Holdups, Renegotiation, and Termination Fees in Mergers *

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Abstract

We examine contracts used in mergers from the announcement of initial definitive agreement to the completion or termination of the deal, and the renegotiation process in between. We build a model that allows for renegotiation following the arrival of new information, and demonstrate that a properly designed contract solves the holdup problem and induces higher deal-specific efforts that increase the synergy of the merger. The contract grants an option to the target to terminate the merger, while the strike price can be regarded as the "termination fee" paid by the target. The optimal *target* termination fee compensates the *acquirer's* deal-specific effort without imposing excessive costs on the target for pursuing non-merger alternatives. With a sample of stock mergers from 1994 to 1999 we find: 1) termination fees are used more frequently on the target side than on the acquirer side because the target's holdup problem is more severe; 2) an acquirer's lockup option or a toehold are also devices to solve target's holdup problem; 3) target termination fee increases when measures of acquirer's deal-specific effort increase, but it decreases when measures of the target's non-merger alternatives increase; and 4) renegotiation of the initial agreement ensures that the merger decision is efficient at the time of merger completion or termination.

Keywords: Holdup, renegotiation, merger, termination fee, lockup, toehold.

***JEL* Classifications:** G34, C71, D8.

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Abstract

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I. Introduction

During much of the 1990s the U.S. experienced another wave of mergers and acquisitions. What distinguishes this latest wave from previous ones is the prevalence of stock-based, friendly mergers. The outcome of such a merger largely depends on the bilateral bargaining between the target and acquiring firms' executives and their advisors. This recent wave was also accompanied by the unparalleled rise in both the valuations and volatility of the stock market. High valued stocks became the attractive method of payment in acquisitions (Shleifer and Vishny 2003), while higher volatility of the stocks generated much uncertainty in evaluating the prospects of the merger. Consequently, the market and investors constantly update their knowledge about the merger after the announcement of the initial agreement and as the merger process unfolds.[1]

Given the lengthy process in stock mergers, and the fact that the parties cannot prevent renegotiating the initial contract following the release of new information regarding deal and firm values, opportunistic behaviors during bargaining ("holdup" problem) are expected to occur frequently. Despite the significant advancement in research on mergers and acquisitions (M&A hereafter),[2] to our knowledge existing research has not examined the bargaining process and the holdup problem in mergers. In this paper we examine contracts used in stock mergers from the announcement of initial definitive agreement to the final completion or termination of the deal, as well as the renegotiation process in between. Within the incomplete contract framework,[3] we first build a model that allows for renegotiation, and demonstrate that a properly designed initial contract solves the holdup problem. The optimal contract grants an option to the target to withdraw from the merger, while the strike price on this option can be regarded as the "termination fee" (TF hereafter) paid by the

[1] The average length between the signing of initial agreement to the completion/termination of a deal is 6 months. Some recent papers (e.g., Baker and Savasoglu 2002, Mitchell and Pulvino 2001, 2002, Mitchell et al. 2004, Hsieh and Walkling 2004) show that the release of new information following the initial announcement has significant impact on the risk and return of merger arbitragers.
[2] See Andrade, Mitchell, and Stafford (2001) and Holmstrom and Kaplan (2001) for recent surveys on mergers.
[3] See Section II below for our review of this literature.

target, a frequently used contract feature in practice. Employing a sample of stock mergers from 1994 to 1999, we also find empirical evidence supporting our predictions at different stages of the merger process.

In our model, the acquirer's effort, exerted *before* the completion or termination of the deal, includes the attempt to improve the business and operation plans for the target and the acquirer, and the due diligence task that reveals potential problems in the pending merger. As such the acquirer's effort increases the *expected* synergistic gains of the merger. This effort is also "deal-specific," because it creates higher gains between the two firms than outside the merger. At the same time the target can exert effort to increase the expected value of her non-merger alternative, which includes merging with another firm or remaining stand-alone.[4] Unlike previous theories that are based on one-period models, we allow for the arrival of new information that (partially) resolves the uncertainty surrounding merger synergy and target's non-merger alternative.

Following the release of new information, one or both firms may have the incentive to renegotiate part or the entire initial contract. The optimal initial contract grants the target an (call) option to forego the merger with the acquirer and pursue her best alternative instead. However, the target's option to terminate the merger is not "free," in that if she can walk away from the deal without any costs, she will behave opportunistically by, for example, demanding a much higher offer price after the realization of synergy and non-merger alternative. This holdup problem reduces the acquirer's *ex ante* incentive to exert costly, deal-specific effort, which in turn lowers the expected merger synergy and payoffs of *both* firms.

To solve the holdup problem, the initial contract must have the target compensate the acquirer if the *target* decides to terminate the deal for whatever reasons. This is the strike price on the call

[4] The target's effort does not affect merger synergy because it is usually the acquirer, the larger of the two firms, that initiates the merger process by approaching the target and investigating the merger prospects. We also relax this assumption by assuming that the target also contributes to merger synergy, which leads to holdup problems on both sides.

option granted to the target. The optimal strike should balance between compensating the acquirer's deal-specific effort and not imposing excessive costs on the target to pursue her non-merger alternative, especially when the alternative is expected to be good. In practice, the contract feature (in the initial definitive agreement) that closely resembles the option strike in our model is the termination fee (TF hereafter) on the *target* side, or the amount the target must pay the acquirer upon her termination of the deal. Since the holdup problem can also exist on the acquirer side, there should be acquirer TFs included in the initial contract to solve the acquirer's holdup problem.[5]

Our empirical work is based on a sample of more than 1100 stock mergers in the U.S. announced between 1994 and 1999. We find that in 55% of all deals a target TF is included in the initial contract, while in 21% of deals an acquirer TF is also included *in addition to* the target TF. Among the deals with (positive) target TFs, the mean is 3% of deal size, or $55 million in dollar amount. One may expect that the use of *acquirer* TFs should be more frequently relative to target TFs, as a means of "protecting" the target. But as our model indicates the goal of using TFs is to solve the holdup problem. In most cases it should be the *target*, facing the choice of merging with the acquirer vs. other alternatives, who has the incentive to holdup the acquirer by threatening to break up the merger. It makes little sense for the acquirer to make such a threat to the target, since after all he is the one who investigated the prospects of the merger and approached the target with an offer.[6] Therefore, the holdup problem is actually more severe on the target side despite her status as the smaller firm, and target TFs are used more often.[7]

In addition to TFs, there are other devices that can help to solve the holdup problem. First, the

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[5] Our model is set up to examine holdup problem in mergers, but it can be easily applied to the design of many other financial contracts in situations where uncertainty and renegotiation can lead to a holdup problem.

[6] However, the acquirer will have an incentive to holdup the target if the target can also contribute to the merger synergy (e.g., size comparable to the acquirer) by exerting deal-specific effort. In this case there is holdup problem on both sides.

[7] Consistent with this argument, we find that the larger the size of the acquirer the more (less) likely that a target (acquirer) TF is used, while the larger the size of the target the more likely that an acquirer TF is used. Moreover, in deals where TFs are used on *both* sides, the acquirer TF is never higher than the target TF.

target can grant a (stock) "lockup" option to a bidder of her choice (usually the first bidder), which allows the bidder to purchase a fraction of target shares at a specified price.[8] This option becomes more valuable when, for example, a competing bidder with high valuation of the target is expected to enter the control contest. The lockup option can be regarded as a reward for the (initial) acquirer's deal-specific effort, and thus it serves a similar purpose as a *target* TF, in that with either contract feature the target pre-commits not to holdup the acquirer during subsequent renegotiation. The difference between the two features lies in the fact that, while the target can merge with another bidder *without* paying a fee to the "locked-up" acquirer, the target and/or the winning bidder must pay the acquirer with the target TF clause upon termination of the original deal.

In 35% of our sample deals the acquirer has a lockup option, while in only 25% of all deals neither a TF nor a lockup is used. Moreover, when the acquirer has large market cap and is much larger than the target and has high (industry-adjusted) return to assets prior to the announcement of the deal, all of which indicate a high merger synergy and thus severe holdup problem on the target side, *both* a target TF and acquirer lockup are used. In these cases the lockup option *complements* the target TF in solving target's holdup problem.[9] When comparing targets in the banking industry with those in all the other industries, we find that target (and acquirer) TFs are much less frequently used in bank mergers, while the acquirer lockup is observed in more than 55% of such mergers. By law commercial banks in the U.S. are most likely to be merged with other banks. Under regulatory capital requirements, commercial and savings banks (as targets or acquirers) are severely constrained from committing to cash TFs, while stock lockups offer a non-cash alternative. In these cases an acquirer

[8] The target can also grant an *asset* lockup to an acquirer, or a call option on certain assets of the target at a specified price. See, for example, Coates and Subramanian (2000) and Burch (2001) for more details on lockups.
[9] As noted by Coates and Subramanian (2000), prior to the court's decision (in favor of the use of target TF) in the case of Brazen (shareholder of Bell Atlantic) vs. Bell Atlantic in 1997, most of the target TFs are less than 3% of deal size, as managers of the two firms fear a higher TF will trigger (target) shareholder lawsuits, in particular when there are competing bids for the target. In these cases, a lockup is used in addition to a target TF (bounded above) to solve a severe holdup problem on the target side, and is consistent with our model that predicts a high strike price on the option granted to the target to terminate the deal in such an environment.

lockup seems to be a *substitute* for the use of a target TF.

Another device to solve the target's holdup problem is the acquirer's toehold, or target shares purchased by the acquirer prior to the announcement of the merger. The reason for the holdup problem is that, by threatening to terminate the merger, the target can "free-ride" on the acquirer's deal-specific effort. With a toehold the acquirer participates in the appreciation of target stock, even if the target does not merge with the acquirer, and thus the target's threat becomes less effective. Accordingly, we find that when the acquirer has a toehold, the likelihood of seeing either a target TF or an acquirer lockup significantly decreases.

Next, we perform cross-sectional analysis to examine determinants of the size of the target TF, measured by the percentage of dollar TF over total deal value. First, we find that the target TF increases when the acquirer's market cap and industry-adjusted return to assets prior to merger increase, both of which proxy for the productivity of the acquirer's effort during the merger process. Second, we find that target TF decreases when the acquirer has successfully acquired more firms during the 3-year window *prior to* the current merger, or when the target has less intangible assets. With more (recent) successful experience in the M&As, the acquirer can better utilize his current due-diligence effort to subsequent mergers, and therefore his effort becomes less deal specific and the target's holdup problem becomes less severe. In contrast, the acquirer's effort, aiming at improving the performance of a target with more intangible assets, becomes more deal specific, and thus the degree of (target) holdup problem is higher.

Third, we find that the target TF decreases when she has better, expected non-merger alternatives, which are proxied by her lower leverage ratio and higher initial premium paid by the acquirer in the initial offer. We also find a negative (continuous) relationship between the size of the acquirer's toehold and the target TF, while the granting of a lockup option to the acquirer also lowers the target TF. All of these results provide direct support for our model and in particular, the comparative static predictions on the optimal size of target TF.

Finally, we examine a subsample of mergers in which either the deal is terminated or terms in the initial merger agreement are renegotiated. Reasons for renegotiation and termination, after the announcement of initial merger agreement, include target receiving other offers, the release of new information that significantly alters the status of one or both firms, and external factors such as adverse ruling by a court or a regulatory agency. When we compare the final outcome of the mergers predicted by our model with the actual outcome in the subsample, we find that they coincide for most of the deals. Moreover, target TFs are paid in almost all of the cases in which the target is acquired by a competing bidder, while TFs (on one or both sides) are waived in most of the cases where the proposed merger is blocked by courts or regulatory agencies. These results support the hypothesis that renegotiation ensures *ex post* efficiency so that merger will be consummated only when both sides are better off merging with each other than not.

The rest of the paper is organized as follows. We review literature on incomplete contracts and mergers in Section II. In Section III we develop a general model to examine the merger process. In Section IV we derive closed-form solutions of optimal contract under a set of stylized assumptions, and discuss testable implications. We test the model predictions using a stock swap sample in Section V. Section VI concludes and the Appendix contain all the proofs.

II. Literature Review

The process and features of stock mergers fit well with the literature on incomplete contract. This literature was pioneered and developed by the work of Klein et al. (1978), Williamson (1979), Grossman and Hart (1986), and Hart and Moore (1988, 1990). It concerns a bilateral trade of a product, where there are *relationship-specific* efforts that generate more value inside the trade than outside the trade. The main problem is that opportunistic behaviors on how to distribute the benefits from relationship-specific efforts (holdup problem) may arise prior to the completion of the trade. A solution to the holdup problem is to design binding contracts, and the task of designing contracts becomes straightforward if efforts and the uncertainty in the value and cost of the product can be fully specified and verified by a third party. However, these assumptions are often unrealistic, and the resulting *incompleteness* of contracts and opportunistic behaviors will lead to under-investment in relationship-specific efforts by one or both sides, which in turn will lower the payoffs of both parties.

Recently, researchers argue that sometimes very simple contracts observed in practice can actually solve the holdup problem.[10] These contracts are signed before effort decisions are made, and they specify the renegotiation process after the uncertainty in trade conditions is resolved. Our M&A model is based on some of the main developments in this recent literature (e.g., Aghion et al. 1994, Noldeke and Schmidt 1995, and Che and Hausch 1999), which studies the canonical buyer-seller problem. By solving our M&A model, we demonstrate that the signing of a simple initial contract that includes TFs, as a solution to the holdup problem in merger.[11]

One of the quandaries with the incomplete contract literature is the gap between theories and empirical evidence on real contracts and the renegotiation process. This is in part due to the highly abstract nature of most of the theory work.[12] Therefore, deriving testable implications from models that describe the contract environment in practice becomes necessary for guiding empirical tests. In this regard, our paper contributes to both the M&A and incomplete contract literature, in that we

[10] See Hart (2001) and Tirole (1999) for reviews of the literature.
[11] There is also a strand of literature on the design of optimal legal remedies for breach of contracts (e.g., Shavell 1980, Rogerson 1984, and Edlin and Reichelstein 1996). Researchers show that the punishment for contract breaching should not be excessive as it will induce over-investment of relationship-specific effort.
[12] Empirical work analyzing holdup problem and contracts include Joskow (1987), who examines contracts used in coal markets, Crocker and Reynolds (1993), who investigate contracts used in air force engine procurement, and Kaplan and Stromberg (2003, 2004), who look at contracts between venture capitalists and entrepreneurs.

empirically test our model, in particular, the renegotiation outcome and the determinants of TFs and lockups, and find supporting evidence.

Our paper also extends previous research on several related issues in M&As. First, in the empirical work of Officer (2003) and Bates and Lemmon (2003), the authors find that the use of TFs increases the probability of a deal being completed, but does not seem to reduce the payoff to target shareholders and thus they concluded the use of TFs is not a result of agency problems in the targets. Second, Burch (2001) empirically examines acquirer's lockup options, and finds that target shareholders do not seem to be hurt by the lockup feature, in contrast to the view that lockups are used by self-interested target managers to discourage competition in control contests. Coates and Subramanian (2000) provide detailed explanations on the legal and practical differences between TFs and lockups, which they view as substitutes. The factors that they consider for the use of these contract features include agency problems, transaction costs, and tax and informational effects.

While Officer (2003) and Bates and Lemmon (2003) (Burch 2001) focus on the relationship between TFs (lockups) and the success of merger and target shareholder payoffs, we show theoretically that the goal of designing ex ante contracts is to maximize total expected surplus between both firms and minimize costs during bargaining and renegotiation. Each of the above papers separately examines factors determining the use of TFs and lockups in merger contracts, while we build a unified theory on the holdup problem in mergers and argue that the use of both TFs and lockups are aimed at solving the holdup problem in practice. Our empirical work also extends previous research on the determinants of TFs and lockups.[13]

Second, Officer (2004) provides empirical evidence that the inclusion of collars (attached to stock-based offers) in initial agreement facilitates deal completion by avoiding the (costly)

[13] First, we link the relative degree of holdup problem on the target vs. acquirer side to the use of TFs on one of both sides. Second, we also empirically test how TFs (continuously) vary with merger characteristics based on our model, which is absent in Officer (2003) and Bates and Lemmon (2003). In contrast to Coates and Subramanian (2000) and Burch (2001), we find TFs and lockups to be both complements and substitutes while toehold is a substitute for either contract feature.

renegotiation of initial offer price. In contrast, we examine the holdup problem in merger, resulting from the inability to prevent renegotiation following the arrival of new information regarding firm and deal values, and propose TFs as a solution to the problem. Moreover, our paper is the first to model and empirically examine renegotiation outcomes in mergers.

III. The Incomplete Contract Model for M&A

Consider a risk neutral acquirer and target, who are interested in completing a merger. The merger process is depicted in Figure 1 below. At t = 0, they get together and decide whether to write a (ex ante) contract specifying the terms of merger that will take place at a future date t = 3. At t = 1, both the acquirer and target make investment efforts. At t = 2, the realizations of merger synergy (V) and target's non-merger alternative (W) are observed, based on which the renegotiation of the initial contract will take place. Notice between Time 1 and 2, there can be new information regarding one or both of the merging firms revealed to the public. Finally, at t = 3, firms will decide whether to complete or terminate the merger, and payoffs to both firms are realized.

We now describe how investment efforts e_A and e_T affect firm values. First, the expected synergy of the current merger, above and beyond the combined market values of both firms, is denoted by $V(e_A, \theta)$. θ is a random state variable, follows a cumulative distribution function (cdf) $F(\cdot)$, and its realization will also be observed at t=2. The goal of acquirer's deal-specific effort, exerted at t = 1, is to discover and evaluate possible sources and channels of merger synergy between the two firms. This effort includes the attempt to improve the business and operation plans for the target and the acquirer, and the due diligence task that reveals potential problems in the pending merger.[14] Since the actual synergistic gains will not be implemented until the merger is completed, we assume that the

[14] One may argue that the acquirer's effort to improve merger synergy is exerted before time 0 rather than at time 1. While the acquirer may expend effort in screening potential merger partners prior to approaching the target with an offer, it is unlikely that he can effectively evaluate the sources and channels of merger synergy between the two firms, until the target agrees to the terms of the initial offer and grants the acquirer the access to her financial and accounting information.

acquirer's effort, e_A, increases expected synergy, V.

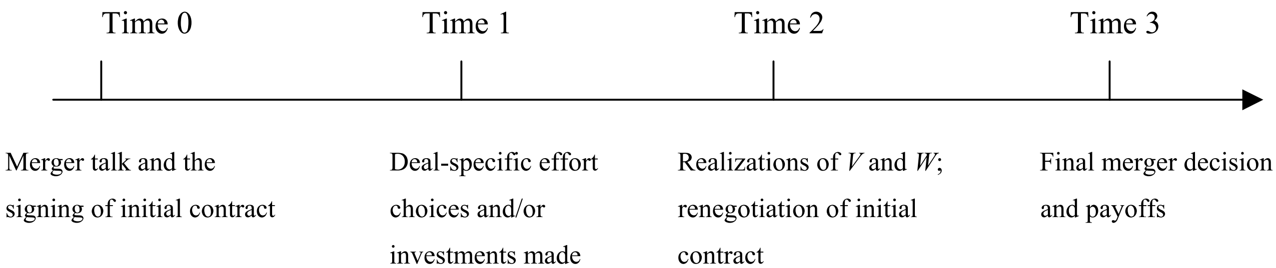

Figure 1 Merger Timeline

Second, the target's best alternative if *not* merging with the acquirer, above and beyond the current market value, is denoted by $W(e_T, \omega)$. The random state variable, ω, follows a cdf $G(\cdot)$, and its realization will be observed at t = 2. Upon being contacted by the acquirer for a potential merger, the target will exert effort to examine the merger proposal as well as explore her non-merger options, including remaining stand-alone and identifying other firms as merging partners. The effort in exploring non-merger options, e_T, is triggered by the initial merger talk and related to the value of the current merger, and thus is also deal specific. We also assume that the value of the target's best non-merger alternative, W, is increasing in e_T. Finally, let $C(e_A)$ and $C(e_T)$ denote the strictly increasing and convex cost functions of the efforts.

We first examine the First Best solution of the merger process, which is equivalent to maximize the *joint*, expected surplus of both the acquirer and target by choosing optimal levels of efforts. Consider the following problem, calculated after effort choices are made at t=1, and *before* realizations of V and W are observed at t=2:

$$W^{FB} \equiv \underset{(e_A,e_T)}{Max}\left[\iint_{\theta\omega} \max[V(e_A,\theta), W(e_T,\omega)]dG(\omega)dF(\theta) - C(e_A) - C(e_T)\right]. \quad (1)$$

The first term (double integrals) denotes the total expected surplus between the two firms. As the "max" operator inside the integrals indicates, the First Best, efficient decision is to complete the deal if and only if the value of the synergy, V, is larger than W, the target's best alternative,[15] while the "Max" operator outside the bracket implies that effort choices of both firms are made to maximize joint total payoffs from efficient merger outcome, net of costs. Once First Best effort choices e_A^{FB} and e_T^{FB} are made, lump sum transfers between the two firms can be made to compensate for the cost of these efforts.

In second best situations, the goal of designing a contract at t=0 is to ensure that both the acquirer and the target will have incentives to provide First Best efforts at t=1 so that the total expected surplus is equal to that of the First Best outcome, W^{FB}, or as close to W^{FB} as possible. Before we consider optimal contracts in second best, we first clarify what is contractible and what is not in the model.

Assumption 1 *The following assumptions hold throughout the model:*

a) *Information on state variables* θ *and* ω *is* symmetric *to all parties at any point of time;*
b) θ *and* ω *are observable at t=2, but they are not* verifiable *in a court;*
c) *any and all parts of the initial contract signed at t=0 can be renegotiated at t=2, following the realizations of V and W; as long as both sides agree to the entirety of the renegotiated contract, the court will void the initial contract;*
d) *the court can verify* who *initiates a termination of initial merger contract at t=2, but the court cannot verify* why *the termination is initiated.*

As seen in standard incomplete contract models, we assume a *symmetric* information structure (part a)

[15] Our setup departs from standard incomplete contract models in which the total surplus is the difference between product revenue of the buyer and production cost of the seller. The efficient trade decision there is that whenever the (ex post) realized buyer's revenue is higher than the seller's cost of production, the trade should be completed.

to highlight the holdup problem on the acquirer's effort and its solutions.[16] This assumption is also justified by the fact that during the (friendly) merger process, management teams from both firms will hold extensive conversations and exchange information about each other and the merger, and it will be difficult for either side to hide any significant information from the other. Similar to previous research, we assume that the two state variables are not verifiable thus ex ante contracts cannot be written contingent on future realizations of these variables (part b). This assumption is justified by the complex nature of the M&A process, and is also consistent with what is observed in real M&A contracts.[17]

Part c) states that the renegotiation of contract signed at t=0, following the release of new information on V and W, cannot be prevented. Similar to Noldeke and Schmidt (1995), we assume (in part d) that the court *can* differentiate which of the two sides initiates a withdrawal request from the merger, even though the courts cannot understand *why* anyone wants to terminate the merger. As a result, both sides know that the inclusion of TF in ex ante contract is enforceable at t=2.[18] Finally, if there is no ex ante contract, then the two sides negotiate *after* the realizations of θ and ω are observed, to decide whether to merge and how to split the total surplus (e.g., a Nash Bargaining or a 50-50 split).[19]

The interesting case in the second best situation, where the signing of a complete, state-contingent contract is not feasible, is to examine whether any simple ex ante contract can induce the

[16] In practice there can be information asymmetry between insiders (managers of both firms) and outsiders on the value of the synergy. In a companion paper (Hotchkiss et al. 2004), we show that by choosing different types of contract with collar bids, acquirers can signal both the value and standard deviation of the synergy, so that in a separating equilibrium there will be no information asymmetry. We also control for the types of contract used in our empirical tests below.

[17] There are two schools of thoughts on how complete ex ante contracts are (see Tirole 1999 for a survey). Some researchers argue that contracts are highly incomplete due to legal and institutional limitations (e.g., Hart and Moore 1999, Siegel 1999), while others argue that ex ante contracts can be much more complete even if there are many unforeseen contingencies, as long as agents can perform some basic mathematical functions (e.g., Maskin and Tirole 1999).

[18] This means a TF must be paid by the side that initiates the withdrawal, unless both sides mutually agree to terminate and waive the TF clause. Our assumption, similar to that made in Noldeke and Schmidt (1995), is different from that made in Hart and Moore (1988, 1990), who assumes that the court cannot even verify who initiates the termination of deal.

[19] In Appendix B.1, we show that efforts made at t = 1 without any contract signed at t=0 will be less than First Best efforts under this bargaining situation, a result that is standard in the incomplete contract literature.

First Best outcome. In the canonical buyer-seller model, Noldeke and Schmidt (1995) show that option-like contract in practice can be a solution. In their model, the seller has a *put* option to sell the product to the buyer for a fixed price (strike) when the cost of production is lower to make a profit. In our M&A framework, the acquirer (which can be thought of as the "buyer" of the target), being the larger firm of the two, owns the "residual" claim on the total surplus from merger, beyond the expected value of the option granted to the target. The option allows the target to walk away from the merger, if doing so provides her with higher payoffs. Therefore, in contrast to the Noldeke and Schmidt (1995) model, in our model the target has a *call* option with the underlying asset being the value of her best non-merger alternative.

However, the target's call option is not free, because if the target can walk away without paying the acquirer, then she will behave opportunistically after the realization of V and W at t=2: for example, the target will demand that the acquirer shares the value of deal-specific synergy, created by the acquirer's effort at t=1, or else withdraws from the merger. This holdup problem will reduce the acquirer's incentive to exert costly effort at t=1. To prevent this problem, the time 0 contract must have the target compensate the acquirer upon terminating the deal at t=2. This is the target TF, and can be interpreted as the strike price (denoted by k) on the call option granted to the target. On the other hand, the target TF cannot be too high, because the target also exerts effort to increase W, which is also part of the total surplus of both firms (recall that the acquirer has the residual claim of this total surplus). The target's effort (acquirer's effort) at t=1 would be too low (too high) if the TF is too high.

As discussed earlier, the holdup problem on the target side is more severe than that on the acquirer side. This is because, it is the acquirer who approaches the target with an offer and who will exert deal-specific effort, and thus it is the acquirer who has more (sunk effort and value) to lose during the bargaining and renegotiation process than the target. This problem becomes more severe when the acquirer (target) is larger (smaller). This is the holdup problem that we focus on in the model, but our model can be extended to consider holdup problem on both sides. This can occur when, for example, when the size of target is not much smaller than the acquirer, her importance in contributing to the success of the merger cannot be ignored as we do in the Basic Model.[20]

With the understanding of the option-like contract, we can now formally describe the initial contract to be signed at t=0. Similar to Noldeke and Schmidt (1995), this contract includes the pair (p_0, k). First, p_0 is a constant payment to the target, regardless of the outcome of the merger at t=3, and can be interpreted as the total initial offer premium (in dollar) paid by the acquirer to the target, over the target's current market value. Since we focus on the holdup problem rather than how the offer price is determined in this paper, we take the offer price as given.[21] Second, the constant k is the strike on the target's option. The following lemma describes the payoffs given the contract.

Lemma 1 *Given an option contract (p_0, k) at t=0, and realizations of V and W at t=2, we have*:

a) *the target's payoff at t=2 is given by:*

$$U_T = -C(e_T) + \begin{cases} p_0, & W - k < p_0; \\ W - k, & W - k \geq p_0. \end{cases} \tag{2}$$

b) *the acquirer's payoff at t=2 is given by:*

$$U_A = -C(e_A) + \begin{cases} -p_0, & V < W, \text{and } W - k < p_0; \\ V - p_0, & V \geq W, \text{and } W - k < p_0; \\ k, & V < W, \text{and } W - k \geq p_0; \\ V - (W - k), & V \geq W, \text{and } W - k \geq p_0. \end{cases} \tag{3}$$

c) *the merger will be completed at t=3 if and only if $V \geq W$.*

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[20] In this case there will be a holdup problem on the acquirer side as well, as he may behave opportunistically and demand sharing the part of the merger synergy that comes from the target's deal-specific effort. The solution will then be, adding TF on the acquirer side, in addition to the target side.

[21] In practice there are several forms of stock-based contract offered by the acquirer to the target. In a fixed payment contract, the acquirer guarantees the total payment to the target by floating the exchange ratio of the stock swap, while in a fixed exchange ratio contract the total amount offered to the target will float depending on realization of acquirer's stock prices. In some cases there are also collars attached to either the fixed payment or a fixed exchange ratio contract. See Fuller (2002), Officer (2004), and Hotchkiss et al. (2004) for more details.

The target's payoff is described in part a). Whenever $W - k \geq p_0$, that is, when the value of her non-merger alternative is greater than the sum of offer premium and the TF, she exercises the call option and receives exactly $W - k$, regardless of the merger outcome. When the reverse is true, the target receives the constant payment p_0. Given her time 2 payoffs in (2), the target's optimal effort given k and the option contract solves the following problem:

$$U_T = \underset{e_T}{Max}\left[\int_{\omega} \max[W(e_T,\omega) - k, p_0]dG(\omega) - C(e_T)\right]. \tag{4}$$

The first term in (4) indicates the value of the call option with strike k. Since k is a constant and the value of synergy, V, is independent of the target's effort, e_T, her effort choice in second best is *independent* of the acquirer's and it will be the dominant strategy in the Nash Equilibrium.

The acquirer's payoff, denoted in part b) of Lemma 1, depends on whether the target exercises the option ($W - k \geq p_0$), and whether the merger will be completed ($V > W$). With the residual claim of total surplus over the option value in the time 0 contract, the acquirer will make a take-it-or-leave-it offer to the target at t=2. The top two rows in (3) represent his payoffs when the target's call option is not exercised (and receives the constant p_0), with a higher payoff, $V - p_0$, occurring when the merger is completed. The bottom two rows of (3) represent his payoffs when the target exercises the options (and receives $W - k$). In particular, when the merger is terminated ($V < W$), his payoff is the TF paid by the target. Finally, when $V > W > p_0 + k$, by offering exactly the amount that the target would have received from her non-merger alternative, the acquirer can convince the target to complete the merger, and captures the residual claim (V –(W-k)).[22]

Based on Lemma 1, the merger decision always coincides with the First Best efficient outcome at t=2, given the time 0 contract. However, the payoffs to the target and the acquirer when the merger

[22] By contrast, if $V > W$ but $W < k$, the merger will go through and the acquirer will offer the target nothing beyond the fixed payment p_0 as the target's option is worthless. Finally, if $V < W$ and $W > k$, the target will terminate the merger as she will receive less in the merger, while the acquirer will receive the TF.

is terminated may be peculiar, in that the constant payment p_0 is made despite the termination of the merger. In practice the acquirer's offer to purchase the target's shares is *conditional* on the *success* of the merger. We can show that if the payment is indeed conditional on the success of the merger, then the resulting efforts will be *less* than the First Best levels, because the target's effort choice given a TF will not be independent of the acquirer's effort decision.[23]

Having explained the payoffs and merger outcomes under a certain option contract signed at t=0, we now derive how second best contract can induce First Best efforts and total surplus. From the target's effort choice problem specified in (4), the first order condition yields her optimal effort choice as a function of k. We can then equate this effort choice to that of the First Best effort choice, and find an optimal k^* that induces the target to provide First Best effort. On the other hand, the acquirer's problem is given by:

$$U_A = \underset{e_A}{Max}\left[\iint_{\theta\omega} \max[V(e_A,\theta), W(e_T,\omega)]dG(\omega)dF(\theta) - \int_{\omega} \max[W(e_T,\omega)-k, p_0]dG(\omega) - C(e_A)\right]. \quad (5)$$

As above, the acquirer owns the total expected surplus (the first integral in (5)), net of the value of the call option that he writes to the target (the second integral). From (5), it is clear that the acquirer's problem of choosing e_A to maximize his payoff function depends on the target's effort choice e_T, which in turn depends on k. But given that the optimal k^* from the target's problem in (4) induces First Best target effort, i.e., $e_T(k^*) = e_T^{FB}$, in the Nash equilibrium the acquirer's best response is to choose $e_A = e_A^{FB}$. Consequently the First Best surplus will be achieved in second best. The proposition below summarizes the analysis on the derivation of k^*.

Proposition 1 *There exists a unique k^* such that effort choices on e_A and e_T, under the option contract specified in Lemma 1, are the same as those in First Best. Moreover, any division of ex ante surplus of the total surplus can be achieved by choosing the constant, p_0, properly.*

[23] Details of the proof are available from the authors on request. Since the effort levels are lower when the constant payment is conditional, we can call the contracts observed in practice "third best."

Proof: Similar to the proof of Proposition 2 in Noldeke and Schmidt (1995).

IV. A Specific Model and Empirical Implications

Having derived the procedure to solve for the optimal strike price k^* and effort choices, we next present a specific example of our model, and derive testable implications.

IV.1 Equilibrium and Comparative Statics

In order to derive a closed form solution of the target TF and testable implications, we make the following assumptions.

Assumption 2 *The synergy of the merger follows* $V = l_A e_A + \theta$*; the target's best alternative follows* $W = h_T e_T + \omega$*; and cost of effort* $C(e_i) = \frac{1}{2} c e_i^2$*, where* $e_i = \{e_A, e_T\}$.

Assumption 3 *State variables* θ *and* ω *follow Uniform distribution:* θ *~Unif* $[0, \overline{\theta}]$, *and* ω *~Unif*$[0, \overline{\omega}]$; *and they are independent.*

Assumption 4 $c\overline{\omega} \geq 2\max(h_T^2, l_A^2)$; *and* $c\overline{\theta} \geq 2\max(h_T^2, l_A^2)$.

First, in Appendix A.1 we prove that when the acquirer's effort (target's effort) becomes relatively more important in increasing the total surplus W^{FB}, which can result from an increase in l_A or $\overline{\theta}$ or a decrease in $\overline{\omega}$ (an increase in h_T or $\overline{\omega}$ or a decrease in $\overline{\theta}$), the acquirer's *First Best* effort (the target's effort) will increase in order to maximize W^{FB}. These results will also help us understand our comparative statics for the second best contracts.

Proposition 2 *The First Best efforts and payoffs can be achieved by choosing the option contracts specified in Lemma 1, with the optimal strike* k^**:*

$$k^* = \frac{\overline{\theta}}{2} + \frac{l_A^2(c\overline{\theta} - 2h_T^2)}{2c(c\overline{\omega} - l_A^2 - h_T^2)}.$$

Proof: *See Appendix A.2.*

Corollary 1 *The expected merger synergy and the probability of completing the deal are higher when the target and acquirer sign ex ante contract that includes a* target *TF (k^*) than without it.*

In the Basic Model a properly chosen target TF can induce First Best efforts and highest total surplus possible. It also solves the target's holdup problem so that the likelihood of opportunistic behavior that will prevent the completion of the deal is minimized. Without such a TF, the holdup problem will lead to both lower deal-specific effort of the acquirer and lower probability of deal completion. This result also provides an explanation for the empirical findings in Bates and Lemmon (2003), Officer (2003), and Burch (2001), who find that the inclusion of target TF and acquirer lockup increases the (negotiated) premiums offered to target shareholders and deal completion rate.[24]

Corollary 2 *The optimal strike, k^*,* increases *as $\overline{\theta}$ increases, or as l_A increases.*

Proof: See Appendix A.3.

As $\overline{\theta}$ (twice the mean of the random component of merger synergy *V*) or l_A (the productivity of acquirer's deal-specific effort) increases, the acquirer's role in increasing total surplus becomes more important because merger synergy is expected to be higher. Therefore, in order to induce the efficient First Best efforts and outcome, the option contract should impose a higher cost on the target to withdraw from the merger, so as to compensate the acquirer's effort. A higher target TF also increases the probability that the merger will be completed, ceteris paribus, but this is also efficient because the efficient First Best outcome is now more likely coming from the merger.

Corollary 3 *The optimal strike, k^*,* decreases *as $\overline{\omega}$ increases, or as h_T increases.*

Proof: See Appendix A.3.

This result may be counter-intuitive. As $\overline{\omega}$ (twice the mean of the random component of target's

[24] As stated above, in our model the goal of designing time 0 contracts is to maximize expected joined surplus, not the probability of completing the merger. In particular, when the merger synergy is expected to be low relative to that of target's non-merger alternative, the contract should not force her to merge with the acquirer or impose excessive costs on her when withdrawal from it. On the other hand, in deals where either the holdup problem is not severe or too severe to overcome by initial contract features (see Section IV.2 below), target TFs are not used.

alternative W) or h_T (the productivity of target's effort) increases, the value of target's non-merger alternative is expected to increase relative to merger synergy, and thus her role in increasing total surplus becomes more important. Therefore, the second best contract should impose lower costs on the target for withdrawal in order to induce her First Best effort. A lower target TF also decreases the likelihood of the completion of the merger, but again this is efficient because the First Best outcome is now more likely coming from the target's best non-merger alternative.

IV.2 Testable Implications

In a framework of symmetric but incomplete information, our model describes the entire merger process. First, the initial contract specifies how to split the total expected surplus, with the target holding a call option on her non-merger alternative, while the acquirer owning the residual claim of the total surplus. It also allows for renegotiation following the release of new information regarding V and W, while the goal of renegotiation is to ensure ex post efficiency of the merger. Finally, the contract specifies a target TF should she decide to terminate the deal.

By examining target shareholders' payoff in deals with and without TFs (and lockups), previous research (Burch 2001, Bates and Lemmon 2003, Officer) has rejected the alternative hypothesis of target agency problem as the reason in the use of target TF (and acquirer lockup). To save space we do not repeat similar tests in our empirical work, and instead focus on examining the validity of our model through tests performed at different stages of the merger process. Our empirical work provide the most complete analysis of stock merger in the literature, as well as the links to previous empirical work performed at particular stages of the merger process.

First, our model predicts that renegotiation ensures ex post efficient merger decisions. This implies that, if the terms of the initial contract are renegotiated, the deal will be completed if (updated) measures of synergy are higher than those for target's non-merger alternative, i.e., $V > W$, otherwise the deal will be terminated. This is our first hypothesis (H1). To our knowledge these tests have never been performed before.

Our next two hypotheses relate to the likelihood of observing target and acquirer TFs as well as acquirer lockups included in the initial merger agreement. Part of this test is also to confirm results from previous work (Burch 2001, Officer 2003, Bates and Lemmon 2003). Unlike previous papers we regard both the TFs and lockups as devices to solve the holdup problem, and we argue that the relative degree of holdup problem on the target vs. acquirer sides is the most important determinant of the use of these devices. When the acquirer plays a dominant role in determining merger synergy, has shown good prospects in merger synergy, and his effort is more deal-specific, the degree of target's holdup problem becomes more severe, and thus we expect to see target TFs and/or acquirer lockups used more frequently. However, when the target's contribution to merger synergy cannot be ignored, the holdup problem also exists on the acquirer side and TFs should also be used on the acquirer side (hypothesis H2). Finally, when the holdup problem exists on both sides, it should be the side where the holdup problem is more severe that pays more upon terminating the deal (H3).

Finally, the model provides comparative statics on how the optimal target TF depends on deal characteristics. Specifically, we know that the optimal TF increases with measures for acquirer's role in improving merger synergy ($\overline{\theta}$ or l_A). As each of them increases, the expected synergy is higher given the same effort of the acquirer, and therefore the contract should ensure that the likelihood of a merger should increase. On the other hand, the optimal target TF decreases with measures of target's role in improving her non-merger alternatives ($\overline{\omega}$ or h_T). An increase in these measures indicates that the target's non-merger alternative is expected to be higher (relative to merger synergy), and the second best contract should allow the target to walk away from the merger with a higher probability as well as paying a smaller TF to the acquirer. These results constitute our fourth and final hypothesis (H4).

To summarize, we test the following hypotheses:

H1) Renegotiated mergers will be completed if measures of ex post synergies are higher than measures for the target's non-merger alternatives; otherwise the merger will be terminated;

H2) Devices to solve target's (acquirer's) holdup problem are more likely to be used when measures of target (acquirer) holdup problem are more severe;

H3) When there is a holdup problem in both the target and the acquirer, TFs are used on both sides while the TF is higher on the side with more severe holdup problem;

H4) Target TFs increase with measures of the acquirer's deal specific effort; while they decrease with measures of the value of target's non-merger alternatives.

V. Empirical Evidence

V.1 Description of Data

Our data collection begins with the Security Data Corporation (SDC) database: mergers announced between January 1994 and December 1999 are included in our initial sample. To ensure the accuracy of information, we also rely on SEC's database of electronic company filings that dated back to 1994, and the Dow Jones News Retrieval Service, in particular the Dow Jones Interactive company filings database that began in 1996. As a result mergers announced prior to 1994 are excluded. We drop all-cash mergers in this period, because these deals, despite being characterized by "friendly" by the SDC, may actually have been hostile takeovers, in which a target's holdup problem probably does not exist. Applying other standard selection criteria,[25] our final merger sample includes 1122 stock mergers. Firms' financial and accounting information prior to the merger is obtained from Center for Research and Security Prices (CRSP) database and Compustat Annual files. Finally,

[25] Merger deals are also excluded from the final sample if the value of the transaction is lower than $10 million, or if either the target or the acquirer is not based in the U.S., or deals that have pending status, or deals that do not have any definitive agreement and are never completed. Moreover, both the target and acquirer have to be included in the CRSP database and in the Compustat Annual files for at least one year prior to the merger announcement date.

information on acquiring firms' CEO (tenure, whether sits on the Board of Director) is obtained from the ExecuComp database.

Insert Table 1 and Figure 2 here.

Table 1 presents the sample distribution according to offer types and TFs over the announcement years. Not surprisingly, the largest number of deals was announced in 1998 and 1999, the peak of the stock market boom. Overall target TFs are used in 55% of all deals in our sample, while acquirer TFs are included in only 21% of all deals. Both target and acquirer TFs are used more often in deals announced during 1997-1999 than those announced prior to 1997.[26] On the other hand, acquirer's lockups are used in 35% of deals, and used more often after 1997.[27] In 274 stock merger deals (24.42% of all deals) cash is also used as part of the method of payment. By far the most frequently used offer type is Fixed Exchange Ratio (FEX) offer, while the least frequently used offer type is Fixed Payment (FP) offer. Moreover, for 332 deals a *collar* bid is used to modify either a FEX contract (a FEX collar) or a FP contract (a FP collar). For each of the four offer types, target and acquirer TFs (and acquirer lockups) are used for a significant fraction of deals.

Figure 2 illustrates the distribution of non-zero target TFs, as fraction of deal size, among 619 deals (55% of all deals). While the distribution spreads out from below 1% to as high as 15% of deal size, it is clustered between 1% to 4% and in particular between 2% to 3% of deal size (35% of 619 deals). For non-zero observations, the mean of target TF is 3.01% of deal size, or $55.32 million in dollar amount.

Table 2 presents summary statistics of the targets and acquirers. We group deals by whether a target and/or acquirer TF is used or not (Panel A) and by whether an acquirer lockup is used (Panel B). First, in 242 out of 1122 (21.6%) of deals TFs are used on both sides, while there is no deal in

[26] In all of our subsequent tests we include a year (1997) dummy to control for this impact.
[27] For most of the deals SDC does not provide complete information on lockups (e.g., strike, fraction of target shares can be acquired, etc), thus we only use a dummy variable on the lockups in our empirical tests below.

which only the acquirer TF is used. Comparing the group of deals with TFs on both sides (group 1) vs. deals with only target TF (group 2), we can see that in terms of both market value of equity (variable "MV") and total assets (not reported in Table 2), acquirers are larger (mean and median) in group 2 than those in group 1, while targets are much larger in group 1. These facts are consistent with our argument that the holdup problem is more severe on the target side, and that it is more severe the larger the acquirer is relative to the target. Next, in 503 out of all deals (45%, group 3) TFs are not used on either side. Most of the deals in this group are bank mergers, and acquirer's lockups are a substitute for a target TF. Among the 395 deals that have a lockup (group 4), 185 of them also have a target TF. Finally, in 286 deals (25.5%) neither a TF nor a lockup is used.

Insert Table 2 here.

The variable "Duration" is the number of days between the signing of initial definitive agreement and final completion date or termination date. The longer duration for deals without TFs suggests that TFs shorten the decision process of renegotiation and completion/termination of the deal. "TOEHOLD" measures the acquirer's percentage holding of target shares prior to the merger announcement. Notice that the mean of acquirer's toehold for deals without TFs in the initial contract is higher than that for deals with TFs, and the same is true for deals with and without the lockup.

Finally, Table 2 presents statistics on three sets of firm characteristics, all of which are industry adjusted. First, a firm with high (low) "Book-to-Market" ratio is more value (growth) oriented. On average the acquirer is more likely to be a growth firm, while the target is more likely to be a value firm. This is not surprising given the time period of our sample coincides with the technology bubble, and firms took advantage of their over-valued stocks to acquire value firms (Shleifer and Vishny 2003). Second, the variable "ROA" is the return on assets *prior to* the announcement of the deals. Acquirers tend to have higher ROAs or better performance to their assets if they are involved in deals in which target TFs or acquirer lockups are used. Third, both the acquirer and target's leverage ratios (variable "LEV") are higher in deals with TFs than those in deals without them.

V.2 Empirical Tests

Following the signing of initial definitive agreement, we observe one of the three possible outcomes: 1) deals that are completed *without* renegotiation; 2) deals that are terminated without renegotiation; and 3) deals that are renegotiated and subsequently either completed or terminated. Despite the provision of information on the changes in offer prices during the merger process, the SDC data set does not differentiate these cases from those with changes resulting from stock splits and dividend payments during the merger process.[28] To ensure the accuracy of the renegotiated deals, we manually examine 8-k and S-4 filings and the Dow Jones News Retrieval for each deal to verify the amendments to the initial agreement.[29] This process yields 96 renegotiated deals out of the original 1122 mergers, and 83 terminated deals.

We first examine factors determining the outcome of deals following the signing of initial definitive agreement by using multinomial logistic regressions. The results are presented in Table 3. The *default* outcome is "completed without renegotiation," while the alternative outcomes (dependent variables) are "terminated without renegotiation," or "renegotiated," which can lead to an eventual completion or termination of the deal. While not reported in Table 3, we also calculate the partial derivatives of outcome probabilities with respect to firm and deal characteristics (calculated at the mean of explanatory variables), which provide economic significance of these factors.

Insert Table 3 here.

We first find that when the acquirer becomes smaller relative to the target, the deal is more

[28] Officer (2004) defines the occurrence of renegotiation by a change in offer price in a merger. He also screens the plain stock offers to ensure that SDC does not record a change in the offer price caused by movements in the acquirer's stock price under a FEX contract. However, these classification procedures are still subject to the potential problem of SDC not recording changes in the offer price due to stock splits and dividends.

[29] If there is more than one amendment to the original contract, we record the information from the *final* amendment as the reason for renegotiation and how the terms are revised.

likely to be terminated (rather than completed without renegotiation).[30] Whether the merger is related or not, measured by the variables "SSIC3" and "CORR," does not seem to affect the outcome of the deal, nor does the offer premium or whether cash is used. Consistent with the toehold literature that mainly focuses on hostile takeovers (e.g., Betton and Eckbo 2000), when the acquirer accumulates a larger toehold, the deal is more likely to be completed but this impact is not statistically significant.

Second, three sets of variables obtained after the announcement of initial agreement but before deal completion or termination have significant impact on merger outcomes. When the standard deviation of *target* stock returns *after* the announcement of the initial contract (TRETSD-post) increases, which proxies for higher uncertainty in merger synergy, the deal is less likely to be completed.[31] These results confirm the significant impact of uncertainty on the outcome of a merger.

Next, the variable "CAR" measures the cumulative abnormal stock return after the signing of initial contract and before the deal completion/termination date. The coefficient for *target*-CAR in both "Terminated" and "Renegotiated" outcome regressions are negative and significant. These results suggest that if the market reassesses target stock (and of merger synergy) upwards following the initial announcement, the deal is more likely to be completed. Finally, the coefficients on the dummy variable "COMPETE" in both regressions are positive and significant at 1% level, implying that the existence of competing bidders makes the original deal much more likely to be either renegotiated or terminated. In terms of the impact on probabilities, with a competing bid the likelihood of the completion (termination) of the original deal decreases (increases) by 52% (17.4%) while the probability of renegotiation of the original deal increases by 34.6%, as compared to single acquirer cases.[32]

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[30] For deals that are completed without renegotiation, acquirers are much larger than the targets in terms of market cap prior to deal announcement, as compared to firms in the other two outcomes, in particular firms in the 73 terminated deals.
[31] We also find that both the acquirers' and targets' standard deviations of stock returns are lower for deals that are completed, than those for terminated deals.
[32] There is evidence that corporate insiders learn and update their knowledge from the market about merger prospects after the announcement of initial agreement (e.g., Luo 2003). Thus our above results based on variables obtained between

We also examine the impact of target and acquirer TFs on the outcome of initial contract. The impact of the TFs is marginal, with only the coefficient on the acquirer TF dummy variable to be significant at the 10% level.[33] The insignificance of TFs on merger outcomes, after controlling for other factors, indicate *efficient contracting* between target and acquirers, in that in deals where holdup problems are expected to be severe but can be solved by the design of contracts TFs are indeed included in the initial agreements.

Finally, notice that in Table 3 our empirical model explains the "renegotiated" outcome better than it does with the "terminated" outcome, in terms of predicted probabilities. One reason for lower predicted probability for termination is the role of exogenous factors outside of the merger parties. Table 3 also presents another interesting pattern: most of the factors that (statistically) significantly affect deal outcome flow from the target side (competing bid, standard deviation and cumulative abnormal returns after the announcement of deal) rather than the acquirer side.

Table 4 further explores these two issues, with information on 83 terminated deals collected by hand-collecting data from various online news agencies. First, the three most common reasons for terminations all occur after the announcement of initial agreement: adverse price changes or news (about target and/or acquirer), competing bids for the target, and exogenous factors such as ruling by court or regulation agency. More importantly, the results are consistent with model predictions on how TF clauses should be implemented. For example, when the target has competing bids higher than the offer from the acquirer, she initiates termination (in 15 out of 15 cases) and in 12 of the 15 cases the target TF was paid by the winning bidder, who, without the TF, can (partially) free-ride on the acquirer's deal-specific effort aiming at increasing the synergy and thus also improving target

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announcement dates of initial agreement to completion/termination are consistent with our model prediction that renegotiation leads to ex post efficient outcome in mergers.

[33] In addition, the coefficient on FEXC for the outcome "Terminated" is positive and significant in both models, suggesting that the inclusion of a FEX collar in the initial contract makes it more likely for the deal to be terminated. Similarly, the coefficient on FPC for the outcome "Renegotiated" is significantly positive, suggesting that a FP collar increases the likelihood of renegotiation of the initial contract (e.g., Officer 2004).

performance. On the other hand, when the deal is struck down by a court or a regulator, in most cases (6 out of 8) both sides agree to terminate the deal and in some cases the TFs are waived.

Insert Tables 4, 5-A, and 5-B here.

We next examine renegotiation and target TFs more carefully, and the results are presented in Tables 5-A and 5-B. First, Table 5-A summarizes the reasons of renegotiation as announced by the firms or observed in the amended, final merger agreements. Similar to Table 4, most of the news collected here occurs *after* the announcement of the initial agreement, and similar reasons lead to parties renegotiating terms of initial contract. Finally, 90% of the renegotiated deals are completed.

Due to the small sample of renegotiated deals, we do not perform any regression analysis, but Table 5-B provides a simple test for hypothesis H1. Recall that the optimal contract in the model allows for renegotiation that will lead to ex post efficient outcome at the time of deal completion/termination. Specifically, the merger is ex post efficient if $V \geq W$, where V (W) is the *updated* value of synergy (target's non-merger alternative) during the renegotiation period. Since the final, total offer price is the total payment that the acquirer is willing to pay the target to complete the merger, it is a reasonable measure for the (lower bound of) updated value of merger synergy. To measure target's non-merger alternative, we use the *maximum* of target's market value at the time of merger completion or termination and the highest competing outside bid (if available) at the same time. According to our model, if the offer price is greater (smaller) than the target's non-merger alternative, then these two firms should complete (terminate) the merger, and the merger decision is ex post efficient.[34]

From Table 5-B, in 82 out of the 96 deals we observe $V \geq W$ by our own procedure. For these deals the model predicts that all of them should be completed as a result of ex post efficient

[34] Finally, in our model V (W) is net of the sum of the two firms' combined stand alone values (target's stand alone value) prior to the announcement of the initial agreement, while in the empirical tests we use gross values for V and W that can be obtained by a change of variable and consistent with the model notations.

renegotiation outcome. In fact, 77 of the 82 deals are indeed completed, suggesting that our model prediction has an accuracy of 94%.[35] In the rest of the 14 deals we have $V < W$, and according to our model all of them should be terminated to ensure efficiency. However, only 4 of them are actually terminated while the rest are completed. The lower accuracy (29%) of model prediction when $V < W$ can be explained by measurement errors in V.[36] Overall, for our sample of 96 renegotiated deals, our model correctly predicts the final outcome in 81 deals, an accuracy of 84%.[37] These results provide some evidence for hypothesis H1.

Next, we examine the determinants of the use of target and acquirer TFs and acquirer lockups in the initial contract. We first perform logistic regressions in which the dependent variable is whether a single contract feature is used in initial agreement in Table 6: results on target TFs (acquirer TFs) are reported in columns 1 and 2 (columns 5 and 6), while results on acquirer lockups are shown in columns 3 and 4. We include two measures for the acquirer's CEO, his tenure and whether he is on the Board of Directors, in Table 6. Since these two variables significantly decrease sample size we present additional regressions including these two variables and they also serve as robustness tests.

In Table 6, since the dependent variable is whether a contract feature is used or not for the target or the acquirer, we implicitly assume that these contract features are determined separately. However, it is reasonable to expect that in some cases these contract features are determined *jointly* for the same firm and/or between the two firms. Accordingly, we perform *multinomial* logit tests: First, we examine the joint determination of target TF and acquirer lockup as devices solving target's holdup problem (Table 7); second, in deals where the holdup problem exists on both sides target and

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[35] Moreover, among the 5 deals that were terminated but are predicted to be completed by our model, three of them were terminated due to non-valuation reasons.

[36] Notice our measure is the lower bound for V, but in order to examine the efficiency of termination decision we need to know the upper bound (or the average) for V and determine if it is less than W.

[37] Details of the calculation and description of each of the 96 renegotiated deals are available from the authors upon request. We are also in the process of incorporating information from all the *terminated* (without renegotiation deals, 77 of them) to verify whether $V < W$ in these deals.

acquirer TFs are determined jointly (Table 8).[38]

Insert Tables 6, 7, and 8 here.

First, both the acquirer's market cap (A-LMV) and target's market cap (T-LMV) have a significant impact on the use of TFs and lockups. From Table 6 we can see that the target TF is significantly more likely to be used if the size of the acquirer's market cap increases (columns 1 and 2), and the same is true for acquirer lockup (columns 3 and 4), while the opposite is true for the use an *acquirer* TF (columns 5 and 6). Moreover, in column 1 of Table 7, acquirer market cap has a significant positive impact on the *joint use* of target TF *and* acquirer lockup compared to deals where none of these devices is used. Finally, in Table 8, where the default group is deals with only the target TF is used, we can see that as the acquirer market cap increases target TF is more likely to be included while the acquirer TF is much less likely to be used. On the other hand, from columns 5 and 6 (3 and 4) of Table 6 we observe a significantly positive relation between target's market cap and the use of an *acquirer* TF, while it does not affect the use of target TF or acquirer lockup. Similar results can be seen from Tables 7 and 8.

Second, acquirer's return to assets (A-ROA, industry adjusted) prior to initial merger announcement has similar effects on contract features as acquirer's market cap: with higher acquirer ROA, either a target TF (columns 1 and 2 of Table 6) or an acquirer lockup (columns 3 and 4 in Table 6), or both (column 1 in Table 7) will be used. Third, when cash is used as part of the method of payment (CASH is a dummy variable), a target TF is more likely to be used while the opposite is true for the acquirer TF (columns 1 and 5 in Table 6, and both columns in Table 8).

To summarize the above results, when the acquirer is larger, has better (prior) performance, and offers cash for the target stock, all of which imply better prospects in the merger, the target's incentive to holdup the acquirer and to demand more during bargaining also becomes stronger. To

[38] Bates and Lemmon (2003) and Officer (2003) examine target and acquirer TFs separately and find similar results as ours, but they do not examine them jointly.

solve the target's holdup problem and induce optimal acquirer's effort, a target TF is used more frequently, while the opposite is true for an acquirer TF, as he is the one who has a lot to lose during bargaining. The above empirical results provide support for the model and hypothesis H2.

There are additional measures for the degree of holdup problem that affect the use of TFs and lockups. First, similar to the findings of Officer (2003), Bates and Lemmon (2003), and Burch (2001), the acquirer' toehold has a significantly negative impact on the probability of using target TF and acquirer lockup, both separately and jointly (Tables 6-8). As discussed above, a toehold, a target TF, and an acquirer lockup are all "substitutes" for solving the holdup problem on the *target* side. With a higher toehold, the acquirer enjoys more of any appreciation in the target's equity, even if the target does not merge with the acquirer, and thus the need for a target TF or acquirer lockup decreases. Consistent with this argument, acquirer's toehold has no significant impact on the use of an acquirer TF (columns 5 and 6 in Table 6, and column 2 in Table 8).

Second, there is a negative relation between the variable "APastDeals" and the use of target TF (Tables 6-8), while a positive relation exists between the variable "ACEOonBoard" and target TF (column 2 in Table 6). When the acquirer has *successfully* acquired more firms during the 3-year window prior to the current merger (an increase in "APastDeals"), he will be better at applying what his current due diligence effort produces to similar task in future deals, regardless of the outcome of the current deal. His ability to "transfer" his current effort to future deals makes his effort in the current merger less deal specific, and also reduces the degree of target's holdup problem. Consistent with our model the target TF is less likely to be used.[39] On the other hand, when the acquiring firm's CEO also sits on the Board of Directors ("ACEOonBoard" equals to 1), the target knows that the more she can gain from bargaining with the acquirer CEO the more she can also gain from the

[39] We also observe a negative relation between APastDeals and the use of acquirer TF (columns 5 and 6 in Table 6). A more successful acquirer in the M&A market probably cares more about his reputation as being good at turning around troubled target firms, and is less likely to holdup the current target firm.

acquiring firm, as an agreement with the CEO implies a high probability of approval from the acquirer's Board and shareholders. This leads to a stronger target incentive to bargain and thus a more severe holdup problem, and accordingly the target TF is more likely to be used.[40]

From Table 6, we also observe a strong negative relation between the use of target TFs and acquirer lockups, which suggest that these two devices are substitutes in solving the target's holdup problem. This substitution effect between the two devices is especially strong for bank mergers, as will be further discussed below. In column 1 of Table 7, we find that acquirer's market cap (A-LMV) and return to assets (A-ROA) to be significant (1% level) predictors for the outcome of both a target TF and an acquirer lockup being used (compared to deals in which none is used), while the impact of these factors on the deals in which only one device is used (columns 2 and 3) is less significant. These results indicate that in deals where the *target's* holdup problem is severe and there is (possibly) an upper bound on the use of target TFs, both devices are used and the acquirer lockup actually *complements* the use of target TF to solve the holdup problem.

Finally, we also find that an important factor in determining whether target TF is used is whether the target belongs to the banking industry. Interestingly, the TBANK dummy has the exact opposite impact on the use of acquirer lockup in both Tables 6 and 7. Due to the Glass-Steagal Act of 1934, commercial banks can only merge with other commercial banks or financial services companies such as insurance companies in order to form a financial holding company. These regulations imply that commercial banks face a very different set of merging partners from non-banking firms.[41] More importantly, target and acquirer TFs (acquirer lockup) are much less (more) frequently used in bank mergers than non-bank mergers: In 55% of bank mergers an acquirer lockup is used, while in only

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[40] Since we rule out agency problem as a reason for the use of TFs, a more powerful acquirer CEO (being on board) is more likely to get approval from the Board and the firm for the pending merger deal, and is thus less likely to holdup the target.

[41] We confirm this conjecture empirically (results not reported) by grouping all the targets that belong to the commercial banking industry (with the first two digits of SIC codes being 60 or 61). We find that in most of the deals (over 80%) the merger is either between commercial banks, or between insurance companies, or trading companies.

33% of bank mergers a target TF is used. By contrast, 69% of non-bank mergers have target TFs while only 23% of them use acquirer lockups. As discussed above, under regulatory capital requirements, committing to large amount of cash TFs can be costly for commercial and savings banks (as targets or acquirers), as it tends to constrain the banks' cash flow flexibility. In this regard, stock lockups offer a non-cash alternative to solve the holdup problem during a bank merger. In these cases an acquirer lockup is a *substitute* for the use of a target TF.

Our final empirical test is to examine factors determine the size of the optimal target TFs (hypothesis H4), which again is not performed in previous papers. We use the percentage target TF (over initially announced deal size) as the dependent variable. We present results from both an OLS model and a Tobit model (to control for the potential selection bias problem) performed on the whole sample of 1122 deals in the first two columns of Table 9. We then perform the same tests on a smaller sample of deals that have information on acquirers' CEOs in columns 3 and 4.

Insert Table 9 here.

First, when the acquirer's size/market cap (A-LMV) or his return to assets (A-ROA, industry-adjusted) prior to merger increases, the size of the target TF also increases.[42] Both of these acquirer characteristics proxy for his productivity and importance in determining the expected merger synergy, or the parameter l_A in the model. Second, there is a negative (positive) relation between "APastDeals" ("TIntangible") and the size of target TF. As discussed earlier, a more experienced and successful acquirer in the M&A market faces a less severe holdup problem from the current target firm, as his effort is less deal-specific. Thus the size of the target TF is smaller. On the other hand his effort becomes more deal specific when the target has more intangible assets, and thus the size of the target TF is larger.

[42] Not surprisingly, we find that as the deal size increases the target TF as a percentage of deal size decreases (significant in 3 of 4 models in Table 9). Since deal size is highly correlated with target's market value we do not include the latter in the regressions.

Third, we find that when the target has lower, industry-adjusted leverage (T-LEV), or when the acquirer offers higher premium over target value at the announcement date of the initial agreement, the size of the target TF decreases. Higher premium offered by the acquirer implies better potentials for the target going forward despite her poor performance leading up to the merger, while it is well known in the takeover literature that a low-leverage firm is more likely to become a target in M&As and attract more potential bidders. Thus these measures proxy for a higher $\overline{\varpi}$ or h_T in our model, and we observe that empirically the target TF decreases with these measures. All of the above results provide direct support of our model's comparative statics and hypothesis H4.

Finally, both the acquirer' toehold and lockup have a negative impact on the size of the target TF. With a higher toehold, the acquirer enjoys more of any appreciation in the target's equity, even if the target does not merge with the acquirer, so the holdup problem on the target side becomes less severe. On the other hand the lockup option can be regarded as a reward from the target to the acquirer for his deal-specific effort and can serve as a (partial) substitute for target TF, especially in cases where there is an additional cost in using target TF (e.g., an upper bound). Therefore we observe the negative relations between these two variables and the target TF.

Before we close this section, we briefly examine the determinants for the size of acquirer's TF, similar to what we do in Table 9 (while results are not reported in paper, they are available upon request from us). Extending our model that focuses on target TF, we can draw a similar conclusion that when the target also contributes to the merger synergy there is also a holdup problem on the acquirer side. In this regard, we find that when the target's market cap is larger or when the acquirer's market cap is smaller, both of which imply a relatively higher degree of holdup problem on the acquirer side, the size of the acquirer TF increases.

We also find that when the acquirer's stock is more risky (higher A-RETSD), offers the target a lower initial premium, and has a smaller toehold, the acquirer's TF is higher. These variables proxy for a less promising merger prospect and raise the degree of acquirer's holdup problem. Accordingly, the acquirer TF is higher to protect the *target's* incentive to provide effort to improve merger synergy.[43] Overall our results on acquirer TFs are consistent with our model and hypothesis H3.

VI. Summary and Conclusion

Our paper is the first to utilize the incomplete contract framework to examine renegotiation and the holdup problem in mergers. We first develop a model and demonstrate that the signing of an initial contract can solve the holdup problem and induce higher deal-specific efforts that will increase the expected synergy of the merger. This contract grants the target a call option to withdraw from the merger, while the strike price on the call option can be interpreted as the "termination fee" paid by the target firm. The optimal target termination fee compensates the acquirer's deal-specific effort, without imposing excessive costs on the target for pursuing non-merger alternatives.

Using a large sample of stocks swaps from 1994 to 1999, we also find empirical evidence supporting our model predictions. First, termination fees are used more frequently on the target side than on the acquirer side because the holdup problem on the target side is more severe. Second, in addition to target termination fees, acquirer lockup options and toeholds can also solve the holdup problem on the target side. Third, the target termination fee increases when measures of acquirer's deal specific effort increase, but it decreases when measures of the target firm's non-merger alternatives increase. Finally, we find that renegotiation following the signing of initial merger agreement ensures that merger decisions are ex post efficient.

[43] We also find that in the 242 deals in which TFs are used on both the target and the acquirer (most of which are non-bank mergers). The TFs on both sides are the same for the majority of the deals, in which the targets are on average comparable to acquirers in size, suggesting comparable degrees of holdup problems on both sides. In the rest of the deals the acquirer TF is strictly less than that of target TF. In these deals the targets are on average smaller than those in the first group while the size differential between acquirers and targets is higher, all of which implies a more severe degree of holdup problem on the target side.

Appendix A

A.1 Efforts in First Best of the Benchmark Model: *The First Best efforts are,*

$$e_A^{FB} = \frac{l_A(c\overline{\theta} - 2h_T^2)}{2c(c\overline{\omega} - h_T^2 - l_A^2)}, \qquad \text{and} \qquad e_T^{FB} = \frac{h_T\left(2c\overline{\omega} - c\overline{\theta} - 2l_A^2\right)}{2c(c\overline{\omega} - l_A^2 - h_T^2)}.$$

Moreover, $\frac{\partial e_A^{FB}}{\partial l_A} > 0$, $\frac{\partial e_A^{FB}}{\partial \overline{\theta}} > 0$, $\frac{\partial e_A^{FB}}{\partial \overline{\omega}} < 0$; and $\frac{\partial e_T^{FB}}{\partial h_T} > 0$, $\frac{\partial e_T^{FB}}{\partial \overline{\theta}} < 0$, $\frac{\partial e_T^{FB}}{\partial \overline{\omega}} > 0$.

Proof: The problem of the acquirer and the target at date 0 is to design a contract that implements efficient efforts that maximizes expected total surplus:

$$W^{FB} \equiv \underset{(e_A,e_T)}{Max}\, EU = \underset{(e_A,e_T)}{Max}\left[\iint_{\theta\omega} \max[V(e_A,\theta), W(e_T,\omega)]dG(\omega)dF(\theta) - C(e_A) - C(e_T)\right]$$

$$EU = \int_{\theta}\left[\int_{0}^{\omega^*(e)} [V(e_A,\theta)]dG(\omega) + \int_{\varpi^*(e)}^{\overline{\varpi}} WdG(\omega)\right]dF(\theta) - c(e_A) - c(e_T)$$

$$\textit{where} \quad W^*(e_T,\omega) = V(e_A,\theta) \Rightarrow \omega^*(e_T) = V(e_A,\theta) - h_T e_T.$$

Given Assumptions 1-3, we have:

$$EU = \frac{\overline{\varpi}}{2} + h_T e_T + \frac{(l_A e_A - h_T e_T)^2 + (l_A e_A - h_T e_T)\overline{\theta}}{2\overline{\varpi}} + \frac{\overline{\theta}^2}{6\overline{\varpi}} - \frac{1}{2}ce_T{}^2 - \frac{1}{2}ce_A{}^2.$$

The optimal effort levels under first-best situation are:

$$e_T^{FB} = \frac{h_T\left(2c\overline{\omega} - c\overline{\theta} - 2l_A^2\right)}{2c(c\overline{\omega} - h_T^2 - l_A^2)}, \quad e_A^{FB} = \frac{l_A(c\overline{\theta} - 2h_T^2)}{2c(c\overline{\omega} - h_T^2 - l_A^2)}.$$

The following comparative statics on optimal effort levels are obtained based on Assumption 4:

$\frac{\partial e_T}{\partial l_A} \propto 4cl_A h_T \cdot (2h_T^2 - c\overline{\theta}) < 0$; $\frac{\partial e_T}{\partial h_T} \propto (c\overline{\varpi} - l_A^2 + h_T^2)\cdot(2c\overline{\varpi} - c\overline{\theta} - 2l_A^2) > 0$ if $c\overline{\varpi} > c\overline{\theta}$; and

$\frac{\partial e_T}{\partial \overline{\varpi}} \propto (c\overline{\theta} - 2h_T^2) > 0$; $\frac{\partial e_T}{\partial \overline{\theta}} \propto (-ch_T) < 0.$ ***QED***

A.2 Proof of Proposition 2

In this setting, acquirer offers target a call option to walk away from the merger and receive *W* instead, after paying a TF of *k*; the acquirer has all the residual claim (i.e., he owns the total expected surplus between the two firms, minus the value of call, and cost of effort); both sides will renegotiate after θ and ω are realized to ensure that only when $V > W$ will the merger occur ex post (that is, there will be ex post lump sum transfers to make sure that this is the case).

The expected utilities of the acquirer and the target are given by:

$$EU_A = \iint_{\theta\omega} \max[\mathrm{V}(\mathrm{e_A},\theta), \mathrm{W}]dG(\omega)dF(\theta) - \int_{\omega}[W(e_T,\omega) - k, p_0]dG(\omega) - c(e_A),$$

$$EU_T = \int_{\omega} \max[W(e_T,\omega) - k, p_0]dG(\omega) - c(e_T).$$

If we redefine $V - p_0$ as $\widetilde{V}$, and redefine $W - p_0$ as $\widetilde{W}$, then:

$$EU_A = \iint_{\theta\omega} \max[\widetilde{V}, \widetilde{W}]dG(\omega)dF(\theta) - \int_{\omega} [\widetilde{W} - k, 0]dG(\omega) - c(e_A)$$
$$EU_T = \int_{\omega} [\widetilde{W} - k, 0]dG(\omega) - c(e_T) + p_0.$$

Since the newly defined $\widetilde{V}$ and $\widetilde{W}$ are simply linear transformation from *V* and *W*, they should take the same functional forms as *V* and *W* (specified in Assumption 2). For simplicity, we drop the notation "~" from $\widetilde{V}$ and $\widetilde{W}$ in the following proofs, while we keep the original definition for *V* and *W* in the main text. Given an option contract p_0 and k, the target chooses e_T to solve

$$\underset{e_T}{Max}\left[\int_{\omega} \max[W(e_T, \omega) - k, 0]dG(\omega) - C(e_T) + p_0\right].$$

The solution to the above problem is $e_T^{call} = \frac{(\overline{\varpi} - k)h_T}{c\overline{\varpi} - h_T^2}$. By setting $e_T^{call} = e_T^{FB}$, we can solve for *k*,

$$k^* = \frac{\overline{\theta}}{2} + \frac{l_A^2(c\overline{\theta} - 2h_T^2)}{2c(c\overline{\varpi} - h_T^2 - l_A^2)}.$$

And since the first-order condition with respect to e_A is the same as that in first-best situation, the acquirer's optimal effort level in the second-best situation, e_A^{call}, is the same as e_A^{FB}. Therefore,

$$e_A^{call} = \frac{l_A(c\overline{\theta} - 2h_T^2)}{2c(c\overline{\varpi} - h_T^2 - l_A^2)}.$$

Thus, first-best effort levels are achievable in the second-best situation by properly choosing the strike price of the call option (termination fee), k^*.

A.3 Proof of Corollaries 2 and 3

The following comparative statics on optimal termination fee are obtained based on Assumption 4:

$\frac{\partial k^*}{\partial \overline{\theta}} \propto 2c^2(c\overline{\varpi} - h_T^2 - l_A^2)(c\overline{\varpi} - h_T^2) > 0$; $\frac{\partial k^*}{\partial l_A} \propto 4cl_A(c\overline{\theta} - 2h_T^2)(c\overline{\varpi} - h_T^2) > 0$;

$\frac{\partial k^*}{\partial \overline{\varpi}} \propto -2c^2 l_A^2(c\overline{\theta} - 2h_T^2) < 0$; $\frac{\partial k^*}{\partial h_T} \propto c \cdot l_A^2 \cdot h_T(c\overline{\theta} - 2(c\overline{\varpi} - l_A^2)) < 0$, if $c\overline{\theta} < 2(c\overline{\varpi} - l_A^2)$. ***QED***

Appendix B: Effort choices and merger outcome *without* ex ante contract

B.1 Efforts are "selfish"

For a given realization of state variable θ and ω, the following is known: Total gain: $\max[V, W]$. Assume target gets α sharing of the total gain and acquirer gets the rest, 1-α :

Target receives: $\alpha \cdot \max[V, W]$, and Acquirer receives: $(1-\alpha) \cdot \max[V, W]$.

Target solves the following problem by choosing e_T,

$$U_T \equiv \underset{e_T}{Max}\left[\iint_{\theta\omega}\alpha\cdot\max[V(e_A,\theta),W(e_T,\omega)]dG(\omega)dF(\theta)-C(e_T)\right],\text{ and}$$

the acquirer solves the following problem by choosing e_A,

$$U_A \equiv \underset{e_A}{Max}\left[\iint_{\theta\omega}(1-\alpha)\cdot\max[V(e_A,\theta),W(e_T,\omega)]dG(\omega)dF(\theta)-C(e_A)\right].$$

By taking the first-order condition with respect to e_T and e_A separately, we obtain, in the Nash Equilibrium:

$$e_T^{NC}=\frac{h_T(2c\overline{\varpi}-c\overline{\theta}-l_A^2)}{2c(2c\overline{\varpi}-h_T^2-l_A^2)}\text{ and }e_A^{NC}=\frac{l_A(c\overline{\theta}-h_T^2)}{2c(2c\overline{\varpi}-h_T^2-l_A^2)}.$$

Comparison of effort levels between no contract and First best:

$$e_A^{FB}-e_A^{NC}=\frac{l_A(c^2\overline{\theta}\overline{\varpi}+h_T^2(l_A^2+h_T^2-3c\overline{\varpi}))}{2c(2c\overline{\varpi}-h_T^2-l_A^2)(c\overline{\varpi}-h_T^2-l_A^2)}>0 \quad\text{if}\quad c\overline{\theta}>(3-\frac{h_T^2+l_A^2}{c\overline{\varpi}})h_T^2,$$

$$e_T^{FB}-e_T^{NC}=\frac{h_T(l_A^4+c\overline{\varpi}(2c\overline{\varpi}-c\overline{\theta}-3l_A^2)+h_T^2l_A^2)}{2c(2c\overline{\varpi}-h_T^2-l_A^2)(c\overline{\varpi}-h_T^2-l_A^2)}>0 \quad\text{if}\quad 2c\overline{\varpi}-c\overline{\theta}>(3-\frac{h_T^2+l_A^2}{c\overline{\varpi}})l_A^2.$$

Since call option contract can induce first best effort, the optimal effort levels in call option contract (same as those in FB) are higher than those in no ex ante contract situation.

B.2 Acquirer's effort is cooperative

Following the same setup in B.1, the target now solves the following problem by choosing e_T,

$$U_T \equiv \underset{e_T}{Max}\left[\iint_{\theta\omega}\alpha\cdot\max[V(e_A,\theta),W(e_A,e_T,\omega)]dG(\omega)dF(\theta)-C(e_T)\right]$$

and acquirer solves the following problem by choosing e_A,

$$U_A \equiv \underset{e_A}{Max}\left[\iint_{\theta\omega}(1-\alpha)\cdot\max[V(e_A,\theta),W(e_A,e_T,\omega)]dG(\omega)dF(\theta)-C(e_A)\right]$$

By taking the first-order condition with respect to e_T and e_A separately, we obtain the solutions, and the expected total surplus based on the optimal effort levels under no contract can be found.

Next, to compare *optimal effort levels* from First Best and Call Option Contract, by Assumption 6 we can show that $e_A^{FB}-e_A^{call}>0$, and $e_T^{FB}-e_T^{call}>0$. Finally, to compare the *Total Surplus* from three different scenarios (First Best, Call Option Contract, and No Contract at all), we have W_C^{FB} - $W_C^{call}>0$ holds for any $h_A>0$. This means that the total surplus under the call option contract with cooperative effort is strictly less than the first best outcome. Similarly we can show that W_C^{NC} - $W_C^{call}>0$.

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Table 1 Description of Initial Merger Contracts

This table presents the distribution of our sample of stock swap mergers from 1994 to 1999, and the sub-samples for each of the four offer types (FEX is fixed exchange ratio offer; FP is fixed payment offer; FEXC is fixed exchange ratio offer plus a collar; and FPC is fixed payment offer plus a collar), as well as sub-samples of deals that includes the target TF or the acquirer TF. A merger in which "cash is used" means cash is part of the method of payment offered to the target.

Distribution of stock mergers 1994 - 1999

Ann. Year	*# of deals announced*	Number of Stock Swap Merger Deals (percentage of total)							
		Cash is Used	*Stock Offer Types*				*Termination Fees*		Acquirer Lockup
			FEX	FP	FEXC	FPC	Target TF	Acquirer TF	
1994	124	26	63	12	26	23	55	13	33
1995	151	22	95	14	18	24	63	25	42
1996	151	38	89	15	24	23	58	35	31
1997	225	55	145	20	21	39	136	55	94
1998	254	65	172	20	21	41	168	64	106
1999	217	68	137	8	20	52	139	50	89
Total	1122	274 (0.244)	701 (0.62)	89 (0.08)	130 (0.12)	202 (0.18)	619 (0.552)	242 (0.216)	395 (0.352)

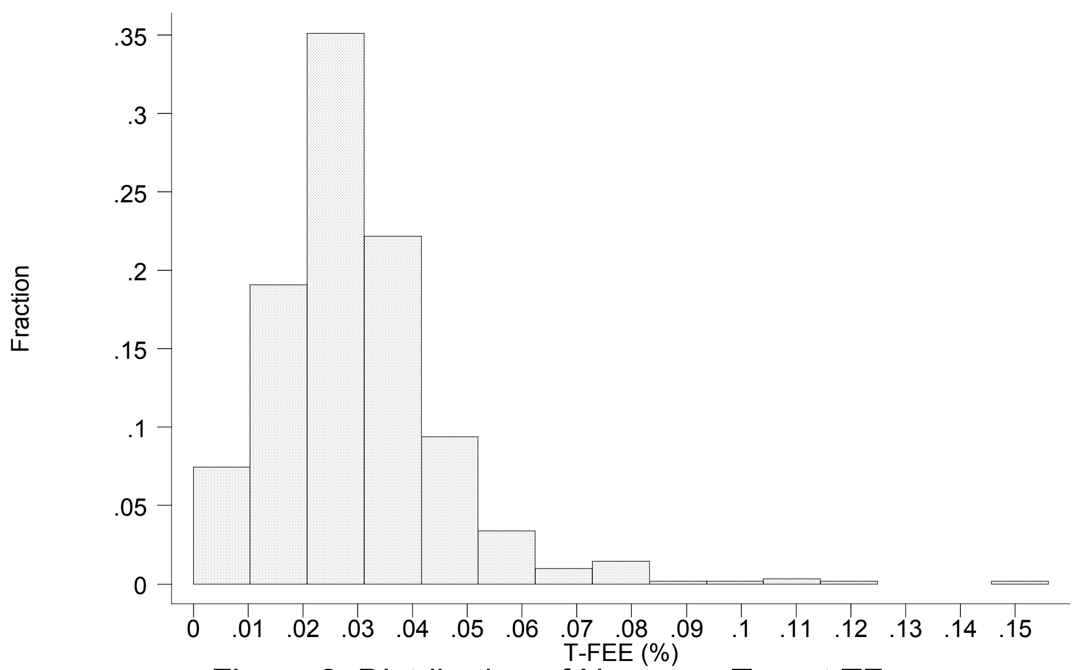

Figure 2: Distribution of Non-zero Target TF

Table 2 Summary Statistics for Stock Merger Deals

This table presents summary statistics of our sample of stock swap mergers from 1994 to 1999 grouped by whether there is termination fee clause or acquirer lockup option in the definitive agreement (1: there are termination fees on both acquirer and target; 2: there is termination fee on target side only; 3: there is no termination fee; 4: there is acquirer lockup option; 5: there is no acquirer lockup option). A-TF (T-TF) is the amount of termination fee on acquirer side (target side), measured in $ millions. "Duration" measures the number of days between the signing of definitive merger agreement to deal completion or deal withdrawal. "Toehold" is a continuous variable measuring the acquirer's percentage holding of target shares prior to merger announcement. A-MV (T-MV) is the acquirer's (target's) market value of equity, measured in $ millions from Compustat data items. A-ASSET (T-ASSET) is the acquirer's (target's) total asset, measured in $ millions. A-B/M (T-B/M) is industry-adjusted book-to-market ratio for acquirer (target). A-ROA (T-ROA) is return on asset prior to merger announcement for acquirer (target). A-LEV (T-LEV) is industry-adjusted leverage ratio (long-term debt/book assets) for acquirer (target). All the accounting data is taken from Compustat for the fiscal year prior to definitive merger agreement date.

	Stats	A-TF ($ mil)	T-TF ($ mil)	Duration (days)	Toehold	A-MV ($ mil)	T-MV ($ mil)	A-B/M	T-B/M	A-ROA	T-ROA	A-LEV	T-LEV
Panel A: Sorting the deals by Termination Fees													
1. TFs On Both Sides (N = 242)	Mean Median	97.25 15.50	98.80 20.00	176 133	0.006 0	7,252 1,206	2,800 511	-0.046 -0.072	0.045 0.016	0.016 0.006	-0.014 0.003	0.187 –0.001	0.191 0.011
2. Target TF Only (N = 377)	Mean Median	--	27.41 8.00	144 120	0.007 0	9,826 1,811	636 172	-0.096 -0.116	0.068 0.008	0.040 0.015	-0.019 0.008	0.165 0.013	0.273 0.009
3. No TFs (N = 503)	Mean Median	--	--	173 157	0.029 0	5,671 1,088	934 109	-0.065 -0.103	0.023 -0.028	-0.002 0.001	-0.012 0.001	0.264 0.073	0.284 0.025
Full Sample (N=1122)	Mean Median	20.99 0	30.51 1.20	164 137	0.017 0	7,402 1,276	1,235 172	-0.072 -0.100	0.043 -0.008	0.016 0.003	-0.015 0.002	0.214 0.032	0.261 0.013
Panel B: Sorting the deals by (acquirer) Lockup Options													
4. With Lockup (N = 395)	Mean Median	--	--	167 156	0.001 0	11,658 1,864	1,444 216	-0.113 -0.131	-0.016 -0.039	0.033 0.002	0.007 0.001	0.271 0.040	0.278 0.022
5. No Lockup (N=727)	Mean Median	--	--	162 129	0.025 0	5,095 1,033	1,121 146	-0.049 -0.078	0.074 0.008	0.007 0.004	-0.027 0.003	0.184 0.028	0.251 0.008

Table 3 Determinants of Deal Outcome Following the Signing of Initial Agreement

This table presents multinomial logistic regression results. The dependent variable represents the choice among three possible outcomes following the announcement of initial agreement: "Completed as initially contracted" (default outcome), "Terminated without renegotiation" or "Renegotiated."

LRSIZE is the log value of ASIZE/TSIZE. SSIC3 is a dummy variable that equals to 1 if the 1st 3 digits of the acquirer's SIC code are the same of that of the target. CORR is the correlation of the monthly stock returns of acquirer and target during the 24-month period ending one month prior to the deal announcement month. APastDeals is the number of successful acquisitions that the acquirer has made in the 3-year period prior to the announcement of the current deal. COMPETE is a dummy variable equal to one if there is at least one competing bidder for the same target after the deal announcement and before the deal completion or deal withdrawn. CASHPCT is a continuous variable that is the cash portion of payment as a percentage of the whole deal value. ARETSD-post (TRETSD-post) is the acquirer's (target's) daily stock return standard deviation for a period of 3 months starting 30 days after the definitive agreement date. A-CAR (T-CAR) is acquirer's (target's) cumulative abnormal returns between the initial agreement date and completion date, withdrawn date or effective date. A-TF (T-TF) is a dummy variable equal to one if there is acquirer (target) TF clause in the agreement. All other variables are defined in previous tables. Robust t-stats are in parenthesis.

	Terminated (N=73)	**Renegotiated** (N=94)
Constant	-3.711 (7.29)***	-2.631 (6.63)***
LRSIZE	-0.621 (4.42)***	-0.028 (0.30)
SSIC3	0.303 (1.01)	-0.224 (0.94)
CORR	0.543 (0.98)	-0.013 (0.03)
A-B/M	0.264 (0.49)	-0.020 (0.04)
T-B/M	-0.534 (1.40)	0.154 (0.53)
APastDeals	-0.043 (0.45)	-0.126 (1.57)
TOEHOLD	-15.474 (0.65)	-0.260 (0.25)
PCTCASH	-1.257 (1.10)	1.080 (1.72)*
PREMIUM	0.337 (0.70)	-0.119 (0.30)
COMPETE	2.959 (5.68)***	2.596 (5.79)***
ARETSD-post	13.409 (1.55)	2.253 (0.26)
TRETSD-post	27.990 (3.77)***	16.284 (2.19)**
A-CAR	0.825 (1.50)	0.349 (0.75)
T-CAR	-2.947 (5.94)***	-1.183 (2.86)***
FEXC	1.035 (2.44)**	0.424 (1.16)
FPC	0.417 (0.94)	0.586 (1.98)**
A-TF	-0.690 (1.72)*	-0.142 (0.40)
T-TF	0.487 (1.37)	-0.169 (0.59)
Predicted Prob.	0.0265	0.0827
(N = 962, pseudo R^2 = 0.192) Wald Chi2(36) = 206.22, Prob > Chi2 = 0.000		

***, **, *: significant at the 1%, 5%, or 10% level, respectively.

Table 4 Reasons for Terminations

This table examines the main reasons for termination of a merger deal. The number of deals with target TF in initial merger agreement, and the number of deals with both target and acquirer TFs, and whether the TF was paid upon termination are also reported. (*No. of deals terminated = 83 or 7.4% of total deals.*)

Reasons for Termination	Fre-quency	Who initiated termination	# of deals with T-TF in initial agreement	# deals with T-TF & A-TF in initial agreement	TF paid or not upon termination
1. Price changes or A's price reached termination range	9	A: 2, T: 2; Mutual: 4; Unknown: 1	4	1	1 T-TF paid, 3 unknown
2. Bad news about firms	9	A: 3, T: 2; Mutual: 4	2	1	1 T-TF not paid, 1 unknown
3. Competing bid and/or T merged with other firm	15	**Target: 15**	15	6	**12 T-TF paid,** 1 T-TF not paid[a] 2 unknown
4. A or T backs off	5	A: 3, T: 2;	4	0	3 T-TF paid, 1 T-TF not paid[a]
5. Closing conditions not satisfied[b]	7	A: 2, T: 1; Mutual: 3; Unknown: 1	3	1	1 T-TF not paid, 2 unknown
6. Outside factors block merger[c]	8	Mutual: 6 Unknown: 2	6	4	1 A-TF paid, 3 T-TF & A-TF not paid, 2 unknown
7. Other reasons*	20	A: 3, T: 2; Mutual: 15	12	6	3 T-TF unpaid, 4 A-TF & T-TF not paid, 5 unknown
8. Unknown	10	A: 1, T: 3; Mutual: 3 Unknown: 3	5	3	1 T-TF paid, 1 A-TF paid, 3 unknown
Total	83	A: 14, T: 27; Mutual: 35 Unknown: 7	51	22	17 T-TF paid, 7 T-TF not paid; 2 A-TF paid, 7 both TFs not paid, 18 unknown

Notes: [a]: law suits involved A and T; [b]: reasons include shareholders' failure to approve merger; [c]: merger blocked by court or regulatory agency;
*: including tax consequences of merger; unfavorable stock market conditions; acquirer is acquired by another acquirer; potential regulation risk; market interest rate increases (acquisition becomes costly); acquirer cannot secure financing on time; personal differences between the two CEOs, etc.

Table 5-A Reasons of Renegotiations

This table lists the main reasons (and frequencies) of renegotiations on merger terms. For each reason of renegotiation, the number of deals completed and the number of deals with a collar provision. (*No. of deals with amendment = 96 or 8.55% of total deals. In 4 deals there are 2 reasons for renegotiation.*)

Reasons for renegotiation	Frequency	# of deals completed
1. Price change	16	14
2. Good or bad news about firms	25	21
3. Competing bid	15	12
4. Price moves beyond collar or reaches termination condition, if any	6	6
5. Closing conditions not satisfied (e.g., shareholders' failure to approve merger)	3	2
6. Other reasons*	12	12
7. Unknown	23	23
Total	100	90

*: including tax consequences of merger changes; acquirer is acquired by another acquirer; to increase the size of board; to avoid the scrutiny of regulators, etc.

Table 5-B Outcome of Renegotiation

This table estimates the precision of model prediction on the final outcome of the renegotiation sample. Based on the model, a merger is ex post efficient if it is completed when $V > W$ and terminated otherwise at the time of renegotiation, where V is the value of synergy and W is the value of the target's non-merger alternative. The lower bound of V is proxied by the initial offer price, while W is proxied by the maximum of target's market value and the highest outside competing bid (if any). Notice that in our model, V and W are values net of firms' stand alone assets, while in empirical tests we use the gross values that include the firms' own stand alone asset values.

Comparing values	No. of deals	No. of deals with outcome predicted by model	Precision of model prediction
$V \geq W$	82 (target TF used in 45 deals)	77 (target TF used in 40 deals)	94%
$V < W$	14 (target TF used in 5 deals)	4 (target TF used in 3 deals)	29%
Total	96	81	84%

Table 6 Logistic Tests on the Use of TFs and Lockups in Initial Contracts

This table presents Logistic regression results on the use of target TFs (Model 1 and 2), acquirer TF (Model 5 and 6) and acquirer lockups (Model 3 and 4). ALockup is a dummy variable that equals to 1 if an acquirer lockup is used. TBANK is a dummy variable that equals to 1 if target is in banking industry, CASH is dummy that equals to 1 if cash is used as method of payment. ACEOtenure is the number of years that acquirer's CEO has been in office. ACEOonBoard is a dummy variable that equals 1 if acquirer's CEO is a director of the board. All other variables are defined in previous table. Robust t-statistics are in parenthesis.

	(1)	(2)	(3)	(4)	(5)	(6)
	T-TF	**T-TF**	**ALockup**	**ALockup**	**A-TF**	**A-TF**
Constant	-1.453	-3.465	-2.975	-2.914	-5.118	-1.376
	(3.09)***	(2.58)***	(6.73)***	(2.16)**	(4.26)***	(0.87)
A-TF	5.654	4.836	-0.019	0.472	--	--
	(5.53)***	(4.42)***	(0.09)	(1.29)	--	--
T-TF	--	--	-0.394	-0.346	5.959	5.218
	--	--	(2.23)**	(1.22)	(5.70)***	(4.48)***
ALockup	-0.412	-0.370	--	--	-0.020	0.488
	(2.22)**	(1.25)	--	--	(0.09)	(1.30)
TOEHOLD	-3.554	-3.631	-9.016	-8.400	-1.775	-0.648
	(3.65)***	(1.96)*	(3.08)***	(2.98)***	(0.58)	(0.33)
PREMIUM	-0.096	-0.266	0.046	-0.306	-0.791	-1.801
	(0.30)	(0.46)	(0.18)	(0.78)	(2.21)**	(2.43)**
CASH	0.373	0.373	-0.772	-0.785	-0.428	-0.202
	(1.76)*	(1.05)	(3.90)***	(2.40)**	(2.04)**	(0.56)
TBANK	-1.108	-0.765	1.525	1.732	-0.422	-0.269
	(5.24)***	(2.09)**	(7.83)***	(4.92)***	(1.58)	(0.52)
CORR	0.035	0.197	0.614	0.719	0.358	0.680
	(0.11)	(0.38)	(2.11)**	(1.54)	(0.93)	(1.02)
ARETSD	-0.270	-3.931	0.186	1.258	-3.998	-4.366
	(0.23)	(1.57)	(0.16)	(0.71)	(1.97)**	(0.92)
TRETSD	0.385	0.469	0.106	2.023	0.669	0.502
	(0.36)	(0.34)	(0.09)	(1.10)	(0.41)	(0.16)
A-B/M	-0.031	1.739	-0.361	-0.303	0.063	-1.288
	(0.09)	(2.61)***	(0.99)	(0.42)	(0.16)	(1.28)
T-B/M	0.310	-0.218	-0.289	-0.138	0.156	0.044
	(1.40)	(0.51)	(1.30)	(0.38)	(0.54)	(0.09)
A-LMV	0.215	0.188	0.118	0.029	-0.660	-0.684
	(3.34)***	(1.68)*	(1.86)*	(0.27)	(6.23)***	(3.62)***
T-LMV	-0.073	-0.122	0.084	0.197	0.797	0.702
	(1.02)	(1.14)	(1.23)	(1.77)*	(6.98)***	(3.60)***
A-ROA	2.052	3.241	2.606	2.971	-0.351	-1.744
	(2.24)**	(1.90)*	(2.91)***	(2.01)**	(0.48)	(0.96)
T-ROA	-0.278	0.524	0.116	0.469	-1.100	-0.545
	(0.68)	(0.60)	(0.24)	(0.50)	(1.88)*	(0.45)
ALEV	0.132	-0.252	0.105	0.512	-0.017	-0.539
	(1.14)	(1.32)	(1.23)	(2.72)***	(0.16)	(1.12)
TLEV	0.096	0.256	0.089	0.054	-0.180	-0.349
	(0.91)	(1.78)*	(1.05)	(0.46)	(1.32)	(1.73)*
APastDeals	-0.139	-0.159	-0.013	-0.011	-0.187	-0.318
	(2.83)***	(2.44)**	(0.32)	(0.19)	(2.18)**	(1.95)*
ACEOtenure	--	0.019	--	0.010	--	-0.008
	--	(0.93)	--	(0.48)	--	(0.35)
ACEOonBoard	--	2.362	--	-0.742	--	-1.729
	--	(2.44)**	--	(0.73)	--	(1.83)*
Observations	1089	439	1089	439	1089	439
Pseudo R^2	0.35	0.34	0.19	0.22	0.42	0.44

***: significant at 1%, **: significant at 5%, *: significant at 10% at levels.

Table 7 Multinomial Logit Tests on Solving Target's Holdup Problem

This table presents multinomial Logistic regression results on the (joint determination) use of devices (*target* TF and acquirer lockup) to solve holdup problem on the target side. The dependent variable represents the choice among four possible combinations of devices in initial agreement: "No target TF or acquirer lockup used," the *default outcome*, "only target TFs used," or "only acquirer lockup used," and "both target TF and acquirer lockup used." ALockup is a dummy variable that equal to 1 if a lockup is used. All other variables are defined in previous table. Robust t-statistics are in parenthesis.

	1. Both T-TF and ALockup	2. T-TF only	3. ALockup Only
Constant	-4.822	-1.042	-2.787
	(6.87)***	(1.92)*	(3.82)***
A-TF	5.206	5.192	-29.769
	(5.08)***	(5.13)***	(0.00)
TOEHOLD	-14.405	-3.453	-9.924
	(1.66)*	(3.46)***	(2.33)**
PREMIUM	-0.078	-0.082	-0.009
	(0.21)	(0.27)	(0.02)
TBANK	0.284	-0.558	2.449
	(0.96)	(2.30)**	(7.47)***
SSIC3	-0.115	-0.164	-0.300
	(0.50)	(0.89)	(1.33)
CORR	0.592	0.246	1.009
	(1.27)	(0.66)	(2.17)**
APastDeals	-0.190	-0.076	0.013
	(2.56)**	(1.28)	(0.24)
CASH	-0.284	0.022	-1.726
	(1.06)	(0.11)	(4.81)***
ARETSD	0.727	-1.269	-1.015
	(0.42)	(0.86)	(0.42)
TRETSD	-0.088	0.156	-0.290
	(0.05)	(0.12)	(0.13)
A-B/M	-0.212	-0.511	-1.505
	(0.40)	(1.27)	(2.54)**
T-B/M	0.025	0.430	-0.090
	(0.07)	(1.79)*	(0.23)
A-LMV	0.357	0.106	-0.034
	(3.76)***	(1.37)	(0.35)
T-LMV	-0.004	-0.031	0.121
	(0.04)	(0.36)	(1.19)
A-ROA	4.539	1.399	0.520
	(3.99)***	(1.89)*	(0.45)
T-ROA	-0.134	-0.229	1.372
	(0.20)	(0.46)	(1.13)
A-LEV	0.358	0.348	0.408
	(1.69)*	(1.79)*	(2.11)**
T-LEV	0.202	0.138	0.108
	(1.31)	(1.17)	(0.88)
N = 1088, pseudo R^2 = 0.289; LR chi2(57) = 835.88, Prob > chi2 = 0.0000.			

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8 Multinomial Logit Tests on Solving Holdup Problems of *Both* Targets and Acquirers

This table presents multinomial Logistic regression results on the (joint determination) use of target *and* acquirer TFs. The dependent variable represents the choice among three possible TF combinations in initial agreement: "TFs used on the target side only," *the default outcome*, "No TFs used on either side," or "TFs used in both target and acquirer." ALockup is a dummy variable that equal to 1 if a lockup is used. All other variables are defined in previous tables. Robust t-statistics are in parenthesis.

	1. Neither T-TF or A-TF	**2. Both A-TF and T-TF**
Constant	1.443	0.392
	(3.10)***	(0.71)
ALockup	0.478	0.044
	(2.62)***	(0.20)
TOEHOLD	3.722	-1.643
	(3.56)***	(0.92)
PREMIUM	0.101	-0.585
	(0.38)	(1.68)*
TBANK	1.145	-0.333
	(5.61)***	(1.27)
SSIC3	0.007	0.055
	(0.04)	(0.29)
CORR	-0.069	0.281
	(0.21)	(0.75)
APastDeals	0.146	-0.179
	(3.11)***	(2.18)**
CASH	-0.445	-0.454
	(2.32)**	(2.14)**
ARETSD	0.135	-3.398
	(0.11)	(1.87)*
TRETSD	-0.098	0.565
	(0.09)	(0.39)
A-B/M	0.136	0.101
	(0.39)	(0.27)
T-B/M	-0.318	0.186
	(1.47)	(0.73)
A-LMV	-0.247	-0.584
	(3.80)***	(6.64)***
T-LMV	0.120	0.742
	(1.69)*	(8.00)***
A-ROA	-2.127	-0.641
	(2.89)***	(0.79)
T-ROA	0.075	-0.878
	(0.16)	(1.67)*
A-LEV	-0.141	0.004
	(1.35)	(0.04)
T-LEV	-0.106	-0.239
	(1.13)	(1.60)
N = 1088; Pseudo R-square=0.186; LR chi2(30) = 429.16, Prob > chi2 = 0.0000		

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 9 Determinants of Optimal Target Termination Fees (% of deal size)

The dependent variable is the target TF as percentage of deal value. Models 1 and 3 are OLS, while Models 2 and 4 are Tobit. PCTCASH denotes the percentage of deal paid in cash. Other variables are defined in previous tables. Robustness t-statistics are in parenthesis.

	MODEL 1: OLS	MODEL 2: TOBIT	MODEL 3: OLS	MODEL 4: TOBIT
Constant	0.021	0.008	0.012	-0.002
	(6.58)***	(1.38)	(0.82)	(0.08)
LDealValue	-0.001	-0.001	-0.002	-0.002
	(2.97)***	(1.17)	(2.02)**	(1.45)
A-LMV	0.001	0.001	0.001	0.001
	(1.97)**	(1.78)*	(1.08)	(0.97)
TBANK	-0.011	-0.020	-0.006	-0.012
	(7.67)***	(8.03)***	(2.34)**	(2.78)***
ALockup	-0.004	-0.008	-0.004	-0.006
	(2.94)***	(3.59)***	(1.74)*	(1.81)*
TOEHOLD	-0.030	-0.066	-0.028	-0.058
	(5.49)***	(5.24)***	(3.44)***	(3.45)***
PREMIUM	-0.003	-0.005	-0.006	-0.010
	(1.71)*	(1.55)	(2.10)**	(1.94)*
PCTCASH	-0.003	-0.004	-0.006	-0.005
	(0.90)	(0.59)	(0.88)	(0.52)
SSIC3	-0.001	-0.002	-0.001	-0.002
	(0.93)	(0.83)	(0.70)	(0.65)
CORR	0.002	0.004	0.004	0.008
	(1.13)	(1.05)	(1.18)	(1.41)
ARETSD	-0.006	-0.014	-0.021	-0.057
	(0.63)	(0.87)	(1.39)	(1.79)*
TRETSD	-0.002	0.000	-0.002	0.003
	(0.25)	(0.00)	(0.22)	(0.17)
A-B/M	0.002	0.001	0.009	0.017
	(0.77)	(0.26)	(1.85)*	(1.98)**
T-B/M	0.003	0.006	0.002	0.000
	(2.33)**	(2.25)**	(0.53)	(0.07)
A-ROA	0.010	0.019	0.017	0.027
	(2.34)**	(2.59)***	(1.58)	(1.59)
T-ROA	-0.004	-0.006	-0.000	0.002
	(1.25)	(1.14)	(0.07)	(0.24)
A-LEV	0.001	0.002	-0.002	-0.007
	(1.76)*	(1.72)*	(1.56)	(2.09)**
T-LEV	0.001	0.002	0.003	0.005
	(1.78)*	(1.64)	(3.42)***	(3.21)***
APastDeals	-0.001	-0.002	-0.001	-0.003
	(2.90)***	(4.06)***	(2.86)***	(3.45)***
AIntangible	--	--	-0.008	-0.007
	--	--	(1.04)	(0.55)
TIntangible	--	--	0.016	0.019
	--	--	(2.00)**	(1.54)
ACEOtenure	--	--	0.000	0.000
	--	--	(0.57)	(0.43)
ACEOonBoard	--	--	0.011	0.018
	--	--	(0.87)	(0.79)
Observations	1089	1089	439	439
R-squared	0.18	--	0.19	--

***: significant at 1%, **: significant at 5%, *: significant at 10% at levels.