When a Buyer Gets Cold Feet: What is the Value of a Bidder Termination Provision in a Takeover?*

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ABSTRACT

Bidder termination provisions enhance a bidder's ability to terminate a takeover but are only included in some deals, and bidder termination fees vary. We liken these provisions to real options on targets' assets. Including them can be optimal because they enable termination when targets become less valuable to bidders than on their own, but creates a trade-off because bidders may terminate deals that should be completed. The provisions appear in takeover agreements when they increase expected joint takeover gains and termination fees are increasing in the provisions' option value. Combined announcement returns are larger in deals with appropriately priced provisions.

JEL Classification: G13, G34, K22
Keywords: Merger, Acquisition, Takeover, Termination fee, Breakup fee, Real option

*We thank Tom Bates, Alice Bonaimé, Susan Christoffersen, Sergei Davydenko, Lora Dimitrova, Craig Doidge, Craig Dunbar, Alexander Dyck, Louis Ederington, Chitru Fernando, David Goldreich, Jarrad Harford, Raymond Kan, Micah Officer, Vahap Uysal, Wei Wang, Jason Wei, conference participants at the Midwest Finance Association 2013 Meeting, Northern Finance Association 2013 Meeting, seminar participants at the University of Oklahoma and the University of Toronto, and Daniel Levine of Paul, Weiss, Rifkind, Wharton & Garrison LLP for valuable comments and suggestions. We thank Javier Castelo, Kiana Xu and Vincent Wang for providing excellent research assistance. Zhao thanks Social Sciences and Humanities Research Council of Canada and grants 71631008 and 71371194 from the National Natural Science Foundation of China for financial support.

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"The buyer [Minmetal Resources] wants to make sure that if things get really bad, they can walk away...By the same token, we [Anvil Mining] want to make sure that we're not just giving the buyer a free option."

Anvil Mining CEO Darryll Castle in an interview with The Globe and Mail newspaper

September 30, 2011

1 Introduction

In a well-functioning market for corporate control, a takeover should result in a socially optimal transfer of the ownership of assets to a bidder who can derive greater value from them than the target alone, though the motive and the mechanism through which it creates value can vary (e.g Malatesta (1983)). Uncertainty and economic shocks are known to impact investment in general (e.g. Abel (1983), Bloom (2009)) and takeovers specifically (e.g. Harford (2005)). In particular, when two firms sign a takeover agreement, a period of over 120 days may elapse before the takeover is completed. Information asymmetry about the transacting parties and potential synergies exists (e.g. Chu (2015)) and much can change during this time, including whether the bidder is the highest-value user of the target's assets. As a result the transacting parties may no longer desire the completion of the takeover. Takeover targets are able to terminate a deal with one bidder in favour of another that presents a better offer. Although bidders are in rare circumstances able to terminate deals when the target experiences a material adverse change, unlike targets, bidders are generally constrained in their ability to walk away from a takeover that loses its appeal. This is an issue of concern for bidders, who have value at stake (e.g. Wang (2015)). We study how a bidder's inability to terminate a takeover is addressed in a takeover contract.

A takeover agreement may contain a contractual feature, known as a bidder termination provision, that does allow the bidder to walk away from the transaction at the cost of paying a fee to the target.[1] For instance, the takeover agreement for Google Inc.'s takeover of Motorola Mobility Holdings in 2011 stipulated that Google could walk away from the deal and instead pay Motorola a termination fee. Without this provision, barring a material adverse change to Motorola, Google

[1]Bidder termination fees/provisions are also referred to as "reverse" termination or break-up fees/provisions.

would have been unable to walk away from this transaction. While anecdotal evidence suggests that bidder termination provisions may be desired by both bidders and targets (e.g. Kiladze (September 30, 2011)), it is puzzling that not all deals include them. For instance, beetween 2011 and 2013, about 30% of takeovers involving two publicly-listed companies in the United States, like the Google-Motorola transaction, included such a provision. Furthermore, the termination fees payable by bidders vary substantially, averaging about 3.5% of transaction value but being as high as 20%, as was the case for the Google-Motorola transaction.

Bidder termination provisions are a key concern for managers engaged in takeover.[2] They have drawn the attention of lawyers and legal scholars (e.g. Collins (July 20, 2012), Afsharipour (2010) Quinn (2010), Nowicki (2008)) and the financial press (e.g. Basak (November 17, 2014)). Questions about the *raison d'etre* of the bidder termination provision however remain largely unanswered in the academic finance literature.[3] In particular, why is it desirable to have a bidder termination provision in some takeovers but not in others? What determines the termination fee that a bidder must pay a target in order to walk away? How does the inclusion of a bidder termination provision affect the outcome of a takeover? Addressing these questions is the focus of our study.

A bidder signing a takeover agreement without a bidder termination provision is generally legally bound to complete the transaction (Gilson & Schwartz, 2005). Although bidders may invoke a material adverse change clause to terminate the transaction, in practice this is difficult to enforce because targets can impose "specific performance" on bidders in court, making them legally liable for completion (Afsharipour, 2010; Denis & Macias, 2013).[4] Without a bidder termination provision therefore, the bidder may effectively be forced to complete the takeover. Having the provision increases the bidder's flexibility to decide whether to complete the transaction.[5] In this way, a takeover agreement with a bidder termination provision effectively gives the bidder a real call option on the target (e.g. Sekhon (2010), Scott and Triantis (2004), Davidoff (August 16,

[2]For instance, proxy disclosure for Mars Inc.'s takeover of Wm. Wrigley Jr. Co. in 2008 indicates that Wrigley's Executive Chair, William Wrigley Jr. II, himself negotiated a $1 billion bidder termination fee (Afsharipour, 2010).

[3]Some analysis of bidder termination provisions is presented in Bates and Lemmon (2003), Officer (2003) and Offenberg and Pirinsky (2015) but is not the focus those studies.

[4]The enforcement of material adverse change clauses is often contested and legal decisions in cases such as IBP v. Tyson Foods, Frontier Oil v. Holly Corp., and Genesco v. Finish Line suggest that bidders face a high barrier to prove that a material adverse change occurred (see Denis and Macias (2013) and Gilson and Schwartz (2005)).

[5]The contractual terms of bidder termination provisions vary, with some contracts giving the bidder complete flexibility over the termination decision in all circumstances ("option-style"), and other contracts giving the bidder flexibility over the termination decision only in some specified circumstances (e.g. a failure to secure financing).

2007)). We therefore use a real option framework to answer the questions posed above.

To frame our empirical analysis, we present a simple model where the stand-alone value of a target and the target's value under bidder's control both vary between when the takeover agreement is signed and when the takeover is completed in the future. The inclusion of a bidder termination provision allows the bidder to terminate the deal at the time of completion and pay the target a termination fee, which it will do if paying the fee is less costly than completing the takeover.

When the takeover agreement is signed, an offer price and bidder termination fee are endogenously chosen ex-ante to maximize the combined expected gains of the bidder and target, who each receive a share of the combined gains. Completion is considered ex-post socially optimal if the target is worth more to the bidder than on its own when the takeover is completed. Allowing the bidder to terminate the takeover can prevent completion from occurring at times when it is not ex-post socially optimal, which increases the ex-ante combined expected gains of both parties. However, because the termination decision is made by the bidder, who weighs the cost of the termination fee against its own payoff from completion (the value of the target to the bidder at the time of completion net of the agreed price), the takeover may also be terminated even when completion is ex-post socially optimal, decreasing the combined expected gains ex-ante. We therefore show that the provision creates a trade-off because it may either increase or decrease the ex-ante combined expected gains and is included in the takeover agreement only if the expected gains are greater with it than without it.

We show that a bidder termination provision is included in the takeover agreement only if there is a sufficiently high probability that the bidder's value for the target will be less than the target's stand-alone value at the time of completion. We find this to be the case when the value of the target's assets to the bidder is more volatile, or if it co-varies less with the stand-alone value of the target's assets. We also find that the optimal bidder termination fee resembles the price of an option on the bidder's value for the target's assets which matures at the time of completion. This implies that like the price of an option, the bidder termination fee increases with the volatility of the option's underlying asset and with the time expected to be taken to complete the takeover.

Using our framework for guidance, we conduct empirical analysis on a sample of takeovers

announced between 1997 and 2013 involving targets and bidders that were both publicly listed in the United States as we require data items for both the target and bidder. About 21% of the deals in our sample include a bidder termination provision and the termination fee payable by the bidder is on average about 3.6% of total transaction value.

To test our predictions, we require a measure of the volatility of the value of the target's assets under the bidder's control, which is latent and therefore admittedly challenging to measure. To construct a proxy, we conjecture that the value of the target's assets under the bidder's control is a function of both the stand-alone asset value and the value added by the bidder's management of the assets. We argue then that the volatility of the value added by the bidder's management is likely to be correlated with the volatility of the bidder's assets, while the volatility of the stand-alone value of the target's assets is likely to be correlated with volatility of the target's assets. For our proxy, we therefore use estimates of both the bidder and target's asset volatilities. Furthermore, we use the covariance of the values of the bidder and target's assets as a proxy for the covariance of the value of the target's assets to the bidder with the stand-alone value of the target's assets. For our third variable of interest, the expected completion, we use the actual time taken between the announcement and the completion or termination of the takeover as a proxy (Officer, 2006).

Our empirical findings are consistent with a real option view of bidder termination provisions. We find that the bidder's asset volatility has a statistically significant positive association, and the covariance between the bidder and target's asset values has a statistically significant negative association with the likelihood that a takeover includes a bidder termination provision. This is consistent with our notion that the desirability of a bidder termination provision increases with the probability that the target's assets will be worth less to the bidder than on their own at the time of completion. We next examine the determinants of the size of the bidder termination fee relative to the total value of the transaction. We find that the bidder's asset volatility and the expected time until the conclusion of the merger have a positive and statistically significant association with the size of the bidder termination fee. This is consistent with the view that the bidder termination fee reflects the price of the real option on the target's assets created by a bidder termination provision. For both tests, we also use the target's asset volatility in place of the bidder's asset volatility and

find similar results.[6] Furthermore, because the decision to include a bidder termination provision and the choice of a termination fee may be related to other deal terms such as the method of payment, target termination provisions and collars, we control for such items in all of our analysis.

A target termination provision, which commits the target to pay a fee to the bidder if it walks away, almost always accompanies a bidder termination provision (96% of deals with bidder termination provisions) and is more common (77% of all deals). We find positive associations between the the inclusion of bidder and target termination provisions, and between the sizes of their termination fees. Furthermore, bidder termination fees may be offered and set equal to target termination fees in some deals as reciprocation for target termination provisions. However, a target termination fee is thought to exist in order to compensate bidders for information production costs (Boone & Mulherin, 2007; Officer, 2003). Therefore, because the two provisions address distinct issues, the optimal bidder termination fee is unlikely to be equal to the target termination fee (Afsharipour, 2010; Quinn, 2010).[7] We thus expect the real option value of bidder termination provisions to better predict the size bidder termination fees which are not set equal to target termination fees. We find that the associations between the size of bidder termination fees and the bidder's asset volatility and expected time to completion are substantially stronger when the two fees are not set equal to each other. This suggests that bidder termination fees are more likely to be priced as real options when they are not reciprocal to target termination fees.

When we examine the combined takeover announcement gains for bidders and targets, we find that bidder termination provisions are associated with larger combined gains only when their termination fees do not equal the target termination fees and not otherwise. Therefore bidder termination provisions that are more likely to have been priced as real options are associated with larger combined gains for bidders and targets. Bidder termination provisions with fees that are reciprocal to target termination fees and not priced as real options are not associated with larger combined gains. Therefore, our results suggest that in order for a bidder termination provision to

[6] In further analysis we estimate non-linear regressions that allow for a more flexible specification consisting of a linear combination of target and bidder's asset volatilities and also find similar results.

[7] The most common reason why targets terminate merger agreements is to accept superior bids (Boone & Mulherin, 2007). Furthermore, in contrast to a bidder termination provision, a target is generally able to terminate a deal even in the absence of a target termination provision. Lastly, Delaware courts have reacted to the concern that large target termination fees interfere with the a target board's duty to secure the highest possible price by limiting the size of target termination fees. In contrast, bidder termination fees have not raised such concerns.

enhance value, it is important that the termination fee is priced appropriately as a real option.

We note that our analysis described so far does not preclude other reasons for the use of bidder termination provisions, but rather it suggests that they create a potentially valuable real option. An alternative view is that if there is information asymmetry about a bidders' ability to complete a transaction, a commitment to a costly termination provision may signal the bidder's ability. If this were true, we expect the information asymmetry about the bidder to explain the inclusion of the provisions and the size of the fees, but find that this is not the case when we measure information asymmetry using the bidder's analyst coverage and forecast dispersion. We also expect that deals with bidder termination provisions are more likely to be completed. However, we find that the probability of deal completion is not associated with the inclusion of a bidder termination provision, suggesting that signaling is an unlikely explanation for the use of bidder termination provisions.

Our paper is, to our knowledge, the first in the finance literature to focus on bidder termination provisions. We contribute to the contracting and takeover literatures by showing how a bidder's commitment and time-varying synergies provide a rationale for the provisions, which can play a role in ensuring that optimal transfers of ownership take place. We highlight, however, that their inclusion involves a trade-off and we shed light on the circumstances under which they create value.

Our work is related to research on contractual features of takeovers, such as collars (Officer, 2004, 2006), lockup options (Burch, 2001), material adverse change clauses (Denis & Macias, 2013; Gilson & Schwartz, 2005), and target termination provisions (Bates & Lemmon, 2003; Boone & Mulherin, 2007; Jeon & Ligon, 2011; Officer, 2003). Bates and Lemmon (2003) in fact note a lack of theoretical or empirical research addressing possible motives underlying the use of bidder termination provisions, which is a void that our paper fills. Our paper challenges the notion that bidder termination provisions are demanded by either the target or bidder alone by showing that they can provide benefits for both parties. Like Bates and Lemmon (2003) and Officer (2003) find for target termination provisions, we find support for the view that bidder termination provisions are an optimal contracting device. Our paper however suggests that bidder termination provisions should be priced differently from target termination provisions because they address different issues, a view shared by legal scholars (Afsharipour, 2010; Quinn, 2010). Cain, Macias, and Solomon (2014) consider the reputational role of bidder termination provisions in private equity transactions.

While we do not examine private equity transactions, our real option view is also applicable to such transactions where bidder termination provisions are also increasingly common (Afsharipour, 2010).

Our paper is broadly related to studies such as Hackbarth and Morellec (2008) and Morellec and Zhdanov (2005), and early work by Margrabe (1978), which examine the value of prospective takeovers as real options. Our paper, in contrast, considers the bidder's explicit real option created by a takeover that includes a bidder termination provision. Our paper is related to work by Bhagwat, Dam, and Harford (2016) and Bhagwat and Dam (2014), who examine the impact of "interim risk" in takeovers that involve public companies, which take a length of time to complete following their announcement.[8] Our paper highlights how a bidder termination provision addresses the asymmetric share of the interim risk borne by a bidder in a takeover.

In practice there is a distinction between "option-style" provisions where a bidder has complete flexibility over the termination decision, and provisions where termination is triggered only by specific events. While we abstract away from this by assuming that the provision gives a bidder complete flexibility to walk away, our framework is also applicable to provisions with specific triggers. For example, events such as a bidder's inability to secure financing, a failure to obtain regulatory approval, and a competing transaction for the bidder, can be triggers for bidder termination provisions (Afsharipour, 2010; Quinn, 2010). Such events may result in a decrease in the value of the target's assets to the bidder. For instance, if a bidder faces a higher cost of capital following a difficulty in securing financing, is forced to undertake costly divestitures to obtain regulatory approval, or faces a higher opportunity cost if a superior competing transaction emerges, the value of the target's assets to the bidder can decrease and fall below the price offered. The potential change in the value of the target's assets to the bidder and the termination choice are both captured by our framework, suggesting that provisions with such triggers have option value.

2 A Simple Model

In this section we present a simple model that we subsequently use as a framework to guide our empirical analysis, where we set up a takeover as a cash transaction. Before we do so, we present

[8]They point out that the asymmetry in the parties' abilities to terminate a takeover implies that the bidder effectively provides the target with a put option on itself, referred to as a "seller's put".

an illustrative numerical example with minimal notation.

2.1 A Numerical Example

Suppose that a bidder and target today agree to the terms of a takeover that is to be completed after one period. There are two possible states of nature in the next period, a "good" state and "bad" state, that occur with equal probability. The values of the target's under the bidder's control and under the target's existing management's control are as follows

Target firm value	Under bidder's control	Under existing management
Good state	100	70
Bad state	50	60

We assume no discounting and also assume that both parties have equal bargaining power.

In practice, in the absence of a bidder termination provision, a bidder is constrained in its ability to terminate a takeover. Although a bidder may attempt to terminate the takeover by invoking a material adverse change clause, enforcing such a clause is likely to entail costly litigation because legal precedents have created a high barrier for bidders attempting to demonstrate that a material adverse change has truly occurred (Denis & Macias, 2013; Gilson & Schwartz, 2005). Furthermore, while a material adverse change clause applies specifically to adverse events affecting the target, a bidder may prefer to walk away for a reason other than an adverse event affecting the target (e.g. an adverse event that affects the bidder itself), for which a material adverse change clause may not be applicable. A target may respond to a bidder's attempt to walk away by imposing a specific performance remedy in court upon the bidder, forcing the bidder to complete the deal.[9] This suggests that in the absence of a bidder termination provision, the cost to a bidder of terminating a deal can be prohibitively high. We assume therefore, that if the deal does not include a bidder termination provision the bidder cannot terminate it. Then, the total expected payoff of the target

[9]For example, when Tyson foods attempted to terminate its proposed takeover of IBP in 2001 on the grounds of a material adverse effect, IBP sought a specific performance remedy and Tyson was ultimately forced to complete the transaction. (*In Re IBP, Inc. Shareholders Litigation, IBP, Inc. v. Tyson Foods, Inc., 789 A.2d 14 (Del. Ch. 2001)*).

and bidder (i.e. the total expected value created by the takeover) is

$$\text{Payoff}(Total) = 0.5(100 - 70) + 0.5(50 - 60) = 10$$

This total payoff is shared equally by the bidder and target because they have equal bargain power so that they each receive $\text{Payoff}(Target) = \text{Payoff}(Bidder) = 5$.

Now we consider the inclusion of a bidder termination provision. In practice, the contractual terms of bidder termination provisions vary. In some instances the bidder always has complete flexibility over the termination decision (an "option-style" bidder termination provision). In other cases, the bidder's ability to terminate the deal is restricted to some pre-specified circumstances. Reasons why bidders walk away include a failure to secure financing, a failure to obtain regulatory approval, and the emergence of a competing transaction for the bidder (Afsharipour, 2010). Such events may raise the bidder's cost of completing the transaction and therefore reduce the bidder's value for the target's assets. For instance, a bidder could face a higher cost of capital following difficulty in obtaining financing for a takeover, could be forced to undertake costly divestitures to obtain regulatory approval, or could face a higher opportunity cost if a superior competing transaction emerges. While our framework captures changes in the target's value to the bidder, we abstract away from specific events that lead to such changes. We therefore assume an option-style bidder termination provision that permits the bidder to walk away from the takeover if it chooses to do so. Our framework is also still applicable to bidder termination provisions that are triggered only by pre-specified events, provided that such events correspond to states in which the bidder's value for the target's assets decreases significantly.

Let K denote the price paid if the bidder completes the deal and P denote the termination fee paid by the bidder if it terminates the deal. An optimal price and bidder termination fee ensure that the bidder terminates the deal in the bad state. That is, the bidder's payoff from terminating the deal in the bad state, $-P$, must be greater than its payoff from completing the deal, $50 - K$. Therefore, the optimal price and termination fee must satisfy the inequality $50 - K < -P$ or $P < K - 50$.[10]

[10] If there were infinitely many states, then setting this constraint to an equality would result in a threshold state $P = K - 50$ where the bidder would terminate the deal in states where the payoff from the deal is below the threshold

Next, we consider the combined expected payoff with a bidder termination provision. If the bidder completes the deal in the good state and terminates it in the bad state, the payoffs to the target and the bidder are

$$\text{Payoff}(Target) = 0.5(K - 70) + 0.5P = 0.5(K + P) - 35$$

$$\text{Payoff}(Bidder) = 0.5(100 - K) - 0.5P = 50 - 0.5(K + P).$$

Summing the two payoffs yields a total expected payoff, $\text{Payoff}(Total) = 15$, that is higher than the total expected payoff without a bidder termination provision (10). Furthermore, because the bidder and target have equal bargaining power, they each receive an equal share of the total expected payoff. In this case, the bidder and target are each better off with the inclusion of a bidder termination provision, receiving a payoff of 7.5, than without it where each received 5.

This example illustrates that a bidder termination provision can create value, and that this value arises from variation in the value of the target firm's assets to the bidder and the target's existing management under different scenarios. Furthermore, it also illustrates that in order for the bidder termination provision to create value, the bidder termination fee must be set optimally.

It may appear at first glance that the inclusion of a bidder termination provision is always weakly optimal for both parties because the bidder will only terminate the takeover when the target is worth more to it than as a stand-alone firm. However this is not the case because, unlike a social planner, the bidder does not base its termination decision on maximizing the total expected payoff of the target and itself. Instead, the bidder determines whether or not to terminate the takeover by comparing its payoff from completing the takeover (the value of the target to it net of the agreed price) to the cost of paying the termination fee. In some states therefore, the bidder may also terminate the takeover even though the target is worth more to it than as a stand-alone firm, which decreases the total expected payoff ex-ante.[11] The inclusion of a bidder termination provision therefore creates a trade-off and it is not obvious if and when a bidder termination provision is

state payoff.

[11] In particular, the bidder will terminate the takeover if the price exceeds the bidder's value for the target by an amount that exceeds the value of termination fee, even if its value for the target is higher than the target's stand-alone value.

ex-ante optimal.[12] To illustrate this, we consider a modification to the example above.

Suppose instead that the value of the target to the bidder in the bad state were 70 instead of 50 (i.e. the target is worth more under the bidder's control even in the bad state), with all else remaining the same. Without a bidder termination provision, the total expected payoff is Payoff$(Total) = 0.5(100 - 70) + 0.5(70 - 60) = 20$, with the target and bidder each receiving Payoff$(Target)$ = Payoff$(Bidder) = 10$. With the inclusion of a bidder termination provision, the payoffs remain unchanged. That is Payoff$(Total) = 15$ and Payoff$(Target)$ = Payoff$(Bidder) = 7.5$.[13] Now, including a bidder termination provision does not create value. This is because, even though the target is worth more under the bidder's control in the bad state (i.e. completion is optimal), the bidder still terminates the deal in the bad state as it has a higher payoff from doing so. If the value of the target is always higher under the bidder's control than under the existing management's control as is the case here, then it is never optimal to include a bidder termination option in the deal. Therefore, this example also illustrates that including a bidder termination provision does not always create value and that whether it does so ultimately depends on how likely it is for the target's value to the bidder to fall below the stand-alone value.

While this example illustrates how the bidder's commitment and time-varying synergies provide a rationale for bidder termination provisions, it does not explain what factors predict whether a bidder termination provision is optimal and what determines the optimal bidder termination fee. To accomplish this, we present a simple model in the next section

2.2 A Simple Model

Suppose that at time 0, a bidder offers a price K in cash to acquire a target firm, and that the transaction is expected to be completed in T periods. The value of the target when the deal is completed is unknown to the bidder at time 0. In some states, the value of the target may fall below the initial offer price that the bidder had agreed to pay. The bidder would like to have the ability

[12]The socially inefficient termination that arises in some instances could be avoided by writing a contract that conditions the termination option on the difference between the target's value to the bidder and the target's stand-alone value (i.e. the "synergies"), in which case having such a termination provision will always be socially optimal. However, such a contract is not implementable because the synergies are likely to be unverifiable in a court and therefore non-contractible.

[13]This assumes that the price and termination fee now satisfy the inequality $70 - K < -P$ or $P < K - 70$.

to withdraw from the deal in such bad states. Under certain conditions (to be derived later), the target agrees to grant the bidder the option to abandon the acquisition in such states. In exchange, the bidder agrees to pay a termination fee P to the target if he withdraws from the deal.

Let $S_{B,t}$ and $S_{M,t}$ denote the values of the target firm *under the control of the bidder and the target's management* respectively at time t. Suppose $S_{B,t}$ and $S_{M,t}$ follow geometric Brownian motions:

$$\frac{dS_{B,t}}{S_{B,t}} = \mu_B dt + \sigma_B dW_{B,t} \tag{1}$$

$$\frac{dS_{M,t}}{S_{M,t}} = \mu_M dt + \sigma_M dW_{M,t} \tag{2}$$

where μ_B, μ_M, σ_B, σ_M are the drifts and volatilities of the target firm under the bidder and existing management's control respectively. $\{W_t, 0 \leq t < \infty\}$ is the standard Wiener process. We also assume $S_{B,0} > S_{M,0}$ so that ex-ante, the takeover creates value, and thus abstract away from the motive for the takeover and the mechanism of value creation (e.g. Malatesta (1983)). We further allow the Brownian motions to be correlated as follows,

$$\rho dt \; = < dW_{B,t},\, dW_{M,t} >; \;\; \sigma_{BM} \; = \; \rho \sigma_M \sigma_B. \tag{3}$$

2.3 Contract Without a Bidder Termination Provision

We first examine a contract without a bidder termination provision. As in the numerical example, we assume that without the provision, a bidder does not have the ability to terminate the deal at the time of completion, T. We determine the offer price in a contract that does not include the bidder termination provision and does not allow the bidder to walk away, K_{NP}. In this case, the NPV of the takeover for the target at 0 is

$$\begin{aligned} G_{Target,0} &= \mathrm{E}^Q[e^{-rT}(K - S_{M,T})] \\ &= e^{-rT}K - S_{M,0}. \end{aligned} \tag{4}$$

Similarly we can express the bidder's share of the NPV, $G_{Bidder,0}$, as follows:

$$\begin{aligned} G_{Bidder,0} &= \mathrm{E}^{Q}[e^{-rT}(S_{B,T}-K)] \\ &= S_{B,0}-e^{-rT}K, \end{aligned} \tag{5}$$

where $\mathcal{Q}$ is the risk neutral probability measure and r is the annual continuously compounded risk free rate. The value created in the takeover, TS_{NP}, in the absence of a termination option is the sum of $G_{Target,0}$ and $G_{Bidder,0}$,

$$\begin{aligned} TS_{NP} &= G_{Target,0}+G_{Bidder,0} = \mathrm{E}^{Q}[e^{-rT}(K-S_{M,T})]+\mathrm{E}^{Q}[e^{-rT}(S_{B,T}-K)] \\ &= S_{B,0}-S_{M,0}. \end{aligned} \tag{6}$$

We further assume that the overall value created by the takeover is divided between the bidder and the target in a Nash bargaining game where both parties have equal bargaining power of 0.5 and a reservation payoff of zero. This assumption is consistent with work by Ahern (2012) who finds that on average targets do not gain much more than bidders, Malatesta and Thompson (1985) who find that acquisition programs are profitable investments, and Wang (2015) who finds that bidders' gains from takeovers are significant.[14] The setup may be interpreted as the bidder offering a price to the target. If the target rejects the offer, with probability 0.5, he makes a-take-it-or-leave-it offer to the bidder; otherwise (with probability 0.5), he receives a final take-it-or-leave-it offer from the bidder. If the final offers are rejected, both the bidder and the target receive a reservation payoff normalized to 0. The share of the overall value created (i.e., 0.5) is therefore a measure of the degree of bidder's bargaining power.

From equation (6) it is clear that, the value created by the takeover is independent of the distribution of bargaining powers between the parties and it is always equal to $TS_{NP} = S_{B,0}-S_{M,0}$. There are many potential sources of value creation in a takeover, such as the reduction of agency costs associated with the change in control and operational synergies due to economy of scale or

[14]Our empirical predictions are not sensitive to changes in the values of the bidder's and target's bargaining powers. For example, the predictions of the model remain unchanged when we allow the target to have complete bargaining power. That is, the comparative statics with respect to our parameters of interest do not change signs when the bargaining power of each party varies exogenously. Endogenously determined bargaining power is however beyond the scope of our paper.

scope. Our model takes a reduced form and does not assume a specific source for value creation.

Using the fact that $G_{Bidder,0} = 0.5(TS_{NP})$ and (6), we have that $K_{NP} = e^{rT}\left[S_{B,0} - 0.5(S_{B,0} - S_{M,0})\right]$. Without a bidder termination option, the merger agreement is simply a forward contract where the bidder takes a long position and the target takes a short position.

2.4 Contract With a Bidder Termination Provision

We now consider a contract that includes a bidder termination provision. Let K denote the offer price and P denote the bidder termination fee under this contract. We will later illustrate the conditions under which the target would agree to include this option. Let $G_{Bidder,T}$ denote the net present value of the acquisition to the bidder at time T. If the deal succeeds at T, then $G_{Bidder,T} = S_{B,T} - K$. If the bidder withdraws from the deal, then he pays the bidder termination fee to the target and $G_{Bidder,T} = -P$. The bidder withdraws from the deal whenever consummating the deal is more costly than paying the bidder termination fee, i.e., if $S_{B,T} - K < -P$. Therefore

$$G_{Bidder,T} = \max(S_{B,T} - K, -P), \tag{7}$$

and

$$\begin{aligned} G_{Bidder,0} &= \mathrm{E}^{\mathcal{Q}}[e^{-rT}\max(S_{B,T} - K, -P)] \\ &= 0.5(TS_P). \end{aligned} \tag{8}$$

Equation (8) implies that there is a set of values for (K, P) between which the bidder is indifferent. The bidder would participate in a deal with bidder termination fee P if he receives 50% of the total surplus, TS_P. The total surplus TS_P under this contract must be greater than the total surplus TS_{NP} in the contract without a bidder termination option, otherwise the target would not agree to the inclusion of this option in the contract. By terminating the contract in bad states, the bidder incurs lower losses relative to the contract without a bidder termination option.

If the deal succeeds at T, the target receives $G_{Target,T} = K - S_{M,T}$. If the bidder decides to withdraw from the deal, then the target receives the bidder termination fee, and $G_{Target,T} = P$.

Therefore

$$G_{Target,T} = (K - S_{M,T}) \times \mathbb{1}_{\{S_{B,T}-K \geq -P\}} + P \times \mathbb{1}_{\{S_{B,T}-K<-P\}}, \tag{9}$$

and

$$\begin{aligned} G_{Target,0} &= \mathrm{E}^{\mathcal{Q}}\left[e^{-rT} G_{Target,T}\right] \\ &= 0.5(TS_P). \end{aligned} \tag{10}$$

Similarly the target receives half of the total surplus.

The target's optimization problem is to select a pair of an offer price and bidder termination fee (K and P) to maximize his share of the total surplus subject to the bidder's participation constraint:

$$\begin{aligned} \max_{(P,K)} \quad & G_{Target,0} \\ & s.t. \\ & G_{Bidder,0} = 0.5(TS_P) \end{aligned}$$

Proposition 1 (Optimal Bidder Termination Fee) *There exists a unique pair of an offer price and bidder termination fee that maximizes the value created in the takeover. The optimal bidder termination fee and offer price equal to:*

$$P^* = e^{rT} S_{B,0} \left[N(d_1) - N(d_2) \left(\frac{S_{M,0}}{S_{B,0}} \right)^{\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}} e^{0.5\rho\sigma_M\sigma_B T} \right] - 0.5(e^{rT} T S_P^*) \tag{11}$$

$$K^* = P^* + S_{B,0} \left(\frac{S_{B,0}}{S_{M,0}} \right)^{-\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}} e^{(r+0.5\rho\sigma_M\sigma_B)T} \tag{12}$$

where

$$\begin{aligned} d_1 &= \frac{\frac{\ln S_{B,0} - \ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho} + 0.5\sigma_B^2 T - 0.5\rho\sigma_B\sigma_M T}{\sigma_B\sqrt{T}} \\ d_2 &= \frac{\frac{\ln S_{B,0} - \ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho} - 0.5\sigma_B^2 T - 0.5\rho\sigma_B\sigma_M T}{\sigma_B\sqrt{T}} \end{aligned} \tag{13}$$

and the total surplus created by the takeover TS_P^* equals to:

$$\begin{aligned} TS_P^* &= S_{B,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\sigma_B^2 T-0.5\rho\sigma_M\sigma_B T}{\sigma_B\sqrt{T}}\right) \\ &\quad -S_{M,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\rho\sigma_M\sigma_B T-0.5\sigma_B^2 T}{\sigma_B\sqrt{T}}\right) \end{aligned} \tag{14}$$

Proof: See Appendix for the proof.

We can write $Pe^{-rT} = \mathrm{E}^{\mathcal{Q}}[e^{-rT}\max(S_{B,T}-(K-P),0)] - 0.5(TS_P)$. This illustrates that the contract resembles a call option. In particular, the first term on the right side resembles the Black-Scholes price (Black & Scholes, 1973) of a call option on the target firm under the bidder's control with a strike price equal to the difference between the offer price and bidder termination fee.[15] The bidder termination fee is the price of this option less the bidder's share of the total surplus.[16]

2.5 When Is It Optimal to Include a Bidder Termination Provision?

With the following proposition, we examine the conditions under which it is optimal to include a bidder termination option in the takeover contract.

Proposition 2 (Optimality of Inclusion) *There exists an upper-bound on the covariance of the value of the target under the bidder's control and the target management's control $\hat{\sigma}_{BM} = \sigma_B^2 > 0$, such that for any $\sigma_{BM} < \hat{\sigma}_{BM}$ it is optimal to include a bidder termination provision in the merger contract. Furthermore, the range of the covariance σ_{BM} for which inclusion of a bidder termination fee is preferred, increases with σ_B, the volatility of target's assets under the bidder's control.*

Proof: See Appendix for the proof.

[15] As shown above in (7), the payoff to a merger contract with a bidder termination resembles the payoff of a call option. This contract can be decomposed into a merger contract without a bidder termination provision, which has the payoff of a forward contract on the target with a forward price equal to the offer price, and the bidder termination provision alone, which has a payoff resembling that of a put option. Mathematically, the payoff in (7) can be decomposed as $\max(S_{B,T}-K,-P) = (S_{B,T}-K) + \max(0, K-S_{B,T}-P)$.

[16] Margrabe (1978) derives a modified version of the Black-Scholes formula (Black & Scholes, 1973) to value the option to exchange one asset for another, such as an exchange offer. We use similar model primitives and the first term in equation (11) somewhat resembles the option value in equation (7) of Margrabe (1978). However, because the focus of our paper is different, our setup incorporates a termination fee, time-varying synergies and gain-sharing and consequently delivers distinct analytical results.

It is only optimal to include a bidder termination provision in the merger agreement if the ex-ante expected total surplus created is larger with inclusion of the provision. The proposition above implies that when the covariance of the value of the target to the bidder and the stand-alone value of the target (σ_{BM}) is higher, $S_{B,T}$ is less likely to fall below $S_{M,T}$ and there is therefore little incremental value to including a bidder termination provision. Furthermore, fixing σ_{BM}, when the volatility of the target's value to the bidder (σ_B) is higher, $S_{B,T}$ is more likely to fall below $S_{M,T}$ and a bidder termination provision is more valuable.[17] Note that if the value of the target is always higher under the bidder's control than under the existing management's control, then it is never optimal to include a bidder termination option in the deal. This is equivalent to having a large σ_{BM} that is greater than $\hat{\sigma}_{BM}$.

2.6 Comparative Statics

In this section, we derive the comparative statics of the model with respect to the key model parameters, T and σ_B. As the derivatives for these parameters are complex in nature, we present the comparative statics using plots for the bidder termination fee as a fraction of the offer price, p^* in Figure 1.[18]

The bidder termination fee is increasing in the expected time to completion T. The intuition for this result is that the value of the real option to abandon the takeover increases with the time to maturity (completion). Fixing ρ equal to 0.2, (the average ρ in our sample), the bidder termination fee increases with the volatility of the target's assets under the bidder's control, σ_B.[19]

When $\rho = 0$, the comparative statics can be derived in closed form (See the Appendix). The

[17] We assume that $S_{B,0}$ and $S_{M,0}$ are exogenously given and that $S_{B,0} > S_{M,0}$. That is, we assume that the bidder does not initiate a deal if at the time of the offer the value of the target under bidder's control is not larger than the stand alone value of the target. Examining the timing of the bidder's offer is beyond the scope our paper. It is important to note however that in a framework where the timing of the bidder's offer is endogenous (e.g. Morellec and Zhdanov (2005)) the bidder only makes an offer when the ratio $\frac{S_{B,0}}{S_{M,0}}$ exceeds a threshold. The optimal timing of the offer thus reduces the probability that $S_{B,T} < S_{M,T}$. Although this makes the termination option less valuable, it does not eliminate its value. Therefore, even if the bidder's offer is optimally timed, a bidder termination provision can still be valuable and our model's predictions would still hold. Furthermore, because delaying an offer has costs (e.g. increased competition), a deal that is not "optimally timed" that includes a termination provision may be superior to a later deal that does not include a termination provision.

[18] The comparative statics for the dollar value of the bidder termination fee are similar.

[19] When σ_{BM} is close to σ_B^2 or when ρ is very high (fixing σ_M), the inclusion of bidder termination provision is not optimal. For example, when $\sigma_B^2 = \sigma_{BM}$ we have $TS = 0$ or $P = K$. However, whenever the inclusion of the bidder termination option is optimal, we have $P^* < K^*$ and the bidder termination fee increases in σ_B.

results for the general case illustrated in Figure 1 are consistent with the special case where $\rho = 0$. For σ_B, when $\rho = 0$, inclusion of the bidder termination option is always preferred. Therefore $P^* < K^*$ and an increase in σ_B increases the chance that $S_{B,T}$ would fall below $S_{M,T}$ and hence increases the value of the termination fee.

2.7 Empirical Predictions

Our simple model generates testable predictions about the inclusion of the bidder termination provision in takeover agreements. A corollary of Proposition 2 is that the inclusion of a bidder termination provision is optimal if $\sigma_B^2 > \hat{\sigma}_B^2$ where $\hat{\sigma}_B^2 = \sigma_{BM}$. The range of model parameters where inclusion of a bidder termination provision is preferred therefore increases with σ_B and decreases with σ_{BM}. Furthermore, in practice some deals may not include a bidder termination provision because the increase in expected surplus associated with the termination option does not exceed the cost of negotiating this option. While we do not observe the negotiation costs, we expect a bidder termination provision to be included if the associated increase in expected surplus is large enough. A bidder termination provision is therefore more likely to be included when the associated expected surplus is higher. Proposition 2 implies that the expected surplus with a bidder termination provision (TS_P) increases with σ_B, decreases with σ_{BM}, and increases with T. From this we derive the predictions that the likelihood that a bidder termination provision is included in the takeover agreement:

1. Increases with volatility of the target's assets under the bidder's control.
2. Decreases with the covariance between the value of the target's assets under the bidder's control and the stand-alone value of the target's assets.
3. Increases with the length of time between when the takeover agreement is signed and when the takeover is completed.

The comparative statics of the previous section also generate predictions about the size of the bidder termination fee. First, the size of the bidder termination fee relative to the offer price ($p*$) is expected to increase monotonically with σ_B when ρ is moderately positive or negative, which

is likely to be characteristic of the sample we study.[20] Second, the size of the bidder termination fee relative to the offer price ($p*$) is expected to increase monotonically with T. This results in predictions that the size of the bidder termination fee as a fraction of the total transaction value:

1. Increases with the volatility of the target's assets under the bidder's control.
2. Increases with the expected time taken from the announcement of the takeover to completion or withdrawal.

Although a takeover is set up as a simple cash transaction in our framework for tractability, the intuition may also be extended to deals where the method of payment is the bidder's stock. If stock is used as a method of payment, the offer price K, rather than being fixed, will vary with the price of the bidder's stock. Provided that the bidder's stock price and S_B are not perfectly correlated, some of the variation in K will be "exogenous" to our setup and our framework's intuition will thus still hold. Our empirical predictions therefore apply to deals with either cash or stock (or a combination) as a method of payment.

3 Data

3.1 Sample Construction

Our sample of takeover announcements is obtained from Thomson Reuters' SDC Platinum database. We search for mergers and acquisitions that were either completed or withdrawn, where the bidder sought to acquire an interest in the target firm of at least 90%. In order to ensure the availability of data on both the target and bidder that we require, we further restrict the sample to announcements of transactions where both parties were publicly-listed companies domiciled in the United States. We obtain information on transaction characteristics, including information on bidder termination provisions, from SDC. For both the target and the bidder, we require the availability of accounting data in Compustat as at the fiscal year end immediately preceding the merger announcement and daily stock return data in CRSP. We restrict our sample to transactions announced between 1997 and 2013 which results in a final sample consisting of 2078 announced bids.

[20] In our sample, our proxy for ρ, the correlation between the value of the target's assets under the bidder's control and the assets' stand alone value, has a mean, median and 90^{th} percentile of 0.20, 0.15 and 0.51, respectively.

Although the first reported inclusion of a bidder termination provision in SDC was in May of 1985, we choose to focus on deals announced in 1997 and onwards because Boone and Mulherin (2007) identify substantial underreporting of inclusion of target termination provisions in SDC data when compared to SEC filings for takeovers announced between 1989 and 1999. They report that there is less underreporting from 1997 onwards, although this still persists. Jeon and Ligon (2011) also find that SDC underreports the inclusion of target termination provisions in their sample of deals involving publicly listed targets announced between 2001 and 2007. Therefore a potential concern for us that the inclusion of bidder termination provisions is also significantly underreported in our sample like the inclusion of target termination provisions. We find however, that the underreporting is not as severe in our sample, perhaps because we restrict our sample to deals that involve a publicly-listed bidder. We also find that the underreporting is more severe for target termination provisions than bidder termination provisions which are the focus of our study.[21]

3.2 Variable Measurement

For our empirical analysis, we require measures of the volatility of the value of the target's assets under the bidder's control as well as the covariance of the value of the target's assets under the bidder's control with the stand-alone value of the target's assets. The value of the target's assets under the bidder's control is however unobservable to an econometrician and therefore challenging to measure.

To construct a proxy, we conjecture that the value of managed assets is determined by the stand-alone value of the productive assets and the value added by the management of the assets through tangible assets and intangible assets such as human capital. This implies that the value of the target's assets under the bidder's control will be determined by both the stand-alone value of the target's assets and the value added by the bidder managing the target's assets (i.e. the value of the bidder's control over the assets). Therefore, the volatility of the target's assets under the

[21] Jeon and Ligon (2011) find that the underreporting of target termination provisions in their sample is most severe in years 2002, 2003 and 2006. They find that the underreporting is substantially less severe in the other years of their sample period (2001-2007). We verify the SDC data for the transactions in our sample (297) that were announced in years 2002, 2003 and 2006 by checking the SEC filings made in connection with these transactions. We find that 21 deals SDC reported as not having a bidder termination provision in fact had one. We find that there are no statistically or economically significant differences in the means of our variables of interest between the 21 deals with erroneously reported bidder termination provision inclusion and the other deals that included bidder termination provisions either from the 2002, 2003 and 2006 subsample or from our full sample.

bidder's control may be assumed to be a function of both the volatility of the stand-alone asset value as well as the volatility of the value of the bidder's management of the assets. The volatility of the value of the bidder's management is likely to be correlated with the volatility of the bidder's assets, while the volatility of the stand-alone value of the target's assets is likely to be correlated with volatility of the target's assets. To proxy for the volatility of the value of the target's assets under the bidder's control, we therefore use both the bidder and target's asset volatility and remain agnostic about which one is a more appropriate proxy. Furthermore, we use the covariance of the values of the bidder and target's assets as a proxy for the covariance of the value of the target's assets under the bidder's control with the stand-alone value of the target's assets. We compute the bidder's asset volatility, σ_B^V, and the covariance of the bidder and target's asset values, σ_{BM}^V, as follows:

$$\sigma_B^V = \frac{E_B}{V_B}\sigma_B^E, \tag{15}$$

$$\sigma_M^V = \frac{E_M}{V_M}\sigma_M^E, \tag{16}$$

$$\sigma_{BM}^V = \frac{E_B}{V_B}\frac{E_M}{V_M}\sigma_{BM}^E, \tag{17}$$

where E_B and E_M are the market capitalizations of the bidder and target, V_B and V_M are the enterprise values of the bidder and target computed as the sum of market capitalization and book debt, and σ_B^E, σ_M^E, and σ_{BM}^E are the annualized volatility of the bidder's stock returns, the annualized volatility of the target's stock returns and the covariance between the stock returns of the bidder and target measured over the 250-trading day period ending 30 trading days before the merger announcement.[22]

We also require a measure of the expected time taken until the completion for each takeover in our sample. To proxy for this variable, we follow Officer (2006) in using the actual time that elapsed between when the transaction was announced and when the transaction was either completed or withdrawn. We construct our measure of the expected time to completion as the natural

[22] Although we use the bidder and target's equity volatilities to construct proxies for the volatility of the target's value to the bidder, to be sure, we are not implying that a bidder walks away from a takeover because of a drop in the target's equity value.

logarithm of the number calendar days between the date of the announcement and the date of either completion or withdrawal divided by 365.

3.3 Bidder Termination Provisions

Figure 2 shows the fraction of deals that included a bidder termination provision for each year of our sample. There appears to be some increase over time in the inclusion of bidder termination provisions in takeovers involving publicly-listed U.S. bidders and targets, though the increase is not monotonic. For instance, during the first three years of our sample 1997, 1998, and 1999, 16% of announced deals included bidder termination provisions on average. During the final three years of our sample, 2011, 2012 and 2013, on average 30% of deals included the provision. The fact that a bidder termination provision is only included in some deals throughout our sample period is consistent with our framework which illustrates that bidder termination provisions are only optimal under some circumstances.

Figure 3 breaks down the fraction of deals in our sample that included a bidder termination fee by the bidder's Fama-French 12 industry classification. Deals involving bidders from the Utilities and Energy industries had the most frequent inclusion of bidder termination provisions, with 38% and 37% of the deals including the provision respectively. Given that Utilities and Energy are both regulated industries, this observation is consistent with anecdotal evidence pointing to the use of bidder termination provisions in deals where regulatory approval is required (Collins, July 20, 2012). Relative to other industries, bidder termination provisions were also relatively frequent in the Consumer Durables (33%) and Chemicals (30%) industries.

Table 1 contains summary statistics for the variables used in our paper that are based on data obtained from SDC, Compustat and CRSP. These variables are defined in Table B1. Table 1 reports that bidder termination fees are present in about 21% of the entire sample (433 deals). The fees payable by bidders who terminate deals with a bidder termination provision are economically large. The table reports that the mean and median bidder termination fee payable are 4% and 3% of the total transaction value.

A target termination provision requires a target to pay a fee to the bidder in the event that

they terminate the takeover agreement. Table 1 reports that 77 % of deals in our sample include a target termination provision. Most often, targets terminate a takeover in order to accept a superior offer. While targets are usually able to terminate a takeover in favour of a superior offer even in the absence of a target termination provision, a target termination provision ensures that the incumbent bidder receives a payment from the target in the form of a target termination fee. A target termination provision therefore potentially provides the incumbent bidder with an advantage by deterring competing bidders. For this reason, the size of target termination fees is restricted by courts in some jurisdictions such as Delaware. In contrast, no such restrictions on the size of bidder termination fees exist. However, the mean and median sizes of target termination fees in our sample are comparable to the mean and median sizes of bidder termination fees. For deals in our sample that include target termination provisions, the mean and median target termination fee as a fraction of transaction value are between 3% and 3.5% (not tabulated).

Collars and lockup options are two other contractual provisions that are included in some transactions that may be related to bidder termination provisions. A collar is a provision accompanying stock offers that essentially fixes the value of the stock payment offered by the bidder over some range of values of the bidder's stock price. A collar therefore provides protection against changes in the value of a bidder's stock offer. According to our framework, a bidder termination provision in contrast provides protection against changes in the bidder's value for the target's assets. Table 1 reports that about 9% of the transactions in our sample have a collar. A lockup option is a provision that gives a bidder the right to purchase shares of the target at a discount to the price payable by a competing bidder. A lockup option may therefore deter bidding competition like a target termination provision. Table 1 reports that about 13% of the transactions in our sample have a lockup option.

Table 1 also compares the summary statistics for the subsample of 433 deals which included bidder terminations to the subsample of 1645 deals that did not. While the table highlights statistically significant differences in the characteristics of deals that include bidder termination provisions relative to those that don't, we defer the discussion of these differences to section 4 where we present our regression analyses.

3.4 Why do Bidders Terminate Takeovers?

Table 1 reports that 88% of the deals in our sample were completed. Therefore, 12% of the deals in our sample (245 deals) were subsequently terminated. We further examine these deals by searching for news articles related to them to determine why they were terminated and to classify them as being terminated by either the target, the bidder, or by mutual consent of both parties. We separately examine deals without and with bidder termination provisions. We find that out of 210 terminations of deals that did not include a bidder termination provision, only 13 terminations (6%) were classified as being terminated by the bidder. Reasons these deals were terminated include a breach of deal terms by the target, a material adverse change to the target and anticipated regulatory issues. This suggests that bidders rarely terminate deals and that their ability to do so is restricted to instances where the target violates deal terms or if regulatory issues arise. Therefore, consistent with our framework, it appears that bidders are constrained in their ability to terminate deals in the absence of a bidder termination provision.

In contrast, out of 35 terminations of deals that did include a bidder termination provision, 16 terminations (46%) were classified as being terminated by the bidder.[23] In 15 of these cases, a bidder termination fee was either paid by the bidder (11) or demanded by the target but contested by the bidder (4).[24] The reasons these terminations took place include adverse economic conditions for the bidder, failure of the bidder to secure financing to pay for the transaction, a failure to receive regulatory approval and a discretionary decision by the bidder to terminate the deal. These are generally different from the reasons why bidders terminate deals without bidder termination provisions.[25] As our framework suggests, this is consistent with bidder termination provisions being exercised in situations where the bidder's value for the target's assets might decrease.

[23] 11 of the other 19 terminations were classified as being terminated by targets who received superior offers or whose shareholders did not approve the deals, with the remainder being terminated by mutual consent of both parties.

[24] The remaining case was a termination by the bidder because of a material adverse change to the target and hence the bidder did not pay a termination fee.

[25] The exception is a failure to receive regulatory approval. Even in the absence of a bidder termination provision, deals that do not receive the required regulatory approval may be terminated without recourse against the bidder. Bidder termination provisions are however often used to transfer regulatory risk to the bidder that would otherwise be borne by both parties (Afsharipour, 2010; Collins, July 20, 2012), such as in the Google-Motorla transaction. Our framework suggests why it is appropriate for the bidder to bear the regulatory risk. For instance, a regulator might condition antitrust approval on the bidder taking a certain action such as selling off some of its other assets. In the absence of a bidder termination provision, the bidder is likely to be obliged by the takeover agreement to take the action required by a regulator. Absent this constraint, a bidder may or may not prefer to take the required action and a bidder termination provision could give the bidder the ability to make this choice.

4 Empirical Results

4.1 The Inclusion of Bidder Termination Provisions in Takeover Agreements

In this section, we present the results of examining the inclusion of the bidder termination provisions in takeover agreements. We estimate logit regressions where the dependent variable equals to one if an announced deal included a bidder termination provision and zero otherwise. Our variables of interest are the bidder's asset volatility (*Bidder Asset Volatility*), the target's asset volatility (*Target Asset Volatility*), the covariance of the bidder and target's asset value (*Bidder-Target Asset Covariance*), and the time taken from the announcement until completion or withdrawal (*Log(Time-to-Completion(Actual))*).

In our analysis, we control for group of deal characteristics that may be associated with the inclusion of bidder termination provisions. We include indicators of whether the deal was an all-cash offer (*Cash Offer*), an all-stock offer (*Stock Offer*), with the omitted category being deals with a mix of cash and stock offered. We include a variable that measures the size of the bidder's existing share of the target's equity (*Bidder Toehold*). We include indicators of whether the deal was a tender offer (*Tender Offer*), involved a hostile approach from the bidder (*Hostile Approach*), and whether the bidder and target belonged to the same Fama-French 49 industry (*Same Industry*). We also include variables that control for the target and bidder's sizes, measured using the natural logarithm of their market capitalizations (*Log(Target Market Cap.), Log (Bidder Market Cap.)*) and their market-to-book ratios (*Target Market-to-Book Assets*, *Bidder Market-to-Book Assets*). Lastly, we also include the ratio of the target's market capitalization to the bidder's market capitalization (*Target Market Cap./Bidder Market Cap.*) as a measure of relative size. Year fixed effects are included in our specifications to control for the variation in the inclusion of bidder termination provisions over time (see figure 2). A potential concern is that the residuals in our regressions are correlated with our main variables of interest. In particular, there is variation in the inclusion of bidder termination provisions across bidder's industries as shown in figure 3. Furthermore, the bidder's asset volatilities are likely to be correlated within industries. We therefore use standard errors that are clustered by the bidder's Fama-French 49 industry to compute t-statistics (Petersen, 2009).

The results of this analysis are presented in Table 2. In model (1) of Table 2, the coefficient on the bidder's asset volatility is positive and statistically significant. The coefficient implies that a one-standard deviation increase in the bidder's asset volatility is associated with an 4.7 percentage point increase in the probability that a bidder termination provision is included in the takeover agreement. The coefficient on the covariance between the bidder and target asset values is negative and statistically significant. A one-standard deviation decrease in this variable is associated with an 2.1 percentage point increase in the probability that a bidder termination provision is included. Recall that we use the bidder's asset volatility to proxy for the volatility of the bidder's value for the target's assets. Similarly, we use the covariance between the bidder and target asset values to proxy for the covariance between the bidder's value for the target's assets and the stand-alone value of the target's assets. This result is therefore consistent with our framework which predicts that a bidder termination provision will be included when it is likely that the bidder's value for the target's assets will fall below the stand-alone value of the target's assets. This is more likely when the volatility of the bidder's value of the target's assets is higher, and when this value covaries less with the stand-alone value of the target's assets. The coefficient on our third variable of interest, the natural logarithm of the time taken until the completion or withdrawal of the deal is positive and statistically significant.[26] A one-standard deviation increase in this variable is associated with a 5.7 percentage point increase in the probability that a bidder termination provision is included. Given that the unconditional probability that a deal includes a bidder termination provision is about 21%, the marginal effects for our variables of interest imply economically significant associations with the inclusion of bidder termination provisions.

In model (2), we replace the bidder's asset volatility with the target's asset volatility as a proxy for the volatility of the target's value under the bidder's control.[27] Consistent with model (1), we

[26] A potential concern is that termination fees will not be observed in deals that are withdrawn early before a merger agreement is finalized. Early withdrawal may therefore be correlated with both a lower time-to-completion and the absence of termination provisions. To ensure that this is not driving the relationship that we observe for our time-to-completion variable, in untabulated analysis, we also include an indicator of whether a deal was subsequently completed in our specifications and find that this does not alter the significance of our results. We also find that excluding deals that were potentially terminated prior to finalizing a merger agreement does not alter the significance of our results.

[27] We do not include the bidder and target's asset volatilities together in the same specification because the two variables have a correlation coefficient of 0.77 in our sample. In analysis that we do not tabulate for brevity, we run a non-linear regression modeling the inclusion of bidder termination provisions in which we include a volatility variable that is a linear combination of the bidder's and target's asset volatilities. We find that both variables have a positive and statistically significant association with the inclusion of a bidder termination provision.

find that the coefficient on the target's asset volatility is positive and statistically significant and has a magnitude similar to that of the bidder's asset volatility. A one-standard deviation increase in this variable is associated with a 5.2 percentage point increase in the probability that a bidder termination provision is included in the takeover agreement.[28]

The indicators for the method of payment indicate that bidder termination provisions are more common in all-stock offers, consistent with Bates and Lemmon (2003). While the coefficient on the stock offer indicator is positive, it is not statistically significant in model (1) but is in model (2) and subsequent specifications. The coefficient on the size of the bidder's toehold is negative and statistically significant suggesting that deals where bidders have existing toeholds may be negotiated differently.[29] We also find that the indicator of a hostile approach has a negative and statistically significant coefficient implying that bidder termination provisions are more likely to be included during friendly deal negotiations. We do not find that whether a deal is tender offer or was within the same industry are associated with the likelihood that a bidder termination provision is included.

Officer (2003) suggests that bidder termination provisions are a feature of mergers-of-equals where targets with relatively high bargaining power are able to negotiate a reciprocal termination fee arrangement. We find that the sizes of the target and bidder have statistically significant positive and negative associations with the inclusion of the bidder termination provision respectively. While Table 1 indicates that the relative size is on average higher in deals with bidder termination provisions, we find that controlling for the sizes of the target and bidder, the relative size does not have a statistically significant association with the inclusion of bidder termination provisions. Finally, the target's market-to-book ratio does not have an association with the inclusion of bidder termination provisions and the bidder's market-to-book ratio has a positive association with the inclusion of bidder termination provisions that is statistically significant in model (2).

In models (3) and (4), we include as a control variable an indicator of whether the deal included

[28] In untabulated analysis, we also examine whether the inclusion of bidder termination provisions is related to market risk. We proxy for market risk using the price of the VIX one month before the takeover announcement but find that it does not have a statistically significant association with the inclusion of bidder termination provisions. We also find that it does not have a statistically significant association with the size of the bidder termination fee which we examine in the next section.

[29] Bates and Lemmon (2003) find a similar relationship between target termination provisions and bidder toeholds.

a target termination provision (*Target Termination Provision*) and find that the coefficient on this variable is positive and statistically significant. This is consistent with the observation that the bidder termination fee is very often accompanied by a target termination provision which is more frequently included in takeover agreements. We also include an indicator of whether the deal included a collar (*Collar*) and find that the coefficient on this variable is negative and statistically significant. Because collar provisions provide protection against changes in the value of stock offers and thus make stock offers more similar to cash offers, this is consistent with our finding that stock offers are more likely to include bidder termination provisions. We also include an indicator of whether the deal included a lockup option (*Lockup Option*) and find that the coefficient on this variable is not statistically significant. Our main results remain similar in these specifications.

Bidder termination provisions are known to be used when a deal is potentially subject to anti-trust concerns (e.g. Sorkin, De La Merced, and Wortham (March 20, 2011)). To ensure that our results are not being driven by such deals alone, in models (5) and (6), we include the Herfindahl-Hirschmann index of the bidder's Fama-French 49 industry (*Bidder Industry HHI*), which measures industry concentration, as a control variable. We also include an interaction of this variable with the indicator of whether the bidder and target operate in the same Fama-French 49 industry to capture mergers occurring within an already concentrated industry. Neither of these variables, however, have a statistically significant association with the inclusion of bidder termination provisions. Bidder termination provisions are also known to be used when there is uncertainty for the bidder in obtaining financing (e.g. Barusch (February 15, 2013)). To ensure that this is not driving our results, we also include an indicator of whether the bidder was classified as a financial buyer as we expect such bidders to be more prone to financing risk. Consistent with this, we find a positive and statistically significant coefficient on this variable indicating that deals involving financial buyers are more likely to include a bidder termination provision. Our main results however remain similar.

We also investigate the hypothesis that the inclusion of bidder termination provision is driven by the target's uncertainty about the bidder's ability to complete the deal. To test this, we include the number of analysts following the bidder (*Bidder Analyst Following*) and the precision of the bidder's analyst forecasts (*Bidder Analyst Forecast Precision*) in model (5) and (6) as measures of

uncertainty about the bidder. We find that neither variable has a statistically significant impact on the inclusion of bidder termination provisions and that our main results are still similar.

4.2 The Determinants of Bidder Termination Fees

In this section, we present the results of examining the determinants of the size of the fee payable by the bidder to the target upon terminating the takeover agreement. We estimate OLS regressions where the dependent variable is the value of the bidder termination fee divided by total value of the transaction. The sample consists only of takeovers that included a bidder termination provision. Our variables of interest are the bidder's asset volatility, the target's asset volatility and the time taken from the announcement until completion or withdrawal. Our regression specifications include the same set of control variables as those of the previous section.

The results of this analysis are presented in Table 3. In model (1), the coefficient on the bidder's asset volatility is positive and statistically significant. A one-standard deviation increase in the bidder's asset volatility is associated with an increase of about 0.5 percentage points in the size of bidder termination fee relative to the transaction value. The coefficient on the natural logarithm of the time taken until the completion or withdrawal is also positive and statistically significant. A one standard deviation increase in this variable is associated with an increase of about 0.7 percentage points in the size of the bidder termination fee relative to the transaction value. Given that the mean size of the bidder termination fee relative to transaction value is about 4% in our sample, these coefficients imply economically significant impacts. These results are consistent with our empirical predictions from the relationship between the termination fee payable by the bidder and the price of the bidder's real option that is implied by having a bidder termination provision in the takeover agreement. Therefore, like the price of a real option, the size of the fee is shown to increase in the volatility of the underlying asset, which we measure using the bidder's asset volatility, as well as the expected time until the option is exercised, which we measure using the actual time taken from the announcement until the completion of withdrawal of the bid. In model (2), we replace the bidder's asset volatility with the target's asset volatility as a proxy for the volatility of the target's value under the bidder's control. The target's asset volatility also has a coefficient that is positive and statistically significant. A one standard deviation increase in this variable is associated

with an increase of about 0.3 percentage points in the size of the bidder termination fee relative to the transaction value. We note, however, that in subsequent specifications the coefficient on the target's asset volatility, though still positive, is not statistically significant. This suggests that the bidder's asset volatility perhaps better captures the component of the volatility of the target's assets under the bidder's control that determines the size of the bidder termination fee.[30]

Our control variables indicate that bidder termination fees are larger in all-cash offers and to a lesser extent in all-stock offers relative to offers that are a mix of cash and stock. We also find that larger bidder toeholds are associated with larger bidder termination fees and that bidder termination fees are smaller in deals that involve a hostile approach. We note that Offenberg and Pirinsky (2015) find that bidder termination fees are smaller in tender offers but that the coefficient on the tender offer indicator, though negative, is not statistically significant in our specifications. However, to the extent that tender offers have a lower expected time until completion, our finding that bidder termination fees increase with the expected time until completion is consistent with the intuition in Offenberg and Pirinsky (2015), that bidder termination provisions are redundant in deals that a bidder intends to complete quickly.

In models (3) and (4), we include size of the target termination fee relative to the transaction value (*Target Termination Fee/Transaction Value*) as a control variable. The coefficient on this variable is positive and statistically significant. This suggests larger target termination fees may be reciprocated by larger bidder termination fees. We also include indicators for collars and lockup options but find that the coefficient on neither variable is statistically significant.

In models (5) and (6), we examine whether potential regulatory scrutiny has an association with the bidder termination fee. As before, we include the Herfindahl-Hirschmann index of the bidder's Fama-French 49 industry and the interaction of the Herfindahl-Hirschmann index with the indicator of whether the bidder and target operate in the same Fama-French 49 industry in the specification. We also examine whether the risk associated with securing financing and include an indicator of whether the bidder was classified as a financial buyer in the specification. We also examine whether uncertainty about the bidder's ability to complete the deal is associated with

[30]In analysis that we do not tabulate for brevity, we find a similar result when we run a non-linear regression modeling the bidder termination fee in which we include a volatility variable that is a linear combination of the bidder's and target's asset volatilities.

larger bidder termination fees and include the number of analysts following the bidder and the precision of the bidder's analyst forecast in our specifications as measures of uncertainty about the bidder. Neither of these variables have a statistically significant association with the size of the bidder termination fee. More importantly, the coefficients of our main variables of interests retain their magnitude and statistical significance in these specifications.

4.3 Bidder Termination Fees and Target Termination Fees

In this section we extend the analysis of the previous section and investigate the relationship between bidder termination provisions and target termination provisions further.

Our analysis thus far has shown that target termination provisions are significantly associated with the inclusion of bidder termination provisions. Indeed, target termination provisions are much more common than bidder termination provisions and a bidder termination provision is almost always accompanied by a target termination provision.[31] In fact, in about 65% of the transactions in our sample that include bidder termination provisions, the bidder termination fee is equal to the target termination fee.

Although we do not model the target termination provision in our framework, it is unlikely that the optimal bidder termination fee is equal to the target termination fee. For instance, in practice, target termination provisions are most often used by targets accepting a superior bid which suggests that they are used quite differently from bidder termination provisions. Consistent with this view, (Afsharipour, 2010) and Quinn (2010) both point out that setting target and bidder termination fees equal to each other has little rationale and the former suggests that this likely to be an arbitrary arrangement used to ease negotiation. The frequency with which bidder termination fees are equal to target termination fees is in fact consistent with the view that bidder termination provisions and fees are demanded by target firms as reciprocation for target termination provisions and fees (Officer, 2003) and that this fosters a sense of equity between the target and bidder (Afsharipour, 2010). We investigate whether bidder termination provisions are priced differently by the negotiating parties when they are not simply priced as reciprocation for target termination

[31] 77% of deals in our sample include target termination provisions while 21% include bidder termination provisions. Furthermore, 96% of deals with bidder termination provisions also include target termination provisions.

provisions.

Figure 4 shows the fraction of all deals which included bidder termination provisions, where the bidder termination fee is not equal to the target termination fee for each year in our sample. There appears to be some increase over time in the fraction of deals where bidder termination fees were not equal to target termination fees, though this increase is not monotonic. In fact between the beginning and end of our sample, the fraction of deals in which the two fees were not equal doubled. During the first three years of the sample, the average fraction of deals in which the two fees were not equal was about 28%. In contrast, during the last three years of our sample, the average fraction of deals in which the two fees were not equal was about 58%. This observation is consistent with participants in takeovers having developed a better understanding of the use and pricing of bidder termination provisions over time though we concede that this no more than a speculation. We note also that in our sample, the average bidder termination fee as a fraction of transaction value is larger among deals where the two fees are not equal (4.23%) than deals where the two fees are equal (3.27%), although the medians are similar (3.01% vs 3.08% respectively).[32] This is not surprising given the restrictions imposed by courts in some states such as Delaware on the size of the target termination fee but not the bidder termination fee.

Like the previous section, we examine the size of the bidder termination fee relative to the total transaction value with OLS regressions. To capture deals where the bidder termination provision is less likely to be offered as reciprocation for a target termination provision, we introduce an indicator of whether the bidder termination fee is not equal to the target termination fee into our specifications (*Bidder Fee* $\neq$ *Target Fee*). We examine if when this variable is equal to one, the bidder termination is priced differently. To test this, we also include interactions of this indicator variable with the bidder's asset volatility and the time to completion or withdrawal. We also include interactions of the unequal fee indicator variable with the year fixed effects to account for the change in the fraction of deals with unequal fees over time shown in Figure 4.

The results are presented in Table 4. In model (1), the coefficient on the bidder's asset volatility is positive as before but is no longer statistically significant. The coefficient on the natural logarithm

[32] The difference between the means is statistically significant at the 1% level (t-test) whereas the difference between the medians is not statistically significant (Wilcoxon signed-rank test).

of the time until completion/withdrawal is positive and statistically significant as before. The coefficient on the interaction of the bidder's asset volatility with the unequal fee indicator is positive and statistically significant and is about 8 times larger than the coefficient on the bidder's asset volatility. Similarly, the coefficient on the interaction of the time until completion/withdrawal with the unequal fee indicator is positive, statistically significant, and is about 3 times larger than the coefficient on the time until completion/withdrawal. In model (2), we find similar results when we replace the bidder's asset volatility with the target's asset volatility as a proxy for the volatility of the target's value under the bidder's control. These results imply that in deals where the two fees are not set equal to each other, variables that capture the real option value are more strongly associated with the size of the bidder termination fee.

In models (3) and (4), we include the size of the target termination fee relative to the total transaction value and find that the coefficients on this variable are positive and statistically significant, consistent with our previous results. We also include indicators for collars and lockup options, which we find do not have statistically significant coefficients. Our main results are still similar. In models (5) and (6), we include an interaction between the target termination fee size and the unequal fees indicator. We exclude the target termination fee size variable from this specification because it is almost perfectly correlated with the dependent variable.[33] The coefficient on this interaction term is negative and statistically significant while our main results are similar to models (1) and (2). This implies that in deals when two fees are not equal in size, the size of the target termination fee is not associated with the size of the bidder termination fee after controlling for other covariates.

Our results suggest that although bidder termination provisions may often be offered as reciprocation for target termination provisions, this may not be efficient (Afsharipour, 2010; Quinn, 2010). When the bidder termination provision is not offered purely as reciprocation for a target termination provision, the bidder termination fee is more likely to be priced independently and thus reflect the price of the real option that is created by the inclusion of a bidder termination provision. The increase over time in the fraction of deals where the two fees are not equal (Figure 4) potentially

[33] In this specification, the coefficient on the target termination fee size would capture the relationship between the bidder termination fee size and target termination fee size when the two fees are equal to each other. For deals in which this is the case, the target termination fee size will perfectly predict the bidder termination fee size.

suggests an increasing recognition of the option value of bidder termination provisions.

4.4 Do Bidder Termination Provisions Signal Deal Completion Intent?

Deal terms may reveal information about the bidder (e.g. Eckbo, Giammarino, and Heinkel (1990)). We examine the view that bidder termination provisions signal a bidder's intent to follow through with the completion of a deal by committing to incur a cost should they fail to close the deal. For this to be applicable, it must be the case that in the absence of a bidder termination provision, a bidder is able to walk away from a deal at no cost or at a lower cost relative to having to pay a termination fee. In reality, however, in the absence of a bidder termination provision, bidders are generally bound by the takeover agreement to complete the deal (Gilson & Schwartz, 2005). Although bidders may decide to terminate deals following material adverse changes to the target, judicial precedents indicate that this is difficult to accomplish in practice (Denis & Macias, 2013). In the absence of a bidder termination provision therefore, bidders are substantially constrained in being able to terminate a deal at low cost. It is therefore unlikely that bidders use bidder termination provisions to convey their intent to ensure that a deal is completed because without the termination provision, the bidder would in fact have little choice but to complete the deal in most circumstances (Afsharipour, 2010).

Furthermore, information asymmetry about the transacting parties exists (e.g. Chu (2015)) and the use of a bidder termination provision as a signaling device implies the existence of information asymmetry about the ability of the bidder to complete deals. In our analysis thus far, we have included the bidder's analyst following and analyst forecast precision as measures of information asymmetry. We found that neither of these variables is associated with the inclusion of bidder termination fees or the size of bidder termination fees, suggesting that bidder termination provisions are not driven by information asymmetry about the bidder.

Nevertheless, we test the signaling hypothesis by examining whether deals with bidder termination provisions are more likely to be completed. If a bidder termination provision is indeed used to signal the bidder's intent to complete the deal, we expect that the inclusion of a bidder termination to predict deal success. We estimate logit regressions where the dependent variable is equal to one if a deal was successfully completed. The results are presented in Table 5. In model (1), the

coefficient on the indicator of whether the deal included a bidder termination provision (*Bidder Termination Provision*) is positive and statistically significant. However, both Bates and Lemmon (2003) and Officer (2003) find that target termination provisions are positively associated with the likelihood that a deal is ultimately successful. Also, as noted previously, bidder termination provisions are almost always accompanied by a target termination provision. Our specification for model (2) therefore additionally includes an indicator of whether the deal included a target termination provision. The coefficient on the target termination provision indicator is positive and statistically significant, confirming the findings of Bates and Lemmon (2003) and Officer (2003). However, the coefficient on the bidder termination provision indicator is not statistically significant, also consistent with findings by Bates and Lemmon (2003) and Officer (2003). This suggests that the positive association with deal success in model (1) was likely to have been driven by the inclusion of target termination provisions and that bidder termination provisions are not associated with a higher likelihood of deal success.[34]

To the extent that higher bidder termination fees are considered a stronger signal of deal-completion intent, one might expect higher bidder termination fees to be associated with a higher likelihood of deal completion. However, Cain, Macias, and Solomon (2014) find that private equity buyers that have previously terminated deals face high bidder termination fees in subsequent transactions. That is, private equity buyers that were perceived, ex-ante, as being less likely to complete deals in fact faced higher bidder termination fees, which is inconsistent with signaling. Also inconsistent with signaling, in analysis that we do not tabulate we find that higher bidder termination fees are negatively associated with the probability of a deal being completed. Signaling is therefore an unlikely explanation for the use of bidder termination provisions.

4.5 Bidder Termination Provisions and Wealth Gains from Takeovers

Our simple model suggests that the inclusion of a bidder termination provision can potentially increase the expected joint takeover gains. Here, to test whether bidder termination provisions are

[34]Our classification of successful versus terminated deals encompasses terminations by any party rather than just deals that were terminated by bidders. This is because deals may also be terminated by targets or by mutual consent as a result of bidders' actions, such as failure to effectively cooperate. If we restrict our classification of terminated deals to those that were terminated specifically by bidders, we find similar results (untabulated). We in fact find some evidence that deals with bidder termination provisions are more likely to be terminated by bidders which is inconsistent with a signaling hypothesis.

associated with larger joint takeover gains, we examine the association between bidder termination provisions and the combined gains of the bidder and target. We compute the combined gain of the bidder and target by summing the 3-day cumulative dollar abnormal returns of the target and bidder and then dividing this by the sum of the market capitalizations of the bidder and target 50 trading days before the announcement.

Table 6 presents the results of OLS regressions where the dependent variable is the combined gain of the bidder and target. In model (1) the explanatory variable of interest is the bidder termination provision indicator. The coefficient on this indicator is positive but not statistically significant implying that on average, bidder termination provisions are not associated with larger combined gains for the bidder and target around the takeover announcement. The results are similar when we control for the inclusion of target termination provisions, collars and lockup options (model (2)).

Recall that the increase in expected joint takeover gains from having a bidder termination provision is a result of having a real option that facilitates the termination of takeovers when completion is sub-optimal. Furthermore, in Sub-section 4.3, we found that bidder termination fees were more likely to be priced as real options when they were not set equal to target termination fees. In model (3), we therefore distinguish between bidder termination provisions which were more likely to have been priced as real options and those that weren't. We include an indicator for bidder termination provisions with fees that were not set equal to the fees for accompanying target termination provisions, or if there was no accompanying target termination provision altogether (*Bidder Fee* $\neq$ *Target Fee*), and a separate indicator for bidder termination provisions that were accompanied by target termination provisions with equal termination fees (*Bidder Fee* = *Target Fee*). The coefficient on *Bidder Fee* $\neq$ *Target Fee* is positive and statistically significant while the coefficient on *Bidder Fee* = *Target Fee* is negative but not statistically significant. We observe similar results when we control for the inclusion of target termination provisions, collars and lockup options in model (4).

The results of this section therefore suggest that bidder termination provisions that were more likely to have been included in takeovers for their real option value and priced as such (those with termination fees not equal to target termination fees), are associated with larger joint combined

gains for bidders and targets. In contrast, bidder termination provisions that appear to have been offered as reciprocation for target termination fees (those with termination fees equal to target termination fees) are not associated with larger combined gains for the bidder and target. An appropriate (i.e. optimal) termination fee enhances value by incentivizing a bidder to terminate a deal when completion would destroy value (that is, when the target is worth less to the bidder than on its own). Therefore, a failure to price the termination fee appropriately increases the likelihood that a bidder fails to terminate value-destroying deals, or that a bidder terminates a takeover that is value-enhancing (that is, when the target is worth more to the bidder than on its own). Therefore, put differently, our results suggest that in order for a bidder termination provision to enhance value, the termination fee payable must be priced appropriately, as a real option. Our results therefore lend credence to our real option view of bidder termination provisions.

We note however, that the decision to include a bidder termination provision is likely to be made simultaneously with decisions on other deal terms, which may also be correlated with expected gains. Furthermore, given that there are differences in observable and unobservable characteristics between deals with and without bidder termination provisions, we do not observe for each deal with a bidder termination provision, the equivalent of a counterfactual deal without the provision. We therefore refrain from making a causal interpretation of these results.

5 Conclusion

We examine the inclusion of a provision in a takeover agreement that gives a bidder the ability to walk away from the takeover, a contract feature that gives the bidder an option that it is unlikely to otherwise have. We illustrate our insight that a takeover with a bidder termination provision resembles a real option on the assets of the target firm and show that the value of this option lies in facilitating the termination of takeovers which are not optimal at the time of completion. We find that a bidder termination provision is included in takeover agreements when it is more likely to increase the expected takeover gains.

Little guidance exists on assessing when a bidder termination provision is appropriate in practice, an issue which our paper addresses. There is also substantial variation in the size of the fee

payable by the bidder upon termination in practice, and our paper sheds light on why termination fees should be and are higher in some cases than others. Like us, legal scholars such as Afsharipour (2010) and Quinn (2010) have also recognized that the provision has option value but have raised concerns that the pricing of termination fees payable by bidders does not reflect this. Our evidence that the size of the bidder termination fee is in fact associated with the option value of takeovers partially assuages these concerns. However, the fact that bidder termination fees are often set equal to target termination fees may indicate that mis-pricing is indeed taking place. Our paper further suggests that bidder termination provisions potentially create value for both parties and therefore, that a failure to account for the option value of a termination provision may result not only in mis-priced termination fees, but also mis-priced offers and forgone takeover surpluses.

In our framework, the incremental value of having a bidder termination option takes a reduced-form. In practice, the value of the target firm to the bidder could diverge from the target's stand-alone value for numerous reasons. For example, following a failure to secure financing, a bidder's cost of capital may become very high in poor market conditions. Alternatively, regulatory approval for a transaction may be conditioned on the bidder undertaking divestitures which could be particularly costly in times of market-wide distress. Finally, another superior target may emerge and raise the opportunity cost for a bidder already involved in a takeover. Some bidder termination provisions only facilitate termination under such specific scenarios. While our framework is also applicable to these types of provisions, perhaps a more refined set up that incorporates specific frictions in the takeover market is called for. However, pure "option-style" bidder termination provisions that give bidders complete discretion over the termination decision are also observed in practice.

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Appendix

A Proofs

A.1 Proof of Proposition 1

The target's and bidder's shares of the value created by the takeover can be written as follows:

Let $A \equiv \{S_{B,T} \geq K - P\}$ and $A^c \equiv \{S_{B,T} < K - P\}$.

$$\begin{aligned}
G_{Target,0} &= \int_A \iint_{S_{M,T}} e^{-rT}(K - S_{M,T}) f_{S_{B,T}S_{M,T}} dS_{M,T} dS_{B,T} \\
&\quad + \int_{A^c} \iint_{S_{M,T}} P e^{-rT} f_{S_{B,T}S_{M,T}} dS_{M,T} dS_{B,T} \\
G_{Bidder,0} &= \mathrm{E}^Q[e^{-rT} \max(S_{B,T} - K,\ -P)] \\
&= \int_A \iint_{S_{M,T}} e^{-rT}(S_{B,T} - K) f_{S_{B,T}} f_{S_{M,T}} dS_{M,T} dS_{B,T} \\
&\quad - \int_{A^c} \iint_{S_{M,T}} P e^{-rT} f_{S_{B,T}} f_{S_{M,T}} dS_{M,T} dS_{B,T} \qquad (18)
\end{aligned}$$

We know that $TS_P = G_{Taget} + G_{Bidder,0}$, $G_{Target,0} = 0.5TS$ and $G_{Bidder,0} = 0.5TS$. Hence, we can write:

$$TS_P = \int_A \iint_{S_{M,T}} e^{-rT}(S_{B,T} - S_{M,T}) f_{S_{B,T}S_{M,T}} dS_{M,T} dS_{B,T} \qquad (19)$$

where $f_{S_{B,T}S_{M,T}}$ is the joint PDF of $S_{B,T}$ and $S_{M,T}$.

Taking advantage of the log normality assumption, we can write:

$$\ln S_{M,T} | \ln S_{B,T} \sim N\big(\ln S_{M,0} + (r - 0.5\sigma_M^2)T + \frac{\sigma_M}{\sigma_B}\rho(\ln S_{B,T} - \ln S_{B,0} - (r - 0.5\sigma_B^2)T),\ (1-\rho^2)\sigma_M^2 T\big)$$

Therefore, we can write:

$$e^{-rT}\mathrm{E}_{S_{M,T}|S_{B,T}}[S_{M,T}|S_{B,T}] = S_{M,0}\left(\frac{S_{B,T}}{S_{B,0}}\right)^{\frac{\sigma_M}{\sigma_B}\rho} \times e^{\rho T[0.5\sigma_M\sigma_B - 0.5\rho\sigma_M^2 - \frac{\sigma_M}{\sigma_B}r]}$$

Thus, TS_P can be written as follows:

$$TS_P = \mathrm{E}_{S_{M,T}}[e^{-rT} S_{B,T} 1_A] - S_{M,0} e^{\rho T[0.5\sigma_M \sigma_B - 0.5\rho\sigma_M^2 - \frac{\sigma_M}{\sigma_B} r]} \mathrm{E}_{S_{B,T}}[(\frac{S_{B,T}}{S_{B,0}})^{\frac{\sigma_M}{\sigma_B}\rho} 1_A] \tag{20}$$

Using the following property of lognormal distributions we can calculate the expectations and derive an expression for TS. If $X \sim logN(\mu, \sigma)$

$$\int_0^V X^n f(x)dx = e^{n\mu + 0.5n^2\sigma^2} \Phi\left(\frac{\ln V - \mu - n\sigma^2}{\sigma}\right)\left(\right.$$

$$\begin{aligned} TS_P \quad = \quad & S_{B,0}\Phi\left(\frac{\ln S_{B,0} + (r - 0.5\sigma_B^2)T + \sigma_B^2 T - \ln(K-P)}{\sigma_B\sqrt{T}}\right)\left(\right. \\ & -S_{M,0}\Phi\left(\frac{\ln S_{B,0} + (r - 0.5\sigma_B^2)T + \frac{\sigma_M}{\sigma_B}\rho\sigma_B^2 T - \ln(K-P)}{\sigma_B\sqrt{T}}\right)\left(\right. \end{aligned} \tag{21}$$

In this model bargaining powers (0.5 for each party) are exogenously determined. Thus, the target and the bidder share the value created by the takeover ex-post based according their ex-ante bargaining powers. To determine K^* and P^*, the target maximizes his share of the total surplus, given the bidder's participation constraint holds. The endogenous choice variables are K and P:

$$\begin{aligned} \max_{(P,K)} \quad & G_{Target,0} \\ & s.t. \\ & G_{Bidder,0} = 0.5(TS_P) \end{aligned}$$

Substituting for $G_{Target,0}$, $G_{Bidder,0}$ and TS_P from (17) and (20), we can rewrite the optimization

problem as follows:

$$\begin{aligned}\max_{(P,K)} \quad & (0.5)S_{B,0}\Phi\left(\frac{\ln S_{B,0}+(r-0.5\sigma_B^2)T+\sigma_B^2T-\ln(K-P)}{\sigma_B\sqrt{T}}\right)\\ & -(0.5)S_{M,0}\Phi\left(\frac{\ln S_{B,0}+(r-0.5\sigma_B^2)T+\frac{\sigma_M}{\sigma_B}\rho\sigma_B^2T-\ln(K-P)}{\sigma_B\sqrt{T}}\right)\\ s.t.\quad & \end{aligned}$$

$$\begin{aligned}&\int_A\left(\int_{S_{M,T}} e^{-rT}(S_{B,T}-K)f_{S_{B,T}S_{M,T}}dS_{M,T}dS_{B,T}-\int_{A^c}\int_{S_{M,T}} Pe^{-rT}f_{S_{B,T}S_{M,T}}dS_{M,T}dS_{B,T}\right)\\ &=0.5S_{B,0}\Phi\left(\frac{\ln S_{B,0}+(r-0.5\sigma_B^2)T+\sigma_B^2T-\ln(K-P)}{\sigma_B\sqrt{T}}\right)\\ &\quad -0.5S_{M,0}\Phi\left(\frac{\ln S_{B,0}+(r-0.5\sigma_B^2)T+\frac{\sigma_M}{\sigma_B}\rho\sigma_B^2T-\ln(K-P)}{\sigma_B\sqrt{T}}\right)\end{aligned}$$

From this maximization, we can determine a unique (K^*, P^*) for every set of model parameters. Noticing that TS_P is a function of $K-P$, we can treat $K-P$ as one variable and maximize TS_P with respect to $K-P$. The first order condition of maximizing TS_P leads to

$$\begin{aligned}&\frac{\partial TS_P}{\partial(K-P)}=0\\ \Rightarrow\quad &\ln\left(\frac{S_{M,0}}{(S_{B,0})^{\frac{\sigma_M}{\sigma_B}\rho}}\right)^{\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}}+rT+0.5\rho\sigma_M\sigma_BT=\ln(K-P)\\ \Rightarrow\quad &K^*-P^*=S_{B,0}\left(\frac{S_{B,0}}{S_{M,0}}\right)^{-\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}}e^{(r+0.5\rho\sigma_M\sigma_B)T}\end{aligned}\tag{22}$$

Substituting for K^*-P^*, the optimal TS_P can be written as

$$\begin{aligned}TS_P^* \;=\;& S_{B,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\sigma_B^2T-0.5\rho\sigma_M\sigma_BT}{\sigma_B\sqrt{T}}\right)\\ &-S_{M,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\rho\sigma_M\sigma_BT-0.5\sigma_B^2T}{\sigma_B\sqrt{T}}\right)\end{aligned}\tag{23}$$

Now substituting for TS_P^* and K^*-P^* into the binding constraint of the optimization problem,

we can solve for the optimal bidder termination fee P^*:

$$
\begin{aligned}
G_{Bidder,0} &= \mathrm{E}^Q[e^{-rT}\max\left(S_{B,T}-K,\,-P\right)] \;=\; 0.5(TS_P^*) \\
&\Rightarrow\; e^{-rT}P^* \;=\; \mathrm{E}^Q[e^{-rT}\max\left(S_{B,T}-(K-P),\,0\right)] - 0.5(TS_P^*) \quad \Rightarrow \\
P^* &= e^{rT}S_{B,0}\quad N(d_1) - N(d_2)\left(\frac{S_{M,0}}{S_{B,0}}\right)^{\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}}\quad e^{0.5\rho\sigma_M\sigma_B T}\Bigg)\Bigg(\\
&\quad -0.5e^{rT}S_{B,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\sigma_B^2T-0.5\rho\sigma_M\sigma_BT}{\sigma_B\sqrt{T}}\right)\Bigg(\\
&\quad +0.5e^{rT}S_{M,0}\Phi\left(\frac{\frac{\ln S_{B,0}-\ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\rho\sigma_M\sigma_BT-0.5\sigma_B^2T}{\sigma_B\sqrt{T}}\right)\Bigg(
\end{aligned}
\tag{24}
$$

where

$$
\begin{aligned}
d_1 &= \frac{\frac{\ln\left(\frac{S_{B,0}}{S_{M,0}}\right)}{1-\frac{\sigma_M}{\sigma_B}\rho}+0.5\sigma_B^2T-0.5\rho\sigma_B\sigma_MT}{\sigma_B\sqrt{T}} \\
d_2 &= \frac{\frac{\ln\left(\frac{S_{B,0}}{S_{M,0}}\right)}{1-\frac{\sigma_M}{\sigma_B}\rho}-0.5\sigma_B^2T-0.5\rho\sigma_B\sigma_MT}{\sigma_B\sqrt{T}}
\end{aligned}
\tag{25}
$$

It is also clear that from (21) we can express the optimal offer price, K^*:

$$
K^* \;= P^* \;+\; S_{B,0}\left(\frac{S_{B,0}}{S_{M,0}}\right)^{-\frac{1}{1-\frac{\sigma_M}{\sigma_B}\rho}}\quad e^{(r+0.5\rho\sigma_M\sigma_B)T} \tag{26}
$$

A.2 Proof of Proposition 2

Inclusion of bidder termination provision is optimal iff $TS_P \geq TS_{NP}$ (Optimality Constraint). The indifference condition is

$$\begin{aligned} TS_P^* &= S_{B,0} - S_{M,0} \\ &\Rightarrow \quad S_{B,0}\Phi\left(\frac{\frac{\ln S_{B,0} - \ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho} + 0.5\sigma_B^2 T - 0.5\rho\sigma_M\sigma_B T}{\sigma_B\sqrt{T}}\right) \\ &\quad -S_{M,0}\Phi\left(\frac{\frac{\ln S_{B,0} - \ln S_{M,0}}{1-\frac{\sigma_M}{\sigma_B}\rho} + 0.5\rho\sigma_M\sigma_B T - 0.5\sigma_B^2 T}{\sigma_B\sqrt{T}}\right) \\ &= S_{B,0} - S_{M,0}. \end{aligned}$$

It is clear that when $\frac{\rho\sigma_M}{\sigma_B} = 1$, the above equation holds. And we have $\hat{\sigma}_{BM} = \sigma_B^2$ or $\hat{\rho} = \frac{\sigma_B}{\sigma_M}$.

When $\sigma_{BM} > \sigma_B^2$, we have

$$\begin{aligned} TS_P &= S_{B,0}\Phi\left(\frac{\ln S_{B,0} + (r - 0.5\sigma_B^2)T + \sigma_B^2 T - \ln(K-P)}{\sigma_B\sqrt{T}}\right) \\ &\quad -S_{M,0}\Phi\left(\frac{\ln S_{B,0} + (r - 0.5\sigma_B^2)T + \sigma_{BM} T - \ln(K-P)}{\sigma_B\sqrt{T}}\right) \\ &< (S_{B,0} - S_{M,0})\Phi\left(\frac{\ln S_{B,0} + (r - 0.5\sigma_B^2)T + \sigma_B^2 T - \ln(K-P)}{\sigma_B\sqrt{T}}\right) \leq (S_{B,0} - S_{M,0}). \end{aligned}$$

Therefore, it is not optimal to include a bidder termination option when $\sigma_{BM} \geq \sigma_B^2$.

A.3 Comparative Statics with $\rho = 0$

For every parameter of interest, we derive the comparative statics for both the bidder termination fee P^* and the bidder termination fee expressed as a percentage of the offer price $p^* \equiv \frac{P^*}{K^*}$. When $\rho = 0$ we can rewrite TS^* and P^* as:

$$TS^* = S_{B,0}N(d_1) - S_{M,0}N(d_2) \quad \Rightarrow \quad P^* = 0.5e^{rT}TS^*$$

We have

$$N'(d_2) = \frac{1}{\sqrt{2\pi}}e^{-0.5d_2^2} = \frac{1}{\sqrt{2\pi}}e^{-0.5d_1^2}\frac{S_{B,0}}{S_{M,0}} = N'(d_1)\frac{S_{B,0}}{S_{M,0}}$$

For any parameter x, we have

$$\begin{aligned}\frac{\partial TS^*}{\partial x} &= S_{B,0}N'(d_1)\frac{\partial d_1}{\partial x} - S_{M,0}N'(d_2)\frac{\partial d_2}{\partial x} \\ &= S_{B,0}N'(d_1)\left(\frac{\partial d_1}{\partial x} - \frac{\partial d_2}{\partial x}\right)\left(\right.\end{aligned}$$

When $x \in \{\sigma, T\}$, we have

$$\begin{aligned}\frac{\partial d_1}{\partial \sigma} - \frac{\partial d_2}{\partial \sigma} &= \sqrt{T} \\ \frac{\partial d_1}{\partial T} - \frac{\partial d_2}{\partial T} &= \frac{\sigma}{2\sqrt{T}}\end{aligned}$$

Therefore, we have

$$\begin{aligned}\frac{\partial P^*}{\partial \sigma} &= 0.5S_{B,0}e^{rT}N'(d_1)\sqrt{T} > 0 \\ \frac{\partial P^*}{\partial T} &= rP^* + 0.5S_{B,0}e^{rT}N'(d_1)\frac{\sigma}{2\sqrt{T}} > 0\end{aligned}$$

Next we derive the comparative statics for the bidder termination fee expressed as a percentage of the offer price

$$p^* \equiv \frac{P^*}{K^*}$$

and it is straightforward to show that

$$\begin{aligned}\frac{\partial p^*}{\partial \sigma} &= 0.5S_{B,0}e^{rT}N'(d_1)\sqrt{T} \times \frac{e^{rT}S_{M,0}}{(K^*)^2} > 0 \\ \frac{\partial p^*}{\partial T} &= 0.5S_{B,0}e^{rT}N'(d_1)\frac{\sigma}{2\sqrt{T}} \times \frac{e^{rT}S_{M,0}}{(K^*)^2} > 0\end{aligned}$$

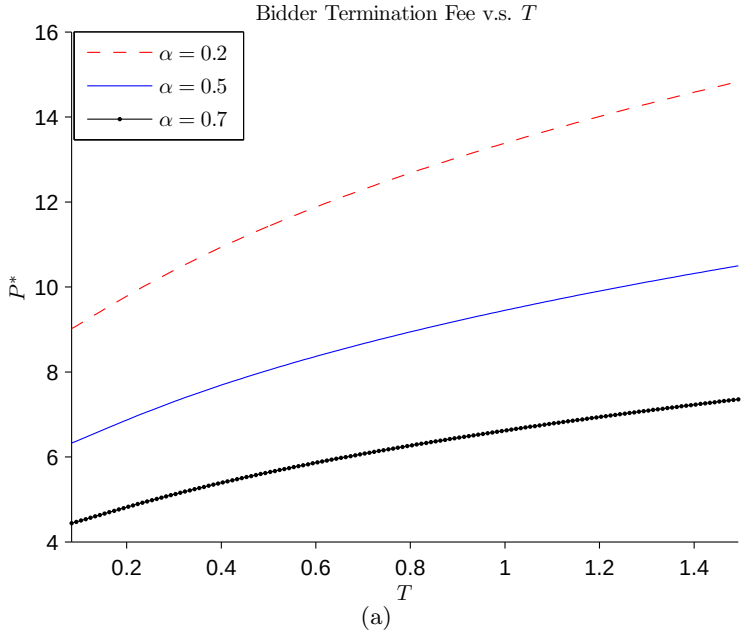
B Variable Definitions

Table B1: Variable Definitions
This table contains the definitions and descriptions of the variables used in the paper.

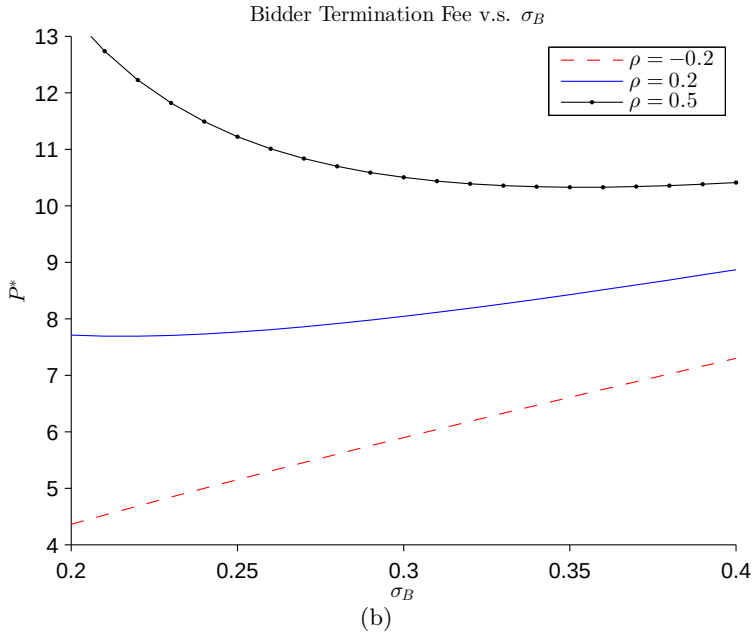
Variable	Definition
Bidder Termination Provision	Equals 1 if the takeover includes a provision that permits the bidder to terminate the takeover agreement and 0 otherwise.
Bidder Termination Fee	The value of the fee payable by the bidder to the target upon terminating the takeover agreement.
Bidder Term. Fee/Transaction Value	The value of the bidder termination fee (see Bidder Termination Fee definition) divided by the total value of the transaction.
Target Termination Provision	Equals 1 if the takeover includes a provision that required the target to pay a fee to bidder in the event that the target terminated the takeover agreement and 0 otherwise.
Target Termination Fee	The value of the fee payable by the target to the bidder upon terminating the takeover agreement.
Target Term. Fee/Transaction Value	The value of the target termination fee (see Target Termination Fee definition) divided by the total value of the transaction.
Bidder-Target Asset Covariance	The product of the bidder and target's ratios of their market capitalization to their enterprise values (computed as market capitalization + book debt), multiplied by the annualized covariance between the stock returns of the bidder and target in the 250-trading day period ending 30 trading days before the merger announcement.
Bidder Asset Volatility	The ratio of the bidder's market capitalization to its enterprise value (computed as market capitalization plus book debt), multiplied by the annualized volatility of the bidder's stock returns and the covariance between the stock returns of the bidder and target in the 250-trading day period ending 30 trading days before the merger announcement.
Time-to-Completion (Actual)	The number of days between takeover announcement date the date of completion or withdrawal, divided by 365.
Collar	Equals 1 if the method of payment offered by bidder included stock together with a provision that accommodated changes in the stock exchange ratio conditional on the level of the bidder's stock price at the time of the closing of the merger.
Lockup Option	Equals 1 if the merger agreement includes a provision giving the bidder the right to purchase target shares at a discount to the price payable by a competing bidder.

Cash Offer	Equals 1 if the method of payment offered by bidder was consisted only of cash.
Stock Offer	Equals 1 if the method of payment offered by bidder was consisted only of the bidder's stock.
Bidder Toehold	The fraction of the target's shares outstanding held by the bidder at the time of the announcement of the takeover.
Tender Offer	Equals 1 if the bidder made a tender offer.
Hostile Approach	Equals 1 if the bidder's approach to the target was hostile.
Same Industry	Equals 1 if the bidder and target belonged to the same Fama-French 49-Industry Classificaiton.
Financial Buyer	Equals 1 if the bidder was classified as a financial buyer.
Completed Deal	Equals 1 if takeover was completed successfully.
Bidder (Target) Market Capitalization	The market capitalization of the bidder (target) 50 trading days before the takeover announcement.
Bidder (Target) Market-to-Book Assets	The ratio of the bidder's (target's) market value of assets to book value of assets computed following the definitions in Baker and Wurgler (2002)
Bidder Industry HHI	The Herfindahl-Hirschman index of the bidder's Fama-French 49-Industry.
Bidder Analyst Following	The number of analysts following the bidder.
Bidder Analyst Forecast Precision	Equals 1 divided by the standard deviation of analyst forecasts for firms followed by more than one analyst. Equals 0 for firms followed by one or no analysts.
Combined Gain	The sum of the target and bidder's cumulative dollar abnormal returns in the three period around the announcement of the takeover divided by the sum of the target and bidder's market capitalizations 50 trading days before the takeover announcement date.

Figure 1:
Bidder Termination Fee as a function of T and σ_B
The base parameters for the graphs are $r = 0.04$, $S_{M,0} = 100$, $S_{B,0} = 110$, $\sigma_M = 0.2$, $\sigma_B = 0.3$, $\alpha = 0.5$, $T = 0.5$, and $\rho = 0.2$. In each graph only one parameter changes and the others take the base parameter values. In Figure 1(a) T changes from 0.1 years to 1.5 years. In Figure 1(b) σ_B changes from 0.2 to 0.6.



(a)



(b)

Figure 2:
Fraction of Deals with Bidder Termination Provisions by Year
This graph shows the fraction of announced takeovers that included bidder termination provisions in a sample of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The data are grouped by the year the takeover was announced.

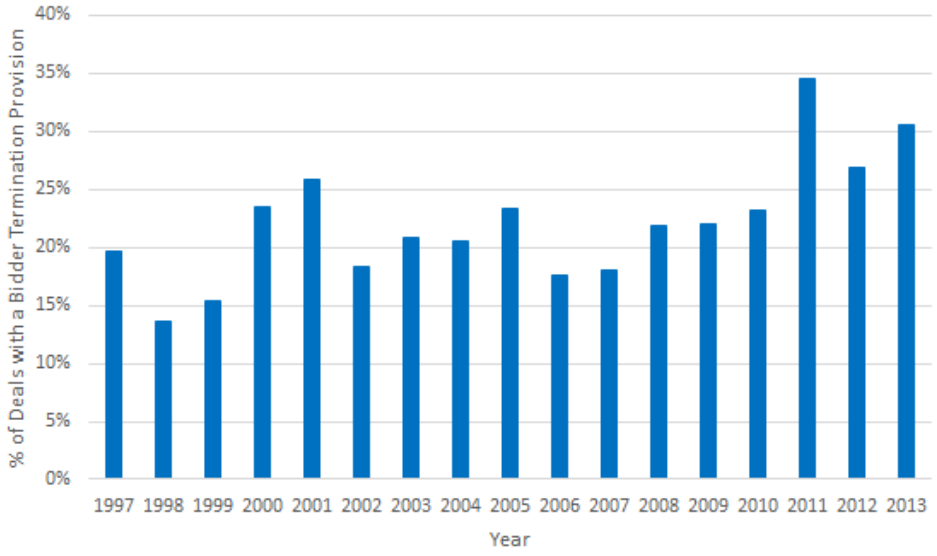


Figure 3:
Fraction of Deals with Bidder Termination Provisions by Industry
This graph shows the fraction of announced takeovers that included bidder termination provisions in a sample of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The data are grouped by the bidder's Fama-French 12-industry classification.

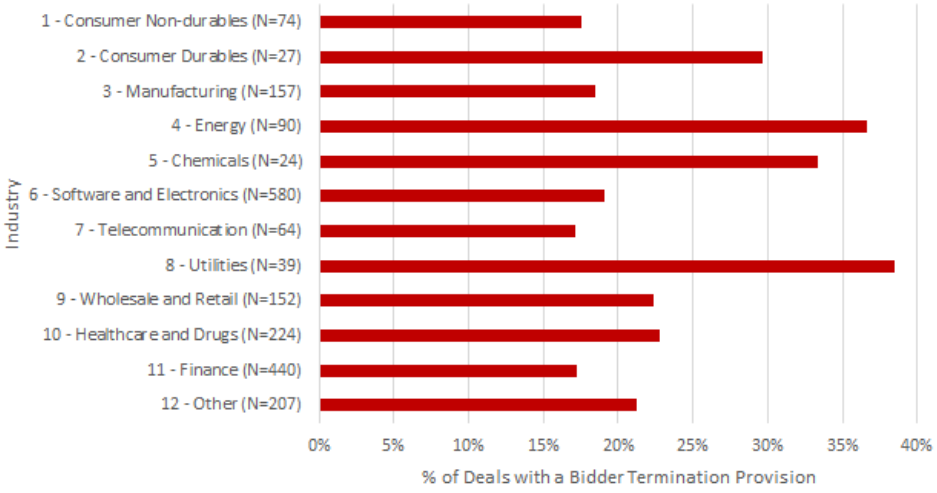


Figure 4:
Fraction of Deals with Bidder Termination Fees Not Equal to Target Termination Fees
This graph shows the fraction of announced takeovers where the bidder termination fee was different from the target termination fee. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The data are grouped by the year the takeover was announced.

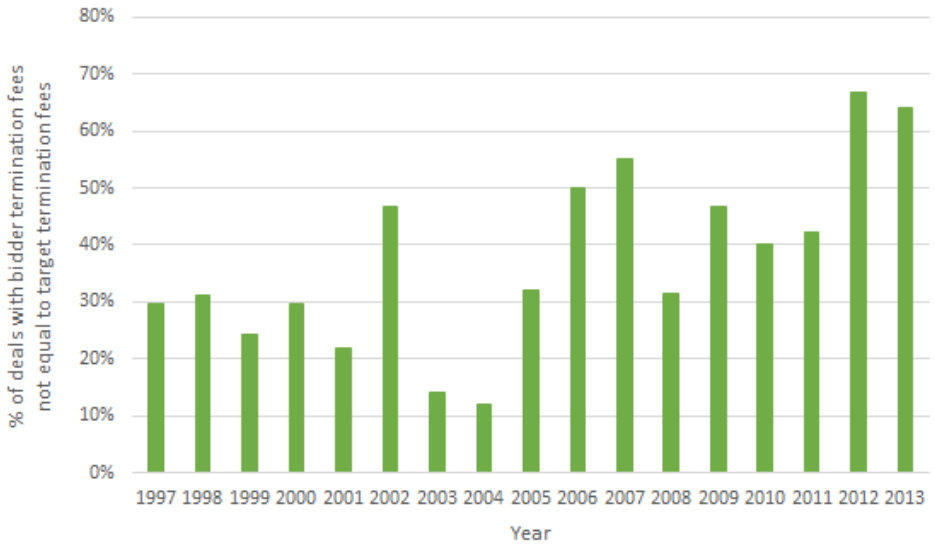


Table 1:
Descriptive Statistics for Target, Acquirer and Transaction Characterisitcs

This table reports descriptive statistics for the variables used in our study of bidder termination provisions. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. All variables are defined in Table B1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, for the difference in means (t-test) and medians (Wilcoxon signed-rank test) between the samples of deals with and without bidder termination provisions.

	All Deals (N=2078)			Deals with a Bidder Termination Provision (N=433)		Deals without a Bidder Termination Provision (N=1645)	
	Mean	Median	Std. Dev.	Mean	Median	Mean	Median
Bidder Termination Provision	0.21	0.00	0.41	1.00	1.00		
Bidder Termination Fee	15.40	0.00	107.35	73.92	15.00		
Bidder Termination Fee/Transaction Value	0.01	0.00	0.02	0.04	0.03		
Target Termination Provision	0.77	1.00	0.42	0.96	1.00	0.72***	1.00***
Target Termination Fee	31.86	5.50	106.19	58.41	15.00	24.87***	4.00***
Target Termination Fee/Transaction Value	0.03	0.03	0.02	0.03	0.03	0.02***	0.03***
Bidder-Target Asset Covariance	0.03	0.01	0.08	0.04	0.01	0.03***	0.01***
Bidder Asset Volatility	0.29	0.22	0.26	0.33	0.27	0.28***	0.21***
Target Asset Volatility	0.36	0.29	0.31	0.38	0.30	0.35*	0.29
Time-to-Completion (Actual)	0.35	0.31	0.22	0.41	0.35	0.34***	0.29***
Log(Time-to-Completion (Actual))	-1.22	-1.17	0.63	-1.02	-1.05	-1.28***	-1.23***
Collar	0.09	0.00	0.28	0.07	0.00	0.09*	0.00
Lockup Option	0.13	0.00	0.33	0.11	0.00	0.13*	0.00
Cash Offer	0.34	0.00	0.47	0.20	0.00	0.37***	0.00***
Stock Offer	0.32	0.00	0.47	0.39	0.00	0.30***	0.00***
Bidder Toehold	0.08	0.00	0.78	0.00	0.00	0.10***	0.00**
Tender Offer	0.16	0.00	0.37	0.09	0.00	0.18***	0.00**
Hostile Approach	0.02	0.00	0.14	0.01	0.00	0.02**	0.00**
Same Industry	0.62	1.00	0.48	0.67	1.00	0.61**	1.00**
Financial Buyer	0.04	0.00	0.19	0.07	0.00	0.03***	0.00***
Completed Deal	0.88	1.00	0.32	0.93	1.00	0.87***	1.00***
Target Market Capitalization	993.97	181.89	3298.87	1505.46	336.12	859.33***	156.76***
Log(Target Market Cap.)	12.20	12.11	1.74	12.71	12.73	12.07***	11.96***
Target Market-to-Book Assets	1.83	1.22	1.97	1.96	1.33	1.80	1.18**
Bidder Market Capitalization	14808.30	1677.69	43580.19	9186.44	1240.85	16288.09***	1768.95***
Log(Bidder Market Cap.)	14.47	14.33	2.05	14.10	14.03	14.57***	14.39***
Target Market Cap./Bidder Market Cap.	0.28	0.13	0.44	0.44	0.34	0.24***	0.10***
Bidder Market-to-Book Assets	2.25	1.43	3.03	2.44	1.46	2.20	1.41*
Bidder Industry HHI	0.05	0.04	0.05	0.05	0.04	0.05	0.04
Bidder Analyst Following	9.73	7.00	9.29	8.30	7.00	10.10***	7.00***
Bidder Analyst Forecast Precision	30.26	20.00	34.10	27.21	14.29	31.07**	20.00**
Combined Gain	0.01	0.01	0.07	0.01	0.01	0.01	0.01

Table 2:
The Inclusion of Bidder Termination Provisions in Takeover Agreements

This table reports estimates from logit regressions that examine the inclusion of bidder termination provisions in takeover agreements. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The dependent variable equals 1 if the takeover agreement included a bidder termination provision. The explanatory variables are defined in Table B1. Year fixed effects are included. *t*-statistics are computed with standard errors clustered at the bidder's Fama-French 49-industry level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	=1 if deal includes a Bidder Termination Provision					
Constant	-1.749***	-1.715***	-3.465***	-3.432***	-3.301***	-3.289***
	(-4.32)	(-4.34)	(-4.24)	(-4.31)	(-4.09)	(-4.16)
Bidder Asset Volatility	1.372***		1.110***		1.090***	
	(3.87)		(3.14)		(3.20)	
Target Asset Volatility		1.285***		1.021***		1.002***
		(3.80)		(3.29)		(3.34)
Bidder-Target Asset Covariance	-2.004**	-2.010***	-2.054**	-2.001**	-2.133**	-2.073**
	(-2.44)	(-2.83)	(-2.08)	(-2.46)	(-2.12)	(-2.48)
Log(Time-to-Completion (Actual))	0.695***	0.710***	0.626***	0.642***	0.652***	0.666***
	(5.91)	(5.83)	(4.34)	(4.47)	(4.76)	(4.83)
Target Termination Provision			2.492***	2.494***	2.536***	2.538***
			(5.20)	(5.21)	(5.29)	(5.32)
Collar			-0.592***	-0.565**	-0.591**	-0.564**
			(-2.58)	(-2.57)	(-2.55)	(-2.54)
Lockup Option			0.123	0.141	0.0932	0.112
			(0.61)	(0.69)	(0.46)	(0.55)
Cash Offer	-0.178	-0.211	-0.0899	-0.108	-0.0947	-0.110
	(-0.92)	(-1.14)	(-0.38)	(-0.47)	(-0.42)	(-0.50)
Stock Offer	0.177	0.187*	0.367***	0.373***	0.357***	0.363***
	(1.56)	(1.67)	(2.88)	(2.89)	(2.92)	(2.92)
Bidder Toehold	-0.556***	-0.564***	-0.534**	-0.544**	-0.627***	-0.635***
	(-2.69)	(-2.65)	(-2.56)	(-2.51)	(-3.50)	(-3.38)
Tender Offer	0.0236	0.0323	-0.131	-0.124	-0.113	-0.107
	(0.11)	(0.15)	(-0.56)	(-0.52)	(-0.49)	(-0.45)
Hostile Approach	-1.778***	-1.792***	-0.544	-0.563	-0.533	-0.550
	(-3.68)	(-3.69)	(-1.15)	(-1.20)	(-1.15)	(-1.19)
Same Industry	-0.0299	-0.0169	-0.0918	-0.0775	-0.115	-0.103
	(-0.25)	(-0.15)	(-0.74)	(-0.63)	(-0.66)	(-0.58)
Log(Target Market Cap.)	0.633***	0.677***	0.613***	0.650***	0.604***	0.641***
	(6.25)	(6.95)	(5.28)	(5.74)	(5.27)	(5.75)
Target Market-to-Book Assets	0.0174	-0.0203	0.00133	-0.0292	0.00310	-0.0265
	(0.45)	(-0.48)	(0.03)	(-0.64)	(0.07)	(-0.57)
Log(Bidder Market Cap.)	-0.500***	-0.539***	-0.511***	-0.544***	-0.513***	-0.544***
	(-5.68)	(-6.18)	(-5.43)	(-5.90)	(-5.10)	(-5.61)
Bidder Market-to-Book Assets	0.0156	0.0281**	0.0145	0.0251*	0.0159	0.0262**
	(1.25)	(2.23)	(1.07)	(1.89)	(1.19)	(1.96)
Target Market Cap./Bidder Market Cap.	-0.202	-0.233	-0.0275	-0.0639	-0.0215	-0.0561
	(-1.08)	(-1.24)	(-0.12)	(-0.30)	(-0.10)	(-0.26)
Bidder Industry HHI					-0.754	-0.899
					(-0.37)	(-0.43)
Same Ind. × Bidder Ind. HHI					0.419	0.443
					(0.14)	(0.15)
Financial Buyer					0.946***	0.938***
					(3.01)	(2.95)
Bidder Analyst Following					0.00455	0.00376
					(0.51)	(0.42)
Bidder Analyst Forecast Precision					-0.00154	-0.00152
					(-1.15)	(-1.13)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2078	2078	2078	2078	2078	2078
Pseudo R^2	0.142	0.144	0.209	0.210	0.214	0.214

Table 3:
The Determinants of Bidder Termination Fees

This table reports estimates from OLS regressions that examine the size of bidder termination fees payable by a bidder upon terminating a takeover agreement. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms, that included a bidder termination provision in the takeover agreement. The dependent variable is the value of the bidder termination fee divided by the total value of the transaction. The explanatory variables are defined in Table B1. Year fixed effects are included. *t*-statistics are computed with standard errors clustered at the bidder's Fama-French 49-industry level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	Bidder Termination Fee/Transaction Value					
Constant	0.0432***	0.0482***	0.0248	0.0287	0.0207	0.0254
	(3.37)	(3.47)	(1.63)	(1.67)	(1.38)	(1.49)
Bidder Asset Volatility	0.0186***		0.0168***		0.0151***	
	(3.26)		(3.03)		(3.22)	
Target Asset Volatility		0.00943*		0.00799		0.00603
		(1.85)		(1.59)		(1.29)
Log(Time-to-Completion (Actual))	0.0109**	0.0100**	0.00992**	0.00900**	0.0104**	0.00955*
	(2.60)	(2.54)	(2.15)	(2.08)	(2.07)	(1.99)
Target Termination Fee/Transaction Value			0.298**	0.308**	0.290*	0.300*
			(2.05)	(2.11)	(1.92)	(1.96)
Collar			-0.00392	-0.00327	-0.00457*	-0.00405
			(-1.62)	(-1.29)	(-1.87)	(-1.57)
Lockup Option			0.00303	0.00268	0.00265	0.00218
			(0.79)	(0.67)	(0.67)	(0.52)
Cash Offer	0.0169***	0.0172***	0.0166***	0.0169***	0.0163***	0.0165***
	(3.11)	(3.05)	(2.96)	(2.92)	(3.08)	(3.05)
Stock Offer	0.00427	0.00487*	0.00322	0.00378	0.00407	0.00470
	(1.51)	(1.76)	(1.17)	(1.37)	(1.40)	(1.59)
Bidder Toehold	0.0458***	0.0459***	0.0269***	0.0262***	0.0296***	0.0294***
	(6.38)	(6.20)	(2.83)	(2.71)	(2.92)	(2.90)
Tender Offer	-0.000219	0.000214	-0.00135	-0.00104	-0.000860	-0.000614
	(-0.03)	(0.03)	(-0.17)	(-0.13)	(-0.11)	(-0.08)
Hostile Approach	-0.0123	-0.0127	-0.0163*	-0.0171*	-0.0144	-0.0151
	(-1.23)	(-1.25)	(-1.81)	(-1.90)	(-1.50)	(-1.58)
Same Industry	0.0000639	0.000639	-0.000200	0.000320	-0.00681	-0.00624
	(0.02)	(0.19)	(-0.06)	(0.10)	(-1.05)	(-0.99)
Log(Target Market Cap.)	-0.00253*	-0.00213	-0.00162	-0.00123	-0.00197	-0.00164
	(-1.93)	(-1.49)	(-1.08)	(-0.75)	(-1.22)	(-0.93)
Target Market-to-Book Assets	-0.0000683	-0.000214	-0.00000353	-0.000118	-0.0000331	-0.0000840
	(-0.16)	(-0.48)	(-0.01)	(-0.25)	(-0.08)	(-0.18)
Log(Bidder Market Cap.)	0.00153	0.000858	0.00127	0.000655	0.00211	0.00145
	(1.24)	(0.70)	(0.95)	(0.49)	(1.47)	(1.00)
Bidder Market-to-Book Assets	-0.000261	0.00000635	-0.000230	0.0000256	-0.000298	-0.0000516
	(-1.06)	(0.03)	(-0.95)	(0.13)	(-0.98)	(-0.19)
Target Market Cap./Bidder Market Cap.	-0.00220	-0.00279	-0.00308	-0.00364	-0.00294	-0.00350
	(-0.52)	(-0.64)	(-0.72)	(-0.82)	(-0.71)	(-0.81)
Bidder Industry HHI					0.00669	0.0159
					(0.14)	(0.33)
Same Ind. × Bidder Ind. HHI					0.148	0.148
					(0.85)	(0.84)
Financial Buyer					-0.00246	-0.00281
					(-0.46)	(-0.54)
Bidder Analyst Following					-0.000236	-0.000210
					(-1.39)	(-1.19)
Bidder Analyst Forecast Precision					-0.0000264	-0.0000249
					(-0.68)	(-0.63)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	433	433	433	433	433	433
Adjusted R^2	0.119	0.108	0.147	0.137	0.155	0.146

Table 4:
Bidder Termination Fees and Target Termination Fees

This table reports estimates from OLS regressions that examine the size of bidder termination fees payable by a bidder upon terminating a takeover agreement. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms, that included a bidder termination provision in the takeover agreement. The dependent variable is the value of the bidder termination fee divided by the total value of the transaction. *Bidder Fee ≠ Target Fee* equals 1 if the bidder termination fee equals the target termination fee or if there is a bidder termination provision and no target termination provision, and 0 otherwise. The other explanatory variables are defined in Table B1. Year fixed effects are included. *t*-statistics are computed with standard errors clustered at the bidder's Fama-French 49-industry level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	Bidder Termination Fee/Transaction Value					
Constant	0.0448***	0.0502***	0.0253**	0.0301**	0.0471***	0.0530***
	(3.91)	(4.42)	(2.16)	(2.54)	(4.02)	(4.52)
Bidder Asset Volatility	0.00639		0.00558		0.00688	
	(1.28)		(1.35)		(1.33)	
Target Asset Volatility		0.00192		0.00169		0.00159
		(0.55)		(0.54)		(0.43)
Log(Time-to-Completion (Actual))	0.00533**	0.00512**	0.00425*	0.00410*	0.00571**	0.00539**
	(2.15)	(2.10)	(1.93)	(1.97)	(2.18)	(2.14)
Bidder Fee ≠ Target Fee	0.00979	0.0111	0.00149	0.00297	0.0169	0.0180
	(0.98)	(1.05)	(0.12)	(0.23)	(1.09)	(1.14)
Bidder Asset Volatility × Bidder Fee ≠ Target Fee	0.0379***		0.0368**		0.0378***	
	(2.91)		(2.65)		(2.86)	
Target Asset Volatility × Bidder Fee ≠ Target Fee		0.0220*		0.0199*		0.0227*
		(1.98)		(1.70)		(1.99)
Log(Time-to-Completion) × Bidder Fee ≠ Target Fee	0.0171*	0.0160*	0.0167*	0.0154*	0.0176*	0.0167*
	(1.98)	(1.99)	(1.94)	(1.90)	(1.97)	(2.00)
Target Termination Fee/Transaction Value			0.328**	0.330**		
			(2.46)	(2.47)		
Target Fee/Transaction Value × Bidder Fee ≠ Target Fee					-0.111	-0.111
					(-0.76)	(-0.74)
Collar			-0.00186	-0.00173	-0.00403	-0.00382
			(-0.91)	(-0.75)	(-1.44)	(-1.36)
Lockup Option			0.00282	0.00268	0.00308	0.00291
			(0.76)	(0.69)	(0.83)	(0.74)
Cash Offer	0.0156***	0.0160***	0.0154***	0.0158**	0.0152***	0.0156***
	(3.01)	(2.87)	(2.75)	(2.66)	(2.95)	(2.82)
Stock Offer	0.00558*	0.00586*	0.00456	0.00481	0.00527*	0.00560*
	(1.84)	(1.93)	(1.52)	(1.56)	(1.76)	(1.88)
Bidder Toehold	0.0493***	0.0485***	0.0290***	0.0282***	0.0498***	0.0489***
	(8.85)	(7.83)	(2.93)	(2.75)	(8.92)	(7.85)
Tender Offer	-0.000933	0.00117	-0.00259	-0.000595	0.0000659	0.00218
	(-0.12)	(0.16)	(-0.33)	(-0.08)	(0.01)	(0.29)
Hostile Approach	-0.0269**	-0.0273**	-0.0311**	-0.0316**	-0.0246*	-0.0251**
	(-2.04)	(-2.24)	(-2.14)	(-2.32)	(-1.94)	(-2.14)
Same Industry	-0.000517	0.000130	-0.000577	0.0000444	-0.000533	0.000136
	(-0.16)	(0.04)	(-0.18)	(0.01)	(-0.17)	(0.04)
Log(Target Market Cap.)	-0.00246*	-0.00205	-0.00136	-0.000997	-0.00270**	-0.00227
	(-1.99)	(-1.39)	(-1.00)	(-0.62)	(-2.08)	(-1.48)
Target Market-to-Book Assets	0.0000863	0.0000891	0.0000575	0.0000635	0.000165	0.000184
	(0.22)	(0.20)	(0.15)	(0.13)	(0.41)	(0.39)
Log(Bidder Market Cap.)	0.00116	0.000396	0.000873	0.000188	0.00117	0.000369
	(1.01)	(0.31)	(0.71)	(0.14)	(0.98)	(0.29)
Bidder Market-to-Book Assets	-0.000280	-0.000111	-0.000245	-0.0000769	-0.000344	-0.000164
	(-1.00)	(-0.44)	(-0.86)	(-0.33)	(-1.10)	(-0.58)
Target Market Cap./Bidder Market Cap.	-0.00245	-0.00304	-0.00349	-0.00394	-0.00231	-0.00295
	(-0.61)	(-0.73)	(-0.87)	(-0.94)	(-0.55)	(-0.68)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	433	433	433	433	433	433
Adjusted R^2	0.181	0.167	0.212	0.198	0.179	0.164

Table 5:
Bidder Termination Provisions and Deal Completion

This table reports estimates from logit regressions that examine the completion of takeovers. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The dependent variable equals 1 if the takeover takeover was successfully completed. The explanatory variables are defined in Table B1. Year fixed effects are included. *t*-statistics are computed with standard errors clustered at the bidder's Fama-French 49-industry level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Dependent Variable:	=1 if deal was Completed	
Constant	-0.728	-1.386**
	(-1.16)	(-2.02)
Bidder Termination Provision	1.098***	0.328
	(5.55)	(1.47)
Target Termination Provision		2.260***
		(9.54)
Collar		-0.179
		(-0.54)
Lockup Option		0.881**
		(2.07)
Cash Offer	-0.246*	0.00678
	(-1.69)	(0.05)
Stock Offer	0.0692	0.226
	(0.32)	(1.16)
Bidder Toehold	-0.345***	-0.317***
	(-5.75)	(-4.04)
Tender Offer	0.721**	0.301
	(2.30)	(1.01)
Hostile Approach	-3.553***	-2.581***
	(-7.05)	(-5.79)
Same Industry	-0.0867	-0.180
	(-0.42)	(-0.79)
Log(Target Market Cap.)	-0.417***	-0.461***
	(-4.07)	(-4.41)
Target Market-to-Book Assets	-0.0948**	-0.129***
	(-2.33)	(-3.20)
Log(Bidder Market Cap.)	0.604***	0.605***
	(5.71)	(4.71)
Bidder Market-to-Book Assets	-0.00584	-0.0186
	(-0.31)	(-1.07)
Target Market Cap./Bidder Market Cap.	-0.0653	0.111
	(-0.36)	(0.45)
Year Fixed Effects	Yes	Yes
Observations	2078	2078
Pseudo R^2	0.198	0.297

Table 6:
Bidder Termination Provisions and Wealth Gains from Takeovers

This table reports estimates from OLS regressions that examine the offer premiums and wealth gains in takeovers. The sample consists of takeovers announced between 1997 and 2013 involving bidders and targets that were both publicly listed U.S. firms. The dependent variable is the combined gain of the bidder and target around the takeover announcement which is computed as the sum of the bidder and target's 3-day cumulative dollar abnormal returns around the takeover announcement divided by the sum of the bidder's and target's market capitalizations 50 trading days before the takeover announcement. *Bidder Fee* $\neq$ *Target Fee* equals 1 if both a bidder and target termination provision are included with the bidder termination fee not equal to the target termination fee or if there is a bidder termination provision and no target termination provision, and equals 0 otherwise. *Bidder Fee = Target Fee* equals 1 if both a bidder and target termination provision are included with the bidder termination fee equal to the target termination fee, and equals 0 otherwise. The other explanatory variables are defined in Table B1. Year fixed effects are included. t-statistics are computed with standard errors clustered at the bidder's Fama-French 49-industry level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable:	Combined Gain			
Constant	0.0639***	0.0639***	0.0650***	0.0645***
	(5.32)	(5.25)	(5.47)	(5.30)
Bidder Termination Provision (BTP)	0.00348	0.00437		
	(1.06)	(1.34)		
BTP with Bidder Fee $\neq$ Target Fee			0.0176***	0.0180***
			(5.05)	(5.19)
BTP with Bidder Fee = Target Fee			-0.00439	-0.00360
			(-0.94)	(-0.76)
Target Termination Provision		-0.00208		-0.00109
		(-0.52)		(-0.27)
Collar		0.00787		0.00754
		(1.42)		(1.34)
Lockup Option		0.00606		0.00581
		(1.13)		(1.09)
Cash Offer	0.0141***	0.0150***	0.0141***	0.0151***
	(4.08)	(4.39)	(4.08)	(4.40)
Stock Offer	-0.0137***	-0.0149***	-0.0133***	-0.0143***
	(-3.20)	(-3.22)	(-3.23)	(-3.21)
Bidder Toehold	0.00164	0.00167	0.00168	0.00173
	(0.96)	(0.97)	(0.99)	(1.00)
Tender Offer	0.00507	0.00552	0.00485	0.00515
	(1.49)	(1.50)	(1.40)	(1.39)
Hostile Approach	0.0000384	-0.00102	-0.000729	-0.00121
	(0.00)	(-0.10)	(-0.09)	(-0.12)
Same Industry	-0.00126	-0.000873	-0.00128	-0.000958
	(-0.48)	(-0.33)	(-0.50)	(-0.38)
Log(Target Market Cap.)	0.000854	0.000781	0.000925	0.000846
	(0.55)	(0.49)	(0.59)	(0.52)
Target Market-to-Book Assets	-0.000918	-0.000832	-0.000835	-0.000760
	(-1.17)	(-1.13)	(-1.03)	(-0.99)
Target Debt/Assets	0.000886	0.00113	0.000588	0.000803
	(0.12)	(0.15)	(0.08)	(0.11)
Log(Bidder Market Cap.)	-0.00414**	-0.00418**	-0.00429**	-0.00433**
	(-2.47)	(-2.52)	(-2.54)	(-2.60)
Bidder Market-to-Book Assets	-0.0000192	-0.0000397	-0.0000146	-0.0000398
	(-0.06)	(-0.13)	(-0.05)	(-0.13)
Bidder Debt/Assets	0.0109	0.0116	0.0112	0.0119
	(1.33)	(1.41)	(1.42)	(1.48)
Target Market Cap./Bidder Market Cap.	0.00770	0.00778	0.00797	0.00812
	(1.53)	(1.52)	(1.57)	(1.57)
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2078	2078	2078	2078
Adjusted R^2	0.065	0.066	0.071	0.072