf{z}$, where $\mathbf{z}$ is a vector of target characteristics including target size (logarithm of target market capitalization), market-to-book ratio (M/B), return on assets (ROA), cash holdings defined as cash divided by total assets (Cash), and leverage.

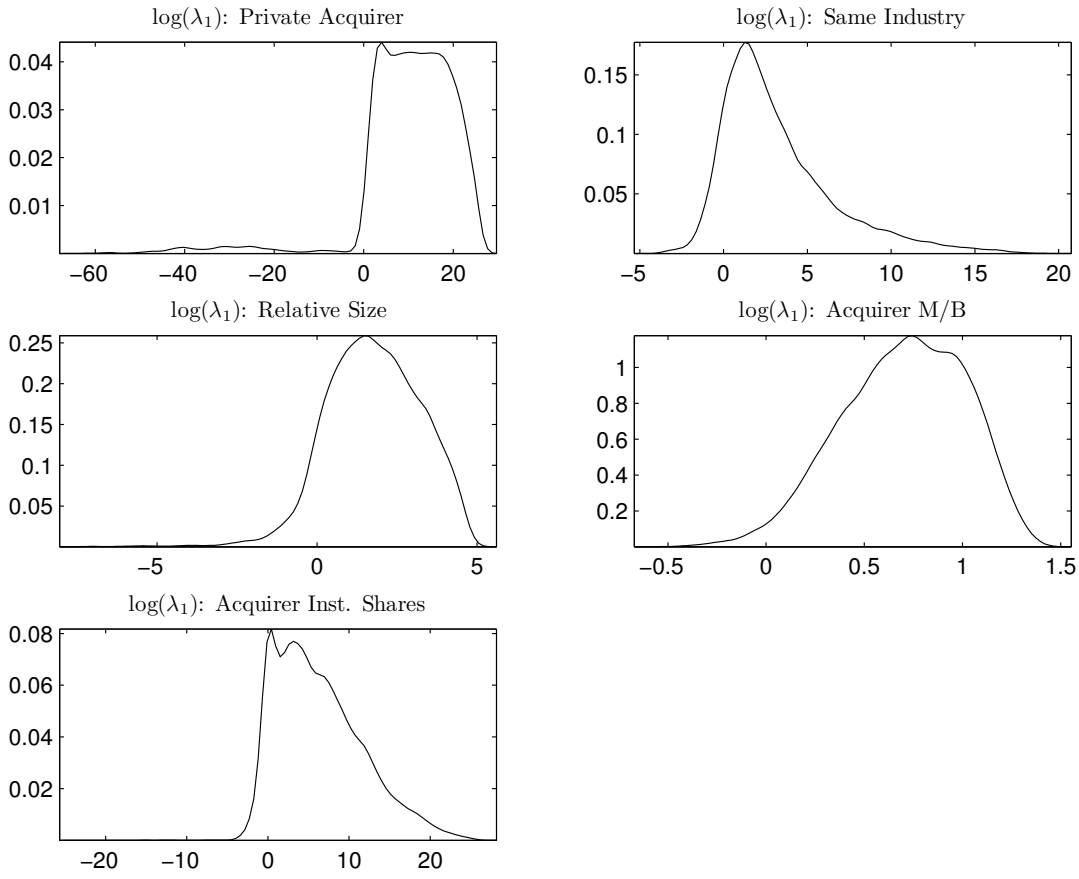

Figure 1.4 : Posteriors of NLS-QBE Estimators of Structural Parameters for Bidder Characteristics.

This figure illustrates the posteriors of NLS-QBE estimators of the parameters that determine the distribution of the first bidders' valuation: $V_1 \sim \text{Exp}(\lambda_1)$, and $\log(\lambda_1) = \mathbf{a}_1'\mathbf{x} + \mathbf{a}_2'\mathbf{z}$, where $\mathbf{x}$ is a vector of bidder characteristics and $\mathbf{z}$ is a vector of target characteristics. The posteriors of the elements of $\mathbf{a}_2$ are illustrated in Figure 1.3. This figure only shows the posteriors of the elements of $\mathbf{a}_1$. The bidder characteristics include the private/public status, indicator of same-industry acquisition, relative size (ratio of the deal value and the bidder market value), market-to-book ratio, and institutional shareholdings.

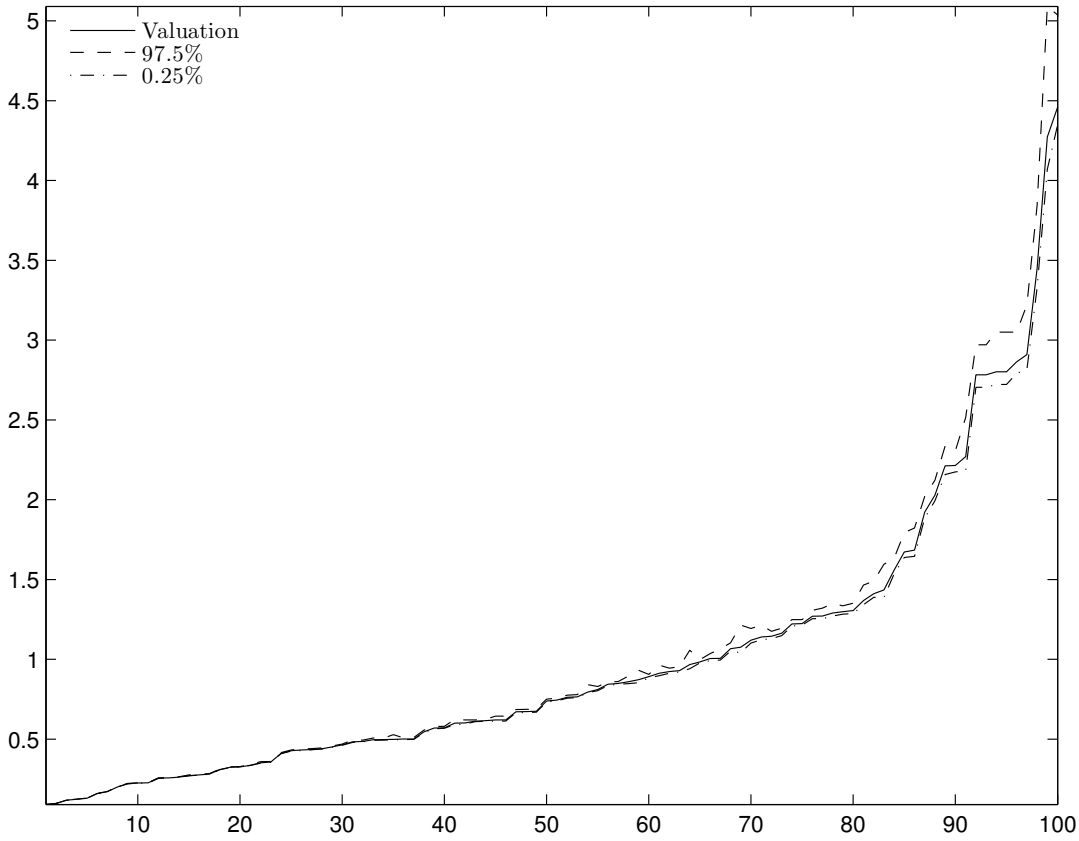

Figure 1.5 : Estimated Bidder Valuation and the 95% Confidence Interval.

This figure illustrates the estimated bidder (managerial) valuations as well as the 95% confidence interval for 100 randomly selected acquiring firms. Bidder valuations are calculated by inverting the bidding function with the estimated coefficients given in Table 1.4. And the 95% confidence interval is obtained by the same operation using 1,000 randomly selected vectors of coefficients from the NLS-QBE draws. The detailed implementation of the NLS-QBE procedure is given in Appendix B.2.

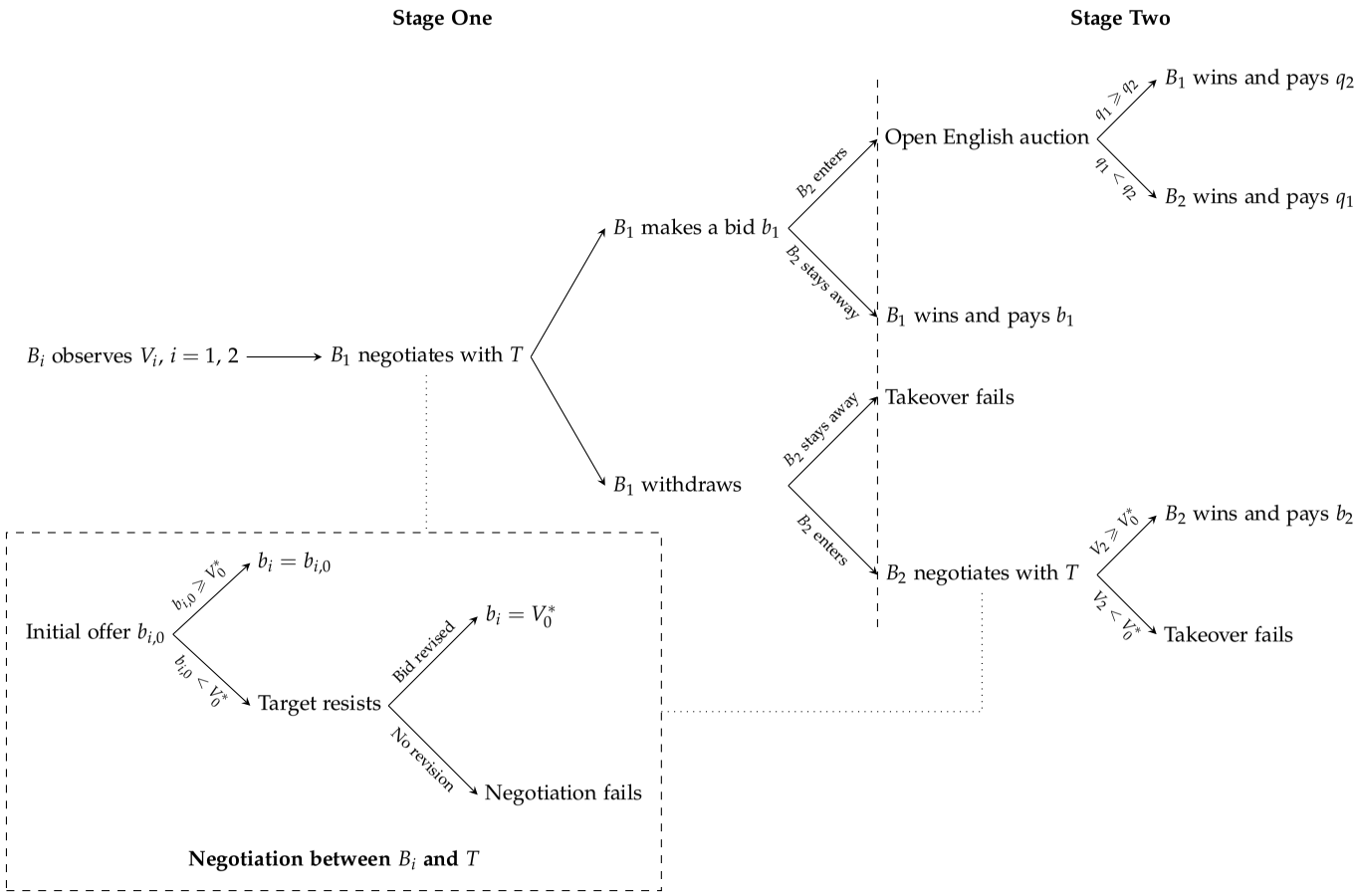

Figure 1.6 : Timing of the Takeover with Target Resistance.

Two bidders, B_1 and B_2, with valuations, V_1 and V_2, respectively, are interested in acquiring the target, T. B_1 take the first move and negotiates with T which yields either a tentative bid b_1 or the withdrawal of B_1. Having observed B_1's actions, B_2 decides whether to enter. If the negotiation between B_1 and T is successful and B_2 does not enter, B_1 acquires T at b_1. If B_1 and B_2 compete, an open English auction with dropout prices q_1 and q_2 is used to decide who gets the right of acquiring T and the premium. If B_1 withdraws and B_2 steps in, a new negotiation is conducted between B_2 and T. And if B_2 stays away after B_1 withdraws, the takeover fails. The negotiation process is zoomed out and illustrated in the dashed frame. In any negotiation, bidder i makes an initial offer $b_{i,0}$, and the target management resists whenever $b_{i,0}$ is below the reservation value V_0^*. The bidder can choose whether to revise the bid and top up V_0^*. If $b_{i,0} \geqslant V_0^*$ or $b_{i,0}$ is revised, the negotiation succeeds with a tentative agreement $b_i = \max\{b_{i,0}, V_0^*\}$. Otherwise, the negotiation fails.

Table 1.1 : Distribution of Takeover Contests by Year

This table describes the sample of takeover contests used in the estimation of the equilibrium bidding function and managerial valuations. The break-up of the sample is provided for each year from 1986 to 2010. Columns (1)-(3) contain the number of successful takeovers, and columns (4)-(6) report the total number of takeovers in the sample. Columns (1) and (4) are for the takeovers with only one revealed bidder. Columns (2) and (5) are for the takeovers with two bidders. Column (3) summarizes the number of total successful takeovers, and column (6) reports the total number of takeovers in the sample, successful and unsuccessful.

	(1)	(2)	(3)	(4)	(5)	(6)
	Successful Takeovers			Whole Sample		
Year	Single-Bidder	Two-Bidder	Sum	Single-Bidder	Two-Bidder	Sum
1986	88	4	92	113	7	120
1987	79	6	85	101	8	109
1988	84	5	89	129	11	140
1989	68	5	73	107	5	112
1990	53	2	55	71	2	73
1991	56	1	57	72	1	73
1992	58	1	59	69	1	70
1993	89	4	93	105	4	109
1994	111	5	116	122	6	128
1995	194	9	203	220	10	230
1996	209	8	217	240	12	252
1997	299	12	311	330	13	343
1998	317	5	322	355	6	361
1999	337	8	345	393	11	404
2000	256	4	260	297	4	301
2001	194	1	195	218	1	219
2002	108	0	108	131	2	133
2003	159	1	160	182	2	184
2004	145	1	146	158	1	159
2005	157	3	160	169	3	172
2006	187	6	193	210	7	217
2007	185	4	189	208	5	213
2008	100	2	102	131	3	134
2009	79	5	84	91	6	97
2010	70	1	71	79	2	81
Total	3,682	103	3,785	4,301	133	4,434

Table 1.2 : Summary Statistics

This table describes summary statistics of deal, acquirer, and target characteristics of the takeover deals by the first bidders. Panels A and B correspond to the sample of successful takeovers and to the whole sample, respectively. *Days to Complete* for successful deals is the number of days between the announcement date and the effective date, and for unsuccessful deals is the number of days between the announcement date and the date 6 months after the last bid. *Deal Value* is the transaction value reported by SDC (in millions). *Premium* is the net percentage of the offered price per share over the stock price of the target 4 weeks prior to the first bid. *Relative Size* is the ratio of the deal value to the market capitalization of the bidder 4 weeks prior to the bid, measured in percentage. *Share Sought* is the percentage of target shares that the bidder seeks to purchase in the transaction. *Same Industry* is a binary variable that equals one if both the bidder and the target have the same 4-digit SIC code. *Size* is logarithm of the market capitalization (in millions) of the firm's equity 4 weeks prior to the bid. *M/B* is the market-to-book ratio defined as the market value of the firm divided by its book value. *Leverage* is the ratio of the total debt to the total assets, measured in percentage. *Cash/Assets* is the ratio of cash and short-term investments divided by total assets, measured in percentage. *ROA* is the return on assets, measured in percentage. *Inst. Share* is the percentage of shares held by institutional investors. *Mngr. Share* is the percentage of shares held by the top executives of the firm. Firm financials and shareholding variables are reported for all targets and public bidders. Without specific report, there are 3,785 successful takeovers and the whole sample consists of 4,434 takeovers.

	Mean	Std. Dev.	25%	50%	75%	*N*
			Panel A: Successful Takeovers			
a: Deals						
Days to Complete	137.57	87.38	81.00	120.00	170.00	
Deal Value ($M)	1,468.20	5,756.39	72.47	222.36	800.03	
Premium (%)	47.11	42.76	21.79	37.12	60.00	
Relative Size (%)	42.94	71.93	5.65	19.00	51.43	3,157
Share Sought (%)	99.58	3.81	100.00	100.00	100.00	
Same Industry	0.32	0.47				
b: Targets						
Size	5.12	1.73	3.87	4.97	6.25	
M/B	1.81	1.55	1.04	1.27	1.88	
Leverage (%)	35.71	33.12	4.32	27.42	62.58	
Cash/Assets (%)	16.29	20.14	2.24	6.81	23.70	
ROA (%)	−1.58	18.20	−0.18	1.52	5.85	
Inst. Share (%)	22.98	31.51	0.00	0.00	43.75	
c: Public First Bidders						3,157
Size	7.56	1.97	6.13	7.53	8.92	
M/B	2.47	2.79	1.11	1.50	2.55	
Leverage (%)	22.41	19.04	7.99	19.09	31.33	
Inst. Share (%)	26.27	33.93	0.00	0.00	56.58	
Mngr. Share (%)	2.78	7.26	0.14	0.42	1.52	1,764
			Panel B: Whole Sample			
a: Deals						
Days to Complete	144.16	82.47	87.00	134.00	180.00	
Deal Value ($M)	1,389.02	5,446.41	68.62	208.44	759.73	
Premium (%)	47.88	44.88	21.90	37.47	60.61	
Relative Size (%)	46.26	76.52	6.25	20.68	55.82	3,510
Share Sought (%)	99.38	4.72	100.00	100.00	100.00	
Same Industry	0.31	0.49				
b: Targets						
Size	5.04	1.76	3.76	4.89	6.19	
M/B	1.76	1.51	1.03	1.25	1.84	
Leverage (%)	35.05	32.44	4.66	27.19	58.46	
Cash/Assets (%)	16.00	19.93	2.21	6.74	23.28	
ROA (%)	−1.55	17.90	−0.39	1.53	5.79	
Inst. Share (%)	22.25	31.24	0.00	0.00	41.67	
c: Public Bidders						3,150
Size	7.45	2.00	6.01	7.42	8.82	
M/B	2.48	2.84	1.11	1.49	2.54	
Leverage (%)	23.05	19.70	8.06	19.51	32.35	
Inst. Share (%)	25.84	33.94	0.00	0.00	55.88	
Mngr. Share (%)	2.85	7.59	0.14	0.45	1.57	1,903

Table 1.3 : Correlations between Initial Bids and Target and Bidder Characteristics

This table provides the correlation coefficients between the initial bids and target and bidder characteristics. Panel A reports the correlation coefficients between the initial bids and target characteristics, and Panel B presents the correlation coefficients between the initial bids and bidder characteristics. All correlation coefficients are reported in percentage. In Panel A, *Size* is logarithm of target market capitalization, *M/B* is target market-to-book ratio, *ROA* is the return on assets of the target, *Cash/Assets* is the cash holdings of the target, and *Leverage* is the target leverage ratio. In Panel B, *Relative Size* is the ratio of the deal value and bidder market capitalization, *Size* is logarithm of bidder market capitalization, *M/B* is the bidder market-to-book ratio, *Inst. Share* is the institutional shareholdings of the bidder, *Private* is a binary variable that equals one if the bidder is a private firm, and *Same Ind.* is a binary variable that equals one if the target and the bidder share the same 4-digit SIC code.

	Panel A: Correlations of Initial Bids and Target Characteristics (%)					
	Bid	Size	M/B	ROA	Cash/Assets	
Size	−27.97					
M/B	−4.64	25.09				
ROA	−17.59	24.57	−8.49			
Cash/Assets	7.00	−4.70	33.09	−26.79		
Leverage	−7.46	−0.23	−28.30	6.58	−37.69	
	Panel B: Correlations of Initial Bids and Bidder Characteristics (%)					
	Bid	Relative Size	Size	M/B	Inst. Share	Private
Relative Size	−4.28					
Size	−6.17	−37.71				
M/B	8.17	−8.64	16.41			
Inst. Share	−4.13	−9.39	26.90	−5.46		
Private	−1.84					
Same Ind.	−0.06	6.22	−5.67	−0.90	5.87	18.18

Table 1.4 : Estimation of the Equilibrium Bidding Function

This Table reports the estimates of the structural parameters that define the equilibrium bidding function (1.2). The estimation is based on the initial bids of the first bidders of 3,785 successful takeovers. Panel A reports the estimates of the parameters that determine the first bidder's belief about the potential second bidder's valuation. And Panel B reports the estimates of the parameters that determine the distribution of the first bidder's valuation. In Panel A, *Size* is logarithm of the market capitalization (in millions) of the target before the takeover. *M/B* is the target market-to-book ratio. *ROA* is the return on assets of the target. *Cash/Assets* is the ratio of cash and short-term investments of the target to total assets of the target. *Leverage* is the ratio of total debt of the target to total assets of the target. In Panel B, *Private* is a binary variable that equals one if the bidder is a private firm. *Same Ind.* if a binary variable that equals one if the bidder and the target have the same 4-digit SIC code. *Relative Size* is the ratio of the deal value to the market capitalization of the bidder. *M/B* is the market-to-book ratio of the bidder. And *Inst. Share* is the institutional shareholdings of the bidder. For private bidders, Relative Size, M/B, and Inst. Share are set to zeros due to data availability, so the coefficients of these variables represent the effects of these variables *conditional* on public firms. The 90% confidence interval of the estimates are given in the last two columns that can be used for the assessment of the statistical significance of the estimates.

	Mean	Std. Dev	90% Confidence Interval	
	Panel A: $\log(\lambda_2) = \mathbf{a}_2'\mathbf{z}$, $V_2 \sim \text{Exp}(\lambda_2)$			
Size	0.15	0.14	−0.09	0.37
M/B	−0.10	0.15	−0.35	0.14
ROA	0.55	0.99	−1.06	2.21
Cash/Assets	0.04	1.34	−2.22	2.19
Leverage	0.08	0.79	−1.24	1.36
Intercept	−2.94	0.82	−4.56	−1.88
	Panel B: $\log(\lambda_1) = \mathbf{a}_1'\mathbf{x} + \mathbf{a}_2'\mathbf{z}$, $V_1 \sim \text{Exp}(\lambda_1)$			
Private	10.48	10.81	0.62	23.15
Same Ind.	3.23	3.37	−0.61	10.22
Relative Size	1.78	1.46	−0.43	4.08
M/B	0.70	0.31	0.15	1.17
Inst. Share	6.31	5.37	−0.22	16.60

Table 1.5 : Managerial Overvaluation, Overbidding, and Private Benefits

This table reports the estimation results of managerial overvaluation, overbidding, and private benefits for the public first bidders based on the base model. Panel A provides managerial valuations (Mngr. Val.), shareholder valuations (Shdr. Val.), and managerial overvaluation, both in percentage and in dollar term. Managerial valuations and shareholder valuations are both net of the target market value. The last line of Panel A provides the percentage of takeovers with negative shareholder valuations in the sample. Panel B reports the observed initial bids of first bidders (b_1), the bids desired by the shareholders (b_s), and the managerial overbidding (Δ_b), both in percentage and in dollar term. The observed bids and desired bids are both net of the target market value. The last two lines in Panel B report shareholder valuations (both in percentage and million dollars). All statistics in Panel B are calculated only for the subsample of takeovers with positive shareholder valuations. And Panel C reports the estimates of managerial private benefit (Mngr. PB.), both in percentage of target capitalization and in dollar term. Managerial annual compensation (Mngr. Cmp.) is also reported for comparison.

	Mean	Std. Dev.	25%	50%	75%
			Panel A: Overvaluation		
Mngr. Val. (%)	97.11	79.19	45.35	77.13	125.62
Mngr. Val. ($M)	625.20	1976.67	39.07	116.14	377.58
Shdr. Val. (%)	36.34	195.39	9.67	32.78	64.33
Shdr. Val. ($M)	253.87	1052.15	7.41	44.60	185.81
Overvaluation (%)	62.56	191.74	17.34	41.63	80.95
Overvaluation ($M)	386.61	1232.92	14.41	63.40	237.72
Negative Shdr. Val. (%)	17.04	37.60			
			Panel B: Overbidding		
Initial Bid (b_1, %)	48.91	37.58	24.18	39.54	62.88
Initial Bid (b_1, $M)	340.66	1059.81	21.12	63.83	204.02
Desired Bid (b_s, %)	36.36	61.36	10.90	20.72	36.58
Desired Bid (b_s, $M)	183.29	547.31	10.68	36.67	118.43
Overbid (Δ_b, %)	13.01	56.60	6.75	17.06	30.81
Overbid (Δ_b, $M)	159.55	577.30	5.19	24.14	93.12
Shdr. Val. (%)	66.08	80.10	21.88	41.82	74.04
Shdr. Val. ($M)	373.81	1112.78	21.48	74.29	239.18
			Panel C: Private Benefit		
Mngr. PB. (%)	1.82	9.84	0.01	0.15	0.71
Mngr. PB. ($M)	9.04	45.44	0.05	0.44	2.27
Mngr. Cmp. ($M)	18.70	26.40	4.96	10.09	21.45

Table 1.6 : Bidder Characteristics by Private Benefits Groups

This table reports the bidder characteristics by whether managerial private benefits are larger or smaller than its 75th percentile. *P.B.* is short for the private benefits. *Size* is logarithm of the bidder market capitalization, *Relative Size* is the ratio of the deal value and the bidder market capitalization, measured in percentage. *M/B* is the bidder market-to-book ratio. *Leverage* is the bidder debt to asset ratio (in percentage). *Free CF* is the free cash flows of the bidder scaled by total assets, measured in percentage. *Ind. Board* is a binary variable that equals one if the number of independent board directors exceeds 50%. *GIM Index* is defined by Gompers, Ishii, and Metrick (2003). *Inst. Share* is the institutional shareholdings of the bidder (in percentage). *Same Ind.* is a binary variable that equals one if the bidder and the target share the same 4-digit SIC code.

	P.B. < 75th			P.B. $\geqslant$ 75th			Whole Sample		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
P.B. ($M)	0.14	0.19	1.79	27.58	8.14	50.73	7.00	0.44	28.03
Size	8.26	8.18	1.62	8.60	8.60	1.62	8.35	8.27	1.63
Relative Size (%)	24.52	9.34	41.54	50.60	29.61	60.68	31.04	12.39	48.37
M/B	2.28	1.49	2.32	3.00	1.81	3.36	2.46	1.58	2.63
Leverage (%)	19.90	18.99	14.75	23.12	21.17	17.56	20.70	19.49	15.56
Free CF (%)	−2.67	−1.96	7.09	−2.96	−1.91	6.15	−2.74	−1.94	6.67
Same Ind.	0.31	0.00	0.46	0.42	0.00	0.49	0.34	0.00	0.47
Ind. Board	0.84	1.00	0.37	0.73	1.00	0.44	0.81	1.00	0.39
GIM Index	9.64	9.00	2.68	9.14	9.00	2.60	9.52	9.00	2.67
Inst. Share (%)	35.65	26.86	36.99	34.76	16.38	36.94	35.42	26.14	36.97

Table 1.7 : Multivariate Analysis of Private Benefits

This table reports the results of multivariate analysis of managerial private benefits. The dependent variable is managerial private benefits (P.B.) of the public first bidders estimated using the base model. Columns (1)-(4) are the estimation results using the whole sample. Columns (5) and (6) restrict the analysis in the subsamples where private benefit is higher than its 75th quantile and is lower than its 75th quantile, respectively. *Size* is logarithm of the market capitalization (in millions) of the bidder's equity. *Relative Size* is the ratio of the deal value and the bidder market capitalization, measured in percentage. *M/B* is the bidder market-to-book ratio. *Leverage* is the bidder debt to asset ratio (in percentage). *Free CF* is the free cash flows of the bidder scaled by total assets, measured in percentage. *Ind. Board* is a binary variable that equals one if the number of independent board directors exceeds 50%. *GIM Index* is defined by Gompers, Ishii, and Metrick (2003). *Inst. Share* is the institutional shareholdings of the bidder (in percentage). *Same Ind.* is a binary variable that equals one if the bidder and the target share the same 4-digit SIC code. *Year F.E.* indicates whether the year fixed effects are included. Robust standard errors are provided in parentheses. Superscripts *a*, *b*, and *c* indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Whole Sample				P.B. $\geqslant$ 75th	P.B. < 75th
	(1)	(2)	(3)	(4)	(5)	(6)
Size	5.99^a	5.66^a	4.76^a	4.58^a	10.95^a	-0.14^a
	(1.58)	(1.52)	(1.04)	(1.03)	(2.99)	(0.05)
Relative Size	0.13^a	0.12^b	0.14^a	0.13^a	0.14^c	0.00^a
	(0.04)	(0.05)	(0.03)	(0.04)	(0.07)	(0.00)
M/B	−0.69	−0.95	0.16	0.05	0.59	−0.04
	(0.82)	(0.88)	(0.74)	(0.77)	(2.84)	(0.05)
Leverage	-0.21^c	-0.22^c	-0.17^b	-0.17^b	-0.54^b	0.00
	(0.12)	(0.12)	(0.08)	(0.09)	(0.25)	(0.00)
Free CF	0.27	0.34	0.26^c	0.28^c	1.82^b	−0.01
	(0.23)	(0.24)	(0.16)	(0.16)	(0.82)	(0.01)
Ind. Board	-17.93^a	-17.29^a	-12.81^a	-12.30^a	-34.57^a	0.23
	(6.39)	(6.02)	(4.50)	(4.20)	(12.66)	(0.27)
GIM Index	−0.61	−0.61				
	(0.67)	(0.66)				
Inst. Share	0.01	0.05				
	(0.04)	(0.07)				
Same Industry	−0.25	−0.10	1.83	1.96	1.47	0.08
	(3.43)	(3.36)	(2.63)	(2.66)	(9.67)	(0.14)
Intercept	-21.25^b	−18.95	-23.94^a	-17.03^c	−31.64	1.54^a
	(9.90)	(17.28)	(6.98)	(9.25)	(25.24)	(0.47)
Year F.E.	No	Yes	No	Yes	No	Yes
No. Obs.	593	593	982	982	338	744
R-squared	0.08	0.10	0.05	0.07	0.12	0.04

Table 1.8 : Estimation of the Equilibrium Bidding Function – Variant Models

This Table reports the estimates of the structural parameters that define the equilibrium bidding function under different variations of the base model. Columns 2-5 are based on the extended model with target resistance (Model I). Columns 6-9 are based on the base model except using only public winning first bidders (Model II). Columns 10-13 are the same as Model II and consider the impacts of payment methods. Columns 14-17 are the same as Model II and consider the impact of merger waves. The identification of merger waves follows Harford (2005). Panel A reports the estimates of the parameters that determine the first bidder's belief about the (standardized) potential second bidder's valuation. Panel B reports the estimates of the parameters that determine the distribution of the (standardized) first bidder's valuation. And Panel C reports the estimates of the parameters that determine the distribution of the target reservation value (Model I only). In Panel A, *Size* is logarithm of the market capitalization (in millions) of the target before the takeover. *M/B* is the target market-to-book ratio. *ROA* is the return on assets of the target. *Cash/Assets* is the ratio of cash and short-term investments of the target to total assets of the target. *Leverage* is the ratio of total debt of the target to total assets of the target. In Panel B, *Private* is a binary variable that equals one if the bidder is a private firm. *Same Ind.* if a binary variable that equals one if the bidder and the target have the same 4-digit SIC code. *Relative Size* is the ratio of the deal value to the market capitalization of the bidder. *M/B* is the market-to-book ratio of the bidder. *Inst. Share* is the institutional shareholdings of the bidder. *Pure Cash* is a binary variable that equals one if the deal is a pure-cash one. *Mixed Pmt.* is a binary variable that equals one if the deal is offered with mixture of cash and equity. And *In Wave* is a binary variable that equals one if the deal is identified in a merger wave. In the Target Resistance model, for private bidders, Relative Size, M/B, and Inst. Share are set to zeros due to data availability, so the coefficients of these variables represent the effects of these variables *conditional* on public firms. The estimation of the equilibrium bidding function employs the NLS-QBE approach and the inferences are based the 90% confidence interval given in the last two columns. The variable definitions in Panel C are the same as in Panel A except that *Inst. Share* is the institutional shareholdings of the target. Panel C employs an MLE approach and the inferences are based on regular asymptotic results. Superscripts *a*, *b*, and *c* indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	I: Target Resistance				II: Public Sample				III: Payment Methods				IV: Merger Wave			
	Mean	Std. Dev	90% Interval		Mean	Std. Dev	90% Interval		Mean	Std. Dev	90% Interval		Mean	Std. Dev	90% Interval	
Panel A: $\log(\lambda_2) = \mathbf{a}_2'\mathbf{z}$, $V_2^* \sim \text{Exp}(\lambda_2)$																
Size	0.14	0.14	−0.10	0.35	0.14	0.15	−0.12	0.37	0.14	0.16	−0.14	0.37	0.14	0.14	−0.11	0.37
M/B	−0.09	0.16	−0.35	0.16	−0.09	0.16	−0.38	0.17	−0.09	0.19	−0.42	0.19	−0.09	0.16	−0.36	0.16
ROA	0.60	1.01	−1.08	2.23	0.54	0.97	−1.03	2.13	0.62	1.15	−1.16	2.59	0.61	0.97	−0.99	2.21
Cash/Assets	−0.04	1.49	−2.60	2.37	−0.06	1.42	−2.48	2.16	−0.10	1.50	−2.72	2.24	0.06	1.30	−2.16	2.11
Leverage	0.11	0.83	−1.25	1.50	0.17	0.78	−1.17	1.43	0.27	0.86	−1.14	1.67	0.12	0.82	−1.28	1.46
Intercept	−2.88	0.77	−4.30	−1.83	−2.97	0.76	−4.40	−1.93	−3.05	0.88	−4.68	−1.89	−2.92	0.79	−4.36	−1.84
Panel B: $\log(\lambda_1) = \mathbf{a}_1'\mathbf{x} + \mathbf{a}_2'\mathbf{z}$, $V_1^* \sim \text{Exp}(\lambda_1)$																
Private	11.51	6.23	2.06	21.40												
Same Ind.	3.66	3.56	−0.89	10.49	4.17	3.65	−0.30	11.19	3.77	3.71	−0.55	11.22	3.27	3.23	−0.63	9.41
Relative Size	1.52	1.30	−0.46	3.68	1.86	1.33	−0.20	3.96	1.50	1.38	−0.77	3.58	1.49	1.35	−0.71	3.61
M/B	0.69	0.30	0.18	1.18	0.74	0.31	0.20	1.22	0.65	0.29	0.15	1.12	0.65	0.29	0.17	1.12
Inst. Share	7.14	5.24	0.02	17.06	5.67	4.99	−0.30	15.56	4.98	4.60	−1.40	13.54	5.88	4.88	−0.47	15.37
Pure Cash									4.58	3.83	0.00	12.24				
Mixed Pmt.									5.15	4.17	−0.15	13.08				
In Wave													3.30	3.62	−0.91	10.72
Panel C: $\log(\lambda_0) = \mathbf{a}_0'\mathbf{z}_0$, $V_0^* \sim \text{Exp}(\lambda_0)$																
	Coef.	Std. Dev														
Size	0.19[a]	0.01														
M/B	0.14[a]	0.01														
Cash/Assets	−0.24[a]	0.07														
Leverage	0.26[a]	0.05														
ROA	−0.06	0.08														
Inst. Share	0.56[a]	0.05														
Intercept	0.11[a]	0.04														

Table 1.9 : Cumulative Abnormal Returns and Buy-and-Hold Returns in Variant Event Windows

This table reports cumulative abnormal returns and buy-and-hold returns for winning first bidders in variant windows surrounding the announcement of first bids: (-1, +1), (-1, +20), and (-1, +180). Column 2 reports mean cumulative abnormal returns and column 3 reports mean buy-and-hold returns. The calculation of both abnormal returns uses Fama-French 3-factor model as benchmark. The sample size used in the calculation is 3,448. Parentheses contains Patell *Z*-statistics. Superscripts *a*, *b*, and *c* indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Event Window	Cumulative Abnormal Return (%)	Buy-and-Hold Return (%)
(-1, +1)	-1.84^{a}	-1.85^{a}
	(-12.19)	(-12.83)
(-1, +20)	-3.06^{a}	-3.25^{a}
	(-9.05)	(-11.50)
(-1, +180)	-12.53^{a}	-20.98^{a}
	(-11.40)	(-15.94)
(-20, +1)	-1.63^{a}	-1.88^{a}
	(-5.82)	(-8.25)
(-20, +180)	-12.09^{a}	-24.00^{a}
	(-10.23)	(-15.49)

Table 1.10 : Managerial Overvaluation, Overbidding, and Private Benefits – Based on Variations of Base Model

This table reports the estimation results of managerial overvaluation, overbidding, and private benefits for the public first bidders based on different variations of the base model. Panel A is based on estimation results for the extended model with target resistance (Model I) in columns 2-5 of Table 1.8. Panel B is based on estimation results for Model II in columns 6-9 of Table 1.8. In Panels A and B, same as in Table 1.5, Overbids, both in percentage and dollar term, are calculated only for the takeovers with positive shareholder valuations. Panel C is based on estimation results for Model III in columns 10-13 of Table 1.8. In this panel, managerial private benefits are reported for different subsamples based on the methods of payment. Panel D is based on estimation results for Model IV in columns 14-17 of Table 1.8. In this panel, managerial private benefits are reported for In-Wave and Out-of-Wave subsamples. The classification of merger waves follows Harford (2005). And Panel E is based on Model II and the managerial wealth sensitivity is calculated as *delta* (scaled by the market value of equity) which includes the delta of stock options. Panel E also reports managerial delta of acquiring firms. Managerial delta measures acquiring managers' wealth sensitivity to the market equity value of acquiring firms, i.e., the dollar change in acquiring managers' wealth for $100 increase in the market value of equity. The detailed procedure of delta calculation can be found in Appendix B of Edmans, Gabaix, and Landier (2008).

	Mean	Std. Dev.	25%	50%	75%		Mean	Std. Dev.	25%	50%	75%
	Panel A: Targeted Resistance						Panel B: Public Sample				
Overvaluation (%)	45.90	180.96	7.87	27.35	60.53	Overvaluation (%)	61.29	197.55	17.19	41.51	80.76
Overvaluation ($M)	303.92	1061.59	6.14	37.92	170.04	Overvaluation ($M)	385.07	1230.01	14.41	63.30	236.92
Negative Shdr. Val. (%)	16.26	36.91				Negative Shdr. Val. (%)	17.04	37.60			
Overbid (%)	7.64	53.35	3.04	11.98	25.10	Overbid (%)	12.47	60.29	6.75	17.05	30.80
Overbid ($M)	125.48	497.64	2.10	15.51	69.74	Overbid ($M)	159.15	577.19	5.19	24.12	93.10
Mngr. PB. (%)	1.44	8.86	0.00	0.09	0.50	Mngr. PB. (%)	1.82	9.84	0.01	0.15	0.71
Mngr. PB. ($M)	7.73	41.66	0.00	0.29	1.81	Mngr. PB. ($M)	9.01	45.36	0.04	0.44	2.27
	Panel C: Payment Methods						Panel D: Merger Waves				
a: Pure Cash						**a: Out of Wave**					
Mngr. PB. (%)	2.24	21.49	0.01	0.10	0.56	Mngr. PB. (%)	1.83	10.07	0.02	0.15	0.72
Mngr. PB. ($M)	9.22	70.69	0.01	0.20	1.00	Mngr. PB. ($M)	7.98	39.27	0.05	0.40	2.07
b: Pure Equity						**b: In Wave**					
Mngr. PB. (%)	2.11	10.87	0.02	0.18	0.82	Mngr. PB. (%)	1.67	8.60	0.01	0.15	0.63
Mngr. PB. ($M)	9.32	46.22	0.05	0.55	3.04	Mngr. PB. ($M)	13.94	77.23	0.04	0.57	3.11
c: Mixed Payment											
Mngr. PB. (%)	1.37	5.03	0.03	0.16	0.75						
Mngr. PB. ($M)	9.76	36.67	0.11	0.74	3.95						
	Panel E: Managerial delta										
Mngr. PB. (%)	2.54	10.57	0.16	0.74	2.48						
Mngr. PB. ($M)	17.93	78.54	0.44	2.23	8.55						
delta ($/$100)	4.77	7.54	0.85	2.07	4.81						

Table 1.11 : Multivariate Analysis of Private Benefits, Based on Variations of Base Model

This table reports the results of multivariate analysis of managerial private benefits. The dependent variable is managerial private benefits (P.B.) of the public first bidders estimated using different variations of the base model. Columns (1)-(2) are based on the extended model with target resistance. Columns (3)-(4) are based on the base model estimated using only public first bidders. Columns (5)-(6) are based on the base model using public first bidders with the impacts of payment methods. Columns (7)-(8) are based on the base model estimated using public first bidders with the impacts of merger waves. Merger waves are identified following Harford (2005). And columns (9)-(10) are based on the base model estimated using public first bidders but with managerial private benefits estimated using managerial delta. The calculation procedure of managerial delta can be found in Appendix B of Edmans, Gabaix, and Landier (2008). *Size* is logarithm of the market capitalization (in millions) of the bidder's equity. *Relative Size* is the ratio of the deal value and the bidder market capitalization, measured in percentage. *M/B* is the bidder market-to-book ratio. *Leverage* is the bidder debt to asset ratio (in percentage). *Free CF* is the free cash flows of the bidder scaled by total assets, measured in percentage. *Ind. Board* is a binary variable that equals one if the number of independent board directors exceeds 50%. *Same Ind.* is a binary variable that equals one if the bidder and the target share the same 4-digit SIC code. *Pure Cash* is a binary variable that equals one if the deal is offered in pure cash. *Mixed Pmt.* if a binary variable that equals one if the deal is offered in the mixture of cash and equity. And *In Wave* is a binary variable that equals one if the deal is identified as in a merger wave. Robust standard errors are provided in parentheses. *Year F.E.* indicates whether the year fixed effects are included. Superscripts *a*, *b*, and *c* indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	I: Target Resistance		II: Public Sample		III: Payment Methods		IV: Merger Wave		V: delta	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Size	5.63^a	5.50^a	5.96^a	5.70^a	4.18^a	4.05^a	4.05^a	3.91^a	13.71^a	13.06^a
	(1.30)	(1.29)	(1.54)	(1.52)	(0.84)	(0.83)	(0.81)	(0.80)	(3.40)	(3.29)
Relative Size	0.19^a	0.18^b	0.16^a	0.15^a	0.12^a	0.12^a	0.13^a	0.12^a	0.45^a	0.43^a
	(0.07)	(0.07)	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.10)	(0.10)
M/B	0.39	0.31	0.20	0.06	−0.45	−0.54	−0.39	−0.50	−0.12	−0.36
	(0.90)	(0.92)	(1.00)	(1.04)	(0.44)	(0.46)	(0.43)	(0.45)	(1.71)	(1.80)
Leverage	−0.22^b	−0.22^b	−0.23^b	−0.24^b	−0.12^c	−0.13^c	−0.11^c	−0.12^c	−0.62^a	−0.66^a
	(0.09)	(0.09)	(0.11)	(0.12)	(0.06)	(0.07)	(0.07)	(0.07)	(0.23)	(0.23)
Free CF	0.36^c	0.35^c	0.38^c	0.40^c	0.21^c	0.23^c	0.20	0.23^c	0.71	0.77^c
	(0.20)	(0.19)	(0.21)	(0.22)	(0.12)	(0.13)	(0.12)	(0.13)	(0.46)	(0.46)
Ind. Board	−10.99^b	−10.17^b	−16.23^b	−15.53^b	−11.67^a	−11.15^a	−11.71^a	−11.25^a	−32.80^a	−31.05^a
	(5.04)	(4.65)	(6.47)	(6.03)	(3.53)	(3.30)	(3.53)	(3.29)	(12.42)	(11.59)
Same Ind.	2.98	3.00	2.95	3.22	0.97	1.09	1.05	1.13	7.51	8.34
	(3.07)	(3.06)	(3.56)	(3.60)	(2.12)	(2.10)	(1.97)	(2.02)	(6.40)	(6.58)
Pure Cash					−0.34	0.38				
					(2.27)	(2.19)				
Mixed Pmt.					0.87	1.29				
					(2.01)	(2.05)				
In Wave							−1.29	−0.78		
							(2.03)	(2.10)		
Intercept	−34.45^a	−30.90^b	−30.28^a	−24.15^b	−20.04^a	−21.49^a	−18.96^a	−13.22^c	−76.63^a	−83.98^a
	(10.05)	(12.24)	(9.74)	(12.22)	(5.99)	(7.58)	(5.12)	(7.15)	(20.02)	(22.19)
No. Obs.	1,052	1,052	982	982	962	962	982	982	846	846
Year F.E.	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.05	0.07	0.05	0.06	0.07	0.09	0.07	0.09	0.08	0.10

CHAPTER II

It Pays to Follow the Leader: Acquiring Targets Picked by Private Equity[†]

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Abstract

This paper examines the impact of financial sponsor competition on corporate buyers. We find that corporate acquirers who purchase targets that financial buyers also bid on outperform corporate acquirers who buy targets bid on by corporate firms only. Deal characteristics, acquirer abilities, and observable target characteristics cannot explain this difference in returns. Corporate acquirers have higher returns when they follow a first bid by a financial buyer rather than a first bid by another corporate buyer. The results suggest that financial bidders identify targets with high potential for value improvement and winning corporate bidders are competent in exploiting this potential.

Keywords: Mergers, Acquisitions, Private Equity, Financial Sponsor, Bidding, Competition

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2.1 Introduction

The increase in buyout activity in the mid 2000s sparked an interest in private equity research with several recent papers examining the performance of private equity funds and the loan terms received by private equity-sponsored target firms.[1] Financial bidders (such as private equity firms) differ from strategic (corporate) bidders in their motives and methods of acquisitions. Financial bidders are typically cash rich, with more readily available access to credit. They are believed to be skilled at selecting undervalued targets with a high potential for cost cuts and revenue growth. While corporate buyers may share operational synergies with the target firm, financial buyers rely primarily on improving the stand-alone value of the target firm or buying undervalued assets. Moreover, financial buyers face shorter investment horizons than corporate buyers and possibly incentivize target management differently.[2]

Although their motives and method of acquisition are different, financial bidders often compete with corporate bidders for the same target. Over the last 27 years, 23 percent of all competing bids were made by financial sponsors. The percentage of financial bidders peaked in 1988 and 2006 when they comprised 42 and 36 percent all competing bids respectively. In this paper, we examine how the presence of financial sponsor competition affects corporate buyers. There are several reasons why the presence of financial sponsor competition may affect the returns and deal structure of corporate acquirers. First, financial bidders are considered experts in the business of identifying undervalued targets. Gains from acquiring an undervalued target may accrue to any winning bidder that pays a similar premium for the target. Second, Bargeron et al. (2007) show that private acquirers pay significantly lower premia than public acquirers, while Gorbenko and Malenko (2010) find that financial bidders have lower average valuations than strategic bidders. Thus, a corporate acquirer competing with a financial bidder (which is typically private) may win the auction at a lower premium than when it competes with another public corporate firm. Third, financial bidders typically undertake all-cash acquisitions, often financed with debt. Existing theory suggests that acquirers use the cash component of a bid to signal the value of an acquisition.[3] If the value to a corporate bidder from acquiring targets selected by private equity is different, then the cash component of the deal may also differ depending on the identity of the competitor.

To examine the impact of financial sponsor competition on the experience of corporate buyers, we use a sample of approximately 100,000 merger bids made between 1980 and 2007. We classify offers as coming from a single bidder (*Single Bidder sample*), a corporate bidder that faced competition from at least one financial sponsor (*Financial Competition*

[1] See Kaplan and Schoar (2005), Phalippou and Gottschalg (2009), Ivashina and Kovner (2008), and Demiroglu and James (2010).

[2] "Private Lives," Fortune Magazine, November 27, 2006.

[3] See Hansen (1987), Eckbo, Giammarino, and Heinkel (1990), and Berkovitch and Narayanan (1990).

sample), or a corporate bidder competing with only other corporate bidders (*Corporate Competition sample*).[4] Similar toBradley, Desai, and Kim (1988), we calculate cumulative abnormal returns from 20 days before to 120 and 180 days after the announcement of the bid for corporate acquirers in the three sub-samples. We find that corporate bidders in the Financial Competition sample earn much higher returns than corporate bidders in the Corporate Competition or Single Bidder samples. Over the -20 to 180-day window, corporate bidders competing with financial bidders earn an 8.80% greater cumulative abnormal return than those competing with other corporate bidders. These results are driven by corporate acquirers who eventually win the bidding competition. That is, winning corporate acquirers in the Financial Competition sample earn cumulative abnormal returns of 13.34% over the -20 to 180-day window and outperform winning corporate acquirers in the Corporate Competition sample by 8.83%. The difference in the performance of winning corporate acquirers in the two samples remains significant after controlling for other factors that have been shown to impact acquirer returns in a multivariate analysis. We further confirm these results using buy-and-hold abnormal returns (BHARs), calendar time portfolio returns and alternative windows such as -2 to 120 or 180 days.

We also examine a narrower announcement window of -2 to +2 days to determine if, at the time of announcement, the market expects acquirers in the Financial Competition sample to do better than those in the Corporate Competition sample. We find that corporate acquirers competing with other corporate bidders earn significantly negative announcement returns. Corporate acquirers competing with financial bidders earn positive but statistically insignificant abnormal announcement returns. The difference between the two is not statistically significant. The lack of significance may reflect the fact that the narrower window does not capture the announcement of a competing bid. Therefore, we also examine the abnormal return to a corporate acquirer at the announcement of a subsequent competing bid. We find that firms earn positive and significantly higher returns at the announcement of a competing bid from a financial bidder rather than a corporate bidder, suggesting that financial bidders help certify the value of an acquisition.

Having documented the superior performance of corporate acquirers in the financial competition sample, we proceed to investigate why acquirers competing with private equity outperform. Private equity groups are often credited with having superior skills in identifying good takeover targets as well as in restructuring the target and incentivizing target managers appropriately after the acquisition. There is an important difference between identifying good acquisition targets and taking value-improving actions after the merger. If financial buyers are good at finding undervalued targets, other bidders can pursue the same targets and benefit from the target's undervaluation. Thus, the source of value identified by the financial buyer may be transferable to the eventual winning

[4] We do not study deals where financial sponsors compete only with other financial sponsors since returns data for financial sponsors are usually not available.

bidder. On the other hand, if the unique talent of financial buyers lies primarily in post-merger restructuring, then corporate buyers cannot benefit just by chasing and acquiring the same targets. Corporate buyers would need similar restructuring and incentivizing skills in order to deliver high returns. To examine whether financial buyers like private equity groups are skilled at identifying good takeover targets whose value will transfer to any winning bidder, we divide corporate buyers in the Financial Competition sample into acquirers that bid first and those that followed a bid by a financial buyer. Likewise, we divide the Corporate Competition sample into first bidders and followers. We show that the superior acquirer returns discussed above are concentrated in the sub-sample of acquirers who followed a bid by a financial sponsor. Firms earn a higher abnormal return if they follow a financial bidder than if they follow a corporate bidder. Specifically, acquirers earn about 12 percent greater abnormal returns in the 180 days following announcement if they follow a financial bidder rather than following a corporate bidder. Returns of first bidders in the Financial Competition sample and Corporate Competition sample are not significantly different. These results indicate that, at least in part, financial bidders identify targets with a high value of control, from which the ultimate winner benefits, thus indicating that benefits are transferable.

Next, we conduct a more detailed investigation of why corporate acquirers in the Financial Competition sample have higher returns than those in the Corporate Competition sample. We propose three hypotheses to explain our findings: 1) Acquirers competing with financial bidders are different from those competing with other corporate bidders and the superior returns are due to acquirer abilities (*Acquirer Hypothesis*); 2) Deal terms offered by acquirers competing with financial bidders are more favorable to the acquiring firm, resulting in higher returns for acquirers in the Financial Competition sample (*Deal Terms Hypothesis*); and 3) Targets pursued by financial bidders are different from those pursued by corporate bidders alone and these differences drive the higher returns (*Target Hypothesis*). The acquirer hypothesis suggests that corporate buyers in the financial competition sample perform better because they are innately better acquirers and not because of the competition they face. For example, these corporate acquirers may be better governed or may have restructuring skills similar to those of private equity groups. On the other hand, the deal terms hypothesis and target hypothesis predict a higher return because the financial sponsor has a superior skill in identifying sources of value (such as finding an undervalued target or negotiating better deal terms or a lower premium) that may be transferable to the winning corporate acquirer.

Looking at the deal terms hypothesis first, we find several differences in the deal terms offered by acquirers in the two competition samples. Acquirers competing with financial buyers pay a greater percentage of the transaction with cash, undertake more leveraged transactions, and offer lower premiums as compared with acquirers in the Corporate Competition sample. However, none of these factors can explain away the difference in

returns between the two samples. We next examine whether the difference in returns can be attributed to the possibility that financial sponsors identify "better" targets, perhaps those with a higher potential for value enhancement (the target hypothesis). We find that targets in these two groups are not observably different and that the results are robust to controlling for target characteristics. However, given that the high returns are concentrated in the sub-sample of corporate acquirers who follow first bids by financial buyers, it is possible that financial bidders identify "better" targets based on unobservable characteristics.

Finally, we investigate the possibility that the acquirers in the financial competition sample are superior to those in the corporate competition sample. To better examine if acquirer differences explain the differences in returns, we first compare acquirer characteristics across the two groups in both absolute terms and relative to the targets. We show that acquirers in the financial competition sample have higher management and institutional ownership than those in the corporate competition sample, which may indicate that acquirers in the financial competition sample are better governed firms (perhaps more similar to financial sponsors).[5] We also find that acquirers in the financial competition sample have lower industry adjusted market to book, quick, and asset turn over ratios, both in absolute terms and relative to their targets. However, none of these variables explain the differences in returns and our results are robust to controlling for these differences.

It is possible that, similar to the targets, the acquirers may differ based on unobservable characteristics. Specifically, the acquirer hypothesis states that acquirers who choose to compete with financial buyers are simply better at delivering value from acquisitions, perhaps by identifying undervalued targets or targets with a high synergistic value. To test the acquirer hypothesis, we examine if an acquirer competing with a financial bidder experiences higher returns in previous non-competing acquisitions, thus demonstrating its superior acquiring abilities. We find that acquirers in the Financial Competition sample do not have better returns in earlier, non-competing acquisitions. Moreover, there is no evidence that acquirers in the Financial Competition sample are more frequent acquirers than those in the Corporate Competition sample. Therefore, acquirer experience is an unlikely explanation for the difference in returns.

Having ruled out deal terms, observable target characteristics, and observable or unobservable acquirer characteristics, we propose that financial buyers identify targets based on unobservable characteristics with a high potential for value-improvement. Our finding that corporate acquirers who purchase targets desired by financial bidders earn significantly higher positive abnormal returns goes somewhat against the popular view that corporate acquirers are not as good at delivering value from acquisitions as private equity

[5] Previous research suggests that higher institutional ownership is associated with higher returns in mergers and acquisitions. See Chen, Harford, and Li (2007) and references therein.

buyers. The business press often lauds the ability of the private equity industry to select undervalued targets and take focused, performance-improving actions post-acquisition. Buy-out firms are thought to be better at incentivizing and guiding target management toward cost cuts and revenue growth after the acquisition is completed.[6] We show that corporate acquirers can also deliver high returns when they purchase targets that private equity firms are interested in. Thus, our results suggest that while financial buyers are more skilled at selecting targets that have a high potential for value improvement, corporate buyers are competent in exploiting this potential.

This paper sheds light on our understanding of the sources of gains in acquisitions and improves our understanding of financial sponsors' abilities to reap these gains.[7] Specifically, our results suggest that financial sponsors have superior skills in identifying good takeover targets and negotiating favorable deal terms. Moreover, when framed within the private value - common value paradigm, our results provide insight into a more general understanding of the source of gains in mergers and acquisitions. It is well recognized that takeover targets have both private and common value components.[8] Each corporate buyer has a different private value of the target depending on its strategy and operating synergies with the target. However, takeover targets also have a common-value component, like undervaluation, which is the same for all bidders. The existence of a financial bidder indicates a high common-value component. If a corporate bidder acquires a target pursued by financial bidders, it benefits from the high common-value component in addition to any private synergistic value. Thus, our results illustrate that both private synergistic and common value gains exist in mergers and acquisitions.

Second, this paper contributes to the literature on bidder competition by building on a recent paper by Boone and Mulherin (2010), which shows that private equity bidding is associated with a greater level of competition.[9] Our results provide a partial explanation for this increased competition; acquirers following financial bidders earn superior

[6] See "What's So Great about Private Equity," Wall Street Journal Asia, November 28, 2006, and "Lions in Winter," Financial Post, January 16, 2010.

[7] For existing research on sources of gains in acquisitions, see Asquith, Bruner, and Mullins (1983), Bradley, Desai, and Kim (1983), Eckbo (1983), Jensen and Ruback (1983), Eckbo (1985), Eckbo and Wier (1985), Dennis and McConnell (1986), Palepu (1986), Bradley, Desai, and Kim (1988), Pound (1988), Morck, Shleifer, and Vishny (1988), Franks, Harris, and Titman (1991), Martin and McConnell (1991), Agrawal, Jaffe, and Mandelker (1992), Kim and Singal (1993), Shivdasani (1993), Song and Walkling (1993), Kini, Kracaw, and Mian (1995), Franks and Mayer (1996), Singal (1996), Akhavein, Berger, and Humphrey (1997), Cotter, Shivdasani, and Zenner (1997), Loughran and Vijh (1997), Prager and Hannan (1998), Rau and Vermaelen (1998), Harford (1999), Andrade, Mitchell, and E. (2001), Datta, Datta, and Raman (2001). Maksimovic and Phillips (2001), Fuller, Netter, and Stegemoller (2002), Graham, Lemmon, and Wolf (2002), Agrawal and Jaffe (2003), Bharadwaj and Shivdasani (2003), Officer (2003), Fee and Thomas (2004), Moeller, Schlingemann, and Stulz (2004, 2005), Gaspar, Massa, and Matos (2005), Shahrur (2005), Chen, Harford, and Li (2007), and Bhattacharyya and Nain (2011).

[8] See for example, Bulow, Huang, and Klemperer (1999), and Goeree and Offerman (2002).

[9] The impact of bidding competition on acquirer returns is studied in Bradley, Desai, and Kim (1988), Fishman (1988, 1989), Hirshleifer and Png (1989), Berkovitch and Narayanan (1990), Eckbo, Giammarino, and Heinkel (1990), Servaes (1991), Comment and Schwert (1995), Betton and Eckbo (2000), Schwert (2000), Moeller, Schlingemann, and Stulz (2004), and Boone and Mulherin (2008).

returns and thus this performance could impact aggregate trends in bidder competition.[10] Further, this paper shows that competition is not always detrimental and can have value-enhancing benefits. Previous research shows that bidding competition drives up takeover premiums and has a negative impact on acquirer returns. In this paper, we provide evidence of a brighter side to bidder competition and show that the effect of competition depends on the identity of the competitor.

The rest of this paper is organized as follows. Section 2.2 describes the sample and data. Section 2.3 studies acquirers' stock returns. Section 2.4 explores possible explanations, and Section 2.5 concludes the paper.

2.2 Sample

We obtain a sample of 100,697 successful and unsuccessful mergers and tender offers announced from 1980 to 2007 where the target and bidder were both U.S. firms from Security Data Corporation (SDC). The acquirer can either be corporate strategic bidder or a financial sponsor. The sample excludes all deals with a transaction value less than $1 million. This initial sample is then divided into two categories - deals where only one bidder was present and deals where two or more bidders competed for the same target. To determine if there was bidding competition, we treat every target where more than one bid is recorded in SDC as a potential subject of bidding competition. If SDC records exactly two bids for the same target, we use the following criteria to classify the two bids as competing bids. Bids are considered competing if one of the two bids is completed with more than 50 percent of the target's shares acquired, or if both bids are completed, one completed bid is a majority acquisition and the other completed bid is a minority acquisition and:

(i) SDC specifically flags the two as competing bids. *or*

(ii) The announcement date of the two bids is no more than 12 months apart, the first bid is not completed before the second bid is announced, and neither bid is a divestiture (since with divestitures it is not clear if firms are bidding on the same assets).

If SDC records more than two bidders for the same target, the same criteria listed above are used to classify the bids as competing bids. However, we relax the explicit criteria that all bids must occur within 12 months. We allow for the possibility that when multiple (greater than two) bidders are present, bidding competition can drag on for longer than a year between the first and last bid. Even though we do not require multiple bids to occur within one year, we find that approximately 95% of the multiple-bidder competitions were concluded within a 12-month period and the remaining 5% of

[10] However, this reasoning leads one to ask why more firms do not follow the leader and acquire. We assume that there are costs that prevent all firms from following this strategy.

multiple-bidder competitions were concluded within a 24-month period. Combining the two-bidder and multiple-bidder competitions, we have 4,471 bidders, which we refer to as the *Competing Bidders sample*. This sample includes the successful acquirers and the unsuccessful competing bidders.

Our primary question of interest is how the identity of the competitor impacts the deal characteristics and returns to the ultimate corporate acquirer. Therefore, the paper focuses on the Competing Bidders sample. SDC Platinum flags strategic buyers as Corporate Buyers and private equity groups as Financial Buyers. We sub-divide the 4,471 Competing Bidders into the *Corporate Competition sample* and the *Financial Competition sample*. The Corporate Competition sample includes 3,321 corporate bidders that compete only with corporate bidders. The Financial Competition sample includes 547 corporate bidders that compete with at least one of 470 financial bidders; thus, the Financial Competition sample is made up of 1,017 bidders. The remaining 133 bidders are financial buyers that compete only with other financial buyers and are largely ignored in this paper due to lack of data. We define a financial bidder as a private equity buyer or an investor group and not as financial firms like banks, insurance companies, etc.[11] The division of the Competing Bidders sample into these groups is illustrated in Figure 2.1. Our analyses center on corporate bidders in the Corporate Competition and Financial Competition samples. Table 2.1 provides a year-by-year summary of the total number of deals announced, the number of competed deals, and the number of competed deals that involved financial bidder competition. Column 4 presents the fraction of competed deals that included at least one financial bidder. We see that financial buyer competition varies across time and that it peaked in 1988 and 2006.[12]

Using unique data, Boone and Mulherin (2007) show that competition occurs before the announcement of a deal. Thus, our measure of competition may underestimate the degree of competition. This bias may impact our tests of differences between the *Competing Bidder sample* and the *Single-Bidder sample*. However, this difference is not the focus of our paper. The primary contribution of this paper is to examine the difference in sub-samples of competing bidder deals based on the identity of the competitor. Thus, the bias will only impact our key results if financial bidders and corporate bidders disproportionately participate in pre-announcement auctions.[13]

[11] We have also conducted tests (not shown) by dropping all corporate bidders with SIC codes in the range 6000 to 6999. The resulting sample sizes are smaller but our findings are robust.

[12] The low number of competing bids in 1980 is due to poor coverage of mergers and acquisitions by SDC in 1980.

[13] Boone and Mulherin (2010) suggest that targets in the financial competition sample are more likely to face bidding competition prior to announcement date. However, due to lack of data it is not possible to ascertain whether the pre-announcement competition is more likely to arise from financial bidders or corporate bidders.

2.3 Comparing Returns of the Competing Bidder Samples

In this section, we test whether corporate acquirers can deliver better shareholder returns by purchasing targets pursued by financial bidders. We compare the cumulative abnormal returns (CARs) earned by corporate bidders in the Financial Competition sample with the CARs earned by corporate bidders in the Corporate Competition sample. Recall that corporate acquirers in the Financial Competition sample face at least one competing bid from a financial bidder whereas corporate acquirers in the Corporate Competition sample face competing bids from other corporate bidders only.[14] Abnormal returns of the corporate acquirers are calculated as the acquirer return minus the return on a value-weighted market index.[15]

In Panel A Table 2.2, we present bidder CARs for the -2 to 2-, -20 to 120-, and -20 to 180-day windows. Figure 2.2 plots the CARs of all corporate bidders in the two competing bidder samples as well as the single bidder sample from 20 days before the merger announcement till 180 days after the merger announcement. The figure shows that in the days following merger announcement, CARs of corporate bidders in the Financial Competition sample lie well above the CARs of corporate bidders in the Corporate Competition sample and the Single Bidder sample. The graph suggests that corporations that bid on targets pursued by financial bidders deliver higher shareholder returns than corporate firms that bid on targets that only other corporate bidders are interested in. We see in Panel A of Table 2.2 that returns of corporate bidders in the Financial Competition sample are 7.16% (8.80%) higher than the returns of the Corporate Competition sample in the -20 to 120 (-20 to 180) day windows.[16]

The CARs capture the value of a deal as well as the market's expectation that the deal will be completed. Since the market may have assigned different probabilities of winning to the eventual winner and loser in the competition, we divide the samples into winning and losing bidders. Panel B of Table 2.2 compares CARs of winning corporate acquirers in the two competition samples. We see that CARs of winning corporate bidders in the Financial Competition sample are 13.34% over the -20 to 180 day window and exceed the returns of winning bidders in the Corporate Competition sample by 8.83%. Results are similar over the -20 to 120 day window. In Panel C, we see that the returns of losing corporate bidders in the Financial Competition sample are positive but not statistically significant. The difference in returns of losing corporate bidders in the two competition samples is not statistically significant either. Thus, the difference in the performance of bidders in the two samples appears to be driven by winning corporate acquirers.

[14] A related question is: How do the announcement returns of the financial bidders compare to those of corporate bidders? Unfortunately, this data is not available since the majority of financial bidders are private. Further, this analysis is not necessary to answer our question of interest.

[15] Abnormal returns calculated using a Market Model yield similar results (not shown).

[16] In untabulated tests, we repeat this analysis for the -2 to 120, -2 to 180, and -2 to completion periods and obtain similar results.

We also compare target CARs using the methodology of Bradley, Desai, and Kim (1988). We estimate cumulative abnormal returns for the target firm from two days before the announcement of the first bid till two days after the announcement of the ultimately successful bid. In Table 2.2, Panel D, we see the target CARs are not significantly different across the two competition samples.[17]

It could be argued that over a 180-day window, buy-and-hold returns are a more appropriate measure of returns earned by acquiring firm shareholders. Following the standard methodology outlined in Lyon, Barber, and Tsai (1999), we calculate BHARs as the buy-and-hold return of an acquirer during the six months following announcement less the buy-and-hold return of a Fama-French size and book-to-market matched portfolio. Since BHARs are known to be skewed and suffer from several biases outlined in Lyon, Barber, and Tsai (1999), we follow their methodology and calculate skewness-adjusted *t*-statistics and base inference on bootstrapped critical values. In untabulated results, we find that corporate acquirers in the Financial Competition sample experience positive BHARs of 6.25% while the BHARs of acquirers in the Corporate Competition sample are indistinguishable from zero. The difference between the two is statistically significant at the 10 percent level.

Mitchell and Stafford (2000) argue that the Calendar-Time Portfolio Approach (CTPA hereafter) is a more reliable methodology for estimating long-term abnormal performance.[18] Thus, we compare calendar-time abnormal returns for corporate acquirers in the Financial Competition and Corporate Competition samples in untabulated results. Calendar-time returns indicate that over the 6 months following announcement, acquirers in the Financial Competition sample experience positive abnormal returns whereas abnormal returns of acquirers in the Corporate Competition sample are not significantly different from zero. The difference in the abnormal returns of the two samples is statistically significant. Thus, consistent with the CAR and BHAR results, the 6-month calendar-time returns indicate that acquirers in the Financial Competition sample outperform acquirers in the Corporate Competition sample.

Given the dramatic difference in the BHARs, calendar time returns, and longer-window CARs of the Financial Competition sample relative to the Corporate Competition, it may seem surprising that the differences are insignificant over the -2 to +2 announcement window. One possible reason is that the initial announcement return may not be very informative when competition exists because information is revealed over a longer time

[17] Bargeron et al. (2007) show that targets have significantly lower abnormal return if they are acquired by a private firm (which is typically a private equity firm) rather than a public firm (more likely an operating firm). However, our results are not directly comparable with Bargeron et al. (2007) since targets in the Corporate Competition sample receive bids from corporate acquirers only (which are mostly public firms) whereas targets in the Financial Competition sample receive bids from both corporate acquirers and financial buyers.

[18] See Jaffe (1974) and Mandelker (1974), and Fama (1998) for more information on calendar time abnormal returns.

period as competing bids appear. This is one reason why we focus our analysis on the longer windows. However, to investigate announcement returns further, we allow for the possibility that significant information is released around the day a subsequent competing bid appears. We examine CARs of acquirers who bid first on the date a competing bid appears. We focus on acquirers that bid first so that we can examine the impact of the subsequent bid. In Table 2.3, we present returns for corporate buyers who bid first over the -2 to +2-day window surrounding the announcement of a subsequent competing bid by a financial bidder or a corporate bidder. On average (at the median), corporate first bidders experience a 2.03 (1.37) percent return on the announcement of a competing bid by a financial bidder and a return of only 0.22 (0.26) percent on the announcement of a competing bid by a corporate bidder. These differences are statistically significant at the 10 percent level. Thus, the market's reaction to the appearance of a competing bid supports our hypothesis that competition from a financial bidder indicates that the value of controlling the target is high. It also indicates that in the competing bid sample, a longer window is needed to capture the market's reaction.

2.4 Explaining Differences in Returns

2.4.1 Hypotheses

In this section, we investigate why corporate acquirers competing with financial bidders have significantly greater abnormal returns than corporate acquirers competing with corporate bidders. We consider three possible explanations: 1) Acquirers in the Financial Competition sample are inherently better at undertaking value-enhancing acquisitions (Acquirer Hypothesis); 2) The higher returns of acquirers in the Financial Competition sample can be attributed to the choice of the target firm (Target Hypothesis); and, 3) Deal terms in the Financial Competition sample are more favorable to the bidding firm (Deal Terms Hypothesis).

2.4.2 Following the Leader

The acquirer hypothesis argues that corporate acquirers in the Financial Competition sample earn higher returns because they are inherently more skilled acquirers. That is, corporate bidders competing with financial bidders may be better governed, more skilled at identifying good acquisitions, and/or undertaking post-merger restructuring of their own and the presence of private equity competition may just be a proxy for these differences. The deal terms and target hypotheses, on the other hand, suggest that the financial competition sample outperforms the Corporate Competition sample because either the target identified or deal terms negotiated are superior in this sample. Both the deal term and target hypotheses allow for the possibility that financial sponsors identify sources of value that transfer to the winning corporate acquirer, whereas the

acquirer hypothesis does not. For example, if financial sponsors are skilled at identifying undervalued targets or negotiating lower premiums, then a winning corporate acquirer would benefit just by following the financial buyer's lead.

To test if corporate acquirers outperform because financial sponsors identify sources of value that are transferable to other bidders, we divide corporate acquirers in the Financial and Corporate Competition samples into two groups: 1) *First Bidders* in the Financial (Corporate) Competition sample are corporate acquirers who were first bidders and subsequently faced competition from financial (other corporate) bidders; and 2) *Followers* in the Financial (Corporate) Competition sample are corporate acquirers who entered the bidding competition after observing a first bid from a financial (corporate) bidder. If the difference in returns between the Corporate and Financial Competition samples is due to financial buyers' ability to identify better targets or get superior deal terms, then the difference in returns should be stronger in the Followers subgroup. Figure 2.3 plots CARs of First Bidders and Followers in the Financial Competition and Corporate Competition samples from 20 days prior to announcement until 180 days after announcement. We see that CARs of First Bidders in the Financial Competition sample mostly lie below CARs of first bidders in the Corporate Competition sample. CARs of Followers in the Financial Competition sample in contrast lie consistently and significantly above CARs of Followers in the Corporate Competition sample. A similar picture emerges in Table 2.4, which presents acquirer average CARs over three event windows,: (-2, +2), (-20, +120) and (-20, +180). The univariate results show that the superior performance of the Financial Competition sample is stronger when a corporate acquirer follows a financial bidder rather than being the first bidder. In the follower subsample, all returns for the Financial Competition sample are higher than those for the Corporate Competition sample.[19] Specifically, the Financial Competition sample earns 11.5 and 11.9 percent greater returns over the (-20, +120) and (-20, +180) periods, respectively. Both of these differences are significantly different from zero.[20] Thus, following a financial bidder results in higher abnormal returns than following a corporate bidder.

[19] As shown in Table 2.3, the follow on bid from a competing financial bidder does provide a certification effect for the first bidder. However, this effect seems weak. Table 2.4 shows that that the cumulative effect over the longer event windows is not significantly greater for first bidders in the Financial Competition versus the Corporate Competition sample.

[20] Since the samples are small for this test, the t-statistics may not be normally distributed. Therefore, we assess the statistical significance of the difference in returns using a bootstrapped distribution of the t-statistics. Specifically, under the null hypothesis of equal CARs between the financial and corporate competition samples, we independently draw, with replacement, random samples of the same size from the first mover (follower) sub-groups of both the financial and corporate competition samples and recalculate the t-statistics. We repeat this 1,000 times, and use the bootstrapped series of t-statistics to estimate the empirical distribution of the t-statistics under the null hypothesis.

2.4.3 Multivariate Analysis of Returns

In this section, we subject our findings to more rigorous analysis by controlling for other factors that have been shown to affect acquirer returns. We estimate the following regression equation for winning acquirers in the Financial Competition and Corporate Competition samples:

$$\begin{aligned} CAR_i &= \alpha_0 + \alpha_1 FINCOMP_i + \alpha_2 CASH_i + \alpha_3 ACQSIZE_i + \alpha_4 RELSIZE_i \\ &\quad + \alpha_5 POISON_i + \alpha_6 TOEHOLD_i + \alpha_7 TPUB_i + \alpha_8 TTERMF_i \\ &\quad + \alpha_9 DAYS_i + \alpha_{10} SAMEIND_i + \alpha_{11} PREMIUM_i + \alpha_{12} DEBTFIN_i + \epsilon_i \end{aligned} \tag{2.1}$$

In Equation (2.1), CAR is the cumulative abnormal return earned by successful corporate acquirers over the (-20, +180) window.[21] *FINCOMP* is a dummy variable equal to 1 if the corporate acquirer faced competition from a financial bidder and zero otherwise. We control for a number of variables previously shown to impact acquirer returns and present summary statistics for several of these in Table 2.6. *CASH* is a dummy variable equal to 1 if the entire deal value is paid in cash and 0 otherwise.[22] *ACQSIZE* is acquirer market value of assets in logs. *RELSIZE* captures relative size of the target and is measured as transaction value of the merger divided by acquirer market value of assets. *POISON* is a dummy variable equal to one if the target has a defensive poison pill in place. *TOEHOLD* is a dummy variable equal to 1 if the percentage of target's stock held by the first bidder is greater than 5% at announcement. *TPUB* is a dummy variable equal to 1 if the target is a publicly traded firm and zero otherwise. *TTERMF* is the target termination fee divided by transaction value of merger. *DAYS* is the number of days from merger announcement to merger completion. *SAMEIND* is a dummy variable equal to one if the corporate acquirer is in the same industry as the target, using 4-digit SIC codes and zero otherwise. *PREMIUM* is the premium offered above the target's market value of equity four weeks prior to merger announcement. *DEBTFIN* is the dollar amount of debt financing used to pay for the transaction.

Columns 1-3 of Table 2.5 contains estimates of Equation (2.1). Since data on acquisition premiums and debt financing are available only for a subsample, we first present Equation (2.1) without these two variables in Column 1. The coefficient on FINCOMP is positive and significant, confirming the univariate finding that corporate acquirers who face financial bidder competition perform significantly better than corporate acquirers who compete with other corporate bidders only. The coefficient of 0.197 indicates that after controlling for other differences in deal terms, acquirers bidding against financial sponsors earn a 19.7% higher return than those competing with other corporate bidders.

[21] We repeat this analysis using the -20 to +120 window and get similar results.

[22] In alternative specifications, we use the pure stock dummy instead and find that the results still hold. We do not include the pure cash and pure stock dummies together because the two have a significant negative correlation of -0.54 which results in multicollinearity problems.

In Column 2, we include PREMIUM as a control variable. PREMIUM is not significantly related to acquirer returns, while the FINCOMP dummy remains significant. In the third column, we include DEBTFIN and find that debt financing is associated with higher CARs.[23] Again, the FINCOMP dummy is statistically significant after controlling for debt financing. Thus, corporate acquirers who face competition from financial bidders significantly outperform corporate acquirers who face competition from only other corporate bidders. In untabulated results, we repeat the multivariate analysis with 6-month BHARs as the dependent variable and our finding that corporate acquirers in the Financial Competition sample outperform acquirers in the Corporate Competition continues to hold.

Columns 4 and 5 of Table 2.5 repeats this analysis for the first mover and follower samples. Column 4 shows that first movers that later face competition from a financial bidder do not significantly outperform those facing later competition from corporate bidders. Column 5 confirms the univariate results and shows that for the follower subgroup, firms competing with financial bidders significantly outperform the sample competing with corporate bidders; thus, following financial bidders by bidding on and winning the same target is a value-enhancing strategy.[24] These results suggest that financial bidders have superior abilities in identifying good acquisition targets (and possibly negotiate favorable terms) and corporate buyers benefit from joining the competition and winning.

2.4.4 Differences in Acquirer, Target and Deal Characteristics

One possible explanation for the differing performance of corporate acquirers in the Financial Competition and Corporate Competition samples is that the deal terms, such as the premium paid, consideration offered in cash, deal attitude (hostile or friendly) etc., are different across the two samples. The CAR regressions of Table 2.5 show that the superior returns of the Financial Sample hold even after controlling for the method of payment and the premium paid. Nonetheless, we examine several deal characteristics to get a better picture of how deals in the two competition samples differ. Table 2.6, Panel A presents deal characteristics of these samples. We present data for all deals first and for successful deal only in square brackets.[25]

The transaction value (TV), obtained from SDC, is the total amount paid by the acquirer to complete the acquisition excluding fees. We see in Table 6 Panel A that TV and TV divided by the target's market value of assets are both similar for the Corporate Competition and Financial Competition samples. We also examine the relative size of the

[23] This finding is consistent with Bharadwaj and Shivdasani (2003), who find that bank debt performs a certification and monitoring role in acquisitions.

[24] We do not include premium paid and debt financing in columns 4 and 5 because the availability of these data limits our sample, making too few observations to estimate the model.

[25] In untabulated results, we also compare deal characteristic difference between the first movers and followers. Follower deals have a larger transaction value, use less cash, and pay lower premium; but these differences are not statistically significant.

target and acquirer, which is calculated as TV divided by market value of assets of the acquiring firm. Market value of assets is the book value of total debt plus market value of equity. The relative size of target firms across the two samples is indistinguishable. Days to Completion, measured as the difference between the announcement date of the first bid and the effective date of the successful acquirer, is insignificantly different between the Corporate and Financial Competition samples. The percentage of hostile deals and tender offers are higher in the Financial competition sample relative to the Corporate competition sample. The percentage of deal value offered in cash is higher in the Financial Competition Sample, at 76.13 percent, relative to the Corporate Competition sample at 57.12 percent. Not surprisingly, the pattern of percentage offered in stock is exactly the opposite, with bidders in the Financial Competition sample offering the lowest percentage in stock (13.19 percent). Similar results hold for the percentage of deals that are pure cash or pure stock. Why do corporate bidders competing with financial bidders pay more of the deal value in cash? First, if target shareholders are risk-averse, corporate acquirers competing with financial buyers may pay a higher fraction of deal value in cash to make their offer comparable.[26] Second, existing theory suggests that acquirers with more favorable private information offer more cash.[27] If corporate acquirers in the Financial Competition sample know that their acquisitions are of higher value (because they are chasing targets coveted by private equity groups) and this knowledge is private, they may use more cash as a signal of higher acquisition value.

Since corporate bidders in the Financial Competition sample pay a higher fraction of the deal value in cash, it is possible that they need to borrow more to finance the acquisition. Since debt financing has been linked to acquirer returns, we test whether acquirers in the Corporate Competition sample have to borrow more in order to offer more cash. In this test, we compare the amount borrowed by corporate acquirers for the explicit purpose of financing the acquisition. SDC provides a text description of the details of sources of financing for many deals. We read through the text description for successful deals in the Corporate Competition and Financial Competition samples. All types of bank financing (e.g., line of credit, revolving facility, bridge loans), and any bonds, notes, and debentures issued by the bidder are added up to arrive at one figure for total debt financing of the acquisition. The average dollar amount of debt financing, Debtfin ($), taken by corporate bidders in the Financial Competition and Corporate Competition samples is provided in Panel A of Table 2.6. Corporate acquirers in the Corporate Competition sample borrowed on average $141 million to pay for the acquisition. Corporate acquirers in the Financial Competition sample borrowed on average $306 million. The difference between the two amounts is statistically significant at the 1 percent level. We also compare the amount of

[26] Anecdotal evidence suggests that target shareholders sometimes express a preference for cash. See, for example, the discussion of Starwood Lodging's acquisition of ITT in Rappaport and Sirower (1999).

[27] See Hansen (1987), Fishman (1989), Eckbo, Giammarino, and Heinkel (1990), and Berkovitch and Narayanan (1990).

debt financing scaled by transaction value of the merger, Debtfin (%), across the two samples. Corporate acquirers in the Corporate Competition sample borrow 19.5 percent of the total deal value. Corporate acquirers in the Financial Competition sample borrow 35.4 percent of the total deal value. The difference between the two is statistically significant at the 1 percent level. These results are consistent with the notion that corporate acquirers who face competition from financial bidders borrow more in order to offer more of the deal value in cash. Panel A of Table 2.6 also shows that the average number of competing bids is higher in the Financial Competition sample than in the Corporate Competition sample.[28]

Next, we compare the average takeover premium offered by corporate bidders in the Corporate Competition and Financial Competition samples. The target takeover premium, PREMIUM, is calculated as the price per share offered by the acquirer less the target's share price four weeks prior to the merger announcement divided by the target's share price four weeks prior to announcement. Panel A of Table 2.6 shows that corporate bidders in the Corporate Competition sample pay a premium of 44.6 percent, while corporate bidders in the Financial Competition sample pay a premium of 34.5 percent. The difference between the two is statistically significant at the 1 percent level. Thus, initial univariate tests suggest that corporate bidders pay lower premia when facing financial bidder competition possibly because financial bidders themselves pay low takeover premia. Since financial buyers are usually private firms, this result is consistent with Bargeron et al. (2007), who find that private acquirers pay lower premiums than public acquirers.[29]

In summary, we show several differences in the deal characteristics of the Financial Competition and Corporate Competition samples. If these differences could explain the superior returns then we would have support for the deal terms hypothesis. However, the evidence in Table 2.5 shows that the results persist after controlling for these deal terms. Thus, we do not find support for the deal term hypothesis.

Next, we compare several observable characteristics of corporate acquirers that might capture acquirer ability to determine if acquirer abilities explain the superior returns of the Financial Competition sample. Characteristics of corporate bidders in the Financial and Corporate Competition samples are presented in Panel B of Table 2.6.[30] Comparing the Financial and Corporate Competition samples, we find that acquirers in these two groups share similarities. There are no significant differences in the size, leverage, or

[28] Although not shown, we include the number of competing bids as an explanatory variable in Table 2.5. Our results continue to hold and the number of competing bids is not a significant determinant of acquirer returns.

[29] The lower premia may be due to differing deal or target characteristics; thus, in untabulated results, we conduct a multivariate analysis of takeover premia and confirm that corporate bidders pay lower takeover premia when the competing bidder is a financial bidder instead of another corporate bidder.

[30] Several variables in Panels B and C of Table 2.6 are calculated as deviations from the industry median and may be negative.

profitability of bidders in these subgroups. However, we find that bidders in the Financial Competition sample have significantly lower market-to-book ratio, lower quick ratio, and lower asset turnover relative to the Corporate Competition sample. Thus, a comparison of acquirer characteristics does not support the notion that corporate acquirers who choose to compete with financial bidders are fundamentally more efficient or better-run firms.

Existing research shows that the extent of institutional holdings, managerial and insider ownership, and option awards to managers can affect acquirer returns. We use Thomson Reuters data to calculate institutional holdings and insider ownership in the Corporate Competition and Financial Competition samples. Institutional ownership is defined as the number of shares held by institutions divided by total shares outstanding. Insider ownership is the number of shares held by insiders divided by total shares outstanding. Insiders are broadly defined to include all individuals with access to material, non-public information like board members, top management team, block shareholders, etc. For firms covered by Execucomp, we also calculate management ownership as the percentage of stock owned by the top management team of the acquiring firm. In Table 2.6 Panel B, we see that acquirers in the Financial Competition sample have significantly greater managerial and institutional holdings than acquirers in the Corporate Competition sample. Insider ownership is not significantly different between the two samples. Finally, we use acquisition frequency to capture acquirer experience. We count the total number of merger deals announced by acquirers in each sub-group over the 1980 - 2007 sample period. Panel B of Table 2.6 shows that the frequency of acquisitions by acquirers in the Corporate and Financial Competition samples is similar.[31]

Overall, Table 2.6 Panel B shows some differences between the acquirers in the two samples. To determine if these differences explain our results, we repeat the return regressions in Table 2.5 but now including acquirer characteristics. The new regressions are shown in Panel A of Table 2.7. Though a few acquirer characteristics significantly impact returns, the difference in returns between the two competition samples persists, thus indicating that acquirer differences do not account for the superior returns of the financial competition sample.[32] In unreported regressions, we include the frequency of acquisitions as a control variable and find that the difference between returns of the Corporate and Financial Competition sample remains.

The third potential explanation for the better performance of acquirers in the Financial Competition sample is that they pursue different targets. Panel C of Table 2.6 compares target characteristics across the samples. Targets in the Corporate Competition sample are larger as measured by market value of assets than targets in the Financial Competi-

[31] To test whether acquirers are more likely to undertake restructuring after the acquisition, we examine the number of divestitures between the two samples using data from SDC. We find that the Corporate Competition sample has more divestitures in three years following the acquisition but due to small sample sizes we cannot test for significance.

[32] We do not include acquirer management ownership in the regression because of poor data availability results causes small sample sizes in the multivariate regressions.

tion samples. Thus, when corporate bidders compete with each other, they chase larger targets than in cases where the competitor is a financial bidder. There are no differences in the leverage of targets across the samples. Targets in the Financial Competition sample have lower market-to-book and higher return on assets as compared with the Corporate Competition sample. We also look at the governance and compensation structure of targets in the two samples to check whether targets in the financial competition sample have greater potential for improvements in governance and managerial incentives. We find that target top management ownership in the two samples is similar. However, targets in the Financial Competition sample have higher institutional and insider ownership as compared with targets in the corporate competition sample. Therefore, firms targeted by financial buyers may actually have fewer governance problems. However, options awards as a percentage of total managerial compensation are lower for targets in the Financial Competition sample. Since options awards are a commonly used measure of pay-for-performance sensitivity, it is possible that targets in the financial competition sample have some room for improvement in management incentives. However, the evidence is mixed and poor data coverage for targets prevents us from including these ownership and compensation variables in a multivariate analysis. However, in Panel B of Table 2.7, we control for the other target characteristics in the CAR regressions and show that the difference in returns between the two samples remains.[33] Thus, observable target characteristics do not explain why corporate acquirers do better when they compete with financial bidders.[34]

In Panel D of Table 2.6, we compare the acquirers to their targets. Specifically, for several performance ratios, we present the industry-adjusted ratio of the acquirer's performance minus the industry adjusted ratio of the target prior to merger announcement. We then compare the relative ratios across the two samples. We find that there are no differences in the relative return on assets or cash flow margin. However, the difference between the market to book ratios of the acquirers and the targets is greater for deals in the Corporate Competition sample than in the Financial Competition sample. Lang, Stulz, and Walkling (1989) show that high market to book acquirers have higher returns particularly when they acquire low market to book targets. Interpreting market to book as an indicator of better management, they conclude that acquisitions of poorly managed targets by well-managed acquirers deliver higher returns for the acquirer and target. Ap-

[33] Target options awards not included in multivariate analysis due to small sample size problems.

[34] To examine if one sub-sample is more likely to chase "hot" targets, we also examine the ex-ante probability that the target firm becomes a target. To estimate this probability, we use the predictive regression from Palepu (1986). To employ this analysis, we use a sample of all firms on Compustat with market value over $1 million from 1980 to 1989 and estimate the predictive logit where the dependent variable is equal to 1 if the firm became a target during this period and 0 otherwise. The explanatory variables are described in detail in the appendix of Palepu (1986). We use the coefficients from this estimation to calculate the probability that a firm in our sample during the 1990 to 2007 period becomes a target. In untabulated results, we find that acquirers in the Financial Competition sample go after targets that have a slightly higher probability of being a target, but this difference is small and not significantly different from zero.

plying this line of thought to our sub-samples, the differences between the acquirer and target market-to-book ratios and asset turnover predict higher returns for the Corporate Competition sample. Since we actually find that acquirers in the Financial Competition sample do better, our results are not attributable to better managed firms acquiring poorly managed targets.

2.4.5 Comparing Prior Acquisitions and Motives to Acquire

The above analysis examines and controls for observable acquirer characteristics. However, it is possible that an acquirer is skilled at acquisitions but this skill is not well measured by these observables. To further test the acquirer hypothesis, we therefore examine past acquisitions by the same acquirer. If corporate acquirers in the Financial Competition sample were simply "better" acquirers, we would expect to see similar strong performance in all their acquisitions. Thus, we examine acquisitions by corporate acquirers in the Financial Competition sample between 1980 and 2007 when the corporate acquirer did not face bidding competition. Since these deals did not face competition, they appear in our Single Bidder sample. We therefore divide the corporate acquirers in the Single Bidder sample into two groups. The first group, which serves as a benchmark, contains all single-bidder deals undertaken by acquirers who at no point in our sample period competed with financial bidders. The second group contains single-bidder deals undertaken by acquirers who at any other date in our sample period competed with financial bidders for a different target. We further limit the second group into a sub-group of single-bidder deals undertaken by acquirers who at some later date competed with financial bidders for a different target firm.[35] If acquirers in the Financial Competition sample are skilled at identifying and consummating value-enhancing acquisitions, we should find evidence that the second group (and its sub-group) significantly outperforms the benchmark sample of single-bidder deals. We calculate the mean CARs for each group for the three event windows used earlier. Results are presented in Table 2.8. We find that the abnormal returns of the three groups are indistinguishable over all three event windows. Thus, we find no evidence to support the hypothesis that acquirers who chose to compete with financial bidders are more skilled at delivering value from any acquisition they undertake. Rather, the superior performance is concentrated in deals where financial bidder competition is present. We therefore conclude that the Acquirer Hypothesis does not explain the superior returns.

The above results show that corporate acquirers competing with financial bidders earn significantly higher returns than those competing with corporate bidders. Further, we show that the results are not explained by observable acquirer or target characteristics but rather are concentrated in deals where corporate acquirers follow financial bidders.

[35] Since we calculate CARs over a (-20, +180) event window, we drop observations where a corporate buyer is involved in a single-bidder deal within 6 months of competing with a financial buyer on another deal.

These results point to the possibility that financial bidders identify targets with a high common-value component that any bidder can benefit from. However, it is also possible that returns of corporate acquirers who compete with financial bidders are higher because private valuations, like synergies between the target and corporate acquirer, are higher in this sub-sample. Why would synergies between the corporate acquirer and target be higher in the Financial Competition sample? One possibility is that corporate acquirers require synergies to be higher in order to enter bidding competition with a financial buyer rather than a corporate buyer. This may happen if the cost of acquisition is expected to be higher when competing with a financial bidder rather than a corporate bidder. However, the data in Table 2.6 Panel A show that corporate buyers pay significantly lower premiums when competing against financial buyers rather than corporate buyers. Therefore, this is an unlikely explanation. A second possibility is that corporate acquirers who compete with financial buyers are inherently better at finding and exploiting synergies. However, we find in tests discussed above that acquirer abilities are an unlikely explanation for the high returns of the Financial Competition sample. A third plausible explanation for lower synergies in the Corporate Competition sample may arise if the motive for acquiring differs across the two samples. Corporate bidders may sometimes enter into bidding competition with other corporate bidders even though synergies are low because they want to prevent a rival in the same industry from buying the target and gaining a competitive edge. That is, the poorer performance of bidders in the Corporate Competition sample could be driven by acquirers making low-synergy deals in order to prevent rival firms from becoming more dominant players in the industry. To test this, we divide the Corporate Competition sample into a sub-sample where at least two of the competing bidders belong to the same 4-digit SIC code as the target and a sub-sample where the bidders do not share the same 4-digit SIC as the target. In untabulated results, we find that there is no difference in the returns between these samples, and, thus, the data are not supportive of this alternative explanation.

In summary, we examine differences between the Financial and Corporate Competition samples to explain the superior returns of the Financial Competition sample. We find several differences but none of the observable differences in target characteristics or the deal terms explain our results. Additionally, neither observable nor unobservable acquirer characteristics explain the differences in returns. Since the superior returns are concentrated in deals where the corporate acquirer follows the financial bidder, we conclude that financial sponsor identify better targets, and the value of acquiring this target transfers to the ultimate acquirer.

2.5 Conclusion

This paper demonstrates the importance of target-selection in merger gains. We examine the returns of corporate acquirers who compete with financial buyers for the same target. We find that corporate acquirers who purchase targets that financial buyers bid for earn significantly higher abnormal returns than corporate buyers who buy targets that only other corporate buyers bid on. The cumulative abnormal return for the former group is eight percent higher. Deal characteristics, acquirer abilities, and observable target characteristics cannot explain this difference in returns. However, it is possible that financial buyers identify targets with a high potential for value improvement based on information not easily available to the public. To test this hypothesis, we divide the sample into acquirers that followed another bid and those that were the first bidder. We find that corporate acquirers who follow a first bid by a financial buyer earn significantly higher returns than corporate acquirers who follow a first bid by another corporate buyer. These results suggest that financial buyers identify good takeover targets, and the winning acquirers reap the benefits.

Our findings suggest that financial sponsors, such as private equity firms, have superior skills in identifying targets and negotiating M&A deals. Corporate acquirers can deliver high returns by purchasing targets that financial buyers bid on. Finally, the paper shows that bidding competition does not always hurt the acquirer. Corporate buyers competing with financial buyers pay lower premiums and earn higher abnormal returns.

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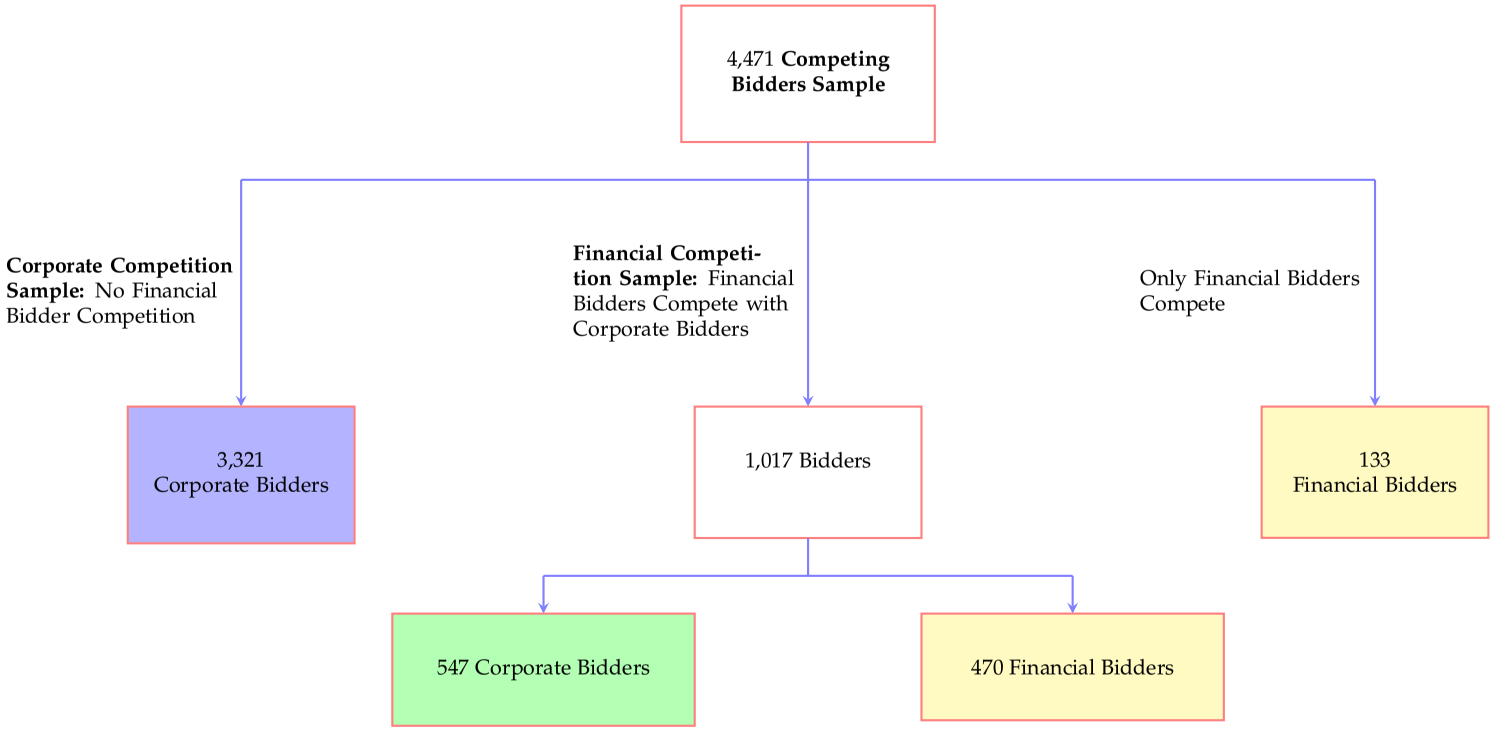

Figure 2.1 : Sample Breakdown

This figure describes the breakdown of the sample used throughout this paper. The sub-sample names in bold are used in the paper.

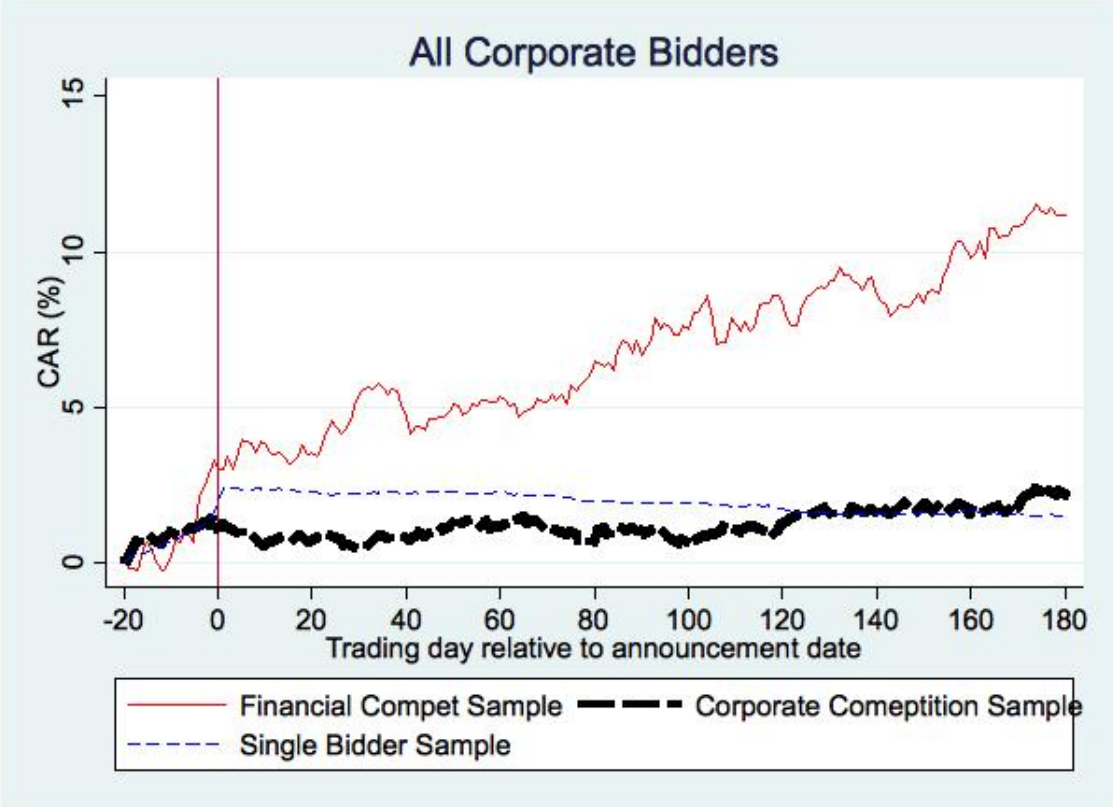

Figure 2.2 : Cumulative Abnormal Returns of All Corporate Bidders

This figure shows the cumulative abnormal returns (CARs) of corporate bidders from 20 days prior to merger announcement until 180 days after merger announcement. The thick long-dashed line shows CARs for corporate acquirers who faced competition from other corporate bidders (Corporate Competition Sample). The thin solid line shows CARs for corporate acquirers who faced competition from financial bidders (Financial Competition Sample). The thin short-dashed line shows CARs for acquirers in the Single Bidder Sample. Abnormal returns are calculated as the acquirer's return minus a value-weighted market index.

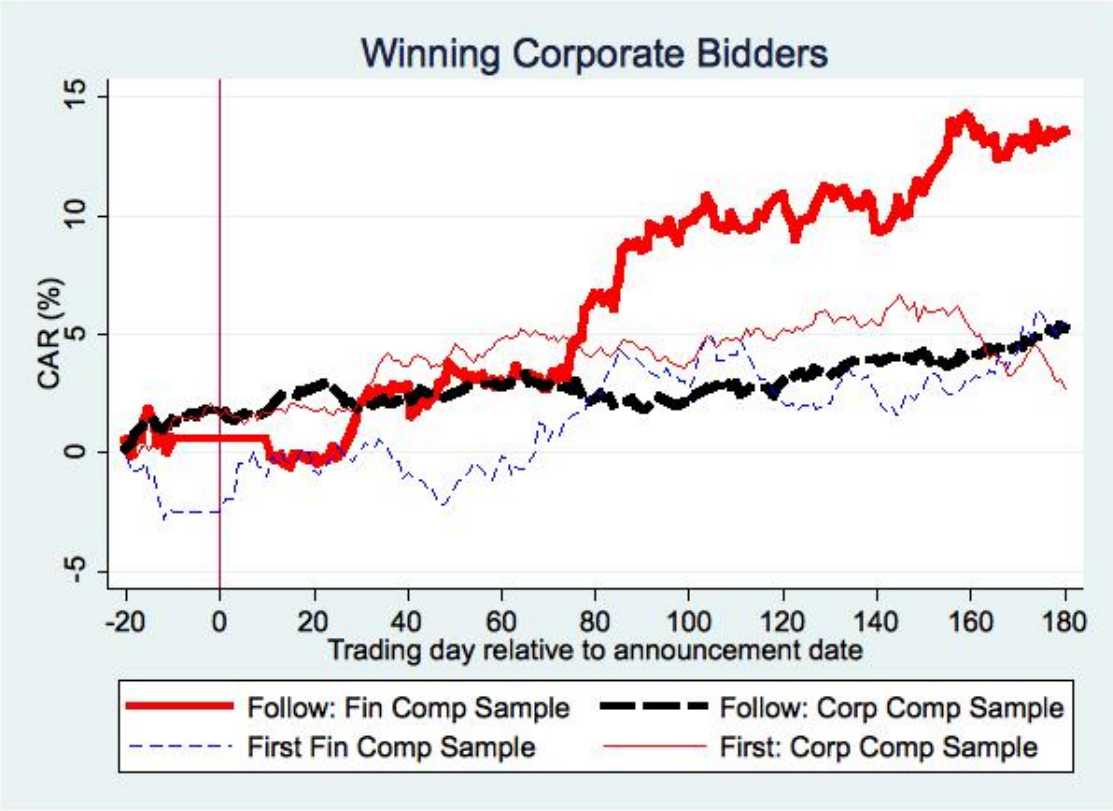

Figure 2.3 : Cumulative Abnormal Returns of First Movers and Followers

This figure shows the cumulative abnormal returns (CARs) of corporate bidders from 20 days prior to merger announcement until 180 days after merger announcement. The thick solid line shows CARs for corporate acquirers in the Financial Competition Sample who followed a first bid by a financial buyer. The thick long-dashed line shows CARs for corporate acquirers in the Corporate Competition Sample who followed a first bid by another corporate buyer. The thin short-dashed line shows CARs for acquirers in the Financial Competition sample who bid first and subsequently faced bidding competition from financial buyers. The thin solid line shows CARs for corporate acquirers in the Corporate Competition Sample who bid first and subsequently faced bidding competition from other corporate bidders. Abnormal returns are calculated as the acquirer's return minus a value-weighted market index.

Table 2.1 : Distribution of Financial Sponsor Competition by Year

This table describes the sample of 100,697 announcements of successful and unsuccessful merger and tender offers made by either corporate bidders or financial sponsors. The break-up of the sample is provided for each year from 1980 to 2007. Column 1 contains the total number of deals announced by either corporate bidders or financial bidders. Column 2 contains the number of deals that faced at least one competing bid from any type of bidder. Column 3 contains the number of deals that faced a competing bid from at least one financial sponsor. Colum 4 captures the fraction of competed deals that include competition from financial bidders (Column 3 divided by Column 2).

	1	2	3	4
Year	Deals Announced	Deals Facing Competing Bids	Deals Facing Competing Bids from Financial	Fraction of Competed Deals with Financial Buyer Competition (3/2)
1980	82	3	0	0.00
1981	646	69	5	0.07
1982	764	94	11	0.12
1983	894	110	19	0.17
1984	1,102	134	36	0.27
1985	1,077	165	58	0.35
1986	1,670	207	72	0.35
1987	1,758	231	82	0.35
1988	2,027	379	159	0.42
1989	2,603	288	94	0.33
1990	2,634	131	22	0.17
1991	2,350	158	36	0.23
1992	2,646	138	24	0.17
1993	3,066	229	24	0.10
1994	3,796	203	45	0.22
1995	4,665	197	24	0.12
1996	5,517	240	39	0.16
1997	6,794	239	40	0.17
1998	8,218	174	20	0.11
1999	6,974	174	17	0.10
2000	6,982	209	39	0.19
2001	4,345	140	20	0.14
2002	3,948	105	22	0.21
2003	4,178	120	19	0.16
2004	5,131	88	22	0.25
2005	5,558	101	21	0.21
2006	6,440	92	33	0.36
2007	4,832	53	14	0.26
Total	100,697	4,471	1,017	0.23

Table 2.2 : Univariate Analysis of Cumulative Abnormal Returns of Corporate Acquirers and Targets

PANEL A of this table compares the cumulative abnormal returns (CARs) of corporate acquirers who bid against either financial bidders or against other corporate bidders. PANEL B compares CARs of corporate bidders who win against either financial bidders or other corporate bidders. PANEL C compares CARs of corporate bidders who lose a bidding competition against financial bidders or other corporate bidders. CARs are presented for the (-2, +2), (-20, +120), and (-20, +180) windows surrounding the bid announcement date of the winning corporate acquirer. PANEL D presents CARs for the target firms. CARs for the target are calculated from 2 days before announcement of the first bid till 2 days after announcement of the winning bid. In all panels, "Financial Competition Sample" refers to the sample of winning corporate acquirers who faced competition from at least one financial bidder. "Corporate Competition Sample" refers to the sample of corporate acquirers who faced competition from other corporate bidders only. Abnormal returns are calculated as the acquirer's return minus a value-weighted market index. Parentheses contain Patell Z-statistics or t-statistics as indicated. Superscript a, b, and c indicate significance at the 1%, 5%, and 10% levels, respectively.

	Financial Competition Sample	Corporate Competition Sample	
	Mean CAR (Patell Z)	Mean CAR (Patell Z)	Difference t-statistic
	PANEL A: ALL BIDDERS		
Acquirer CARs over the (-2,+2) window	0.95%	−0.14%	1.09%
	(0.48)	$(3.16)^a$	(1.41)
Acquirer CARs over the (-20,+120) window	8.40%	1.25%	7.16%
	$(2.06)^b$	$(2.01)^b$	$(2.10)^b$
Acquirer CARs over the (-20,+180) window	10.98%	2.18%	8.80%
	$(2.39)^a$	$(3.25)^a$	$(2.16)^b$
Observations	133	982	
	PANEL B: WINNING BIDDERS		
Acquirer CARs over the (-2,+2) window	0.99%	−0.31%	1.31%
	(0.47)	$(-2.88)^a$	(1.23)
Acquirer CARs over the (-20,+120) window	10.52%	3.56%	6.95%
	$(1.89)^b$	$(2.95)^a$	$(1.66)^c$
Acquirer CARs over the (-20,+180) window	13.34%	4.51%	8.83%
	$(2.28)^b$	$(3.66)^a$	$(1.72)^c$
Observations	76	545	
	PANEL C: LOSING BIDDERS		
Acquiere CARs over the (-2,+2) window	0.91%	0.05%	0.86%
	$(1.33)^c$	$(-1.56)^c$	(0.75)
Acquiere CARs over the (-20,+120) window	5.76%	−1.20%	6.94%
	(1.05)	(−0.075)	(1.26)
Acquiere CARs over the (-20,+180) window	8.37%	−0.40%	8.77%
	(1.21)	(0.89)	(1.34)
Observations	58	443	
	PANEL D: TARGET RETURNS		
Target CARs over (-2,+2) window	28.25%	28.55%	−0.3%
	$(7.53)^a$	$(28.55)^a$	(0.05)
	37	245	

Table 2.3 : Cumulative Abnormal Returns of Corporate Acquirers at Announcement of Competing Bid

This table presents mean and median cumulative abnormal return (CAR) of corporate acquirers who made the first bid. CARs are calculated for the (-2, +2) announcement window surrounding the day a subsequent competing bid appeared either from a financial bidder or from a corporate bidder. Abnormal returns are calculated as the acquirer's return minus a value-weighted market index. *t*-statistics presented in absolute values are in parentheses. The superscripts *a*, *b*, and *c* represent significance at the 1%, 5%, and 10% levels, respectively.

	Competing Bid from Financial Bidder		Competing Bid from Corporate Bidder	Difference-in-Means (*t*-statistic)
Mean CARs	2.03%		0.22%	1.86%
				$(1.78)^c$
Median CARs	1.37%		0.26%	
Pearson χ^2		3.71^c		
Wilcoxon Rank Test		1.74^c		

Table 2.4 : Univariate Analysis of Cumulative Abnormal Returns of First Movers and Followers

This table compares the cumulate abnormal returns (CARs) of corporate acquirers who win bidding competition against either financial bidders or against other corporate bidders. CARs over the (-2, +2), (-20, +120), and (-20, +180) windows are presented. "Financial Competition Sample" refers to the sample of corporate acquirers who faced competition from at least one financial bidder. "Corporate Competition Sample" refers to the sample of corporate acquirers who faced competition from other corporate bidders. Abnormal returns are calculated as the acquirer's return minus a value-weighted market index. "First Mover Sample" refers to the sample of winning corporate acquirers who were first bidders and faced subsequent competition from either financial bidders or corporate bidders. "Follower Sample" refers to the sample of winning corporate acquirers who entered the bidding competition after observing a bid from a financial bidder or a corporate bidder. Parentheses contain Patell Z-statistics or t-statistics in absolute values as indicated. Since the First Mover group in the Financial Competition sample is small, we assess the statistical significance of the differences (I-II) using a bootstrapped distribution of the t-statistics. Specifically, under the null hypothesis of equal CARs between the financial and corporate competition samples, we independently draw, with replacement, random samples with the same sample size from the First Mover (Follower) groups of both the Financial Competition and Corporate Competition samples, and recalculate the t-statistics. We repeat this 1,000 times, and use the bootstrapped series of t-statistics to estimate the empirical distribution of the t-statistics under the null hypothesis. The superscripts a, b, and c represent significance at the 1%, 5%, and 10% levels, respectively.

Event Window	Group	I Financial Competition Sample	II Corporate Competition Sample	I-II
		Mean CAR [N] (Patell Z)	Mean CAR [N] (Patell Z)	Difference (t-statistic)
(-2,+2)	First Mover Sample	0.78% [27](1.31)^c	−0.27% [144](1.09)	1.05% (0.57)
	Follower Sample	1.11% [49](1.56)	−0.33% [401](2.70)^a	1.44% (1.11)
(-20,+120)	First Mover Sample	3.31% [27](0.48)	5.19% [144](2.50)^a	−1.88% (0.28)
	Follower Sample	14.50% [49](2.00)^b	2.98% [401](1.93)^b	11.52% (2.13)^c
(-20,+180)	First Mover Sample	6.62% [27](1.18)	2.68% [144](1.61)^c	3.94% (0.43)
	Follower Sample	17.04% [49](1.97)^b	5.16% [401](3.21)^a	11.88% (1.90)^c

Table 2.5 : The Determinants of Abnormal Returns to Winning Corporate Acquirers

The dependent variable is the Cumulative Abnormal Return (CAR) to winning corporate bidders over the (-20, +180) window, calculated as the acquirer's return minus the return on a value-weighted market index. FINCOMP is a dummy variable equal to 1 if the corporate acquirer faced bidding competition from a financial bidder (regardless of who made the first bid) and 0 if the corporate acquirer faced competition from other corporate bidder. CASH is dummy variable equal to 1 if all of the deal value was paid in cash and 0 otherwise. ACQSIZE is the acquirer's market value of assets in logs. Market value of assets is book value of debt plus market value of equity. RELSIZE is the transaction value of the merger divided by acquirer market value of assets. Transaction value, obtained from SDC, is the total amount paid by the acquirer to complete the acquisition excluding fees. PREMIUM is the premium offered above the target's pre-announcement market value. It is calculated as the price per share offered by the acquirer minus the target's share price four weeks prior to the merger announcement divided by the target's share price four weeks prior to the announcement. It is calculated as the price per share offered by acquirer minus the target's share price four weeks prior to the merger announcement divided by the target's share price four weeks prior to the announcement. POISON is a dummy variable equal to one if the target has a defensive poison pill in place. TOEHOLD is a dummy variable equal to 1 if the percentage of target's stock held by the first bidder is greater than 5% at announcement. TPUB is a dummy variable equal to 1 if the target is a publicly traded firm and zero otherwise. DEBTFIN is the dollar amount of debt financing used to pay for the transaction. TTERMF is the target termination fee divided by the transaction value of the merger. SAMEIND is a dummy variable equal to 1 if target and acquirer belong to the same 4-digit SIC code. DAYS_COMPLETE is the number of days from the announcement of the bid by the winning acquirer until the deal is complete. The *t*-statistics presented in absolute values and based on robust standard errors are in parentheses. Superscripts *a*, *b*, and *c* indicate significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
	All	All	All	First Movers	Followers
FINCOMP: Fin. Competition Dummy	0.197	0.225	0.175	0.131	0.232
	$(2.81)^a$	$(2.37)^b$	$(1.98)^b$	(0.85)	$(2.25)^b$
CASH: Pure Cash Dummy	−0.023	0.099	0.002	−0.176	−0.037
	(0.46)	$(1.79)^c$	(0.03)	(1.31)	(0.58)
ACQSIZE: Log Acq. Mkt Value of Assets	−0.011	0.008	−0.003	0.012	−0.013
	(0.83)	(0.51)	(0.20)	(0.45)	(0.72)
RELSIZE: Deal Value over ACQ SIZE	−0.013	0.052	−0.032	0.000	0.001
	(0.20)	(0.93)	(0.49)	(0.00)	(0.01)
POISON: Target Poison Pill Dummy	0.174	0.070	0.051	0.108	0.214
	$(2.17)^b$	(0.69)	(0.37)	(0.55)	(1.44)
TOEHOLD: Acq. Toehold Dummy	0.008	0.102	−0.043	0.298	−0.042
	(0.12)	(1.08)	(0.44)	(1.63)	(0.41)
TPUB: Target Public Firm	−0.079	0.109	−0.083	−0.048	−0.060
	(1.18)	(0.62)	(1.11)	(0.37)	(0.61)
TTERMF: Target Termination Fee	−6.241	−1.606	−4.423	2.687	−9.982
	$(1.96)^c$	(0.47)	(1.14)	(0.35)	$(2.41)^b$
DAYS_COMPLETE: # days	−0.000	0.000	−0.000	0.000	−0.001
	(1.49)	(0.26)	(0.80)	(0.34)	(1.19)
SAMEIND: Same Industry Dummy	0.104	0.134	0.145	0.133	0.097
	$(2.14)^b$	$(2.15)^b$	$(2.72)^a$	(1.52)	(1.46)
PREMIUM: Premium Offered		0.048			
		(1.05)			
DEBTFIN: $ Debt Financing			0.007		
			$(2.54)^b$		
Intercept	0.226	−0.032	−0.020	−0.041	−0.123
	(1.04)	(0.13)	(0.08)	(0.10)	(0.45)
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Observations	362	228	293	101	261
R-squared	0.28	0.36	0.34	0.64	0.36

Table 2.6 : Bidder, Target, and Deal Characteristics

This table presents deal characteristics, and bidder and target characteristics for successful and unsuccessful tender offers or mergers announced by corporate acquirers between 1980 and 2007. Panel A presents deal characteristics, Panel B presents bidder characteristics and Panel C presents target characteristics. The first column of Panel A contains descriptive statistics of 3,321 competed deals in which all bidders were corporate buyers. The second column contains descriptive statistics of 547 competed deals announced by corporate bidders who faced competition from at least one financial bidder. In Panels A and B, data for all deals are provided first. Data for successful deals only are provided below in square brackets. *TV*, obtained from SDC, is the total amount paid by the acquirer to complete the acquisition excluding fees. *TV/Assets* is TV divided by the target's market value of assets. Market value of assets is the book value of total debt plus market value of equity. *Relative Size* is transaction value (TV) divided by market value of assets of the acquiring firm. *Days to Completion* is the number of days between the announcement date of the first bid and the effective date of the successful acquirer. *Hostile Deals* is the fraction of deals in which the deal attitude of the acquirer was hostile to target management. *Tender Offers* is the fraction of deals in which a tender offer was made to shareholders. *Cash (Stock)* is the percentage of deal value offered in cash (stock). *Pure Cash (Stock) Deals* is the percentage of deals that offer only cash (stock). *Poison Pill* is a dummy variable equal to one if the target has a defensive poison pill in place. *Toehold* is a dummy variable equal to 1 if the percentage of target's stock held by the first bidder is greater than 5% at announcement. *Target termination fee* is the dollar amount the target must pay to the acquirer in order to cancel the merger agreement divided by TV. *Debt Financing ($ mln)* is the dollar amount of debt financing raised by the bidder to pay for the acquisition. *Debt Financing (%)* is Debt Financing ($ mln) divided by TV. *Premium* is the premium offered above the target's pre-announcement market value. It is calculated as the price per share offered by the acquirer minus the target's share price four weeks prior to the merger announcement divided by the target's share price four weeks prior to the announcement.

Panel B presents the following variables for the acquiring firm. *Book Assets* is book value of total assets. *Market Equity* is market value of equity of acquirer calculated as common stock outstanding times share price. *Market Assets* is calculated as book value of total debt (total long-term debt plus debt in current liabilities) plus market value of equity. The following variables are reported as deviations from the industry median: *Book Leverage* is calculated as book value of total debt divided by Book Assets, where book value of total debt is total long-term debt plus debt in current liabilities. *Market Leverage* is calculated as book value of total debt divided by Market Assets. *Market to Book* is acquirer market-to-book ratio calculated as Market Assets divided by Book Assets. *Quick Ratio* is calculated as current assets minus inventories divided by current liabilities. *Asset Turnover* is calculated as net sales over Book Assets. *Return on Assets (ROA)* is acquirer return on assets calculated as net income over Book Assets. *Cash Flow Margin* is calculated as operating income before depreciation over net sales. *Cash to Net Assets* is acquirer's cash and cash equivalents divided by Book Assets less cash and cash equivalents. *Institutional Ownership* is defined as the number of shares held by institutions divided by total shares outstanding. *Insider Ownership* is the number of shares held by insiders divided by total shares outstanding. Insiders are broadly defined to include all individuals with access to material, non-public information like board members, top management team, block shareholders, etc. *Management Ownership* is the number of shares held by the top management team divided by total shares outstanding. *Options Awards* is the mean value of stock options granted to the top executives divided by total compensation. *Acquisition Frequency* is the average number of acquisition bids announced by acquirers in each sub-sample.

Panel C presents the following variables for the target firm. *Book Assets*, *Market Equity*, *Market Assets*, *Book Leverage*, *Market Leverage*, *Quick Ratio*, *Asset Turnover*, *Return of Assets*, *Cash Flow Margin*, *Cash-to-Net Assets*, *Institutional Ownership*, *Insider Ownership*, *Management Ownership*, and *Options Awards* are calculated for the target as described already for the acquirer. *Public*, *Private and Subsidiary Target* capture the fraction of deals in which the target was a public firm, private firm, or a subsidiary, respectively. *Probability target* is the ex-ante probability of a firm becoming a takeover target. Superscripts *a*, *b*, and *c* denote significance at the 1%, 5%, and 10% levels, respectively.

Panel D presents the difference between acquirer and target quality prior to the merger. *Acq. ROA minus Tar. ROA* is the mean value of the difference between the acquirer's return on assets and target's return on assets in the fiscal year end prior to the merger. *Acq. CFM minus Tar. CFM* is the mean value of the difference between acquirer's cash flow margin and target's cash flow margin. *Acq. MTB minusTar. MTB* is the mean value of acquirer market-to-book less target market-to-book. Finally, *Acq. ATO minus Tar. ATO* is the mean value of acquirer asset turnover less target's asset turnover. Return on assets, cash flow margins, market-to-book, and asset turnover are calculated as described above.

Table 2.6: Continued

PANEL A: DEAL CHARACTERISTICS			
	Corporate Competition	Financial Competition	Difference
Transaction Value (TV)	871.40	707.80	163.67
	[904.40]	[697.30]	[207.08]
TV/Assets	0.59	0.53	0.06
	[0.62]	[0.55]	[0.07]
Relative Size	0.29	0.40	−0.11
	[0.23]	[0.25]	[−0.02]
Days to Completion	-	-	-
	[122.82]	[112.43]	[10.39]
Hostile Deals	8.06%	10.42%	−2.35%^{c}
	[4.53%]	[10.48%]	[−5.94%]^{a}
Tender Offers	16.86%	20.01%	−3.25%^{c}
	[21.73%]	[32.66%]	[−10.92%]^{a}
Cash	57.12%	76.13%	−19.00%^{a}
	[56.28%]	[76.11%]	[−19.83%]^{a}
Stock	27.99%	13.19%	14.80%^{a}
	[29.37%]	[15.16%]	[14.21%]^{a}
Pure Cash Deals	46.56%	66.12%	−19.55%^{a}
	[45.16%]	[66.15%]	[−20.98%]^{a}
Pure Stock Deals	20.64%	9.47%	11.17%^{a}
	[20.90%]	[10.93%]	[9.97%]^{a}
Poison Pill	3.34%	4.02%	−0.68%
	[1.79%]	[5.25%]	[−3.45%]^{a}
Toehold	8.51%	13.71%	−5.19%^{a}
	[8.23%]	[12.90%]	[−4.66%]^{a}
Target Termination Fee	0.0023	0.0031	−0.001
	[0.003]	[0.005]	[−0.002]^{c}
Debt Financing ($ mln)	-	-	-
	[141.12]	[305.58]	[−164.45]^{a}
Debt Financing (%)	-	-	-
	[19.46%]	[35.37%]	[−15.9%]^{a}
Number of Competing Bids	1.70	2.09	−0.39^{a}
	[1.62]	[1.88]	[−0.26]^{a}
Premium	44.63%	34.50%	10.12%^{a}
	[46.27%]	[29.73%]	[16.53%]^{a}

continued on next page

Table 2.6: Continued

PANEL B: BIDDER CHARACTERISTICS			
	Corporate Competition	Financial Competition	Difference
Book Assets	5,671	5,427	244
	[5,589]	[4,541]	[1,048]
Market Assets	11,771	12,441	-670
	[11,320]	[11,326]	[-6]
Market Equity	5,049	5,816	-766
	[4,864]	[6,503]	-[1,639]
Book Leverage	3.34%	3.90%	−0.55%
	[3.63%]	[0.79%]	[2.83%]
Market Leverage	1.68%	3.01%	−1.33%
	[0.83%]	[1.87%]	−1.03%
Market to Book	0.51	0.10	0.41^{b}
	[0.53]	[0.16]	$[0.37]^{c}$
Quick Ratio	0.55	0.21	0.34^{b}
	[0.60]	[0.12]	$[0.48]^{c}$
Asset Turnover	0.046	−0.052	0.098^{c}
	[0.012]	[0.023]	[−0.011]
Return on Assets (ROA)	−0.01	0.01	−0.02
	[−0.017]	[0.022]	[−0.039]
Cash Flow Margin	−0.097	0.033	−0.13
	[−0.146]	[0.047]	[−0.03]
Cash to Net Assets	0.16	0.093	0.07
	[0.164]	[0.039]	$[0.12]^{c}$
Institutional Ownership	40.39%	48.00%	-7.61^{a}
	[41.54]	[51.80]	$[10.26]^{a}$
Insider Ownership	5.01	5.76	−0.75%
	[5.23]	[3.32]	[1.91%]
Management Ownership	0.92%	2.26%	$-1.34\%^{a}$
	[0.75%]	[1.85%]	$[-1.10\%]^{a}$
Option Awards over Total Compensation	31.30%	31.58%	−0.27%
	[31.88%]	[32.27%]	[−0.78%]
Acquisition Frequency	6.33	6.37	−0.047
	[7.68]	[8.16]	[−0.48]

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Table 2.6: Continued

PANEL C: TARGET CHARACTERISTICS			
	Corporate Competition	Financial Competition	Difference
Book Assets	1,560	830	729
Market Assets	2,403	1,247	1,156[c]
Market Equity	627	343	283
Book Leverage	2.55%	−1.66%	4.22%
Market Leverage	6.99%	5.42%	1.56%
Market to Book	−0.015	−0.21	0.20[b]
Quick Ratio	0.57	0.43	0.14
Asset Turnover	0.13	0.14	−0.01
ROA	−0.04	0.01	−0.05[b]
Cash flow Margin	−0.07	−0.003	−0.07
Cash to Net Assets	0.10	0.13	−0.03
Institutional Ownership	32.79%	39.67%	−6.87%[a]
Insider Ownership	4.50%	6.99%	−2.48%[a]
Management Ownership	0.62%	0.70%	−0.08%
Option Awards over Total Compensation	28.68%	20.58%	8.10%[c]
Public Target	0.58	0.78	−0.20[a]
Private Target	0.34	0.15	0.18[a]
Subsidiary Target	0.07	0.05	0.02
Probability Target	57.38%	60.11%	−2.73%

PANEL D: DIFFERENCE BETWEEN ACQUIRER AND TARGET			
	Corporate Competition	Financial Competition	Difference (*t*-statistic)
Acq. ROA minus Tar. ROA	0.057	0.045	0.012 (0.48)
Acq. CFM minus Tar. CFM	0.024	0.093	−0.07 (0.68)
Acq. MTB Tar. MTB	0.446	0.069	0.376 (1.79)[c]
Acq. ATO minus Tar. ATO	−0.088	−0.353	0.264 (3.36)[a]

Table 2.7 : Cumulative Abnormal Returns Controlling for Acquirer and Target Characteristics

The dependent variable is the Cumulative Abnormal Return (CAR) to winning corporate bidders over the (-20, +180) window, calculated as the acquirer's return minus the return on a value-weighted market index. Panel A includes acquirer characteristics as control variables. Panel B includes target characteristics as control variables. All explanatory variables are as described in Table 2.5 and Table 2.6.

PANEL A: CONTROLLING FOR ACQUIRER CHARACTERISTICS			
	1	2	3
	All	All	Follower
FINCOMP: Fin. Competition Dummy	0.207	0.222	0.223
	(2.63)^a	(2.58)^b	(1.89)^c
CASH: Pure Cash Dummy	−0.024	−0.005	−0.052
	(0.34)	(0.08)	(0.57)
ACQ SIZE: Log Acq. Mkt Value of Assets	−0.008	−0.021	−0.015
	(0.45)	(1.06)	(0.57)
RELSIZE: Deal Value over ACQ SIZE	0.006	−0.100	0.014
	(0.10)	(1.08)	(0.17)
POISON: Target Poison Pill Dummy	0.219	0.123	0.134
	(1.92)^c	(1.19)	(0.56)
TOEHOLD: Acq. Toehold Dummy	−0.004	0.141	−0.035
	(0.04)	(1.27)	(0.26)
TPUB: Target Public Firm	−0.087	−0.141	−0.104
	(0.90)	(1.39)	(0.75)
TTERMF: Target Termination Fee	−8.454	−5.354	−10.786
	(2.20)^b	(1.31)	(2.23)^b
DAYS_COMPLETE: # days	−0.000	−0.000	−0.001
	(1.19)	(1.00)	(1.02)
SAMEIND: Same Industry Dummy	0.084	0.133	0.052
	(1.23)	(2.01)^b	(0.57)
AMB: Acquirer Market to Book	−0.028		−0.036
	(1.00)		(0.97)
Acq. Asset Turnover	−0.021		−0.025
	(0.27)		(0.24)
Acq. Cash to Net Assets	0.083		0.140
	(0.90)		(1.31)
Acq. Cash Flow Margin	−0.081		−0.096
	(1.66)^c		(1.82)^c
Acq. Market Leverage	0.022		−0.245
	(0.08)		(0.73)
Acq. ROA	0.136		0.413
	(0.44)		(1.01)
Acq. Quick Ratio	−0.044		−0.066
	(1.50)		(1.98)^b
Acq. Institutional Ownership		−0.002	
		(1.29)	
Acq. Insider Ownership		0.000	
		(0.06)	
Intercept		1.074	
		(5.30)^a	
Industry Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	277	231	200
R-squared	0.33	0.37	0.41

continued on next page

Table 2.7: Continued

PANEL B: CONTROLLING FOR TARGET CHARACTERISTICS		
	All	Follower
FINCOMP: Fin. Competition Dummy	0.152	0.225
	$(1.89)^c$	$(1.93)^c$
CASH: Pure Cash Dummy	0.080	0.170
	(1.09)	(1.83)
POISON: Target Poison Pill Dummy	−0.007	0.184
	(0.06)	(0.73)
TOEHOLD: Acq. Toehold Dummy	0.035	−0.016
	(0.47)	(0.19)
TPUB: Target Public Firm	0.170	0.195
	(1.18)	(0.83)
TTERMF: Target Termination Fee	−5.71	−11.39
	(1.49)	$(2.52)^b$
DAYS_COMPLETE: # days	−0.000	−0.001
	(1.22)	(1.65)
SAMEIND: Same Industry Dummy	0.128	0.094
	$(1.95)^c$	(1.12)
Tar. Asset Turnover	−0.048	0.022
	(0.70)	(0.27)
Tar. Cash to Net Assets	−0.050	−0.198
	(0.55)	$(1.76)^c$
Tar. Cash Flow Margin	−0.014	−0.002
	(0.17)	(0.01)
Tar. Market Leverage	0.021	−0.107
	(0.08)	(0.33)
Tar. Market To Book	−0.049	−0.053
	(1.25)	(0.98)
Tar. ROA	−0.321	−0.642
	(1.13)	(1.62)
Tar. Quick Ratio	0.001	0.042
	(0.05	(1.52)
Intercept	0.316	1.257
	(1.61)	$(1.90)^c$
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	222	158
R-squared	0.41	0.58

Table 2.8 : Cumulative Abnormal Returns of Single-Bidder Deals Undertaken by Acquirers in the Financial Competition Sample

This table presents Cumulative Abnormal Returns (CARs) of corporate acquirers in the Financial Competition sample after they announced single-bidder acquisitions. Column I is restricted to single-bidder acquisitions undertaken prior to the acquisitions in the Financial Competition sample. Column II includes any single-bidder acquisition undertaken either before or after the acquisitions in the Financial Competition sample. Column III contains the benchmark No Competition sample. Acquirers that appear in Column I and II are excluded from Column III. The *Z*-statistics and *t*-statistics presented in absolute values are in parentheses, as labeled in the header. Superscripts *a*, *b*, and *c* indicate significance at the 1%, 5%, and 10% levels, respectively.

	I Prior Single-Bidder Acquisitions by Corporate Acquirers in Financial Competition Sample	II All Single-Bidder Acquisitions by Corporate Acquirers in Financial Competition Sample	III Benchmark Single Bidder Sample	I-III	II-III
	CAR (Patell *Z*-stat)	CAR (Patell *Z*-stat)	CAR (Patell *Z*-stat)	CAR (*t*-stat)	CAR (*t*-stat)
CARs over the (-2+2) window	0.76% $(1.51)^c$	0.72% $(2.83)^a$	1.12% $(18.32)^a$	−0.35% (0.46)	−0.40% (0.84)
CARs over the (-20, +120) window	4.26% $(2.76)^a$	2.32% $(2.38)^a$	2.32% $(4.96)^a$	1.94% (0.61)	−0.0% (0.03)
CARs over the (-20, +180) window	4.49% $(2.08)^b$	2.56% $(2.03)^b$	1.79% $(1.75)^b$	2.7% (0.71)	0.77% (0.36)
Observations	149	400	21,670		