LEARNING FROM MARKET FEEDBACK: EVIDENCE FROM MERGERS & ACQUISITIONS

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Targets of merger deals experience significant value increases in the days leading up to the announcement of a deal. Existing literature attributes the runup in target value solely to deal anticipation and, as such, the runup is regarded as being uninformative about the surplus that can be generated from the deal. I find empirical evidence that target runup is positively related to bidder gain and to deal completion probability and that these results are strongest when the level of uncertainty regarding deal surplus is high. The results suggest that target runup reflects the market consensus about the deal surplus and that this independent outside signal of deal surplus allows bidder insiders to update their priors and improve their decision making in regards to the deal. These results add to our understanding of managerial learning from the market and the role of the market in determining the outcome of privately negotiated deals.

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PREFACE

This work would not have been possible without the support of many people. I am deeply grateful to my husband, Torsten, for his continued support, encouragement and love for many years. I also greatly appreciate the expertise, advice and encouragement that I received from my committee members: Diane Denis, Frederik Schlingemann, Sara Moeller, Leonce Bargeron and Daniel Berkowitz. A special note of thanks to Diane Denis and Sara Moeller for their encouragement and support which saw me through some of the low points in this process. I thank my brother - Rajesh for leading by example and never giving up in the light of hurdles. Finally, I thank my parents for their love and endless support during my years of wandering.

1.0 INTRODUCTION

Imagine a firm (the bidder) that is in private negotiations to acquire another firm (the target). During the negotiation period the market value of the target firm increases. How does the increase in the target value impact the premium it receives in the deal? The target management would most likely make the case that its stand-alone value has increased and demand an equivalent premium on the now higher base value. The bidder would likely counter this argument by making the case that the increase in target value is a result of deal anticipation by the market. The price offered for the target ultimately depends upon the relative persuasion powers of the parties involved in the deal. Existing empirical work is focused on the issue of deal anticipation and examines whether the target runup adds to the cost of the deal for the bidder (see for example, Schwert (1996), Betton, Eckbo, Thompson and Thornburn (2011)). In this paper I examine the possibility that target runup provides an independent outside signal of deal surplus, and that it benefits the bidder by improving the precision of the bidder insider's private signal.

There is a well established stream of literature which argues that rational agents can learn from outsiders (market participants) regarding the value of an investment or even the prospects of their own firm. In theoretical models by Dow and Gorton (1997) and Subrahmanyam and Titman (1999) stock prices are informative because they aggregate information from many different participants who do not have channels for communication with the firm outside the trading process (Chen, Goldstein and Jiang (2007)). Per these

models, stock prices may contain some information that managers do not have.[1] Rational agents could hence use such market feedback to update their priors regarding different investment propositions. In the case of mergers, insiders of the bidding firm could potentially use the market feedback to evaluate the fair value/remium that a target should receive in a deal.

In the context of mergers, the pre-announcement change in the value of the target can potentially be viewed as market feedback on the value of the expected surplus from the deal. With managerial learning such market feedback would result in an updating of the priors of the insiders that could influence their decisions in regards to the deal. In this paper, I investigate whether the target runup has the potential to be beneficial to the bidder by providing usable feedback. Specifically, I address the following questions: (1) Does target runup contain information about the surplus that can be generated from the deal? (2) How does target runup impact the bidder's outcome from the deal? (3) If target runup is informative, do managers use this information in guiding their investment decisions, specifically in regards to deal selection and payment?

I find empirical evidence that deals that generate a larger surplus from the combination of the bidder and the target, on average see larger runup in the target value prior to deal announcement. In other words, a larger target runup is a signal of a deal which would generate a bigger surplus. Further, the runup represents a larger fraction of the total target premium in high surplus deals. This result suggests that the target runup closely reflects the expected surplus from the deal especially when the potential surplus is large.

The runup in the value of the target does not however increase the cost of the deal

[1] Chen, Goldstein and Jiang (2007, p.620): "This information is more likely to be about the demand for the firm's products or about strategic issues, such as competition with other firms. It is less likely to be about the technology used by the firm, because the manager is expected to have an informational advantage about technological factors."

to the bidder: I document a positive relation between target runup and the bidder's deal-related gain. I hypothesize that the target runup is beneficial to the bidder stockholders because it provides an independent outside estimate of the surplus that can be generated from the deal, thereby enabling the bidder insiders to update their priors and make better decisions about deal selection and pricing. I further hypothesize that a larger target runup is more valuable because it is a less noisy signal of deal surplus.

To test the managerial learning hypothesis, I examine the impact of target runup on bidder gain in scenarios that differ in the level of uncertainty about deal surplus. If the target runup serves as an outside signal of deal surplus for the bidder insiders, then it should have a larger impact on the bidder gain in high uncertainty scenarios because there is a greater potential for misestimation of the deal surplus in such cases. I use 5 different measures to capture the uncertainty regarding the deal surplus: (i) mode of payment (cash vs. stock), (ii) target idiosyncratic volatility, (iii) target B/M, (iv) target technology intensity and (v) industry relatedness of the bidder and the target. I interact the target runup with each of the uncertainty measures and find that it has a larger impact on the bidder gain in deals where the level of uncertainty is high.

I further document that the unanticipated premium (i.e., the difference between the offer price and the end of runup period price of the target) is significantly smaller in deals with greater levels of uncertainty. This suggests that managers more closely benchmark their offer price against the end of runup period price when they are less certain about value, which is consistent with the notion of managerial learning.

To test whether a larger target runup is a less noisy signal, I examine its relation to the change in bidder uncertainty around deal announcement. The change in bidder uncertainty around deal announcement should be related to the uncertainty regarding deal surplus. If

a larger target runup is indicative of a greater level of certainty about deal surplus, then it should be negatively related to the bidder uncertainty change around deal announcement. Using the implied volatility on the bidder stock to capture the change in its uncertainty, I document a negative relation with target runup, which is consistent with my hypothesis. Finally, I find evidence that the target runup has a positive impact on deal completion probability in scenarios where there is a greater level of uncertainty. This suggests that the target runup impacts the deal selection decision by managers and that they treat the market feedback as information that is complementary to their own when faced with a high level of uncertainty.

This paper contributes to the existing mergers and acquisitions literature in three ways: first, by shedding light on the nature of information contained in target runup, it lays out an alternative channel through which the target runup can impact the bidder's outcome from a deal. Academics and practitioners alike view target runup as having an adverse impact on the bidder in an acquisition. Schwert (1996) describes the existence of markup pricing in mergers, wherein the pre-announcement increase in the target value adds to the cost of the deal for the bidder. However, the existence of markup pricing goes against the dominantly observed outcome that targets of most completed deals see a substantial runup in their value. By acknowledging the role of the market in influencing the precision of the insiders' private signal and hence managerial action, this paper provides a rational explanation for this dominant outcome. Second, it adds to our understanding of the role of financial markets in improving the outcome of privately negotiated deals. Absent any uncertainty regarding value, incentives will naturally guide managers toward the value maximizing outcome. However, when the manager is uncertain about the value of the investment proposition (acquisition), market feedback (in the form of target runup) helps improve the precision of his estimate and thereby reduces the likelihood of overpayment.

Finally, the results of this paper highlight some important measurement issues in the way deal synergy/surplus is measured in the current literature. Traditionally, the synergy/surplus from a deal is measured as the weighted sum of the target and the bidder abnormal return in a small window surrounding announcement. The underlying assumption is that the pre-announcement window is uninformative, thus ignoring the price movements in the window will not bias the estimates of synergy in any systematic way. The results of this paper suggest that this may not be the case. Deals that generate a larger surplus are anticipated to a greater degree. Hence by ignoring the pre-announcement window in the estimation of deal surplus, we may be underestimating the surplus of those deals that truly have a large surplus.

The remainder of this paper is organized as follows. Section 2 provides a survey of the existing literature. Section 3 discusses potential sources of target runup and the channels through which it can impact the bidder's outcome from a deal. Section 4 lists the empirical implications of the hypotheses, Section 5 describes the empirical findings, and section 6 concludes.

2.0 LITERATURE REVIEW

Channels of information leakage prior to major corporate events, especially mergers and acquisitions, have been studied extensively. Barclay and Warner (1993) and Schwert (1996) find that the target runup represents between 50 and 57 percent of the total premium paid for the targets in mergers. Deal anticipation, and hence the target runup, has been attributed to actions of insiders (Meulbroek (1992), Schwert (1996)), hedging of credit risk exposure by investment banks underwriting debt/equity issues made by the acquiring firms (Acharya and Johnson (2007, 2010), Bodnaruk and Massa (2009)) and unexpected option grants to CEOs (Fich, Cai and Tran (2011)). Ahern and Sosyura (2012) find that bidders of stock financed deals originate substantially more news stories after the start of merger negotiations but before the public announcement. Jayaraman, Frye and Sabherwal (2001) document a significant increase in the volume of traded options (Put and Call) in firms involved in merger negotiations, suggesting that the pre-announcement period sees heightened activity by informed/sophisticated investors who are actively engaged in collecting private information.[1]

Schwert (1996) is the first to address the question of how such information leakage and the resulting runup in the value of the target impacts the offer price it receives from the bidder. Schwert argues that if target runup is driven by deal anticipation, then it should

[1] Jayaraman et al. (2001), Ni, Pan and Poteshman (2008) find that the option market leads the stock market in information production, which is consistent with greater participation of informed investors in the options market.

substitute for the market response to the deal at announcement. Hence, a linear projection of the target announcement return on its runup should have a slope of -1. However, if target runup results in "markup pricing", in which there is a dollar-for-dollar increase in the offer price for the target, then the target announcement return and its runup will be unrelated (slope coefficient of zero). Empirically, Schwert finds that the target announcement return and its runup are unrelated. Hence, he rejects the deal anticipation hypothesis and concludes that markup pricing exists and that target runup is costly for bidders. With markup pricing the bidders partially incur the costs of information production by the informed market participants who invest in the targets prior to the deal announcement (Brigida and Madura (2012)).

Betton, Eckbo, Thompson, and Thornburn (2011), however, argue that if the runup adds to the bidder's cost, the projection of markup (offer price minus target price just prior to announcement) on runup should yield a strictly positive slope (and not zero as previously thought). The authors construct a model which allows for the target runup to reflect the updated probability of the bid (deal anticipation), as well as the expected surplus that can be generated from the deal. According to the model, the relation between markup and runup will be nonlinear when the runup is driven by market anticipation of the expected premium and, hence, the projection of markup on runup will yield a slope coefficient greater than -1. Under this framework, the empirical evidence found by Schwert (1996) – namely, the lack of perfect substitution between runup and markup – is consistent with the deal anticipation hypothesis.[2]

In related work, Cornett, Tanyeri and Tehranian (2011) point to issues in the way deal outcomes are measured. They find that investors can more successfully predict bidder firms

[2] Another prediction of the model by Betton et al. (2011) is that bidder takeover gains will be increasing in target runup. They present some empirical evidence in this regard. I take the results further by relating the value of information in target runup to the degree of uncertainty about the target/deal value.

than target firms. The asymmetry in the anticipation of bidder and target firms causes disparity in the announcement return of the parties. After accounting for the predictability of the bidder firms they find a significant decline in the difference between the bidder and target announcement return. There is however no clear evidence on how the target runup impacts the bidder's outcome from the deal.

While Schwert (1996) and Betton et al.(2011) focus on the costly feedback effects of target runup, I argue that the target runup could be potentially beneficial to the bidder. If the target runup is informative about the deal surplus, the bidder management can use the target runup to update their priors regarding the deal. The notion of learning from the market is an important underpinning of the efficient market hypothesis, according to which the market's assessment of value is superior to that of any individual or group of investors. If markets are informationally efficient they can contribute to the efficient allocation of investments. Bond, Edmans, and Goldstein (2011) discuss the real effects of financial markets in the context of mergers:

> *"Consider, for example, a firm manager, who is arguably the individual most informed about the firm's fundamentals. The manager announces an acquisition bid for another firm. This decision is often made after undertaking substantial internal analysis and seeking the external counsel of investment banks, to assess whether the value of the target to the acquirer exceeds the offer price. As is well known, this assessment is based on assumptions with a high degree of uncertainty. In particular, the desirability of the deal depends on many factors other than the acquirer's fundamentals and about which the acquirer may be less than fully informed –such as the stand-alone value of the target,the likely synergies between the acquirer and the target,and the future prospects of the industry (which affects whether it is optimal for the acquirer to expand via acquisition).Hence, it is entirely plausible that, among the many speculators who trade in the stock market, some have insight into the proposed deal that are missed by the manager and his advisors. If participants trade on this information, their insights will be reflected in the price. Hence, when a manager announces an acquisition and the market responds negatively, he may learn from this response and cancel the deal."*
>
> (Bond et al., 2011: 4)

The assumption that stock market participants have information about some aspects of the firm which is not available to the firm's managers is also made in papers by Dow and

Gorton (1997), Subrahmanyam and Titman (1999, 2001), Fulghieri and Lukin (2001), Dow and Rahi (2003), Goldstein and Guembel (2008), Dow, Goldstein, and Guembel (2010),and Bond, Goldstein and Prescott (2010). Bond et. al. (2010) provide a theoretical analysis of situations in which managers learn from the markets and show that market information and agents' information are complementary.

Baker, Stein and Wurgler (2003), Luo (2005) and Chen, Goldstein, and Jiang (2007) provide empirical evidence that managers learn from the market response while making investment decisions. In the context of mergers, Luo (2005) finds a positive correlation between the bidder's announcement return and the completion of mergers. He attributes this to insiders' learning from outsiders. Chen et al. (2007) examine the impact of private information in stock prices on investments. They find that even after directly controlling for the amount of managerial information, the amount of private information in the stock price has a strong positive effect on the sensitivity of corporate investment to stock price, suggesting that managers learn from the market.

In the context of this paper, the target runup can be viewed as the consensus estimate of the market participants regarding the expected deal surplus. In the following sections I describe the sources of runup in target value and the potential channels through which it can impact the bidder.

3.0 SOURCES OF TARGET RUNUP AND THEIR IMPACT ON THE BIDDER GAIN

3.1 DEAL ANTICIPATION AND TARGET RUNUP

Consider a target firm which is in negotiations with a potential bidder to be acquired. If the market anticipates the impending takeover announcement, then the change in the target market value during the pre-announcement period can come from two sources: (1) increase in the stand-alone value of the target and (2) target's expected share of any synergies that can be generated from the deal. The increase in target stand-alone value represents any value that can be created by replacing the target management or correction of any potential under-valuation of the target. Increase in the target stand-alone value and synergy gain are hence the two components of the total surplus that can be generated from a deal. The target runup can thus be characterized as follows:

$$\text{Target Runup} = \Delta V_T + \theta_{\text{Mkt}} * \gamma * p_c \tag{3.1}$$

where,

ΔV_T is the change in the stand-alone value of the target. Unconditionally, we would expect the target to be fairly valued and hence the expected change in the target stand-alone value is zero ($E(\Delta V_T) = 0$). However, to the extent that the bidder is trying to exploit an undervaluation of the target's assets (Dong, Hirshleifer, Richardson and Teoh (2006)), the anticipation of the impending deal could result in the correction of any potential undervaluation of the target. An alternative source of change in target stand-alone value is the benefit from replacing the target management or from the current target management committing to undertake some value increasing measures as a result of a takeover threat.

θ_{Mkt} is the market's estimate of the synergy gains from the combination of the bidder and the target.

$\gamma > 0$ is the market's estimate of the target's share of the deal surplus.

p_c is the market's estimate of the likelihood that the deal will be successfully completed. We would expect p_c to be increasing in deal surplus.

How are rumors about impending bids priced-in to the target? Arguably, the extent to which deal related rumors get translated into active trading/purchases in the target depends upon the perceived likelihood of completion of the proposed deal, which in itself is a function of the market's estimate of the potential surplus from the deal. In other words, market participants are more likely to price in deal-related rumors by active purchases in the target when the expected surplus/benefit from the deal is high since they attribute a larger likelihood of completion to such deals. Given the large expected premium for the target in deals with a large surplus, any market participant aware of the impending deal would try to accumulate as much of the target stock as possible. Such increased interest in the target stock would result in an increase in the anticipation of the deal by a larger

section of the market. Thus, it is less likely that deals with a large surplus are anticipated by only a few market participants for a prolonged period of time.[1]

Therefore, larger the potential surplus from a deal, greater the likelihood that active trading by market participants causes a runup in target value. Under such a framework, the target runup is systematically related to deal surplus: deals with a higher expected surplus are anticipated to a greater degree and hence associated with a larger runup in target value. The difference in target runup in the cross-section is thus related to the difference in deal surplus and is not merely the result of difference in the degree of anticipation. Hence, the hypothesis:

Hypothesis 1: *Target runup reflects the market's estimate of potential deal surplus.*

If the target runup is informative about the deal surplus (i.e., increase in stand-alone value plus synergy gain) that can be generated from a deal then we would expect it to be positively related to deal surplus (measured as the combined wealth effect of the bidder and the target). If, instead, the target runup is due to an increase in the target stand-alone value resulting from exogenous reasons (i.e., unrelated to potential gains that can be made by replacing the target management) we would not expect to see the same positive relation between the target runup and the deal surplus. This is so because compensating the target for such exogenous increases in value would simply result in a transfer of wealth from the bidder to the target. For example, consider a deal with no significant surplus. However, merger rumors cause a runup in the target value. If the bidder chooses to proceed with such a deal, it would experience a decline in its market value upon announcement, which is commensurate to the overpayment for the target. The combined wealth effect of the bidder and target in this case is zero. The target runup in such a scenario will thus be

[1] I will examine the validity of this assumption empirically in Section 5.2.

unrelated to the deal surplus.

If the target runup reflects information about the deal surplus and the bidder management uses this information to make better deal-related decisions, then the target runup could potentially have a positive impact on the bidder's deal-related gain. I develop this idea in the following subsection.

3.2 MANAGERIAL LEARNING FROM TARGET RUNUP

Consider a manager who is contemplating a bid for a target firm. His only prior regarding the deal is that the expected increase in cashflow from the deal is in the range $[l, h]$. Let the true deal surplus be θ_0 which lies in the range $[l, h]$. The potential for misestimation of deal value by the manager increases in the degree of uncertainty regarding deal surplus, i.e., the greater the distance $(h - l)$. Thus, the greater the manager's uncertainty regarding deal surplus the more he can potentially benefit from an outside signal of deal surplus.

From the previous section we note that the target runup is expected to increase with the market's estimate of deal surplus. A deal with higher potential surplus will attract more market interest, resulting in a target runup that more closely estimates the total expected premium for the target. A smaller runup in target value is a weaker signal of deal surplus: since deal-related rumors are less likely to be translated into active trading/anticipation by market participants when the potential surplus is low, the target price is less likely to reflect the fair value of the expected premium and hence the expected surplus in such cases.

Thus, while the target runup can serve as an outside signal of deal surplus, it is more noisy, and therefore less beneficial, when the magnitude of the runup is small. Therefore,

a larger target runup is expected to be associated with better bidder decisions, leading to a higher bidder gain. Improved decision-making can take at least two forms.

1. Better deal selection: Learning enables managers to walk away from potentially low surplus/value-destroying deals and to only complete deals with a large surplus, and
2. Reduction in the likelihood of overpayment: Managers can update their priors regarding the expected surplus from the deal and adjust the payment for the target accordingly, thereby lowering the likelihood that they overpay.

Hence, the bidder gain from the deal should be positively related to the target runup. This leads us to the second hypothesis:

Hypothesis 2: *Target runup has a positive impact on the bidder's deal-related gain.*

However, as discussed in earlier sections, to the extent that the target runup is due to exogenous factors unrelated to the potential surplus, the bidder gain will be negatively related to the target runup and will bias us against our null in hypothesis 2. An important implication of managerial learning is that the extent to which the target runup impacts the bidder's deal-related gain should be related to the level of uncertainty – the target runup should be more valuable for the bidder stockholders when the level of uncertainty regarding deal surplus is high and there is therefore greater potential for misestimation by bidder managers.

Hypothesis 3: *The impact of target runup on the bidder's deal-related gain increases with the degree of uncertainty.*

Further, with managerial learning, the target runup should impact whether or not the manager chooses to go forward with the deal. Luo (2005) finds evidence that the bidder announcement return is positively related to the likelihood of deal completion, indicating that managers listen to the market. If the target runup has information on deal surplus,

rational managers should be less likely to complete deals which have a low target runup, particularly if they are less certain about deal surplus.

Hypothesis 4: *The target runup is positively related to the likelihood of deal completion, and this relation is stronger in deals for which the level of uncertainty is high.*

To the extent that a runup in target value reduces the incentive of bidders to go forward with the bid, there will be a negative relation between the target runup and the likelihood of deal completion, which would bias us against our null in hypothesis 4.

4.0 EMPIRICAL IMPLICATIONS

4.1 DOES DEAL ANTICIPATION INCREASE WITH DEAL SURPLUS?

In the previous section I assume that deal related rumors are more likely to be priced in when the potential surplus from the deal is high. This is an important assumption because it goes to the informativeness of target runup. Without this assumption even deals with a larger surplus could potentially have a small runup in target value, making the target runup more noisy and therefore less informative about deal surplus. If anticipation is increasing in deal surplus, we would expect to see the following:

1. A larger degree of deal anticipation should result in greater interest in the target stock. Hence, the abnormal turnover (i.e., the turnover in excess of the average turnover) in the target stock should also increase with deal surplus. Conversely, a large abnormal turnover makes it less likely that that the deal anticipation is limited to a few market participants.
2. With greater deal anticipation the adjustment in the target value should be closer to the total expected premium. If the degree of anticipation increases with deal surplus, then the target runup should represent a larger fraction of the total premium received by the target in high surplus deals.

4.2 DOES TARGET RUNUP CONTAIN INFORMATION ON THE DEAL SURPLUS?

As described in section 3, the target runup is impacted by the following factors: (i) change in target stand-alone value, (ii) synergy gains to be made (iii) target's share of any syngery gain and (iv) likelihood of deal completion. As argued earlier, the higher perceived likelihood of completion of deals that generate a large surplus, increases the likelihood that deal-related rumors translate into active trading/anticipation by the market, which in turn guarantees that high surplus deals will have a larger target runup. Hence, we would expect to find a positive relation between target runup and the deal surplus.

Deal surplus is measured in existing literature as the weighted sum of the target and bidder abnormal return over a small window surrounding deal announcement. However, with anticipation, at least part of the wealth effects from the deal are impounded into the target and bidder price prior to the announcement of the deal. Hence, I measure the wealth effect or deal surplus as the weighted average of the target and bidder return over the window (-42, +42) surrounding deal announcement.

Note that even though the deal surplus is measured over a window that includes the pre-announcement period, the relation between the deal surplus and the target runup is not one that can be assumed by default. Any change in the target stand-alone value unrelated to the potential surplus that can be generated by replacing the target management, would simply result in a transfer of wealth from the bidder to the target and as such the target runup would be unrelated to the deal surplus in such cases. Similarly, if the target runup is not informative about the deal surplus and it merely reflects the degree of deal anticipation, then even high (low) surplus deals could potentially have a low (high) runup in target value because they are poorly (well) anticipated. In such a case there would be

no relation between the target runup and the deal surplus. Figures 1A and 1B provide the intuition behind the same.

In figure 6.1, deal 2 generates a larger surplus than deal 1 ($\theta_2 > \theta_1$). Deal 1, however, for some reason is better anticipated by the market than deal 2 and therefore the target of deal 1 sees a larger runup in its value than the target of deal 2.[1] In such a scenario, the target runup would be uninformative and not systematically related to the deal surplus – i.e., a deal with a low target runup would be just as likely to have a large surplus as a deal with a larger runup in target value. In figure 6.2 however, deal 2 generates a larger surplus than deal 1 and is also anticipated to a larger extent than deal 1. The target of deal 2 therefore sees a larger runup in value. In a cross-sectional setting only this scenario will yield a positive relation between the target runup and deal surplus.

An implicit assumption behind this test is that the deal surplus is exogenously given. We are therefore able to examine whether there is significantly larger runup for deals with a large surplus. While the exogeneity of deal surplus is a reasonable assumption, one might be worried that the observed results are obtained by construction since this deal surplus measure includes the runup period returns accruing to the target and bidder. To address this concern I construct alternative measures of deal surplus. A detailed description of the construction of these alternative measures is provided in a later section.

[1] For ease of interpretation Figures 6.1 and 6.2 are drawn under the assumption that the target extracts the entire surplus from the deal. Relaxing this assumption and allowing the bidder to capture a share of the surplus does not impact the suggested inferences.

4.3 MANAGERIAL LEARNING AND BIDDER GAIN

If the target runup has information on the expected surplus from the deal then there is scope for managerial learning, which enables managers to make a better selection of deals by withdrawing low value/surplus deals and by reducing the likelihood that they overpay for the target due to misestimation of the deal surplus. We would thus expect the target runup to be positively related to the bidder's deal-rated gain among deals that are subsequently completed. Further, we would expect the target runup to have a larger impact in deals where the degree of uncertainty about deal surplus is high. Panel A of Table 6.1 summarizes the impact of target runup on the bidder's deal-related gain under the different scenarios.

From Table 6.1 Panel A, the target runup will have a larger/stronger impact on the bidder's outcome in deals involving a greater level of uncertainty under the scenario where the managers of the bidding firm actively use market feedback in making their pricing/deal selection decisions. Note that in order to attract a bidder, targets of high uncertainty deals might be more inclined/willing to share a larger part of the surplus with the bidder irrespective of the magnitude of the potential surplus. We might therefore expect to see a positive relation between the deal uncertainty measures and the bidder outcome unconditionally (i.e., irrespective of the target runup). The argument in Table 6.1 Panel A, however, is that the bidders of deals with a greater level of uncertainty fare better when there is a larger target runup because the market feedback enables the bidder manager to make a more informed pricing decision, and hence reduces the likelihood of overpayment. Thus, the learning outcome is based on the marginal impact of target runup on the bidder's outcome in high uncertainty deals.

As proxies for uncertainty about deal surplus I use four different measures of general

target uncertainty, effectively assuming that uncertainty about deal surplus is correlated with uncertainty about target value more generally. These measures are: (i) mode of payment (cash versus stock), (ii) target idiosyncratic volatility, (iii) target B/M, and (iv) target technology intensity. I assume that the choice of the mode of payment in a deal should be related to the level of uncertainty. Managers are more likely to use stock financing when they are less certain about deal surplus because with stock financing they can share some of the deal-specific risk with the target. In deals involving high-technology targets or targets with low B/M, whose value is tied to growth opportunities, uncertainty can come from the fact that such targets are intrinsically more difficult to value. Also, the synergies involving high-technology targets are more uncertain since the success of the deal depends on the market potential for the growth opportunity. In addition I use the industry relatedness of the bidder and the target as a measure of uncertainty, assuming that synergy gains are less certain in cross-industry deals relative to same-industry deals.

I prefer the mode of payment as a measure of uncertainty because it allows us to capture the manager's priors in light of the other uncertainty measures. The manager might be in possession of some private information which would lead him to be more certain about deal surplus even when the other measures indicate a high level of uncertainty. To test whether target runup has a larger impact in high uncertainty scenarios, I examine the sign on the interaction term `Uncertainty Measure` × `Target runup`. Panel B of Table 6.1 summarizes the expected signs on the interaction terms with each of the uncertainty measures.

Finally, per hypothesis 4, if the target runup is informative about deal surplus, then rational managers would use this information in deciding whether or not to go forward with deals – i.e., the target runup should impact the deal selection decision. To test this hypothesis, I run a logit regression to estimate the relation between the target runup and the likelihood of deal completion. If the target runup is informative, it should have a pos-

itive impact on likelihood of completion. If, however, the target runup reflects an increase in target stand-alone value, it would reduce the bidder's incentive to complete the deal. Further, the impact of target runup on the likelihood of deal completion should increase with the degree of uncertainty regarding the deal/target stand-alone value since there is greater scope for information complimentarity in such scnerios which should make the manager more likely to heed to market feedback. One should note however that any observed relation between target runup and the likelihood of completion is potentially endogenous,if as argued earlier, deals that are perceived as being more likely to be completed are likely to see a larger runup. Such reverse causality prevents us from making causal inference regarding the role of target runup in impacting deal completion. The inferences in this paper are however based on the differential impact of target runup on deal completion in scenarios that differ in the level of uncertainty regarding the deal/target value.

5.0 EMPIRICAL RESULTS

5.1 DATA

The data is extracted from the Thomson Reuters SDC Platinum database and consists of all deals (completed, withdrawn or rumored) between 1980 and 2010. To be included in the sample the target and the bidder firms must be publicly held with valid return data in CRSP for a period (-372,+10) around deal announcement. The deal value must exceed $10 million (in 2010 dollars) and represent at least 5% of the bidder's market value 60 days prior to deal announcement. I exclude deals involving subsidiaries and deals involving multiple bidders. Data on the implied volatility of the target (the bidder) is obtained from the volatility surface files of the Optionmetrics database. Institutional ownership information is obtained from the 13F filings compiled by Thomson Reuters.

Table 6.2 provides summary statistics on the sample. From Panel A we see that the average (median) deal is $1.5 billion ($287 million). The average (median) deal is 40% (24%) of the bidder in terms of market value of equity. The average size of the target relative to the bidder is much larger in stock financed deals (39%) than in cash financed deals (28.6%). Relative to cash deals the targets of stock deals on average have lower B/M, higher idiosyncratic volatility, and are more likely to be technology intensive.

The main variables in this study are the target and bidder runup, announcement re-

turn, total gain and the overall deal surplus. I construct five different measures of these variables; variable definitions can be found in the appendix.[1] Panel B of Table 6.2 shows the correlation between the different measures of target and bidder runup and total gain. The correlation between the different measures is 80% or more in the case of the target and 70% or more in the case of the bidder. The empirical results presented in the sections to follow hold independently from the measure that is used. The results presented in tables 3 through 11 use measure 3 which (size and book-to-market match portfolio adjusted) to construct the variables of interest.

Table 6.2 Panel B also presents the correlation between the different measures of deal surplus. "Deal Surplus 1" is the weighted sum of the target and the bidder abnormal return over the (-42,+42) window.[2] In the event that the bidder already has a toehold in the target the weights are adjusted to account for the toehold. Deal surplus measures 2, 3 and 4 are constructed as the change in the combined market value of assets of the bidder and the target as of 42 days, 1 year and 2 years following deal announcement relative to their combined market value 42 days prior to deal announcement. Following the completion of the deal the market value of the target is set to zero. The industry-adjusted deal surplus measures are constructed by adjusting the deal surplus measures 2, 3, 4 by the change in the market value of matched firms in the industry (matched on industry, size, B/M and ROA). While the deal surplus measures 2, 3 and 4 are all significantly positively related to the primary measure "Deal Surplus 1", the relation gets progressively weaker with time: the correlation between "Deal Surplus 1" and "Deal Surplus 3" (measured 1 year follow-

[1] The five measures differ in the benchmarks used to calculate the buy-and-hold abnormal return (BHAR) on the bidder / the target stock during the runup / the announcement window. Specifically, in measure 1 the benchmark return is estimated using the Fama-French 4-factor model. In measure 2 the value-weighted market return is used as the benchmark. The benchmark return used in measure 3 is the return on the size and B/M match portfolio. In measure 4 the benchmark return is calculated as the equally-weighted return on a portfolio of 10 match firms, matched on size and B/M. Finally, measure 5 uses the change in the value of the market index as the benchmark.

[2] $\text{Deal Surplus} = \frac{\text{Bidder MVE}_{-42} * \text{Bidder BHAR (-42,+42)} + \text{Target MVE}_{-42} * \text{Target BHAR (-42,+42)}}{\text{Bidder MVE}_{-42} + \text{Target MVE}_{-42}}$

ing deal announcement) is 60% while the correlation between "Deal Surplus 1" and "Deal Surplus 4" (measured 2 years following deal announcement) is only 25%.

Figure 6.3 presents the target cumulative abnormal return in the days surrounding deal announcement. We see that there is significant abnormal trading in the target stocks starting 25 trading days prior to the announcement of a deal, which is accompanied by an increase in the target market value. On average, the targets of completed deals increase in value by 6.8% prior to deal announcement (Table 6.2, Panel C). The targets further appreciate by 21% on average at announcement. Thus, the targets in the sample on average receive a premium of 28%. About 25% (=0.07/0.28) of the total target premium accrues to the target prior to the announcement of the deal.

The bidders, on the other hand, experience a relatively small runup of 3.1% on average (0.6% at the median). The bidder runup is significantly larger for stock deals (mean=5.6%) than in cash deals (mean=-0.3%), consistent with the notion that deals are more likely to be financed with stock when the bidder stock is overvalued or has appreciated recently. The bidder announcement CAR is significantly negative in the case of the stock deals (mean=-3.2%) but significantly positive in cash deals (mean=1.3%). While there is no significant post-announcement abnormal return for bidders in cash deals, the median post-announcement return is significantly negative (-2.8%) for bidders in stock deals. However, from Table 6.2 Panel C we see that the total bidder gain measured over the window (-42,+42) is not significantly different from zero for bidders in cash as well as in stock deals. The average deal (cash as well as stock) generates a surplus of 4.7% (Deal Surplus 1). Deal surplus measured over longer duration (Deal Surplus measure 3 and 4) are also significantly positive: the median deal surplus (industry-adjusted) measured 2 years and 3 years following deal announcement is 4.5% and 5.4% respectively.

5.2 IS DEAL ANTICIPATION RELATED TO THE DEAL SURPLUS?

As mentioned earlier, the target runup is informative because market participants are more willing to act on rumors regarding an impending bid when the proposed deal is a good/high surplus deal since such deals have a higher likelihood of completion. We would therefore expect to see greater anticipation of high surplus deals in the form of observable actions of market participants such as active purchase of the target stock during the pre-announcement period. To examine whether there is a relation between the quality of the deal (i.e., the surplus that can be generated from the deal) and deal anticipation, I sort deals into terciles based on the deal surplus (Deal Surplus 1). If deal anticipation is increasing in deal surplus, we would expect to see significantly higher abnormal (log) turnover in the deals in the highest tercile of deal surplus than those in the lowest tercile.

Table 6.3 Panel A summarizes the average abnormal log turnover in the target during the runup period (-42, -2). The abnormal turnover in targets during the runup period is positively related to the deal surplus: while the targets in the lowest deal surplus tercile do not see any abnormal turnover during the runup period, targets in the highest deal surplus tercile see significant abnormal turnover (mean: 0.184). The average (log) abnormal turnover of the target stocks in each deal surplus tercile is plotted in figure 6.4 and shows a similar pattern. Table 6.3 Panel B confirms that the target average abnormal turnover during the runup period is significantly positively related to the different measures (all but two) of deal surplus in a multivariate setting.

While the evidence in Table 6.3 Panels A and B suggests that the extent of anticipation is positively related to the quality of the deal (i.e., deal surplus), it is not clear who drives the information generation process. Given that informed/sophisticated investors have the incentive to invest in gathering private information such as an impending deal

announcement, we would expect to see significant trading activity by such investors in the pre-announcement period. In Table 6.3 Panel C, I provide suggestive evidence that institutions increase their holdings in the targets and that the extent of the increase in institutional ownership is related to deal quality. To this end I examine 13F filings made by institutions with $100 million or more in assets under management. I restrict the sample to 13F filings that were filed no earlier than 30 days prior to deal announcement so that there is reasonable scope for deal anticipation related change in holding. In this sub-sample I examine changes in the institutional ownership in the targets from quarter -2 to quarter -1 (the quarter that ended just prior to deal announcement).

From Table 6.3 Panel C we see that institutional ownership in targets of high surplus deals (deal surplus tercile = 3) increases by 1.55% (1.51% on an industry-adjusted basis) on average in the quarter prior to deal announcement. There is no significant change in institutional ownership in targets of low surplus deals. Targets of high surplus deals see an average inflow of $3,785,000 ($155,000 at the median) while the targets of low surplus deals see an average outflow of $1,150,000 ($6,000 at the median). Institutions seem to be more willing to increase their holding in the targets of high surplus deals while being mostly passive in targets of low surplus deals. The evidence is thus consistent with greater involvement of sophisticated investors in driving the pre-announcement runup in target value.

Higher anticipation of large surplus deals should naturally result in larger runup in the targets of such deals. Further, with higher anticipation the target runup should represent a larger fraction of the total expected premium for the target. From Table 6.3 Panel A (and also figure 6.5) we see that targets of high surplus deals see significantly larger runup than those of low surplus deals. Further, on average 32% of the total target premium is anticipated prior to deal announcement in high surplus deals (deal surplus tercile 3), compared to 17% in low surplus deals (deal surplus tercile 1). In high surplus deals the

runup represents a larger fraction of the total premium received by the target, which is consistent with the assumption that deal anticipation is increasing in deal surplus.

5.3 HYPOTHESIS 1: IS THE TARGET RUNUP INFORMATIVE ABOUT DEAL SURPLUS?

To examine whether the target runup is informative regarding deal surplus, I sort deals into terciles based on the level of target runup. If the difference in target runup in the cross-section is solely due to differences in the degree of deal anticipation or exogenous changes in the target stand-alone value (i.e., for reasons unrelated to the surplus that can be generated from the deal), we will not expect to see any systematic relation between target runup and the overall deal surplus. However, if the target runup is informative about the total expected surplus from the deal, we would expect to see a positive relation between target runup and deal surplus.

Table 6.4 Panel A presents the mean and the median surplus of deals sorted by the level of target runup. The deal surplus increases monotonically as we move from the lowest tercile of target runup to the highest tercile. The average surplus ("Deal Surplus 1") of deals in the lowest tercile of target runup is not significantly different from zero (1.1%). The average(median) surplus of deals in the highest runup tercile on the other hand is 14%(10%). While this is consistent with the notion that a larger target runup is indicative of a better deal, one might be concerned about the extent to which this result is obtained by construction since the deal surplus measure is a composite of the bidder and the target BHAR over the (-42,+42) window. To address this concern, the mean and median for alternative measures of deal surplus is also provided. These alternative measures of deal surplus do not explicitly include the target runup, rather they measure the change in the

combined value of the target and the bidder 42 days, 1 year and 2 years following deal announcement. The longer window of the measures (1 year and 2 years) ensure that we are capturing a persistent increase in value as a result of the deal. Across all the different measures we see that the surplus generated by deals in the lowest target runup tercile is on average 10% - 15% lower than that from deals in the highest tercile of target runup.

To further address the concern that the relation between the target runup and the deal surplus is the result of variable construction: because the deal surplus is the weighted sum of the bidder and the target gain, there would be a monotonic relation between the deal surplus and the target runup as the size of the target relative to that of the bidder increases. Hence, we could observe the relation between target runup and deal surplus even when the runup is not truly informative. To address this concern I double sort deals based on the level of target runup and relative size. From table 6.4 Panel B we see that relative size does contribute to the relation between target runup and deal surplus: within any runup tercile, the magnitude of deal surplus increases with relative size. However, the increase in the relative size of the target cannot completely explain the relation between target runup and deal surplus. Within a relative size group, moving from the lowest to the highest tercile in target runup results in a significant increase in the deal surplus. Hence, the relation between the target runup and the deal surplus is not merely the result of variable construction. Relative size is included as a control variable in all multivariate analysis in later sections.

Finally, in table 6.4 Panel C, I examine the relation between target runup and deal surplus in a multivariate setting. Since we are interested in the relation between target runup and deal surplus in the cross-section of completed deals, I use the Heckman 2-stage estimator (selection model) to allow for any latent factors that are related to deal completion to also influence the target runup. Consistent with the univariate results, the target runup

is significantly positively related to all the different measures of deal surplus. The result is robust to the use of industry-adjusted measures of deal surplus which reassures that the runup is capturing deal-specific information rather than industry-wide information. The economic significance of the coefficients is provided in table 6.4 Panel E. A one standard deviation increase in deal surplus implies an increase between 2% and 6% in the observed target runup.

The above results suggest that targets of high surplus deals on average see a larger runup in value. Next, I examine the relation between the fraction of the target premium anticipated over the runup period (anticipated premium) and deal surplus. The total premium that a target receives in a deal is related to the deal surplus. If the runup in target value is indeed informative about the potential deal surplus then it should closely reflect the total premium that the target receives ex-post. Table 6.4 Panel D presents the relation between the anticipated premium [3] and deal surplus (censored Tobit regressions). We see that the fraction of the premium anticipated over the runup period is positively related to the deal surplus. The larger the deal surplus the closer the target runup gets to the expected premium, suggesting that runup is more informative when the potential surplus is large. A one standard deviation increase in deal surplus (Table 6.4 Panel E) increases the fraction of target premium anticipated over the runup period by 2.7% - 5%.[4]

The multivariate evidence presented in Table 6.4 Panel C and D is consistent with the hypothesis that target runup is a signal of the total expected surplus from the deal. Next I examine the relation between target runup and the bidder's deal related outcome.

[3] Anticipated premium is calculated as the following ratio: $\frac{\text{Ln(Target Price (-2)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$

[4] One might worry that the runup itself might impact the total premium that a target receives in a deal. If runup increases the bargaining power and results in markup pricing (as in Schwert (1996)), then we would expect the runup to be a smaller fraction of the total premium.

5.4 HYPOTHESIS 2: TARGET RUNUP AND BIDDER GAIN

Table 6.5 Panel A presents the mean and median bidder return across the target runup terciles. There is a positive relation between the target and bidder runup: the mean and median bidder runup in the highest target runup tercile is significantly higher than the bidder runup in the lower (target) runup terciles. The bidder runup can be due to deal-specific factors or due to industry-wide factors. However, the bidder return during the runup period is significantly higher than the abnormal return of matched firms (matched on industry,size, B/M and ROA) and the market-adjusted abnormal return of the industry. The bidder runup is hence not driven purely by industry-wide information.

There is some evidence that the bidder abnormal return ((-1,+1) and (-1,+42)) is slightly higher for deals in the highest tercile of target runup. The average(median) bidder announcement return (-1,+42) in the lowest target runup tercile is -2.8% (-2.7%) while that in the highest target runup tercile is not significantly different from zero. Looking at the cumulative return of the bidder in the (-42,+42) window we see that bidders of deals in the largest tercile of target runup see significant gains (6.9% at the mean and 3.8% at the median) while the bidders of deals in the lowest tercile of target runup see significant losses (-2.7% at the mean and -3.3% at the median). The large runup period return of the bidders in the highest target runup tercile (8.1% at the mean and 3.7% at the median) do not reverse even 42 days after deal announcement. A large bidder runup therefore does not necessarily imply an overvaluation of bidder equity which is corrected subsequent to the announcement of a deal. The univariate evidence thus suggests that the bidder's outcome from the deal is positively related to the target runup.

Table 6.5 Panel B presents the relation between target runup and the bidder's outcome from the deal in a multivariate setting. I use the Heckman 2-stage estimator to estimate the

relation between target runup and the bidder outcome in deals that are subsequently completed. This estimation approach explicitly accounts for unobservable factors that could impact the likelihood of completion and the bidder's outcome from the deal simultaneously. All results presented in Table 6.5 Panel B are however robust to simple OLS regressions for the sub-sample of completed deals.

From models (1), (3) and (5) of Table 6.5 Panel B we see that there is a positive relation between the target runup and the bidder announcement return (CAR (-1,+1), CAR(-1,+42)) and the bidder total gain (bidder BHAR (-42,+42)). The coefficient in model (1) implies that relative to deals at the 25th percentile of target runup, those at the 75th percentile have a 0.77% higher bidder 3-day announcement CAR. From model (5), moving from the 25th percentile of target runup to the 75th percentile improves the bidder gain (Bidder BHAR (-42,+42)) by 4.7%. A potential concern is that this positive relation is driven by a few deals that involve targets that are doing poorly (i.e., target runup$<$0) and are hence acquired cheaply by the bidder, which results in a larger bidder gain. To address this concern, I use a dummy variable equal to 1 if the target runup is positive. The significant positive coefficient indicates that bidders in fact benefit more from acquiring targets with positive runup than from acquiring targets with negative returns during the runup period.

While the results re-affirm the idea that the target runup is informative, they are consistent with two not-mutually-exclusive interpretations:

1. Since a large target runup is indicative of a deal of better quality (large surplus), the better bidder outcome from large runup deals is simply the result of better deal selection.
2. Managers use the target runup to update their priors on deal surplus. Because a larger target runup is a more certain signal of deal surplus, it reduces the likelihood that the

manager enters into an adverse contract that would have had a negative impact on the bidder shareholders.

We can distinguish between these two possibilities using measures of uncertainty. If the better bidder outcome from high-runup deals is purely the result of better deal selection we would not expect to observe a significant difference in the impact of target runup on the bidder's outcome in deals that differ in the level of uncertainty about deal surplus. However, if the result reflects bidder management utilization of information contained in the runup, we would expect a stronger impact of target runup on bidder gain in deals where the level of uncertainty about deal surplus is higher, given that in such cases there is greater scope for managers to learn and act on the feedback by adjusting their payment and completion decision.

5.5 HYPOTHESIS 3: TARGET RUNUP AND MANAGERIAL LEARNING

In Table 6.6 Panel A, I use the mode of payment (cash versus stock) to capture the manager's uncertainty about deal surplus. The managerial learning hypothesis would suggest that the target runup would have a larger impact on the bidder's deal-related gain under high uncertainty (i.e., in stock deals). From Table 6.6 models (1) and (5) we see that the interaction term `Target runup` × `Percent stock offered` is significantly positive, indicating that target runup has a larger impact on bidder announcement returns in stock deals. Also, from models (2) and (6) we see that bidder announcement returns (-1,+1) and (-1,+42) in cash-financed deals are not impacted by the target runup. However, bidder announcement return is strongly positively related to the target runup in stock deals (models (3), (4), (7) and (8)). For example, the coefficient on target runup in deals financed wholly with stock (model (8)) is 0.086. In economic terms, this coefficient implies that moving

from deals in the 25th percentile of target runup to the 75th percentile would improve the bidder announcement return over the (-1,+42) window by 2.2%.

These results are consistent with the hypothesis that managers learn from the target runup. By providing an estimate of the deal surplus, the target runup reduces the uncertainty of the manager's signal and lowers the likelihood that the bidder overpays for the target. However, since a lower runup in target value is a noisier signal of deal surplus, there is a higher likelihood that the manager's estimate of deal surplus differs from that of the market when the runup is low. This could explain the poorer bidder outcome when the target runup is small, especially when the level of uncertainty about the deal/target value is high. One might worry, however, about the use of the mode of payment as a measure of uncertainty since unobservable factors related to choice of the mode payment may also impact bidder's outcome. To address the selection concerns, I re-estimate the models in Table 6.6 Panel A in the robustness section (Table 6.11) by allowing for selection into the observed mode of payment. To further ensure that the above results are not the result of using the mode of payment as a measure of uncertainty, I use alternative measures to capture the level of uncertainty. Table 6.6 Panel B presents the results from the interaction of each of the alternative uncertainty measures with the target runup.

In models (1) and (5) I interact the target idiosyncratic volatility with the target runup (`Target runup` × `High Target Idiosyncratic Volatility Dummy`, where the dummy is set equal to one if the target idiosynctratic volatility is above median). As expected, the interaction term is positive and significant (model (1): 0.04, model (5): 0.092), suggesting that the target runup has a larger impact on the bidder gain in deals involving high uncertainty targets. The coefficient on the interaction term `Target runup` × `Target BVE/MVE` in models (2) and (6) is significantly negative (model (2): -0.03, model (6): -0.069). This is consistent with our expectation. Following Pastor and Veronesi (2006) there is a higher

level of uncertainty associated with firms with higher M/B ratio. Since the target runup would be more informative/valuable to the manager in deals where the level of uncertainty is high – i.e. when the target B/M is low, we would expect the interaction term to have a negative coefficient.

Consistent with our expectations, the target runup has a larger impact on bidder gain when the deal involves a target which is technology intensive: the coefficient on the interatction term `Target runup` × `High Technology Target` in models (3) and (7) are 0.048 and 0.066 respectively. Finally, the coefficients on the interaction term `Target runup` × `Same Industry Deal` in models (4) and (8) (-0.054 and -0.055 respectively) suggest that the target runup has a smaller impact on the bidder's outcome in same industry deals wherein the level of uncertainty about synergy is likely to be lower. Although there is a negative relation between the degree of uncertainty and the bidder's announcement return (as implied by the negative coefficients on target idiosyncratic volatility and target technology intensity), the positive coefficients on the interaction terms imply that in scenarios with a higher degree of uncertainty, a one standard deviation increase in target runup has an incremental impact (relative to scenarios with a lower degree of uncertainty) on bidder's announcement return (-1,+1) of 0.75% - 1.35%.

In Panel C of table 6.6 I further sort deals into low, medium and high uncertainty categories. Deals get a score of one for each of the uncertainty measures. The total uncertainty score is obtained by adding the uncertainty score of the deal for each measure. The total uncertainty score can therefore range from zero to five. A deal gets a total uncertainty score of five if it satisfies all of the following: (i) is financed mostly with stock, (ii) involves a target with high (above median) idiosyncratic volatility, (iii) involves a target with low (below median) B/M, (iv) involves a target with high technology intensity and (v) the target industry is different from the bidder's primary industry (2-digit SIC). If a

deal satisfies none of the five conditions it gets a total uncertainty score of zero. Deals are then assigned to low (total uncertainty score $\leq$1), medium (2$\leq$ total uncertainty score $\leq$3) and high (total uncertainty score $\geq$4) groups. I then re-estimate the relation between target runup and bidder announcement return for each of the uncertainty groups (Table 6.6 Panel C).

From model (1) we see that relative to the low uncertainty group (omitted group) deals in the medium and high uncertainty groups see significantly lower bidder announcement return (-1.8% and -4.3% respectively). The coefficient on the interaction term `Target Runup` $\times$ `High Uncertainty` however is significant and positive (5.7%) indicating that a larger target runup is associated with an improvement in bidder outcome for this group. Also note that the target runup does not significantly impact the bidder outcome in deals in the low and medium uncertainty categories in models (1) and (5). Sub-sample estimation in models (2) through (4) and (6) through (8) yields similar results. Overall, the target runup plays a bigger role in determining the outcome of deals with a greater level of uncertainty, which is consitent with the use of market feedback by managers of the bidding firm in their deal pricing decision in such scenarios.

Table 6.7 provides more direct evidence on the deal pricing behavior of managers depending on the level of uncertainty. If managers use the market feedback in determining the offer price for the target, then we would expect to see that the offer price is closer to the end of runup period price (day -2 relative to announcement day) especially when the manager is less certain about the deal/target value. To this end, I calculate the "unanticipated premium" that a target receives in a deal. The unanticipated premium is the price premium paid to the target relative to its share price 2 days prior to deal announcement scaled by the total premium (i.e., premium relative to day -42). More specifically, the unanticipated premium is measured as 1 - anticipated premium; where the anticipated

premium is $\frac{\text{Ln(Target price (-2)/Target price (-42))}}{\text{Ln(Offer price/Target price (-42))}}$. If managers "learn" from the market then we would expect the unanticipated premium to be smaller since they choose to pay a price close to the end of runup period price. We would therefore expect to see a smaller unanticipated premium in deals with a greater level of uncertainty.

Table 6.7 Panel A presents the mean and median unanticipated premium for the different measures of uncertainty and also for the low, medium and high uncertainty categories. Of the five different uncertainty measures, we see that the unanticipated premium is lower for the high uncertainty group in three of the measures (and not significantly different in the other two measures). The unanticipated premium in stock deals is on average 15% (20% at the median) lower than that in cash deals. Similarly, the unanticipated premium for targets with high idiosyncratic volatility is on average 10% lower than that for low idiosyncratic volatility targets and the unanticipated premium for technology intensive targets is on average 5% lower than that for non-technology intensive targets. Figure 6.6 plots the unanticipated premium in deals in the low, medium and high uncertainty groups. We see from figure 6.6 (and Table 6.7 Panel A), that the unanticipated premium is the smallest for the high uncertainty group (Uncertainty Score$\geq$4) - on average deals in the high uncertainty category receive a 20% smaller unanticipated premium relative to the low uncertainty category (Uncertainty Score $\leq$1). Panel B of Table 6.7 examines the relation between unanticipated premium and the uncertainty scores of deals in a multivariate setting. Again, the unanticipated premium for deals in the high uncertainty group is 15.6%-17% lower than that for deals in the low uncertainty group. The smaller unanticipated premium for deals in the high uncertainty group suggests that when faced with a greater level of uncertainty the manager makes a pricing decision closer to the market estimate.

Taken together the results in tables 6.6 and 6.7 suggest that the target runup plays a larger role in influencing the pricing decision by managers and hence the bidder outcome

in deals when there is a greater level of uncertainty. In the next set of results I examine the impact of target runup on deal completion.

5.6 HYPOTHESIS 4: TARGET RUNUP AND THE LIKELIHOOD OF DEAL COMPLETION

In examining the relation between target runup and the likelihood of completion, I recognize the inherent endogeneity that deals that are perceived as being more likely to be completed see higher active trading by investors and hence are more likely to witness a bigger runup in value. The problem of reverse causality would therefore confound any causal interpretation. The inferences regarding the role of target runup in influencing the completion decision is therefore based on inter group comparison. I posit that managers are more likely to heed to market feedback when the degree of uncertainty is high. We would therefore expect a stronger relation between the target runup and the likelihood of completion in high uncertainty scenarios.

In table 6.8 I examine the relation between target runup and the likelihood of completion of a deal. The results presented in Table 6.8 are the average marginal effect of the independent variables. All continuous independent variables are standardized (i.e., each continuous variable is mean-differenced and scaled by its own standard deviation) so that their respective coefficients can be interpreted as the impact of a one-standard deviation change in the independent variable on the likelihood of successful completion. From model (1) of Table 6.8 Panel A we see that there is no significant association between target runup and the likelihood of completion. The target runup however has a significant impact on the likelihood of completion of stock deals as the interaction term `Target Runup` $\times$ `Percentage Stock` is significantly positive: a one-standard deviation in-

crease in target runup increase the likelihood of completion of stock deals by 3.6%.

In models (2) through (4), I estimate the relation in sub-samples of cash deals, majority stock deals and all stock deals. In estimating the sub-sample regressions, I allow for selection into mode of payment by using a 2-stage estimator. In the first stage, I estimate the following Probit regression:

$$\begin{aligned} \text{Y} = \alpha &+ \beta_1 \times \text{Target Runup} + \beta_2 \times \text{Bidder Runup} + \beta_3 \times \text{Ind. Abn. Return (-42,-2)} \\ &+ \beta_4 \times \text{Relative Size} + \beta_5 \times \text{Log(Target MVE)} \\ &+ \beta_6 \times \text{Target}\left(\frac{\text{BVE}}{\text{MVE}}\right) + \beta_7 \times \text{Bidder}\left(\frac{\text{BVE}}{\text{MVE}}\right) \\ &+ \beta_8 \times \text{Target Idio. Vol.} + \beta_9 \times \text{Target Idio. Vol.} + \beta_{10} \times \text{High-Techn Target} \\ &+ \beta_{11} * \text{Same Industry} + \beta_{12} * \text{Hostile Deal} + \beta_{13} * \text{Tender Offer} + \beta_{14} * \text{Wave} + \epsilon \end{aligned}$$

where Y is set equal to one for the sub-sample of interest (all cash, majority stock, all stock) and zero otherwise. Following Heckman (1979) I use the first stage estimates to calculate the inverse-Mill's Ratio and include it as a control variable in the estimation of interest so as to explicity account for selection into the group. We see that the target runup is unrelated to the likelihood of completion in cash deals but is significantly related to the completion likelihood of stock deals (% Stock >0.5). A one standard deviation in target runup increases the likelihood of completion of stock deals by 3.5% (or reduces the likelihood of withdrawal by 3.5%). The reduction in withdrawal likelihood is significant given that the unconditional withdrawal likelihood is about 16%. We also note that the unconditional withdrawal likelihood is not very different across the sub-samples, thus this finding is not simply the result of insignificant power of the test in some sub-samples.

I also estimate the relation between target runup and the likelihood of completion in low, medium and high uncertainty categories. From model (1) of Table 6.8 Panel B we again see that target runup is strongly related to deal completion likelihood only for the high uncertainty deals, as suggested by the significant positive coefficient (4.7%) on the interaction term `Target Runup` × `High Uncertainty`. Sub-sample estimations yield similar results. Overall, the fact that target runup impacts the likelihood the completion only in scenarios with a large degree of uncertainty is consistent with the notion that managers view information in market prices to be complementary to their own when they are less certain about their own private signals. Market prices thus serve as a valuable input to managers and impact the deal selection process in such scenarios.

5.7 TARGET RUNUP & THE CHANGE IN UNCERTAINTY AROUND DEAL ANNOUNCEMENT

In earlier sections I argue that a larger target runup leads to a greater degree of certainty regarding deal surplus. To verify the validity of this argument, I examine the relation between target runup and the change in uncertainty of the bidder following the announcement of a deal. When the potential surplus that can be generated from the deal is less certain, we would expect to see an increase in the bidder uncertainty around deal announcement. However, if a larger target runup indicates a greater level of certainty about deal surplus, then there should exist a negative relation between the target runup and the bidder uncertainty change around deal announcement.

Following Bargeron et al. (2010) I use the implied volatility of 91-day at-the-money options on the bidder stock as a measure of uncertainty about its value. I also construct a measure of change in implied volatility which takes into account the portfolio effects asso-

ciated with the combination of the bidder and the target (the change in portfolio implied volatility). The change in the bidder implied volatility is measured as the difference between the bidder implied volaility immediately following the announcement of a deal and its implied volatility long prior to deal announcement (calendar time (-83,-63) relative to deal announcement). The change in portfolio implied volatility is the change in the bidder implied volatility following deal announcement relative to the combined implied volatility of the bidder and the target long prior to deal annoucement (calendar time (-83,-63) relative to deal announcement).[5] From Table 6.9 Panel A we see that mergers are accompanied by an increase in uncertainty for the bidder shareholders. The bidder implied volatility increases by 1.6% on average around the announcement of a deal.[6] The average as well as the median change in the portfolio implied volatility is also significantly positive. On average (median) the portfolio implied volatility increases by 7.9% (6.34%) surrounding the announcement of a deal. Further,the change in the bidder (portfolio) implied volatility is larger in the case of deals financed with stock.

From Panel B of Table 6.9 we see that the target runup is negatively related to the percentage change in the bidder implied volatility and the percentage change in the portfolio implied volatility around the deal announcement. However, the negative relation between the target runup and the change in uncertainty is significant only in deals which are financed mostly with stock (models (3), (4), (7) and (8)), which is consistent with the idea that the target runup is more informative when the ex-ante level of uncertainty is high. On average, a one standard deviation increase in the target runup is associated with a change in uncertainty of the bidder which is lower by 2.56% in stock-financed deals.

[5]The construction of the change in bidder implied volatility and portfolio implied volatility is discussed in appendix A1.

[6]The smaller sample size is due to the fact that the Optionmetrics database begins only in 1995. Also, some of the target firms may be too small to have traded options.

5.8 ROBUSTNESS CHECKS

5.8.1 Is the relation between bidder outcome and target runup driven by industry/macro factors?

An alternative explanation for the positive relation between bidder outcome and target runup is that they are due to industry-wide rather than deal-specific factors. In other words, deals with large runup and high bidder returns are from industries which have recently had an improved outlook. To examine the extent to which industy outlook drives the observed results, I estimate the relation between bidder outcome and target runup in sub-samples sorted on the industry return in the days prior to the runup period (specically, the industry abnormal return over (-293,-43)). If the relation is driven by industries with improved outlook (i.e., with industry return > Median), we would not expect to see any relation between the variables in industries which have not witnessed any significant upward trend. The result in models (1) and (2) of Table 6.10 suggest that this is not the case: there continues to exist a positive relation between the bidder outcome and target runup in both industry return groups, assuaging the concern that the result is limited to deals in industries with improved outlook.

An implication of the managerial learning hypothesis is that market feedback (and hence target runup) is most valuable to bidders when there is a greater level of uncertainty. In Table 6.6 Panels A, B and C, I used measures related to uncertainty about target stand-alone value/deal surplus to examine this assertion and find that the bidder runup is closely related to the target runup when the level of uncertainty is high. In Table 6.10 models (3) through (6), I examine whether the results persist when I use measures related to industry-wide uncertainty rather than deal-specific uncertainty.

Models (3) and (4) examine the relation between the bidder outcome and target runup

in deals that are completed in wave and non-wave years. Following Ahern and Harford (2012) a deal is classified as being part of a merger wave if it is announced in an year where the number of deals in the industry (using Fama Frech 49 industry classification) lies in the top quartile of the distribution of deals in the industry. If merger waves are driven by industry-specific shocks then there is a lower level of uncertainty on the potential surplus from the deal. We would therefore expect to see that the target runup is less beneficial to the managers of the bidding firm when they are pursuing deals following a shock in the industry (and hence as part of a merger wave). Consistent with our expectation there is a significant positive relation (model (3): coefficient=0.076) between target runup and the bidder outcome only among deals which are done in non-wave years and where there is presumably a greater level of uncertainty.

In models (5) and (6) of Table 6.10, I sort deals based on the industry B/M. Similar to the Target B/M measure we would expect a greater level of uncertainty associated with deals in industries which have lower B/M since they are likely to be growth rather than asset-in-place industries. The coefficient on target runup is significant only among deals which take place in industries with below median B/M (model (5): coefficient=0.062). The results are thus materially similar to the case where I use Target B/M to capture the level of uncertainty.

5.8.2 Can the Results be Explained by Self-Selection of Firms into Different Methods of Payment?

The mode of payment (cash vs. stock) is used as the primary measure of uncertainty faced by the manager regarding deal surplus and/or target stand-alone value. A valid concern with this measure is the extent to which self-selection by firms into different modes of payment explains the observed relation between target runup and bidder gain. To address this concern, I use a selection model (Heckman's selection model) to control for any unobserved

correlation between factors that determine the choice of mode of payment and the bidder's deal related gain. If the unobserved factors that determine the choice of payment method also drive the bidder announcement return, then we would expect the significance on the coefficient on target runup to disappear once these unobserved factors are controlled for.

In table 6.11 I use selection equations to determine selection into the mode of payment: majority cash (% cash > 0.5) and majority stock (% stock > 0.5). The selection equation includes two additional controls, namely: (i) low target price dummy (=1 if target price (-42) $\leq$ \$5) and (ii) bidder cash/assets. The underlying assumptions behind the two additional control variables is that they are potentially related to the choice of mode of payment but unrelated to the bidder gain itself. The coefficient on the Inverse-Mill's Ratio (which is a measure of the degree to which unobserved factors that contribute to selection into the group also impact the outcome variable of interest) in table 11 is only significant suggesting that self selection is not a significant factor contributing to the bidder's deal related gain. Even after controlling for the potential self selection of bidders into different modes of payment, the bidder's outcome continues to be positively related to the target runup in stock (models(3) and (4)) deals but not so in cash deals (models (1) and (2)).

5.8.3 Are the Results driven by Model-Specification?

One of the central findings of this paper is that there is a positive relation between target runup and the bidder outcome, more so, in deals involving a greater level of uncertainty. In this section, I relax the assumption of linearity in the relation between the bidder gain and the target runup, which is implicit in my regression based analysis. As an alternative test, I match deals which have a similar target runup but differ in the level of uncertainty. If, on average, the bidder gain is increasing in deal surplus, we would expect to observe this effect in deals with low uncertainty as well as in deals with high uncertainty. However, if the relation between the bidder gain and the target runup is due to factors attributable

to managerial learning, we would observe this result only in deals with greater uncertainty.

I use the mode of payment to capture the level of uncertainty. Hence, for each stock deal (percent stock>0.5) with target runup>0 (or target runup<0), I find matching cash deals (percent cash >0.5) that have a target runup within a (-20%, +20%) threshold.[7] By subtracting the bidder gain in cash deals with a similar target runup (i.e., a similar expected deal surplus), we can purge the bidder gain of any effect which is common to both stock and cash deals. In other words, we difference out any effect of target runup that is common to both low and high uncertainty deals.

From Table 6.12 we see that the average deal surplus is lower in the sample with target runup<0 than in the sample where target runup>0. Further, we see that in stock as well as in cash deals, the bidder gain is increasing with the deal surplus. For example, the average bidder gain in deals financed with cash is -0.015 in the sub-sample with target runup<0 which are of lower value (average deal surplus=0.008). The bidder gain is much larger (on average 0.026) in the sub-sample with target runup>0 which includes deals with a larger surplus (average deal surplus=0.093). This suggests that the improvement in bidder gain with target runup can at least partly be attributed to better quality (larger surplus) of deals which see a larger runup in target value.

More importantly, in deals with target runup<0, the bidder gain in stock deals is 4.6% lower than in matched cash deals. Thus, even after controlling for any effect that is common to low and high uncertainty deals, the bidder gain in stock deals is lower than matched cash deals when target runup<0. There is, however, no significant difference between the bidder gain in stock deals and matched cash deals when target runup>0. This result is consistent with the managerial learning hypothesis: a larger target runup is a more reliable

[7] The exact matching procedure is described in Table 6.12.

signal of deal surplus and it therefore reduces the likelihood that the managers overpay for the target even when there is a high level of uncertainty. Hence, there is no significant difference in the bidder gain in low and high uncertainty deals when the target runup is high.

On the other hand, a low runup in target value is a much noisier signal of deal surplus and even when the manager updates his priors in response to the market feedback, there is a greater likelihood that he may be overestimating the deal surplus. The average bidder gain realized upon observing a low runup (target runup$<$0) is thus significantly smaller in stock deals where there is a higher uncertainty about deal surplus. Overall, while the matching procedure suggests that the improvement in the bidder's outcome with target runup is in part due to higher quality (larger surplus) of deals, it is also consistent with the managerial learning based interpretation.

6.0 CONCLUSION

The results presented in this paper provide evidence that the target runup contains useful information about the surplus that can be expected from the deal: on average a higher target runup is indicative of a larger deal surplus. The differences in target runup in the cross-section are not merely a result of differences in deal anticipation but rather are due at least in part to differences in the market's estimate of deal surplus. I also provide evidence that managers use this market feedback in improving the precision of their private signal, particularly when the level of uncertainty is high. Target runup thus benefits the bidder shareholders by: (i) reducing the likelihood that manager overestimates deal surplus and overpays for the target, and (ii) enabling better deal selection. This suggests that managers view the market as a complementary source of information.

One of the implications of the results presented in this paper is that there may be systematic biases in the way synergy/deal surplus is currently measured in the literature. Since deals with a larger surplus are anticipated to a greater degree, any estimate of deal surplus that ignores the pre-announcement window is likely to underestimate the surplus of those deals that truly generate a large surplus. This paper also provides a rational explanation for the dominantly observed outcome that the targets of completed deals experience significant runup in value. It does so by allowing market prices to contain information that is complementary to the manager's information set and allowing for managerial learning from such market feedback.

The results in this paper refute the existence of markup pricing in mergers and suggest that managers use the feedback from the market appropriately when it comes to deal selection and pricing. The evidence also reinforces the role of the market in determining the outcome of privately negotiated deals. It contributes to the growing stream of literature which argues that there is potential for insiders to learn from the market and thereby increase the precision of their private signals. In the larger context, learning from the market improves allocational efficiency by helping firms avoid potential investment pitfalls.

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Figure 6.1: Deal Surplus and Target Runup: Case 1

Case 1: Target runup solely reflects differences in the degree of deal anticipation: If deal anticipation is unrelated to the expected deal surplus then even high surplus deals could see a smaller runup in target value if they are anticipated poorly. In the figure below, Target 2 which is involved in a deal with larger surplus ($\theta_2 > \theta_1$) sees a smaller runup in value than Target 1 ($\theta_{R2} < \theta_{R1}$) because it is less anticipated. Target 2 however sees a larger announcement return than Target 1.

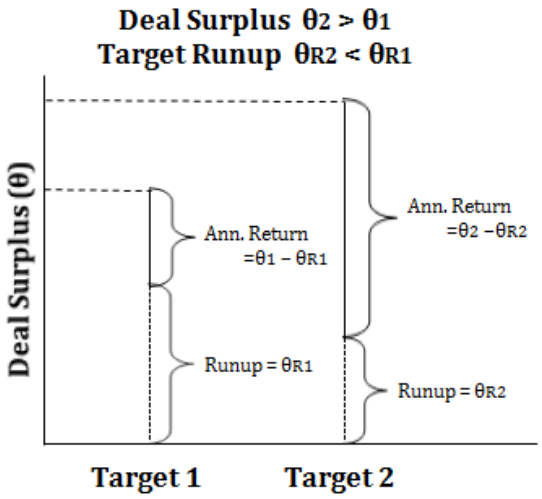

Figure 6.2: Deal Surplus and Target Runup: Case 2

Case 2: Target runup reflects expected deal surplus: If deals with larger surplus are better anticipated, then the target runup would reflect the expected deal surplus. In the figure below, Target 2 sees a larger runup in its value ($\theta_{R2} > \theta_{R1}$) because it is involved in a deal with a larger surplus ($\theta_2 > \theta_1$), which is anticipated to a greater degree by the market.

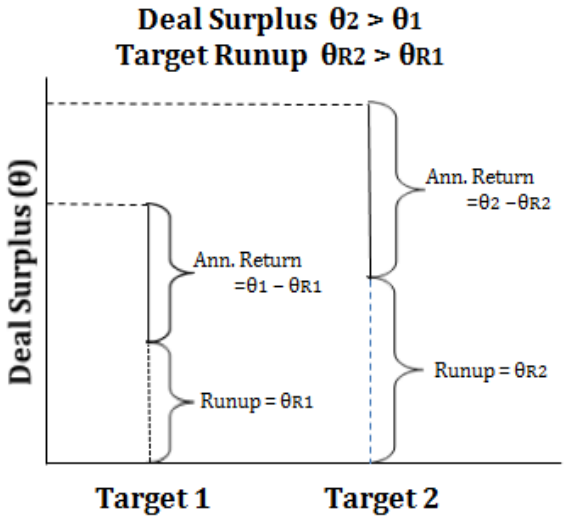

Figure 6.3: Target Abnormal Return and Abnormal Turnover Relative to Deal Announcement Day

The industry adjusted BHAR is the difference between the buy-and-hold return of the target stock over the window (-42, t) and the median of the buy-and-hold return of all other stocks in the target 2-digit SIC over the same period. The plotted figure is the average industry adjusted BHAR of all targets of completed deals.

The abnormal log turnover of a target stock on any day t is calculated as the difference between its log turnover on day t and the median of its log turnover which was estimated over the window (-294,-43) relative to deal announcement. The industry abnormal log turnover is the median abnormal log turnover of all firms in the targets 2-digit SIC. The industry adjusted abnormal log turnover is obtained by subtracting the abnormal log turnover in the industry from the abnormal log turnover in the target stock. The plotted figure is the average industry adjusted abnormal log turnover in targets of completed deals in the days surrounding deal announcement.

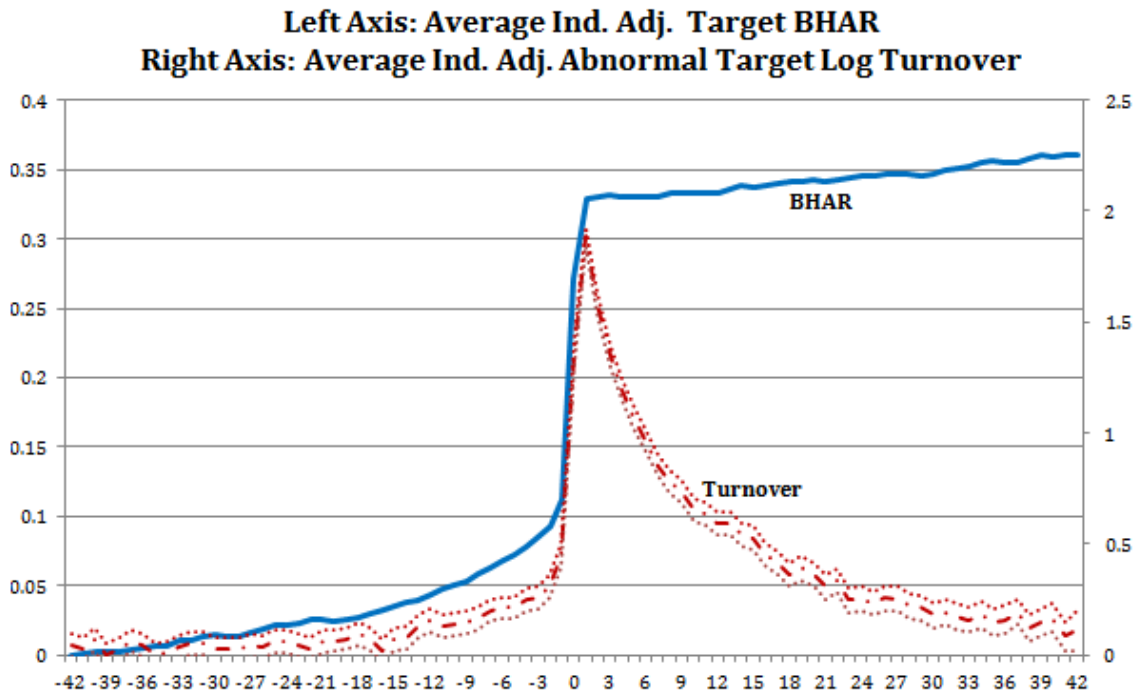

Figure 6.4: Target Average Abnormal Turnover Sorted by Deal Surplus

The abnormal log turnover of a target stock on any day t is calculated as the difference between the logarithm of its turnover on day t and the median of its log turnover which was estimated over the window (-294,-43) relative to deal announcement. The industry abnormal log turnover is the median abnormal log turnover of all firms in the targets 2-digit SIC. The industry adjusted abnormal log turnover is obtained by subtracting the abnormal log turnover in the industry from the abnormal log turnover in the target stock. The average industry adjusted abnormal log turnover (plotted) on any day t relative to deal announcement is obtained by averaging the industry adjusted abnormal log turnover of all target stocks (of competed deals) in a given deal surplus tercile.

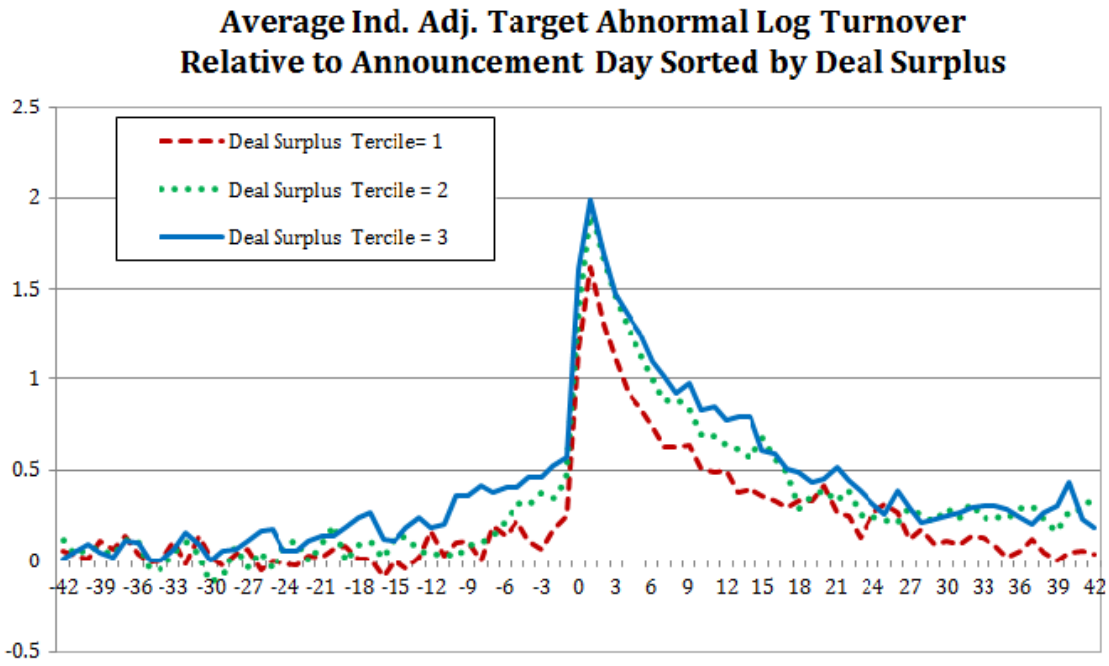

Figure 6.5: Target Abnormal Return Sorted by Deal Surplus

The industry adjusted BHAR return is the difference between the buy-and-hold return of the target stock over the window (-42, t) and the median of the buy-and-hold return of all other stocks in the target 2-digit SIC over the same period. Deals are sorted into terciles based on the value of deal surplus. The plotted figure is the average industry adjusted BHAR of all targets in a given deal surplus tercile.

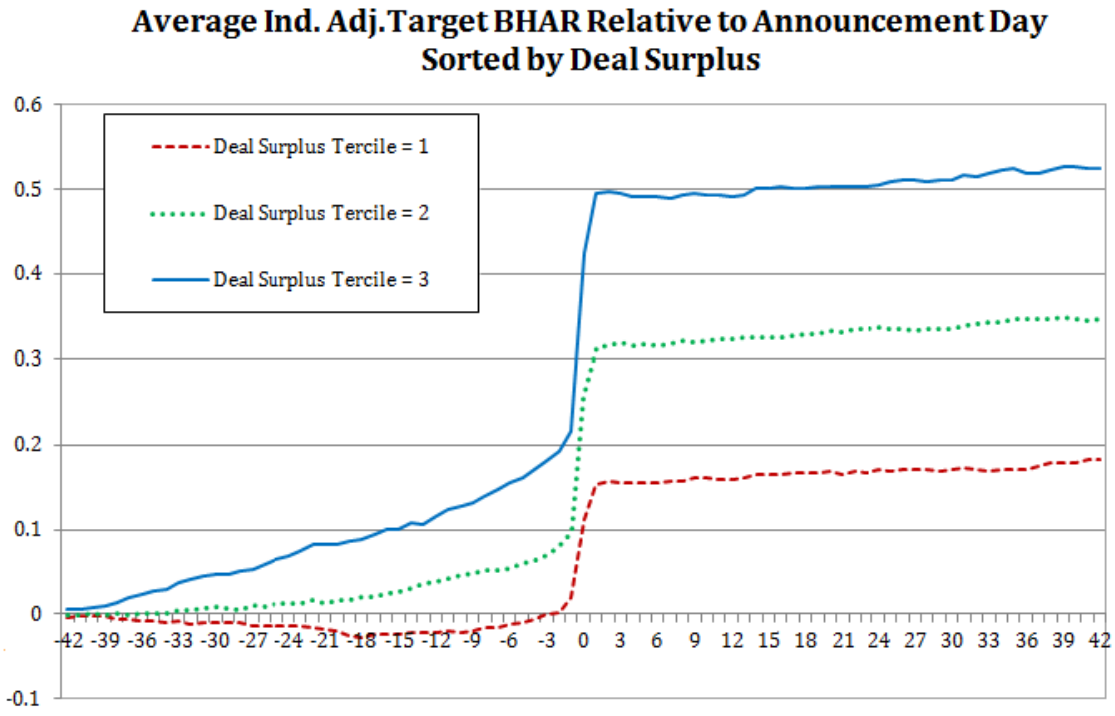

Figure 6.6: Offer Price relative to Target Price Sorted by Degree of Uncertainty

Deals are sorted into low (Uncertainty Score≤1), Medium (2≤Uncertainty Score≤3) and High (Uncertainty Score≥4) groups based on their composite uncertainty score. The composite uncertainty score for a deal is obtained by adding its uncertainty score for each of the following uncertainty measures (i) Percent Stock (score=1 if % Stock >0.5 and 0 otherwise), (ii) target idiosyncratic volatility (score=1 if target idiosyncratic volatility > Median and 0 otherwise), (iii) Target BVE/MVE (score=1 if target BVE/MVE < Median and 0 otherwise), (iv) target technology intensity (score=1 if target is technology intensive and 0 otherwise) and (v) target industry relatedness (score=1 if target and bidder primary industry classification (2-digit SIC) is the different and 0 otherwise). The figure plotted is the fraction of the target premium anticipated prior to announcement. Specifically, for each day t the ratio: $\frac{\text{Ln(Target Price (t)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$. Following the announcement of the deal the fraction of the premium anticipated is set equal to 1 since the offer price is revealed on the announcement day. The figure plotted is the median of the above mentioned ratio for firms in the low/medium/high uncertainty groups.

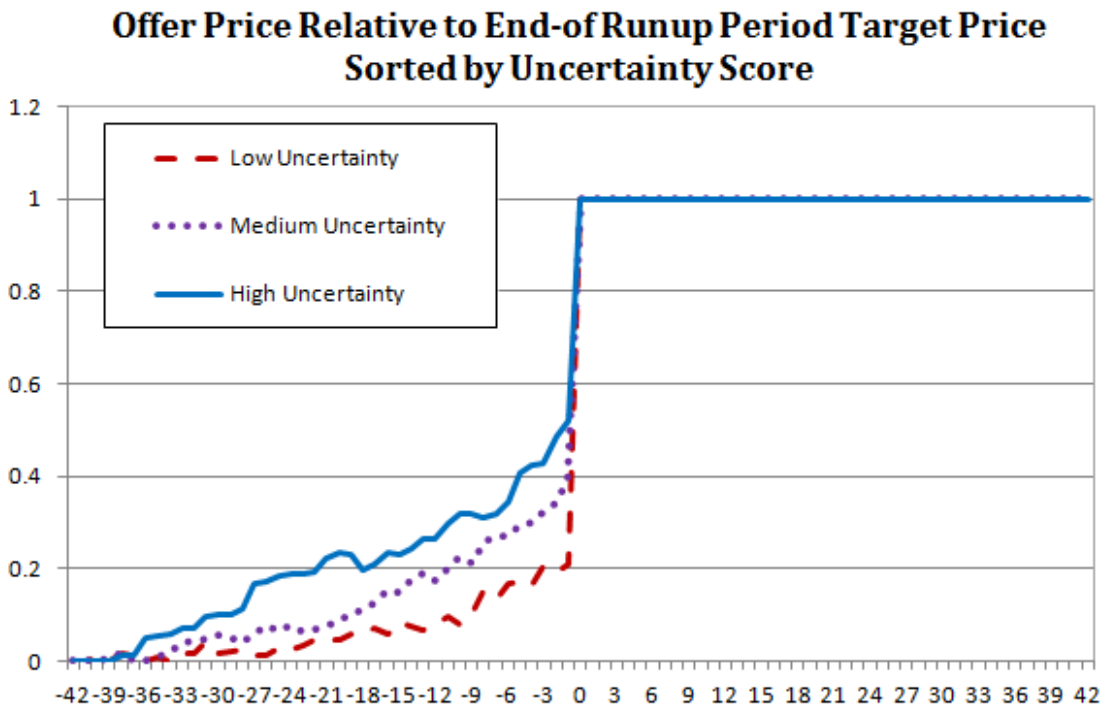

Table 6.1: Summary of Predictions

Panel A

	Relation between Bidder Gain and Target Runup	**Does the Impact Differ by Level of Uncertainty?**
Target runup reflects difference in the degree of deal anticipation only.	Zero	No
Target runup reflects an exogenous increase in the stand-alone value of the target.	Negative	No
Target runup increases the bargaining power of the target.	Negative	No
Target runup reflects the market's estimate of deal value. Managers learn from target runup which enables better deal selection / reduces the likelihood of overpayment.	Positive	Yes, stronger when deal/target value is more uncertain (i.e., in stock deals).

PANEL B

Uncertainty Measure	**Interaction Term**	**Expected Sign on the Interaction Term**
Mode of Payment	% Stock × Target Runup	+
Target Idiosyncratic Volatility	Target Idiosyncratic Volatility × Target Runup	+
Target $\left(\frac{\text{BVE}}{\text{MVE}}\right)$	Target (BVE/MVE) × Target Runup	-
Target Technology Deals	High-technology Target × Target Runup	+
Industry Relatedness	Same-industry Dummy × Target Runup	-

Table 6.2: Summary Statistics

Panel A contains the summary statistics on the sample of completed deals. Panel B provides the correlation between different measures of runup, announcement return for the bidder and the target and also the correlation between the deal surplus measures. Panel C has the summary statistics on the target/bidder runup, announcement return and post-announcement return and deal surplus.

The deal value is the SDC deal value in millions in 2010 dollars. The target (bidder) MVA (expressed in millions 2010 dollars) is calculated as the target (bidder) total assets less the book value of equity plus the market value of equity on day -42. The target idiosyncratic volatility is the standard deviation of the residuals of the target returns estimated using the Fama-French 4-factor model over a 252 day window (-294, -43). The target (bidder) BVE/MVE is the ratio of the book value of the target (bidder) equity to the market value of the target (bidder) equity (both values are from the fiscal year prior to announcement). Same industry deal is a dummy equal to one if the target and the bidder share the same 2-digit SIC code. High technology target is a dummy equal to one if the primary SIC target belongs to a technology intensive industry (as coded by the SDC).

The runup, announcement return and post-announcement return of the target (bidder) are all measured as the buy-and-hold abnormal return (BHAR) over following windows $(t,\ t+i)$ surrounding the announcement of a deal: runup window (-42, -2), announcement return window (-1,1), post-announcement return window (+2, +42). I construct 5 different measures of buy-and-hold abnormal return:

Measure 1: $\Pi_t^{t+i}\big(1+R_{i,t}-R_{f,t}\big)-\Pi_t^{t+i}\big(1+\hat{\alpha}_i+\hat{\beta}_{1i}(R_{Mkt,t}-R_{f,t})+\hat{\beta}_{2i}R_{SMB,t}+\hat{\beta}_{3i}R_{HML,t}+\hat{\beta}_{4i}R_{UMD,t}\big)$ where $\hat{\alpha}_i$, $\hat{\beta}_i$ are the estimates from the Fama-French 4-factor model over a 252 day window (-294, -43).

Measure 2: $\Pi_t^{t+i}\big(1+R_{i,t}-R_{f,t}\big)-\Pi_t^{t+i}\big(1+(R_{Mkt,t}-R_{f,t})\big)$

Measure 3: $\Pi_t^{t+i}\big(1+R_{i,t}-R_{f,t}\big)-\Pi_t^{t+i}\big(1+(R_{\text{Size \& B/M match portfolio},t}-R_{f,t})\big)$

Measure 4: $\Pi_t^{t+i}\big(1+R_{i,t}-R_{f,t}\big)-\Pi_{-2}^{-42}\big(1+(R_{\text{10 firm match portfolio},t}-R_{f,t})\big)$

Measure 5: $\log\big(\frac{P_{i,t+1}}{P_{i,t}}\big)-\log\big(\frac{\text{Market Index}_{i,t}}{\text{Market Index}_t}\big)$ where P_i is the target (the bidder) price on day t.

The measure "Deal Surplus - 1" is the weighted sum of the target and bidder BHAR over the (-42,+42) window relative to the announcement date. The weight of the bidder and the target are calculated using their respective market value of equity 42-days prior deal announcement day, after adjusting for any bidder holding/toehold in the target. The measures "Deal Surplus - 2", "Deal Surplus - 3" and "Deal Surplus - 4" are constructed respectively as the change in the combined market value of assets of the bidder and the target 42 days, 1 year and 2 years after deal announcement relative to their combined values 42 days prior to deal announcement (scaled by the combined market value of assets on day -42). Following the completion of the deal the target market value is set equal to zero. The Industry-adjusted deal surplus measures are constructed by adjusting the deal surplus measures by the change in the market value of match firms in the same industry (matched on industry, size, B/M and ROA).

The details of the construction of the five measures are discussed in the appendix. $*$, $**$, $***$ indicate that the statistic is different from zero at the 10%, 5% and 1% level respectively.

Panel A

		All Deals	Cash only deals	Stock only deals	
		(1)	(2)	(3)	(3)-(2)
Deal Value (in 2010 $ million)	Mean	1,547	895	1,458	0.029
	Median	287	244	272	0.227
	N	1,897	472	656	
Target MVA (in 2010 $ million)	Mean	1,621	989	1,409	0.107
	Median	320	260	284	0.353
	N	1,812	447	625	
Target MVE (day -42) (in 2010 $ million)	Mean	1,078	636	1072	0.035
	Median	202	175	214	0.064
	N	1,680	419	589	
Bidder MVA (in 2010 $ million)	Mean	9,242	9,840	8,999	0.753
	Median	1,583	2,153	1,358	0.010
	N	1795	435	605	
Bidder MVE (day -42) (in 2010 $ million)	Mean	6,411	6,248	6,950	0.693
	Median	1,099	1,356	1,086	0.259
	N	1,804	438	606	
Relative Size	Mean	0.405	0.286	0.389	0.000
	Median	0.243	0.154	0.264	0.000
	N	1,773	430	602	
Target-$\left(\frac{\text{BVE}}{\text{MVE}}\right)$	Mean	0.588	0.660	0.500	0.000
	Median	0.459	0.544	0.347	0.000
	N	1,792	444	619	
Bidder-$\left(\frac{\text{BVE}}{\text{MVE}}\right)$	Mean	0.454	0.499	0.346	0.000
	Median	0.369	0.424	0.260	0.000
	N	1,784	429	604	
Target Idiosyncratic Volatility	Mean	0.037	0.032	0.044	0.000
	Median	0.032	0.028	0.039	0.000
	N	1,565	400	528	
Same-industry Deal	Mean	0.795	0.803	0.805	
	N	1,973	472	656	
High-technology Target	Mean	0.512	0.538	0.661	
	N	1,973	472	656	

Panel B

Target runup (-42,-2)	**(1a)**	**(1b)**	**(1c)**	**(1d)**	**(1e)**
Fama-French 4-factor adjusted (1a)	1				
Market-adjusted (1b)	0.912***	1			
Size & B/M match portfolio adjusted (1c)	0.893***	0.969***	1		
Industry, Size & B/M match firm adj. (1d)	0.795***	0.861***	0.888***	1	
Price-based (1e)	0.846***	0.940***	0.907***	0.802***	1
Target Ann. Ret. (-1,+1)	**(2a)**	**(2b)**	**(2c)**	**(2d)**	**(2e)**
Fama-French 4-factor adjusted (2a)	1				
Market-adjusted (2b)	0.998***	1			
Size & B/M match portfolio adjusted (2c)	0.997***	0.998***	1		
Industry, Size & B/M match firm adjusted (2d)	0.990***	0.991***	0.992***	1	
Price-based (2e)	0.960***	0.962***	0.960***	0.954***	1
Target Post-Ann. Ret. (+2,+42)	**(2a)**	**(2b)**	**(2c)**	**(2d)**	**(2e)**
Fama-French 4-factor adjusted (2a)	1				
Market-adjusted (2b)	0.879***	1			
Size & B/M match portfolio adjusted (2c)	0.840***	0.955***	1		
Industry, Size & B/M match firm adjusted (2d)	0.890***	0.889***	0.892***	1	
Price-based (2e)	0.765***	0.892***	0.929***	0.842***	1
Bidder runup (-42,-2)	**(3a)**	**(3b)**	**(3c)**	**(3d)**	**(3e)**
Fama-French 4-factor adjusted (3a)	1				
Market-adjusted (3b)	0.871***	1			
Size & B/M match portfolio adjusted (3c)	0.841***	0.967***	1		
Industry, Size & B/M match firm adjusted (3d)	0.743***	0.834***	0.855***	1	
Price-based (3e)	0.752***	0.875***	0.840***	0.730***	1
Bidder Ann. Ret (-1,+1)	**(4a)**	**(4b)**	**(4c)**	**(4d)**	**(4e)**
Fama-French 4-factor adjusted (4a)	1				
Market-adjusted (4b)	0.992***	1			
Size & B/M match portfolio adjusted (4c)	0.984***	0.990***	1		
Industry, Size & B/M match firm adjusted (4d)	0.944***	0.947***	0.946***	1	
Price-based (4e)	0.921***	0.927***	0.913***	0.875***	1
Bidder Post-Ann. Ret (+2,+42)	**(4a)**	**(4b)**	**(4c)**	**(4d)**	**(4e)**
Fama-French 4-factor adjusted (4a)	1				
Market-adjusted (4b)	0.852***	1			
Size & B/M match portfolio adjusted (4c)	0.810***	0.954***	1		
Industry, Size & B/M match firm adjusted (4d)	0.784***	0.831***	0.868***	1	
Price-based (4e)	0.734***	0.886***	0.873***	0.843***	1

Panel B (cont'd)

	(2a)	(2b)	(2c)	(2d)	(2e)	(2f)	(2g)
Deal Surplus - 1 (2a) Weighted sum of bidder and target abnormal return (-42,+42)	1						
Deal Surplus - 2 (2b) Combined change in bidder and target 42-days after deal announcement	0.763***	1					
Ind. Adj. Deal Surplus - 2 (2c) Ind. adj. combined change in bidder and target 42-days after deal announcement	0.599***	0.686***	1				
Deal Surplus - 3 (2d) Combined change in bidder and target year after deal completion	0.397***	0.433***	0.306***	1			
Ind.Adj. Deal Surplus - 3 (2e) Ind. adj. combined change in bidder and target year after deal announcement	0.338***	0.336***	0.440***	0.840***	1		
Deal Surplus - 4 (2f) Combined change in bidder and target 2 years after after deal announcement	0.253***	0.247***	0.164***	0.604***	0.483***	1	
Ind. Adj. Deal Surplus - 4 (2g) Ind. adj. combined change in bidder and target 2 years after deal announcement	0.175***	0.160***	0.246***	0.447***	0.562***	0.777***	1

Panel C

	ALL DEALS			CASH-ONLY DEALS			STOCK-ONLY DEALS		
	Mean	**Median**	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**	**N**
Measure 3: Size & B/M portfolio matched									
Target Runup	0.068***	0.041***	1,634	0.059***	0.032***	418	0.067***	0.042***	564
Target Ann. Ret.	0.210***	0.171***	1,625	0.296***	0.268***	415	0.173***	0.151***	561
Target Post-Ann. Ret.	-0.001	-0.005**	1,622	-0.010*	-0.006*	414	0.017	0.000	561
Target Total Gain (-42,+42)	0.277***	0.258***	1,620	0.351***	0.323***	414	0.251***	0.227***	560
Bidder Runup	0.029***	0.006***	1,725	-0.003	-0.008	417	0.056***	0.028***	572
Bidder Ann. Ret.	-0.013***	-0.011***	1,724	0.013***	0.006***	416	-0.032***	-0.031***	572
Bidder Post-Ann. Gain	-0.008**	-0.019***	1,724	-0.006	-0.010	416	-0.015	-0.027***	572
Bidder Total Gain (-42,+42)	0.008	-0.008	1,724	0.004	-0.007	416	0.010	-0.010	572
Deal Surplus - 1	0.047***	0.030***	1,547	0.047***	0.034***	395	0.045***	0.024***	527
Deal Surplus - 2	0.090***	0.062***	1,343	0.064***	0.055***	337	0.125***	0.070***	487
Ind.-Adj. Deal Surplus - 2	0.063***	0.047***	1,132	0.057***	0.053***	280	0.077***	0.045***	407
Deal Surplus - 3	0.219***	0.104***	1,175	0.131***	0.029	285	0.317***	0.199***	415
Ind.-Adj. Deal Surplus - 3	0.134***	0.045***	1,117	0.070***	0.007	278	0.233***	0.116***	397
Deal Surplus - 4	0.336***	0.147***	1,084	0.249***	0.074***	269	0.436***	0.189***	372
Ind.-Adj. Deal Surplus - 4	0.184***	0.054***	1,031	0.132***	0.030*	263	0.259***	0.080***	356

Table 6.3: Relation between Deal Surplus and Deal Anticipation

Panel A presents the mean and median abnormal log turnover in the target and the fraction of target premium anticipated over the runup period in each deal surplus tercile. Panel B presents the relation between deal surplus and pre-announcement abnormal turnover in the target stock in a multi-variate setting. The log abnormal turnover in the target for any day t is equal to the logarithm of turnover in day t minus the median estimated log turnover in the target (the median is estimated over the window (-294, -43)). The fraction of the target premium anticipated is the ratio of the target runup to the total target premium, i.e., $\frac{\text{Ln(Target Price (-2)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$. The ratio is censored at -1 and 1 at the left and right tails. Target runup is measured as the target BHAR over (-42,-2) constructed as per measure 3 described in the appendix. Industry abnormal return is the market-adjusted abnormal return of firms in the same 2-digit SIC as the target. The measure "Deal Surplus - 1" is the weighted sum of the target and bidder BHAR over the (-42,+42) window relative to the announcement date. The weight of the bidder and the target are calculated using their respective market value of equity 42-days prior deal announcement, after adjusting for any bidder toehold in the target. The measures "Deal Surplus - 2", "Deal Surplus - 3" and "Deal Surplus - 4" are constructed respectively as the change in the combined market value of assets of the bidder and the target 42 days, 1 year and 2 years after deal announcement relative to their combined values 42 days prior to deal announcement (scaled by the combined market value of assets on day -42). Following the completion of a deal the target market value is set to zero. The Industry-adjusted deal surplus measures are constructed by adjusting the deal surplus measures by the change in the market value of match firms in the same industry (matched on industry, size, B/M and ROA). Panel C presents the institutional ownership and the change in institutional ownership in targets which had a deal announcement date within 30 days of a quarter-end. The institutional ownership and the change in institutional ownership is calculated from quarterly 13-F filings (which are made by institutions with $100 Million or more in assets under management). See the appendix for a description of the control variables. In panel B the value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the statistic is different from zero at the 10%, 5% and 1% level respectively.

Panel A

		Deal Surplus Tercile			**p-Value of Difference**		
		1	**2**	**3**	**(2)-(1)**	**(3)-(2)**	**(3)-(1)**
Average Abnormal Log Turnover in Targets	Mean	0.039	0.099***	0.184***	0.120	0.028	0.001
	Median	0.015	0.045***	0.134***	0.458	0.017	0.001
Target Runup	Mean	0.002	0.079***	0.149***	0.000	0.000	0.000
	Median	-0.011	0.041***	0.112***	0.000	0.000	0.000
Percentage of Total Premium Anticipated	Mean	0.168***	0.217***	0.319***	0.182	0.006	0.000
	Median	0.223***	0.262***	0.390***	0.527	0.000	0.000
Average Target Runup / Average Total gain		0.014	0.240	0.309			
Median Target Runup / Median Total gain		-0.072	0.141	0.255			
		419	419	419			

Panel B

The dependent variable in models (1) through (7) is the average abnormal log turnover in the target over (-42,-2) window relative to deal announcement. The deal surplus measure in model (1) is the weighted sum of the bidder and target BHAR over the (-42, +42) period. In models (2), (3) and (4), deal surplus is measured as:

$$\text{Deal Surplus} = \frac{\text{(Bidder Mkt. Val. Post + Target Mkt. Val. Post) - (Bidder Mkt. Val. Pre + Target Mkt. Val. Pre)}}{\text{Bidder Mkt. Val. Pre + Target Mkt. Val. Pre}}$$

The bidder/target market value *Pre* is the market value of assets of the bidder/target 42 days prior to deal announcement. In models (2), (3) and (4) the bidder/target market value *Post* is the market value of the bidder/target 42 days, 1 year and 2 years following the deal announcement. Following the completion of a deal the target market value is set to zero. In models (5), (6) and (7) the deal surplus from models (2), (3) and (4) is adjusted by subtracting the change in the market value of matched-firms (matched on Industry, size, B/M and ROA) over the same period.

	Dependent Variable: Target Avg. Abn. Log Turnover (-42,-2)						
					Ind.-Adi.	**Ind.-Adi.**	**Ind.-Adi.**
Deal Surplus Measure:	**1**	**2**	**3**	**4**	**2**	**3**	**4**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Completed Deal Dummy	0.064*	-0.039	0.051	-0.019	0.057	0.047	-0.019
(=1 if deal is completed)	[0.039]	[0.160]	[0.165]	[0.175]	[0.164]	[0.165]	[0.173]
Deal Surplus †	0.266***	0.315***	0.053*	0.035	0.163**	0.062**	0.017
	[0.071]	[0.079]	[0.029]	[0.023]	[0.083]	[0.031]	[0.023]
Log Target MVE	0.005	0.002	0.008	0.007	0.001	0.010	
	[0.011]	[0.012]	[0.014]	[0.015]	[0.014]	[0.015]	[0.015]
Target BVE/MVE	-0.011	-0.002	0.047	0.037	-0.003	0.044	0.031
	[0.038]	[0.044]	[0.053]	[0.054]	[0.048]	[0.054]	[0.055]
Target Idio. Volatility	-2.166*	-2.488*	-2.488*	-2.097	-3.140**	-2.699*	-2.215
	[1.195]	[1.302]	[1.448]	[1.452]	[1.427]	[1.491]	[1.496]
Toehold	-0.005*	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
High-tech Target Dummy	0.020	-0.010	-0.025	-0.051	-0.000	-0.007	-0.017
	[0.041]	[0.046]	[0.050]	[0.050]	[0.051]	[0.052]	[0.052]
Same-Industry Dummy	-0.015	0.008	-0.006	0.006	0.006	-0.018	-0.006
	[0.040]	[0.046]	[0.051]	[0.051]	[0.051]	[0.052]	[0.053]
Hostile-Deal Dummy	0.004	-0.006	-0.008	-0.021	-0.022	-0.040	-0.052
	[0.075]	[0.112]	[0.138]	[0.143]	[0.137]	[0.142]	[0.148]
Tender-Offer Dummy	-0.034	-0.021	-0.043	-0.061	-0.037	-0.041	-0.056
	[0.040]	[0.044]	[0.049]	[0.050]	[0.049]	[0.050]	[0.051]
Wave Dummy	-0.077**	-0.074**	-0.065*	-0.043	-0.070*	-0.069*	-0.047
	[0.030]	[0.034]	[0.038]	[0.039]	[0.038]	[0.039]	[0.040]
Constant	-0.192*	-0.209	-0.614***	-0.251	0.119	0.128	0.356
	[0.115]	[0.204]	[0.189]	[0.232]	[0.189]	[0.191]	[0.236]
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,438	1,183	1,062	972	1,040	1,027	948
R-squared	0.062	0.064	0.051	0.051	0.059	0.058	0.058

†: Deal Surplus is measured differently in each of the specifications. Please refer to the text on top of the table.

Panel C

		Deal Surplus Tercile			p-value of Difference		
		1 *(N=118)*	**2** *(N=172)*	**3** *(N=158)*	**(2)-(1)**	**(3)-(2)**	**(3)-(1)**
Target market value of equity quarter -2 *(in $ Billion)*	Mean	616	1688	881	0.964	0.266	0.686
	Median	180	278	161	0.666	0.000	0.309
Institutional ownership in target from quarter -2 (%)	Mean	39.43	47.59	37.20	0.413	0.000	0.621
	Median	41.01	42.70	28.55	0.423	0.002	0.255
Change in institutional ownership in the target from quarter -2 to -1 (%)	Mean	0.388	1.551***	1.510***	0.035	0.906	0.042
	Median	0.120	0.682***	0.275**	0.084	0.343	0.224
Ind.-adj. change in instit. ownership target from quarter -2 to -1 (%)	Mean	-0.017	1.412***	1.508***	0.065	0.912	0.040
	Median	-0.083	0.185**	0.130**	0.078	0.345	0.104
Inst. inflow into target qtr -1 *($ thousand)* *(calculated using median price during qtr)*	Mean	-1103	1720	3271	0.715	0.906	0.771
	Median	-6	37	188	0.179	0.543	0.076
Ind.-adj. instit. inflow into target qtr -1 *($ thousand)* *(calculated using median price during qtr)*	Mean	-1150	1942	3875	0.719	0.897	0.758
	Median	-6	144	153	0.106	0.543	0.104

Table 6.4: Target Runup and Deal Surplus

Panel A presents the mean and median deal surplus of completed deals sorted into terciles based on the level of target runup. Panel B has the mean and median surplus of deals sorted on target runup and the relative size of the target to the bidder. Panel C contains the results from the regression (using a Heckman 2-step estimator to allow for selection into the completed deals category) of target runup on different measures of deal surplus and other controls. The measure "Deal Surplus - 1" is the weighted sum of the target and bidder BHAR over the (-42,+42) window relative to the announcement date. The weight of the bidder and the target are calculated using their respective market value of equity 42-days prior deal announcement day, after adjusting for any bidder holding/toehold in the target. The measures "Deal Surplus - 2", "Deal Surplus - 3" and "Deal Surplus - 4" are constructed respectively as the change in the combined market value of assets of the bidder and the target 42 days, 1 year and 2 years after deal announcement relative to their combined values 42 days prior to deal announcement (scaled by the combined market value of assets on day -42). Following the completion of a deal the target market value is set to zero. The Industry-adjusted deal surplus measures are constructed by adjusting the deal surplus measures by the change in the market value of match firms in the same industry (matched on industry, size, B/M and ROA). Target runup is measured as the target BHAR over (-42,-2) constructed as per measure 3 described in the appendix. Industry abnormal return is the market-adjusted abnormal return of firms in the same 2-digit SIC as the target. See the appendix for a description of the other control variables used in Panel C. In panel C the value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms in regressions are mean centered.

Panel A

		Target Runup Tercile			p-Value of Difference		
		1	**2**	**3**	**(2)-(1)**	**(3)-(2)**	**(3)-(1)**
Deal Surplus - 1 *Weighted sum of bidder and target BHAR (-42,+42)*	Mean	-0.011	0.061***	0.140***	0.000	0.000	0.000
	Median	-0.011	0.059***	0.100***	0.000	0.067	0.000
	N	417	419	420			
Deal Surplus - 2 *Change in combined MV of Assets of bidder and target from -42 to +42 relative to announcement day*	Mean	0.031***	0.081***	0.161***	0.000	0.000	0.000
	Median	0.017***	0.066***	0.099***	0.000	0.002	0.000
	N	427	424	420			
Ind.-adjusted Deal Surplus - 2 *Change in combined MV of Assets bidder and target from -42 to +42 relative to announcement day adjusted by change in industry-matched firms*	Mean	0.016	0.048***	0.125***	0.034	0.000	0.000
	Median	0.013	0.047***	0.086***	0.005	0.012	0.000
	N	370	358	374			
Deal Surplus - 3 *Change in combined MV of Assets of bidder and target from -42 to 1 year after announcement day*	Mean	0.130***	0.210***	0.316***	0.043	0.015	0.000
	Median	0.033***	0.110***	0.185***	0.017	0.028	0.000
	N	377	370	374			
Ind.-adjusted Deal Surplus - 3 *Change in combined MV of Assets of bidder and target from -42 to 1 year after announcement day adjusted by change in industry-matched firms.*	Mean	0.055*	0.102***	0.234***	0.251	0.002	0.000
	Median	-0.009	0.047***	0.112***	0.002	0.073	0.000
	N	368	352	366			
Deal Surplus - 4 *Change in combined MV of Assets of bidder and target from -42 to 2 years after announcement day.*	Mean	0.266***	0.314***	0.461***	0.409	0.020	0.003
	Median	0.075***	0.169***	0.190***	0.020	0.673	0.019
	N	353	334	349			
Ind.-adjusted Deal Surplus - 4 *Change in combined MV of Assets of bidder and target from -42 to 2 years after announcement day adjusted by change in industry-matched firms*	Mean	0.155***	0.138***	0.265***	0.800	0.077	0.104
	Median	-0.012	0.073***	0.092***	0.036	0.611	0.020
	N	345	317	342			

Panel B

Mean/Median Deal Surplus *sorted by T. Runup, Rel. Size*		**Target Runup Tercile**			**p-Value of Difference in Deal Surplus**		
		1	**2**	**3**	**(2)-(1)**	**(3)-(2)**	**(3)-(1)**
Relative Size $\in [0, 0.15]$	Mean	0.037*	0.050***	0.092***	0.627	0.040	0.030
	Median	0.006	0.044***	0.072***	0.030	0.014	0.000
	N	147	142	165			
Relative Size $\in (0.15, 0.30]$	Mean	0.019	0.059***	0.155***	0.174	0.014	0.001
	Median	0.009	0.068***	0.073***	0.014	0.516	0.012
	N	110	95	98			
Relative Size $\in (0.30, 0.50]$	Mean	0.027	0.087***	0.189***	0.093	0.042	0.001
	Median	0.025	0.079***	0.089***	0.300	0.726	0.004
	N	79	78	56			
Relative Size $\in (0.5, \infty)$	Mean	0.042***	0.137***	0.255***	0.004	0.002	0.000
	Median	0.046***	0.103***	0.170***	0.021	0.017	0.000
	N	88	106	111			

Panel C

The dependent variable in models (1) through (7) is the runup in the target value over (-42,-2) window relative to deal announcement. The deal surplus measure in model (1) is the weighted sum of the bidder and target BHAR over the (-42, +42) period. In models (2), (3) and (4), deal surplus is measured as:

$$\text{Deal Surplus} = \frac{\text{(Bidder Mkt. Val. Post + Target Mkt. Val. Post) - (Bidder Mkt. Val. Pre + Target Mkt. Val. Pre)}}{\text{Bidder Mkt. Val. Pre + Target Mkt. Val. Pre}}$$

The bidder/target market value *Pre* is the market value of assets of the bidder/target 42 days prior to deal announcement. In models (2),(3) and (4) the bidder/target market value *Post* is the market value of the bidder/target 42 days, 1 year and 2 years following the deal announcement. Following the completion of a deal the target market value is set to zero. The industry adjusted deal surplus measure is calculated by subtracting the change in the market value of matched-firms (matched on Industry, size, B/M and ROA) over the same period.

	Dependent Variable: Target Runup (-42,-2)						
					Ind-Adj	**Ind-Adj**	**Ind-Adj**
Deal Surplus Measure:	**1**	**2**	**3**	**4**	**2**	**3**	**4**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deal Surplus†	0.273***	0.236***	0.055***	0.021**	0.228***	0.061***	0.020**
	[0.047]	[0.028]	[0.013]	[0.009]	[0.030]	[0.013]	[0.009]
All-Cash Dummy	-0.035	-0.043*	-0.051**	-0.051**	-0.061**	-0.060**	-0.053**
	[0.024]	[0.022]	[0.024]	[0.025]	[0.024]	[0.025]	[0.025]
Percent Stock Offered	0.012	-0.006	-0.008	-0.014	-0.020	-0.013	-0.006
	[0.036]	[0.024]	[0.026]	[0.027]	[0.027]	[0.027]	[0.027]
Relative Size	0.020	0.024	0.049***	0.041**	0.026	0.047**	0.037*
	[0.022]	[0.017]	[0.018]	[0.019]	[0.018]	[0.019]	[0.020]
Log Target MVE	-0.016***	-0.017***	-0.018***	-0.016**	-0.020***	-0.018***	-0.017***
	[0.005]	[0.005]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Target BVE/MVE	0.016	0.013	0.010	0.013	0.010	0.009	0.011
	[0.014]	[0.014]	[0.015]	[0.016]	[0.015]	[0.015]	[0.016]
Bidder BVE/MVE	-0.040*	-0.043**	-0.049**	-0.035	-0.045**	-0.051**	-0.033
	[0.021]	[0.021]	[0.023]	[0.024]	[0.022]	[0.023]	[0.024]
Target Idio. Volatility	0.190	-0.020	-0.407	-0.364	-0.452	-0.554	-0.559
	[0.499]	[0.500]	[0.535]	[0.557]	[0.538]	[0.545]	[0.565]
Bidder Idio. Volatility	-1.712**	-1.750**	-1.808**	-1.303*	-1.599**	-1.815**	-1.286
	[0.763]	[0.694]	[0.747]	[0.788]	[0.738]	[0.762]	[0.800]
Toehold	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	[0.002]	[0.001]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]
High-tech Target Dummy	0.010	0.002	0.002	-0.004	-0.003	0.003	-0.006
	[0.018]	[0.017]	[0.019]	[0.019]	[0.019]	[0.019]	[0.020]
Same-Industry Dummy	-0.013	-0.005	-0.008	-0.007	-0.009	-0.009	-0.006
	[0.024]	[0.018]	[0.020]	[0.020]	[0.019]	[0.020]	[0.021]
Hostile-Deal Dummy	-0.066	-0.074*	-0.084*	-0.096*	-0.063	-0.087*	-0.099*
	[0.080]	[0.043]	[0.050]	[0.052]	[0.050]	[0.052]	[0.053]
Tender-Offer Dummy	0.033	0.034*	0.048**	0.042*	0.037*	0.051**	0.049**
	[0.035]	[0.020]	[0.021]	[0.022]	[0.022]	[0.022]	[0.022]
Wave Dummy	0.003	-0.003	-0.006	-0.008	-0.005	-0.010	-0.007
	[0.013]	[0.014]	[0.015]	[0.016]	[0.015]	[0.015]	[0.016]
Constant	0.600***	0.565**	0.273**	0.251*	0.312**	0.287**	0.241*
	[0.228]	[0.223]	[0.135]	[0.134]	[0.132]	[0.136]	[0.136]
Mill's Lambda	-0.020	-0.103	-0.128	-0.177*	-0.181*	-0.123	-0.107
	[0.108]	[0.094]	[0.101]	[0.104]	[0.101]	[0.102]	[0.105]
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Uncensored Observations	1,176	1,167	1,046	963	1,030	1,016	937
Wald Chi-square Statistic	155.75***	157.40***	90.08***	66.71**	128.81***	95.05***	65.79*

†: Deal Surplus is measured differently in each of the specifications. Please refer text on top of the table

Panel D

The results presented in the table are from Tobit regressions† since the dependent variable is censored at -1 and +1. The dependent variable in models (1) through (7) is the fraction of the target premium that is anticipated over the runup period. It is measured as:

$$\text{Fraction of premium anticipated} = \frac{\text{Ln(Target Price (-2)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$$

	Dependent Variable : Fraction of total premium anticipated						
					Ind-Adj	**Ind-Adj**	**Ind-Adj**
Deal Surplus Measure:	**1**	**2**	**3**	**4**	**2**	**3**	**4**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deal Surplus‡	0.143**	0.204***	0.077***	0.050**	0.128**	0.046**	0.030**
	[0.065]	[0.079]	[0.028]	[0.020]	[0.064]	[0.022]	[0.015]
All-Cash Dummy	-0.031	-0.027	0.005	0.028	-0.029	-0.027	-0.003
	[0.050]	[0.050]	[0.052]	[0.055]	[0.052]	[0.052]	[0.055]
Percent Stock Offered	0.099*	0.100*	0.103*	0.119*	0.091	0.086	0.111*
	[0.059]	[0.058]	[0.061]	[0.063]	[0.062]	[0.062]	[0.065]
Relative Size	-0.000	0.001	0.001	-0.010	-0.013	-0.009	-0.015
	[0.035]	[0.036]	[0.037]	[0.037]	[0.034]	[0.037]	[0.036]
Log Target MVE	-0.005	-0.003	-0.000	0.002	-0.006	0.000	-0.005
	[0.013]	[0.013]	[0.015]	[0.015]	[0.015]	[0.015]	[0.016]
Target BVE/MVE	0.016	0.004	-0.011	-0.018	-0.013	-0.006	-0.020
	[0.034]	[0.033]	[0.035]	[0.036]	[0.035]	[0.036]	[0.037]
Bidder BVE/MVE	-0.011	0.006	0.017	0.022	0.009	0.036	0.024
	[0.053]	[0.054]	[0.055]	[0.058]	[0.054]	[0.056]	[0.059]
Target Idio. Volatility	1.103	1.378	1.669	1.894	0.773	1.332	1.279
	[1.401]	[1.397]	[1.366]	[1.455]	[1.467]	[1.391]	[1.481]
Bidder Idio. Volatility	1.024	0.961	1.333	1.765	1.646	1.854	1.735
	[1.820]	[1.817]	[1.914]	[2.005]	[1.897]	[1.927]	[2.027]
Toehold	-0.005	-0.006*	-0.006*	-0.006*	-0.004	-0.005	-0.005
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
High-tech Target Dummy	0.032	0.024	0.037	0.014	0.046	0.047	0.026
	[0.046]	[0.045]	[0.047]	[0.048]	[0.048]	[0.048]	[0.050]
Same-Industry Dummy	-0.080*	-0.070	-0.121***	-0.125***	-0.103**	-0.123***	-0.133***
	[0.045]	[0.044]	[0.047]	[0.048]	[0.048]	[0.047]	[0.049]
Hostile-Deal Dummy	-0.001	0.013	0.012	0.005	0.028	0.017	0.024
	[0.045]	[0.045]	[0.047]	[0.049]	[0.047]	[0.047]	[0.049]
Tender-Offer Dummy	-0.211**	-0.203**	-0.151*	-0.148	-0.146*	-0.171*	-0.161*
	[0.085]	[0.082]	[0.087]	[0.090]	[0.088]	[0.089]	[0.093]
Wave Dummy	-0.030	-0.033	-0.024	0.001	-0.030	-0.029	-0.008
	[0.033]	[0.033]	[0.035]	[0.037]	[0.036]	[0.036]	[0.038]
Constant	0.751***	0.684***	0.086	0.065	0.156	0.102	0.130
	[0.154]	[0.154]	[0.543]	[0.547]	[0.525]	[0.538]	[0.542]
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,104	1,103	978	907	961	939	876
Adjusted R-squared	0.030	0.033	0.038	0.041	0.031	0.036	0.039

†: Results are robust to the use of Heckman selection model in the place of the censored Tobit model.
‡: Deal Surplus is measured differently in each specification. Please refer text on top of table 6.4 Panel C for a description.

Panel E

	Economic Impact of a one Std. Dev. Change in Deal Surplus on:						
					Ind-Adj	Ind-Adj	Ind-Adj
Deal Surplus Measure:	**1**	**2**	**3**	**4**	**2**	**3**	**4**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Target Runup	6.33%	5.90%	3.33%	1.72%	5.27%	3.58%	1.77%
Fraction of Premium Anticipated	3.59%	5.12%	4.67%	4.10%	2.93%	3.52%	2.66%

Table 6.5: Target Runup and Bidder Outcome

Panel A presents the mean and median bidder gain in completed deals sorted into terciles based on the level of target runup. Panel B contains the results from the regression of bidder gain on target runup and controls. The dependent variable (bidder gain) in models (1) through (6) is measured as follows: model (1) & (2) - Bidder CAR (-1,+1), model (3) & (4) - Bidder CAR (-1,+42) and model (5) & (6) - Bidder BHAR (-42,+42). The estimates presented are from the Heckman 2-stage selection model to allow for selection into the "Completed Deal" category. The coefficients of the selection equation are not presented but the coefficient on the Inverse-Mill's ratio (Mill's Lambda) is provided. The target/bidder BHAR is constructed per measure 3 as described in the appendix. Industry return is the median market-adjusted return of firms in the same 2-digit SIC as the target. See the appendix for a description of the other control variables used in Panel B. In panel B the value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms in regressions are mean centered.

Panel A

		Target Runup Tercile			**p-Value of Difference**		
		1	**2**	**3**	**(2)-(1)**	**(3)-(2)**	**(3)-(1)**
Bidder Runup (-42,-2)	Mean	-0.007	0.016**	0.081***	0.056	0.000	0.000
	Median	-0.019**	0.008	0.037***	0.001	0.003	0.000
	N	420	424	423			
Bidder Match Firm Runup (-42,-2) Matching: Industry, Size, B/M & ROA	Mean	-0.017***	-0.007	0.005	0.188	0.092	0.007
	Median	-0.027***	-0.012**	0.003	0.017	0.003	0.000
	N	387	377	387			
Industry Abnormal Return	Mean	-0.008**	0.002	0.013***	0.022	0.014	0.000
	Median	-0.008***	0.001	0.006***	0.037	0.330	0.000
	N	443	443	442			
Bidder Ann. Return (-1,+1)	Mean	-0.021***	-0.011***	-0.014***	0.050	0.565	0.150
	Median	-0.019***	-0.009***	-0.009***	0.098	0.891	0.098
	N	420	424	424			
Bidder Ann. Return (-1,+42)	Mean	-0.028***	0.000	-0.003	0.015	0.718	0.039
	Median	-0.027***	-0.006	-0.018	0.130	0.582	0.491
	N	420	424	422			
Bidder Total Gain (-42,+42)	Mean	-0.027***	0.005	0.069***	0.002	0.001	0.000
	Median	-0.033***	0.002	0.038***	0.000	0.409	0.000
	N	420	424	422			

Panel B

	Bidder Ann. CAR (-1,1)		Bidder Ann. CAR (-1,42)		Bidder BHAR (-42,42)	
	(1)	(2)	(3)	(4)	(5)	(6)
All-Cash Dummy	0.020**	0.019**	0.025	0.020	-0.006	-0.012
	[0.008]	[0.008]	[0.018]	[0.018]	[0.024]	[0.024]
Percent Stock Offered	-0.014	-0.016	-0.005	-0.027	0.000	-0.008
	[0.012]	[0.012]	[0.028]	[0.027]	[0.036]	[0.037]
Target Runup	0.030**		0.061**		0.185***	
	[0.012]		[0.028]		[0.041]	
Pos.Target Runup Dummy		0.014***		0.023**		0.058***
(=1 if Target Runup >0)		[0.005]		[0.012]		[0.017]
Target Ann. Return					0.141***	0.123***
					[0.047]	[0.047]
Bidder Runup	-0.022*	-0.019	-0.054*	-0.016		
	[0.013]	[0.013]	[0.030]	[0.030]		
Industry Abn. Return	0.019	0.016	0.224***	0.190**	0.895***	0.910***
	[0.034]	[0.033]	[0.077]	[0.077]	[0.104]	[0.107]
Relative Size	-0.006	-0.004	0.010	0.018	0.068***	0.075***
	[0.008]	[0.008]	[0.019]	[0.019]	[0.024]	[0.024]
Log Target MVE	-0.009***	-0.009***	-0.018***	-0.019***	-0.020***	-0.023***
	[0.002]	[0.002]	[0.004]	[0.004]	[0.006]	[0.006]
Target BVE/MVE	-0.005	-0.004	-0.025**	-0.033***	-0.042***	-0.039***
	[0.005]	[0.005]	[0.011]	[0.011]	[0.015]	[0.015]
Bidder BVE/MVE	-0.002	-0.002	-0.044***	-0.050***	-0.076***	-0.080***
	[0.007]	[0.007]	[0.016]	[0.016]	[0.022]	[0.023]
High Target Idio. Volatility	-0.019***	-0.018***	-0.032**	-0.025*	-0.054***	-0.048**
(=1 if Idio.Vol.> median)	[0.006]	[0.006]	[0.013]	[0.013]	[0.019]	[0.019]
High Bidder Idio. Volatility	0.003	0.003	-0.022	-0.014	0.021	0.023
(=1 if Idio. Vol. > median)	[0.006]	[0.006]	[0.015]	[0.014]	[0.020]	[0.020]
High-tech Target Dummy	-0.011*	-0.010*	-0.020	-0.017	-0.004	-0.002
	[0.006]	[0.006]	[0.014]	[0.014]	[0.019]	[0.020]
Same-Industry Dummy	-0.010	-0.011	0.013	0.003	-0.012	-0.013
	[0.008]	[0.009]	[0.019]	[0.020]	[0.026]	[0.027]
Hostile-Deal Dummy	-0.020	-0.014	-0.058	-0.024	0.020	0.038
	[0.029]	[0.029]	[0.066]	[0.067]	[0.089]	[0.091]
Tender-Offer Dummy	0.014	0.013	0.010	-0.004	-0.024	-0.026
	[0.013]	[0.013]	[0.030]	[0.031]	[0.037]	[0.039]
Wave Dummy	-0.001	-0.001	-0.007	-0.005	-0.021	-0.021
	[0.004]	[0.004]	[0.010]	[0.010]	[0.014]	[0.015]
Constant	0.118	0.122	0.107	0.145	-0.115	-0.072
	[0.079]	[0.078]	[0.112]	[0.114]	[0.248]	[0.252]
Mill's Lambda	0.034	0.025	0.047	-0.006	-0.090	-0.121
	[0.039]	[0.040]	[0.092]	[0.093]	[0.118]	[0.121]
Uncensored Observations	1,177	1,177	1,177	1,177	1,177	1,177
Wald Chi-squared Statistic	228.04***	233.15***	111.89***	119.44***	231.17***	205.27***

Table 6.6: Interaction of Target Runup with Uncertainty Measures

The table presents the results from a Heckman 2-stage selection model (selection into "Completed Deal" category) .The dependent variable is the bidder's deal-related gain (Models (1) through (4): Bidder CAR (-1,+1), Models (5) through (8): Bidder CAR (-1,+42)). The coefficients of the selection equation are not presented but the coefficient on the Inverse-Mill's ratio (Mill's Lambda) is provided. In models (1) and (5) the target runup is interacted with the percentage of stock offered in the deal. Models (2) & (6), (3) & (7), (4) & (8) respectively present the coefficients for the sub-sample of deals financed fully with cash, mostly with stock and fully with stock. The target/bidder runup is measured over the (-42, -2) window as per measure 3 described in the appendix. The value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms in regressions are mean centered.

Panel A: Interaction of Target Runup with Mode of Payment

	Bidder Ann. CAR (-1,+1)				**Bidder Ann. CAR (-1,+42)**			
	All Deals	**All-Cash Deals**	**% Stock Offered** $\in (0.5, 1)$	**All-Stock Deals**	**All Deals**	**All-Cash Deals**	**% Stock Offered** $\in (0.5, 1)$	**All-Stock Deals**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All-Cash Dummy	0.018**				0.023			
	[0.008]				[0.018]			
Percent Stock Offered	-0.016		-0.003		-0.003		-0.070	
	[0.011]		[0.024]		[0.027]		[0.061]	
Target Runup	0.031***	0.006	0.045**	0.044**	0.041	0.003	0.098*	0.086**
	[0.012]	[0.025]	[0.022]	[0.022]	[0.027]	[0.046]	[0.055]	[0.053]
Target Runup *	0.047**				0.110**			
Percent Stock Offered	[0.023]				[0.053]			
Bidder runup	-0.033**	0.003	-0.006	0.013	-0.042	-0.122*	0.016	0.036
	[0.013]	[0.037]	[0.020]	[0.023]	[0.031]	[0.069]	[0.051]	[0.055]
Industry Abn. Return	0.029	-0.069	0.052	0.105*	0.233***	-0.065	0.267**	0.284*
	[0.034]	[0.085]	[0.048]	[0.062]	[0.078]	[0.158]	[0.124]	[0.147]
Relative Size	-0.003	0.056***	-0.043**	-0.067***	0.011	0.056*	-0.053	-0.066
	[0.008]	[0.017]	[0.017]	[0.021]	[0.019]	[0.033]	[0.043]	[0.050]
Log Target MVE	-0.009***	-0.014***	-0.010***	-0.011***	-0.018***	-0.015*	-0.019***	-0.025***
	[0.002]	[0.005]	[0.003]	[0.003]	[0.004]	[0.009]	[0.007]	[0.008]
Target BVE/MVE	-0.003	-0.010	-0.017**	-0.018**	-0.023**	0.025	-0.055***	-0.052**
	[0.005]	[0.012]	[0.007]	[0.009]	[0.011]	[0.022]	[0.019]	[0.021]
Bidder BVE/MVE	-0.005	-0.000	0.013	0.020	-0.041**	-0.008	-0.066**	-0.079**
	[0.007]	[0.015]	[0.011]	[0.013]	[0.016]	[0.029]	[0.029]	[0.032]
High Target Idio. Vol.	-0.021***	-0.004	-0.017*	-0.026**	-0.030**	-0.034	-0.044*	-0.070***
(=1 if Idio.Vol.> median)	[0.006]	[0.013]	[0.009]	[0.011]	[0.014]	[0.023]	[0.024]	[0.027]
High Bidder Idio. Vol,	-0.001	0.024*	-0.015	-0.000	-0.023	-0.017	-0.030	-0.012
(=1 if Idio.Vol.> median)	[0.006]	[0.013]	[0.010]	[0.011]	[0.015]	[0.024]	[0.025]	[0.027]
High-tech Target Dummy	-0.019***	-0.005	-0.022***	-0.017*	-0.028**	-0.055***	-0.017	0.006
	[0.005]	[0.010]	[0.008]	[0.010]	[0.012]	[0.018]	[0.019]	[0.023]
Same-Industry Dummy	0.009	0.008	0.010	0.020	-0.008	0.018	-0.055	-0.027
	[0.008]	[0.012]	[0.018]	[0.016]	[0.019]	[0.023]	[0.046]	[0.037]
Hostile-Deal Dummy	-0.028	0.048	-0.004	-0.004	-0.075	-0.080	-0.177	0.136
	[0.028]	[0.045]	[0.080]	[0.097]	[0.067]	[0.091]	[0.195]	[0.226]
Tender-Offer Dummy	0.015	-0.016	-0.005	0.046	0.016	-0.008	0.013	-0.047
	[0.013]	[0.015]	[0.025]	[0.042]	[0.030]	[0.028]	[0.064]	[0.098]
Wave Dummy	0.002	0.016*	-0.006	-0.011	-0.002	0.004	-0.004	-0.001
	[0.004]	[0.009]	[0.007]	[0.009]	[0.010]	[0.017]	[0.019]	[0.021]
Constant	0.045**	0.088**	0.056*	0.052**	0.125***	0.100	0.219***	0.188***
	[0.020]	[0.037]	[0.029]	[0.025]	[0.048]	[0.069]	[0.075]	[0.059]
Mill's Lambda	0.041	-0.082*	0.069	0.076	0.073	0.079	0.217	0.134
	[0.038]	[0.049]	[0.070]	[0.059]	[0.091]	[0.098]	[0.173]	[0.141]
Uncensored Observations	1,175	313	589	419	1,175	313	589	419
Wald Chi-square Statistic	187.11***	33.02***	74.50***	67.05***	71.69***	37.20***	38.48***	43.21***

Panel B: Interaction of Target Runup with Alternative Uncertainty Measures

The table presents the results from a Heckman 2-stage selection model (selection into "Completed Deal" category). The dependent variable is the bidder's deal-related gain (Models (1) through (4): Bidder CAR (-1,+1), Models (5) through (8): Bidder CAR (-1,+42)). The coefficients of the selection equation are not presented but the coefficient on the Inverse-Mill's ratio (Mill's Lambda) is provided. In each model the target runup is interacted with one of the alternative measures of uncertainty (i) High target idiosyncratic volatility dummy, (ii) Target BVE/MVE, (iii) High-technology target dummy, (iv) Same-industry deal dummy. All interaction terms are mean-centered. The expected sign on the coefficients of the interaction terms is outlined in Table 6.1 Panel B. The target/bidder is measured over the (-42,-2) window as per measure 3 described in the appendix. See the appendix for a description of the other control variables. The value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively.

Panel B (cont'd)

	Bidder CAR (-1,+1)				Bidder CAR (-1,+42)			
Interaction of	**Idio.**		**Techn.**	**Industry**	**Idio.**		**Techn.**	**Industry**
Target Runup with:	**Volatility**	**B/M**	**Intensity**	**Relatedne**	**Volatility**	**B/M**	**Intensity**	**Relatedne**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All-Cash Dummy	0.019**	0.020***	0.017**	0.021***	0.024	0.023	0.022	0.023
	[0.008]	[0.008]	[0.008]	[0.008]	[0.018]	[0.018]	[0.018]	[0.018]
Percent Stock Offered	-0.014	-0.013	-0.019	-0.013	-0.013	-0.002	-0.008	-0.008
	[0.011]	[0.012]	[0.011]	[0.011]	[0.027]	[0.027]	[0.027]	[0.027]
Target Runup	0.021	0.035***	0.001	0.039***	-0.011	0.054*	0.004	0.041
	[0.017]	[0.012]	[0.017]	[0.014]	[0.038]	[0.028]	[0.041]	[0.031]
Bidder runup	-0.033**	-0.026*	-0.035***	-0.037***	-0.044	-0.029	-0.036	-0.045
	[0.013]	[0.013]	[0.013]	[0.013]	[0.030]	[0.032]	[0.031]	[0.031]
Industry Abn. Return	0.033	0.032	0.031	0.035	0.250***	0.217***	0.245***	0.244***
	[0.033]	[0.034]	[0.033]	[0.034]	[0.076]	[0.079]	[0.078]	[0.078]
Relative Size	-0.005	-0.006	-0.001	-0.008	0.012	0.000	0.006	0.009
	[0.008]	[0.008]	[0.008]	[0.008]	[0.019]	[0.019]	[0.019]	[0.019]
Log Target MVE	-0.009***	-0.009***	-0.009***	-0.008***	-0.019***	-0.016***	-0.018***	-0.019***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.004]	[0.004]	[0.004]	[0.004]
Target BVE/MVE	-0.006	-0.003	-0.005	-0.005	-0.027***	-0.023**	-0.029***	-0.029***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.011]	[0.011]	[0.011]	[0.011]
Bidder BVE/MVE	-0.005	-0.004	-0.005	-0.002	-0.034**	-0.034**	-0.038**	-0.045***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.016]	[0.017]	[0.016]	[0.016]
High Target Idio. Vol.	-0.021***	-0.021***	-0.020***	-0.020***	-0.031**	-0.031**	-0.030**	-0.031**
(=1 if Idio.Vol.> median)	[0.006]	[0.006]	[0.006]	[0.006]	[0.013]	[0.014]	[0.014]	[0.014]
High Bidder Idio. Vol.	-0.002	-0.001	-0.000	0.000	-0.023	-0.022	-0.024*	-0.026*
(=1 if Idio.Vol.> median)	[0.006]	[0.006]	[0.006]	[0.006]	[0.014]	[0.015]	[0.015]	[0.014]
High-tech Target Dummy	-0.019***	-0.018***	-0.017***	-0.019***	-0.026**	-0.028**	-0.025**	-0.025**
	[0.005]	[0.005]	[0.005]	[0.005]	[0.011]	[0.012]	[0.012]	[0.011]
Same-Industry Dummy	0.008	0.006	0.010	0.006	-0.005	-0.015	-0.013	-0.016
	[0.008]	[0.009]	[0.008]	[0.008]	[0.019]	[0.020]	[0.019]	[0.019]
Target Runup *	0.040**				0.092**			
High Target Idio. Vol.	[0.020]				[0.045]			
Target Runup *		-0.030**				-0.069**		
Target BVE/MVE		[0.013]				[0.029]		
Target Runup *			0.048**				0.066**	
High-techn target			[0.020]				[0.034]	
Target Runup *				-0.054**				-0.055
Same-industry deal				[0.030]				[0.068]
Hostile-Deal Dummy	-0.030	-0.025	-0.017	-0.029	-0.045	-0.078	-0.065	-0.061
	[0.027]	[0.028]	[0.028]	[0.027]	[0.065]	[0.066]	[0.066]	[0.064]
Tender-Offer Dummy	0.017	0.015	0.012	0.018	-0.000	0.019	0.013	0.014
	[0.012]	[0.013]	[0.013]	[0.012]	[0.029]	[0.030]	[0.030]	[0.029]
Wave Dummy	0.002	-0.000	0.001	-0.000	-0.004	-0.003	-0.003	-0.005
	[0.004]	[0.004]	[0.004]	[0.004]	[0.010]	[0.010]	[0.010]	[0.010]
Constant	0.047**	0.043**	0.053***	0.038*	0.151***	0.116**	0.139***	0.144***
	[0.020]	[0.021]	[0.020]	[0.021]	[0.047]	[0.048]	[0.048]	[0.047]
Mill's Lambda	0.044	0.042	0.025	0.048	0.031	0.086	0.065	0.061
	[0.037]	[0.038]	[0.038]	[0.037]	[0.089]	[0.088]	[0.089]	[0.087]
Uncensored Observations	1,173	1,175	1,175	1,175	1,173	1,175	1,175	1,175
Wald Chi-square Statistic	194.33***	179.54***	192.34***	179.69***	79.06***	64.00***	72.26***	75.45***

Panel C: Interaction of Target Runup with Low/Medium/High Uncertainty Categories

The table presents the results from a Heckman 2-stage selection model (selection into "Completed Deal" category). The dependent variable is the bidder's deal-related gain (Models (1) through (4): Bidder CAR (-1,+1), Models (5) through (8): Bidder CAR (-1,+42)). The coefficients of the selection equation are not presented but the coefficient on the Inverse-Mill's ratio (Mill's Lambda) is provided. Deals are assigned to low, medium or high uncertainty categories by adding up their scores for each of the five uncertainty measures: Mode of payment (=1 if % stock $>$ 0.5), Target Idio. Volatility (=0 if target idio. volatility $>$ Median), Target BVE/MVE (=1 if target BVE/MVE $<$ Median), Target technology intensity (=1 if target is technology intensive) and Target industry relatedness (=1 if target is from the same 2-digit SIC code). The low uncertainty category consists of deal with an uncertainty score of 1 or less, the medium uncertainty category consists of deals with an uncertainty score of 2 or 3. The high uncertainty category includes deals with an uncertainty score of 4 or 5. The target/bidder runup is measured over the (-42, -2) window as per measure 3 described in the appendix. See the appendix for a description of the other control variables. The value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively.

Panel C (cont'd)

	Bidder Ann. CAR (-1,+1)				Bidder Ann. CAR (-1,+42)			
		Uncertainty				Uncertainty		
	All Deals	Low	Medium	High	All Deals	Low	Medium	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All-Cash Dummy		0.019*	0.020*	0.113*		0.017	0.009	-0.005
		[0.010]	[0.011]	[0.066]		[0.022]	[0.028]	[0.183]
Percent Stock Offered		-0.016	-0.017	0.060		-0.030	-0.048	-0.080
		[0.019]	[0.017]	[0.047]		[0.042]	[0.042]	[0.129]
Target Runup	0.020	0.005	0.018	0.062***	-0.011	-0.021	0.008	0.142**
	[0.020]	[0.019]	[0.016]	[0.026]	[0.026]	[0.041]	[0.040]	[0.070]
Bidder runup	-0.027*	-0.086***	-0.022	0.017	-0.041	-0.119*	-0.018	0.001
	[0.014]	[0.028]	[0.017]	[0.030]	[0.031]	[0.061]	[0.045]	[0.085]
Industry Abnormal Return	0.020	0.040	0.025	0.003	0.199**	0.288**	0.035	0.351
	[0.037]	[0.065]	[0.051]	[0.084]	[0.078]	[0.142]	[0.131]	[0.235]
Relative Size	-0.014**	0.023***	-0.018	-0.062***	0.004	0.045**	0.043	-0.081
	[0.007]	[0.009]	[0.015]	[0.021]	[0.015]	[0.019]	[0.036]	[0.061]
Log Target MVE	-0.005***	-0.010***	-0.008***	-0.012***	-0.007**	-0.022***	-0.025***	-0.004
	[0.002]	[0.003]	[0.002]	[0.004]	[0.003]	[0.007]	[0.006]	[0.013]
Medium Uncertainty	-0.018***				-0.035***			
(=1 if 2≤Unc.Score≤3)	[0.005]				[0.012]			
High Uncertainty	-0.043***				-0.045***			
(=1 if 4≤Unc.Score≤5)	[0.008]				[0.017]			
Target Runup *	0.010				0.045			
Medium Uncertainty	[0.023]				[0.054]			
Target Runup *	0.057**				0.138**			
High Uncertainty	[0.028]				[0.066]			
Target BVE/MVE		-0.005	-0.002	-0.031		-0.013	-0.038**	-0.100*
		[0.010]	[0.007]	[0.020]		[0.021]	[0.018]	[0.055]
Bidder BVE/MVE		-0.012	-0.005	0.027		-0.027	-0.027	0.028
		[0.011]	[0.011]	[0.022]		[0.024]	[0.027]	[0.061]
High Target Idio. Vol.		-0.013	-0.022**	0.000		-0.014	-0.039*	0.053
(=1 if Idio. Vol. > median)		[0.013]	[0.009]	[0.031]		[0.029]	[0.024]	[0.084]
High Bidder Idio. Vol.		0.015	-0.002	-0.029*		-0.021	-0.009	-0.021
(=1 if Idio. Vol. > median)		[0.010]	[0.009]	[0.017]		[0.022]	[0.023]	[0.048]
High-tech Target Dummy		-0.017	-0.017**	-0.079*		-0.031	-0.013	0.071
		[0.011]	[0.007]	[0.044]		[0.023]	[0.019]	[0.120]
Same-Industry Dummy		-0.008	-0.007	-0.002		-0.011	-0.038	0.064
		[0.015]	[0.012]	[0.018]		[0.033]	[0.031]	[0.052]
Hostile-Deal Dummy	-0.054***	-0.022	-0.033		-0.062	0.007	0.050	
	[0.021]	[0.030]	[0.050]		[0.046]	[0.066]	[0.121]	
Tender-Offer Dummy	0.035***	0.009	0.010	0.044	0.013	-0.024	-0.048	-0.015
	[0.008]	[0.016]	[0.019]	[0.035]	[0.016]	[0.036]	[0.046]	[0.098]
Wave Dummy	-0.002	-0.008	-0.002	0.011	-0.010	-0.005	-0.016	0.030
	[0.005]	[0.007]	[0.006]	[0.013]	[0.010]	[0.016]	[0.016]	[0.036]
Constant	0.009	0.054*	0.061*	0.055	0.045	0.187***	0.277***	-0.115
	[0.013]	[0.033]	[0.035]	[0.082]	[0.029]	[0.072]	[0.086]	[0.228]
Mill's Lambda	0.078***	0.033	0.020	0.066	0.036	-0.062	-0.158	0.231**
	[0.021]	[0.042]	[0.061]	[0.041]	[0.047]	[0.093]	[0.146]	[0.113]
Uncensored Observation	1,175	181	635	364	1,175	181	635	364
Wald Chi-square Statistic	143.47***	48.23***	53.68***	14.37	34.34***	24.59*	42.34***	11.56

Table 6.7: Uncertainty and Unanticipated Target Premium

Panel A of this table presents mean and median unanticipated premium for deal sub-samples sorted by the different uncertainty measures. Panel B presents the results from OLS regression of the unanticipated premium on the low/medium/high uncertainty categories. The unanticipated premium is measured as 1 - anticipated premium where the anticipated premium is measured as: $\frac{\text{Ln(Target Price (-2)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$. The anticipated premium is censored at -1 and +1. Deals are assigned in into low, medium or high uncertainty categories by adding up their scores for each of the five uncertainty measures Mode of payment (=1 if % stock > 0.5), Target Idio. Volatility (=0 if target idio. volatility > Median), Target BVE/MVE (=1 if target BVE/MVE < Median), Target technology intensity (=1 if target is technology intensive) and Target industry relatedness (=1 if target is from the same 2-digit SIC code). The low uncertainty category consists of deal with an uncertainty score of 1 or less, the medium uncertainty category consists of deals with an uncertainty score of 2 or 3. The high uncertainty category includes deals with an uncertainty score of 4 or 5. See the appendix for a description of the other control variables. In panel B, the value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively.

Panel A

Unanticipated Target Premium = 1 - Anticipated Target Premium

	(1)	(2)	(3)	(2)-(1)	(3)-(2)	(3)-(1)
	All Cash		*All Stock*			
Mean	0.835		0.685			0.000
Median	0.796		0.581			0.000
N	344		452			
	Low Target Idio. Vol.		*High Target Idio. Vol.*			
Mean	0.807		0.704			0.000
Median	0.737		0.629			0.001
N	727		447			
	High Target $\frac{\text{BVE}}{\text{MVE}}$		*Low Target* $\frac{\text{BVE}}{\text{MVE}}$			
Mean	0.780		0.753			0.344
Median	0.730		0.686			0.077
N	549		703			
	Low Tech. Int.		*High Tech. Int.*			
Mean	0.791		0.740			0.066
Median	0.726		0.685			0.048
N	583		452			
	Same Ind. Deal		*Cross Ind. Deal*			
Mean	0.773		0.717			0.127
Median	0.707		0.661			0.331
N	1051		1051			
	Low Uncertainty	*Med. Uncertainty*	*High Uncertainty*			
Mean	0.813	0.781	0.627	0.304	0.001	0.000
Median	0.758	0.706	0.538	0.075	0.000	0.000
N	389	606	167			

Panel B

	Unanticipated Target Premium = 1 - Anticipated Target Premium	
	(1)	(2)
Medium Uncertainty	-0.019	-0.022
(=1 if 2≤Uncertainty Score≤3)	[0.032]	[0.035]
High Uncertainty	-0.156***	-0.169***
(=1 if 4≤Uncertainty Score≤5)	[0.047]	[0.053]
Industry Abnormal Return	-0.968***	-0.951***
	[0.210]	[0.217]
Relative Size	-0.047	-0.043
	[0.034]	[0.036]
Log Target MVE	0.013*	0.012
	[0.009]	[0.009]
Hostile-Deal Dummy	0.167*	0.183*
	[0.093]	[0.095]
Tender-Offer Dummy	0.044	0.035
	[0.035]	[0.038]
Wave Dummy	0.016	0.019
	[0.029]	[0.030]
Constant	0.728***	0.577
	[0.057]	[0.486]
Industry Dummy	No	Yes
Observations	1,121	1,121
R-squared	0.040	0.056

Table 6.8: Impact of Target Runup on Deal Completion

The table presents the average marginal effects from a logistic regression of deal completion (=1 if deal is completed and 0 if deal is withdrawn) on the target and bidder runup, target and bidder announcement return and other controls. All continuous variables are standardized so that the coefficients can be interpreted as the impact of a one standard deviation increase in the independent variable on the likelihood of deal completion. The coefficients presented in models (2) through (4) are from second stage of logit regressions. In the first stage the following Probit model is estimated to allow for selection into the group (All Cash, Majority Stock & All Stock).

$$
\begin{aligned}
Y = \alpha &+ \beta_1 \text{Target Runup} + \beta_2 \text{Bidder Runup} + \beta_3 \text{Industry Abn. Return (-42,-2)} \\
&+ \beta_4 \text{Relative Size} + \beta_5 \text{Log(Target MVE)} + \beta_6 \text{Target} \left(\frac{\text{BVE}}{\text{MVE}} \right) \\
&+ \beta_7 \text{Bidder} \left(\frac{\text{BVE}}{\text{MVE}} \right) + \beta_8 \text{Target Idio. Volatility} + \beta_9 \text{Target Idio. Volatility} \\
&+ \beta_{10} \text{High-Techn Target} + \beta_{11} \text{Same-Industry Deal} + \beta_{12} \text{Hostile Deal Dummy} \\
&+ \beta_{13} \text{Tender Offer Dummy} + \beta_{14} * \text{Wave Dummy} + \epsilon
\end{aligned}
$$

where, $Y = 1$ for the selection group of interest (All Cash, Majority Stock and All Stock). The estimates from the 1st stage are included to calculate the Inverse-Mill's ratio, which is used as a control in the 2nd stage Logit regressions. In panel B deals are assigned in into low, medium or high uncertainty categories by adding up their scores for each of the five uncertainty measures Mode of payment (=1 if % stock $>$ 0.5), Target Idio. Volatility (=0 if target idio. volatility $>$ Median), Target BVE/MVE (=1 if target BVE/MVE $<$ Median), Target technology intensity (=1 if target is technology intensive) and Target industry relatedness (=1 if target is from the same 2-digit SIC code). The low uncertainty category consists of deal with an uncertainty score of 1 or less, the medium uncertainty category consists of deals with an uncertainty score of 2 or 3. The high uncertainty category includes deals with an uncertainty score of 4 or 5. The runup, announcement and post-announcement return of the target/bidder are all measured as the buy-and-hold abnormal return over following windows $(t, t+i)$ surrounding the announcement of a deal: Runup window (-42, -2), announcement return window (-1,1), post-announcement window (+2,+42). The target/bidder BHAR is constructed per measure 3 described in the appendix. See the appendix for a description of the other control variables. The value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms in regressions are mean centered.

Panel A

	Logit Regression†			
	All Deals	**All Cash Deals**	**% Stock > 0.5**	**All Stock Deals**
	(1)	(2)	(3)	(4)
All-Stock Dummy	0.071***		-0.044	
	[0.020]		[0.033]	
Percent Cash Offered	0.021*		-0.080	
	[0.011]		[0.058]	
Target Runup	0.014	0.021	0.035**	0.036**
	[0.012]	[0.014]	[0.015]	[0.018]
Bidder Runup	-0.002	0.050*	0.001	-0.004
	[0.009]	[0.026]	[0.014]	[0.018]
Target Ann. Return	0.039***	0.009	0.036***	0.034**
	[0.010]	[0.016]	[0.013]	[0.017]
Bidder Ann. Return	0.002	0.029	0.004	0.001
	[0.008]	[0.019]	[0.011]	[0.012]
Target Post Ann. Return	0.096***	0.052**	0.092***	0.095***
	[0.010]	[0.021]	[0.018]	[0.023]
Bidder Post Ann. Return	0.003	0.036*	-0.010	-0.007
	[0.010]	[0.019]	[0.019]	[0.025]
Target Runup ×	0.036**			
Percent Stock Offered	[0.018]			
Industry Abn. Return (-42,-2)	0.014	0.018	0.003	0.010
	[0.009]	[0.019]	[0.011]	[0.014]
Relative Size	-0.028***	-0.086***	-0.044***	-0.047***
	[0.008]	[0.025]	[0.012]	[0.018]
Log Target MVE	0.047***	0.121***	0.027	0.027
	[0.012]	[0.029]	[0.026]	[0.026]
Target BVE/MVE	0.005	-0.028	0.003	0.017
	[0.010]	[0.029]	[0.017]	[0.024]
Bidder BVE/MVE	-0.012	-0.092***	0.009	0.019
	[0.009]	[0.032]	[0.022]	[0.024]
Target Idio. Volatility	0.029**	0.090***	0.005	-0.010
	[0.014]	[0.032]	[0.021]	[0.026]
Bidder Idio. Volatility	-0.005	0.140**	0.003	0.003
	[0.012]	[0.055]	[0.030]	[0.039]
High-tech Target Dummy	-0.052**	0.016	-0.017	-0.034
	[0.022]	[0.042]	[0.027]	[0.034]
Same-Industry Dummy	0.050**	-0.005	0.104***	0.107**
	[0.023]	[0.034]	[0.036]	[0.044]
Hostile-Deal Dummy	-0.482***	-0.734***	-0.454***	
	[0.061]	[0.071]	[0.146]	
Tender-Offer Dummy	0.149***	-0.428***	0.082	
	[0.017]	[0.016]	[0.124]	
Low Target Price Dummy	0.039*	-0.070	0.034	0.039
(=1 if Target Price (-42)<=$5)	[0.023]	[0.068]	[0.036]	[0.047]
Mill's Ratio		0.532***	-0.066	-0.116
		[0.174]	[0.128]	[0.139]
Observations	1,437	359	697	477
Pseudo R-Squared	0.28	0.29	0.22	0.21
Uncond. Withdrawal Likelihood	18.7%	15.6%	14.7%	16.5%

†: Completed=1, Withdrawn=0.

Panel B

	Logit Regression†			
	All Deals	**Low Uncertainty**	**Medium Uncertainty**	**High Uncertainty**
	(1)	(2)	(3)	(4)
Target Runup	0.004	0.001	0.029**	0.052**
	[0.015]	[0.016]	[0.013]	[0.021]
Bidder runup	0.001	-0.003	0.000	-0.009
	[0.009]	[0.021]	[0.013]	[0.018]
Target Ann. Return	0.054***	0.060***	0.045***	0.030
	[0.010]	[0.017]	[0.014]	[0.021]
Bidder Ann. Return	-0.004	0.018	-0.001	-0.018
	[0.008]	[0.015]	[0.012]	[0.015]
Target Post Ann. Return	0.088***	0.064***	0.072***	0.153***
	[0.011]	[0.023]	[0.019]	[0.018]
Bidder Post Ann.Return	0.003	0.032*	0.009	-0.066***
	[0.011]	[0.019]	[0.017]	[0.016]
Industry Abn. Return (-42,-2)	0.012	0.009	0.024*	0.007
	[0.009]	[0.019]	[0.013]	[0.014]
Medium Uncertainty	0.003			
(=1 if 2≤Unc.Score≤3)	[0.021]			
High Uncertainty	0.043			
(=1 if 4≤Unc.Score≤ 5)	[0.031]			
Target Runup ×	0.018			
Medium Uncertainty	[0.020]			
Target Runup ×	0.047**			
High Uncertainty	[0.023]			
Relative Size	-0.032***	-0.014	-0.051***	-0.008
	[0.008]	[0.015]	[0.011]	[0.030]
Log Target MVE	0.040***	0.022	-0.051***	0.033
	[0.012]	[0.019]	[0.017]	[0.027]
Hostile-Deal Dummy	-0.524***	-0.473***	-0.496***	
	[0.054]	[0.070]	[0.091]	
Tender-Offer Dummy	0.141***	0.191***	0.077**	
	[0.017]	[0.025]	[0.032]	
Low Target Price Dummy	0.050**	-0.055	0.064**	0.135***
(=1 if Target Price (-42)<=$5)	[0.023]	[0.057]	[0.031]	[0.043]
Observations	1455	481	769	198
Pseudo R-Squared	0.23	0.26	0.21	0.38
Uncond. Withdrawal Likelihood	17.4%	21.4%	19.1%	17.7%

†: Completed=1, Withdrawn=0.

Table 6.9: Target Runup and Bidder Uncertainty Change around Deal Announcement

Panel A contains the summary statistics on the change in the bidder and the portfolio implied volatility around deal announcement. Panel B contains the results from the OLS regression of bidder (portfolio) implied volatility change on target runup and other controls. The dependent variable in models (1) through (4) is the change in the bidder implied volatility. The dependent variable in models (5) through (8) is the change in the portfolio implied volatility. In models (1) and (4) I interact the target runup with the percentage of stock offered in the deal. Models (2) & (6), (3) & (7), (4) & (8) respectively present the coefficients for the sub-sample of deals financed fully with cash, mostly with stock and fully with stock. All interaction terms in regressions are mean centered.

The percentage change in bidder (portfolio) implied volatility is measured as the change in bidder implied volatility scaled by the bidder implied volatility long prior to deal announcement (-83,-63).

$$\Delta\text{Bidder Impl. Vol.} = \text{Bidder Implied Volatility}_{0,5} - \text{Bidder Implied Volatility}_{-83,-63}$$

where *Bidder (Target) Implied Volatility*$_{0,5}$ is the median of the implied volatility of the 91-day at-the-money option of the bidder (target) stock over a 5-day window following the announcement of the deal. *Bidder (Target) Implied Volatility*$_{-83,-63}$ likewise with a 21-days window.

$$\begin{aligned}\Delta\text{Portfolio Impl. Vol.} = &\text{Bidder Impl. Vol.}_{0,5} - \text{Bidder Impl. Vol.}_{-1} - \text{Bidder Impl. Vol.}_{-83,-63} \\ &+ \big[(W^2_{\text{Bidder}} \times \text{Bidder Impl. Vol.}^2) + (W^2_{\text{Target}} \times \text{Target Impl. Vol.}^2) \\ &+ 2 \times W_{\text{Bidder}} \times W_{\text{Target}} \times \text{Corr(Bidder,Target)} \times \text{Bidder Impl.Vol.} \\ &\times \text{Target Impl.Vol.}\big]^{0.5}\end{aligned}$$

where $W_{\text{Bidder}} = \text{Target MVE}_{-42}/(\text{Bidder MVE}_{-42} + \text{Target MVE}_{-42})$ and $W_{\text{Target}} = 1 - W_{\text{Bidder}}$. *Correl (Bidder,Target)* is the correlation between the bidder and target return over a 21-day window starting 83-days prior to deal announcement. *Bidder (Target) Implied Volatility*$_1$ is the bidder implied volatility 1-day prior to deal announcement.

The target/bidder BHAR is constructed per measure 3 as described in the appendix. See appendix for a description of control variables. In panel B, the standard error of the coefficient is in parenthesis. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level.

Panel A

		All Deals	All Cash Deals	% Stock > 0.5	All Stock Deals
Percent change in bidder implied volatility	Mean	1.57***	0.04	2.05***	2.01***
	Median	-1.29	-1.75	-0.67	-0.667
	N	821	205	440	286
Percent change in portfolio implied volatility	Mean	7.89***	5.73***	8.60***	9.33***
	Median	6.34***	5.31***	7.02***	7.85***
	N	487	99	273	141

Panel B

	Pct. Change in Bidder Impl. Volatility				Pct. Change in Portfolio Impl. Volatility			
	All Deals	All Cash Deals	% Stock >0.5	All Stock Deals	All Deals	All Cash Deals	% Stock >0.5	All Stock Deals
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All Cash Dummy	-0.013				-0.007			
	[0.018]				[0.020]			
% Stock Offered	0.001				0.013			
	[0.019]				[0.024]			
Target Runup	-0.035*	-0.017	-0.049**	-0.068**	-0.036	0.098	-0.107***	-0.105***
	[0.020]	[0.045]	[0.020]	[0.034]	[0.036]	[0.032]	[0.032]	[0.036]
Target Runup ×	-0.090**				-0.120*			
% Stock Offered	[0.044]				[0.070]			
Relative size	0.031**	0.078***	0.026	0.044**	0.077***	0.096***	0.078****	0.086***
	[0.014]	[0.008]	[0.017]	[0.021]	[0.012]	[0.023]	[0.015]	[0.018]
Log Target MVE	-0.011	-0.001	0.004	0.003	-0.012	-0.014	-0.015	-0.036****
	[0.005]	[0.008]	[0.006]	[0.009]	[0.007]	[0.013]	[0.011]	[0.009]
Target BVE/MVE	-0.033**	-0.001	-0.001	0.015	0.021	-0.004	0.003	-0.085
	[0.016]	[0.026]	[0.026]	[0.033]	[0.029]	[0.048]	[0.054]	
Bidder BVE/MVE	-0.032	-0.033	-0.054	-0.015	-0.039	-0.083	-0.019	-0.040
	[0.023]	[0.037]	[0.041]	[0.045]	[0.030]	[0.030]	[0.046]	
Target Idio.Volatility	-1.000***	-1.651**	-0.742**	-0.453	0.061	-0.387	-0.176	-0.916
	[0.318]	[0.689]	[0.415]	[0.433]	[0.450]	[0.596]	[1.168]	[0.580]
Same industry dummy	-0.010	-0.022	-0.009	0.009	-0.049***	0.013	-0.058	-0.048*
	[0.012]	[0.018]	[0.018]	[0.019]	[0.015]	[0.032]	[0.023]	[0.028]
Hostile deal dummy	-0.001	-0.133***	0.033		0.054	0.016	0.070	
	[0.038]	[0.020]	[0.092]		[0.060]	[0.031]	[0.085]	
Tender offer dummy	-0.003	-0.032*	-0.053	-0.073**	0.013	0.011	0.063	-0.005
	[0.015]	[0.018]	[0.055]	[0.032]	[0.015]	[0.015]	[0.060]	[0.016]
High-tech target dummy	0.012	-0.030	0.018	0.020	0.019	-0.000	0.046**	0.048
	[0.012]	[0.021]	[0.018]	[0.021]	[0.014]	[0.021]	[0.022]	[0.032]
Constant	0.082*	0.106	0.028	-0.019	0.140 **	0.152	0.179	0.393***
	[0.044]	[0.074]	[0.058]	[0.07]	[0.066]	[0.108]	[0.182]	[0.100]
Observations	727	187	387	242	392	97	215	135
R-squared	0.05	0.11	0.04	0.06	0.071	0.161	0.058	0.077

Table 6.10: Impact of Industry and Macro Level Factors

The table presents the results from the OLS regression of the bidder announcement return (-1,+42) on target runup and other controls. The estimation in models (1) and (2) are for sub-samples sorted by industry abnormal return. In models (3) and (4) deals are sorted into "Non Wave" and "Wave" groups. A deal is defined as being part of a merger wave if it happens in an year where the number of deals in the industry (using Fama Frech 49 industry classification) lies in the top quartile of the distribution of deals in the industry. Deals are sorted based on the Industry BVE/MVE in models (5) and (6). The target/bidder runup is measured as the BHAR over the (-42, -2) window as per measure 3 described in the appendix. See the appendix for a description of the other control variables. The value presented in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms in regressions are mean centered.

	Bidder Ann. CAR (-1,+42)					
	Industry Abn. Return		**Merger Wave**		**Industry. BVE/MVE**	
	< Median	**> Median**	**No**	**Yes**	**< Median**	**> Median**
	(1)	(2)	(3)	(4)	(5)	(6)
All-Cash Dummy	0.022	0.017	0.015	0.028	0.036	0.013
	[0.023]	[0.021]	[0.019]	[0.026]	[0.024]	[0.020]
Percent Stock Offered	-0.030	-0.002	-0.019	-0.014	-0.004	-0.025
	[0.025]	[0.022]	[0.021]	[0.029]	[0.026]	[0.021]
Target Runup	0.067*	0.065**	0.076**	0.030	0.062**	0.045
	[0.034]	[0.032]	[0.030]	[0.038]	[0.031]	[0.032]
Bidder Runup	-0.114**	0.039	-0.102**	0.075	-0.063	0.016
	[0.045]	[0.040]	[0.050]	[0.055]	[0.039]	[0.046]
Industry Abn. Return	0.291***	0.094			0.205**	0.177
	[0.110]	[0.105]			[0.100]	[0.118]
Relative Size	0.030*	-0.003	0.023	0.010	0.025	0.032*
	[0.018]	[0.019]	[0.019]	[0.025]	[0.019]	[0.018]
Log Target MVE	-0.022***	-0.019***	-0.019***	-0.019***	-0.017***	-0.025***
	[0.006]	[0.005]	[0.005]	[0.006]	[0.005]	[0.005]
Target BVE/MVE	-0.024	-0.027*	-0.009	-0.056***	-0.011	-0.046***
	[0.015]	[0.015]	[0.014]	[0.021]	[0.016]	[0.014]
Bidder BVE/MVE	-0.033	-0.033	-0.041**	-0.004	-0.073***	-0.027
	[0.022]	[0.022]	[0.020]	[0.037]	[0.026]	[0.020]
High Target Idio. Vol.	-0.051***	-0.016	-0.033*	-0.031	-0.053***	-0.014
(=1 if Idio. Vol.>median)	[0.020]	[0.017]	[0.018]	[0.020]	[0.019]	[0.018]
High Bidder Idio. Vol.	-0.032*	-0.013	-0.022	-0.008	-0.004	-0.048***
(=1 if Idio. Vol.>median)	[0.019]	[0.017]	[0.018]	[0.021]	[0.019]	[0.018]
High-tech Target Dummy	-0.027*	-0.024*	-0.027**	-0.014	-0.038**	-0.005
	[0.016]	[0.014]	[0.013]	[0.017]	[0.017]	[0.015]
Same-Industry Dummy	-0.006	-0.004	0.006	-0.012	0.006	-0.007
	[0.020]	[0.018]	[0.016]	[0.021]	[0.020]	[0.017]
Hostile-Deal Dummy	-0.007	-0.046	-0.020	-0.067	0.045	-0.045
	[0.045]	[0.052]	[0.043]	[0.062]	[0.069]	[0.037]
Tender-Offer Dummy	-0.020	0.003	-0.018	0.017	-0.004	-0.013
	[0.021]	[0.020]	[0.017]	[0.022]	[0.022]	[0.019]
Wave Dummy	-0.001	-0.009			-0.006	-0.001
	[0.015]	[0.014]			[0.014]	[0.014]
Constant	0.181***	0.149***	0.156***	0.141***	0.140***	0.198***
	[0.044]	[0.039]	[0.036]	[0.051]	[0.043]	[0.040]
Observations	596	571	659	522	617	554
R-squared	0.098	0.064	0.068	0.064	0.075	0.087

Table 6.11: Selected Mode of Payment and the Target Runup & Bidder Outcome Relationship

The table presents the first and second stage results from a Heckman selection model. The dependent variable in the second stage in models (1) and (3) is the bidder ann. CAR (-1,1). The dependent variable in the second stage in models (2) and (4) is the bidder BHAR (-1,42). In models (1) and (2) the selection is into the "Majority Cash"(% Cash >0.5) group and in models (3) and (4) the selection is into the "Majority Stock"(% Stock >0.5)those in the main equation. The selection equation (first stage) includes 2 additional controls: (i) Low target price dummy and (ii) Bidder Cash/Assets. The target/bidder runup is measured as the BHAR over (-42, -2) as per measure 3 described in the appendix. See appendix for a description of the control variables. The value in the parenthesis is the standard error of the coefficient. $*$, $**$, $***$ indicate that the coefficient is different from zero at the 10%, 5% and 1% level respectively. All interaction terms are mean centered.

Selection into:	**% Cash >0.5**			**% Stock >0.5**		
Bidder Ann. CAR	**(-1,1)**	**(-1,42)**		**(-1,1)**	**(-1,42)**	
	(1)	(2)	Selection Eq.	(3)	(4)	Selection Eq.
Target Runup	0.024	0.035	-0.179	0.030**	0.070*	0.144
	[0.019]	[0.040]	[0.195]	[0.014]	[0.038]	[0.203]
Bidder Runup	0.006	-0.075	-0.810***	-0.013	0.034	0.775***
	[0.036]	[0.077]	[0.272]	[0.020]	[0.055]	[0.269]
Industry Abnormal Ret.	-0.013	0.172	0.044	0.049	0.227*	-0.117
	[0.062]	[0.128]	[0.669]	[0.045]	[0.123]	[0.689]
Relative Size	0.020**	0.012	-0.098	-0.029***	0.001	-0.002
	[0.010]	[0.020]	[0.105]	[0.009]	[0.024]	[0.113]
Log Target MVE	-0.007**	-0.017**	-0.058*	-0.010***	-0.012	0.128***
	[0.003]	[0.007]	[0.034]	[0.003]	[0.008]	[0.035]
Target BVE/MVE	0.001	0.002	0.141	-0.015**	-0.044**	-0.041
	[0.010]	[0.020]	[0.091]	[0.007]	[0.018]	[0.092]
Bidder BVE/MVE	-0.017	-0.011	-0.036	0.012	-0.117***	-0.560***
	[0.013]	[0.026]	[0.135]	[0.015]	[0.041]	[0.139]
High Target Idio. Vol.	-0.012	-0.018	-0.306***	-0.017	-0.012	0.375***
(=1 if Idio.Vol.> median)	[0.014]	[0.028]	[0.114]	[0.011]	[0.030]	[0.120]
High Bidder Idio. Vol.	0.039*	-0.008	-0.577***	-0.009	0.048	0.715***
(=1 if Idio.Vol.> median)	[0.021]	[0.045]	[0.110]	[0.017]	[0.043]	[0.114]
High-tech Target Dummy	-0.022*	-0.057**	0.295***	-0.020***	-0.005	0.029
	[0.011]	[0.024]	[0.094]	[0.007]	[0.019]	[0.096]
Same-Industry Dummy	0.010	0.014	-0.007	0.025***	-0.011	-0.047
	[0.010]	[0.019]	[0.113]	[0.009]	[0.024]	[0.118]
Hostile-Deal Dummy	0.005	0.021	-0.442*	0.055	-0.008	-0.109
	[0.023]	[0.047]	[0.267]	[0.055]	[0.130]	[0.443]
Tender-Offer Dummy	-0.057	-0.029	1.538***	-0.019	-0.251*	-2.052***
	[0.049]	[0.108]	[0.106]	[0.057]	[0.145]	[0.159]
Wave Dummy	-0.000	-0.006	0.080	-0.004	0.007	0.049
	[0.008]	[0.016]	[0.086]	[0.007]	[0.018]	[0.088]
Low Target Price Dummy			-0.088			0.037
=1 if Tar. Price(-42)≤ \$5			[0.132]			[0.136]
Bidder Cash/Assets			-0.147			0.610**
			[0.244]			[0.251]
Constant	0.131**	0.165	-0.191	0.054	-0.014	-0.711***
	[0.059]	[0.132]	[0.247]	[0.043]	[0.114]	[0.251]
Mill's Lambda	-0.067	-0.020		0.008	0.183*	
	[0.054]	[0.121]		[0.037]	[0.096]	
Uncensored Observations	443	443		443	443	
Wald Chi-square Statistic	35.87***	35.54***		68.85***	39.21***	

Table 6.12: Robustness Check

Panel A presents the difference in (1) the deal surplus and (2) the bidder gain for sub-samples of stock deals (Percentage stock > 0.5) relative to that of matched cash deals (Percentage cash > 0.5) under scenarios of negative and positive target runup. The matching process is as follows: For each deal financed mostly with stock (Percentage stock > 0.5), I match a deal that is financed mostly with cash (Percentage cash > 0.5) using the following restrictions: (i) the deals should have been announced within 3 years of each other, (ii) the target runup in the cash deal should lie within the (-20%, +20%) threshold of the target runup in the stock deal, (iii) the size of the bidder in the cash deal must lie within the (-20%,+20%) threshold of the bidder size in the stock deal. The deal surplus is the weighted average of the target and the bidder BHAR over the window (-42,+42). The target and the bidder weights are based on the respective market values of equity 42-days prior to the announcement of the day. The runup, announcement return of the target (bidder) are all measured as the buy-and-hold abnormal return over following windows $(t,\ t+i)$ surrounding the announcement of a deal: Runup window (-42, -2), announcement return window (-1,+1). The target/bidder BHAR is constructed per measure 3 as described in the appendix. $*$, $**$, $***$ indicate that the statistic is different from zero at the 10%, 5% and 1% level respectively.

		Target Runup < 0 (N=200)			**Target Runup > 0 (N=340)**		
		Mean	Median	Std.Dev.	Mean	Median	Std.Dev.
Deal Surplus (% stock > 0.5)	(1)	-0.045***	-0.036***	0.157	0.095***	0.082***	0.165
Deal Surplus (% cash > 0.5)	(2)	0.008	0.013	0.112	0.093***	0.089***	0.087
Diff. Deal Surplus	(1)-(2)	-0.054***	-0.050***	0.183	0.002	0.006	0.180
Bidder Total Gain (% stock > 0.5)	(3)	-0.061***	-0.063***	0.179	0.031***	0.027***	0.177
Bidder Total Gain (% cash > 0.5)	(4)	-0.015***	-0.020***	0.137	0.026***	0.027***	0.107
Diff. Bidder Total Gain	(3)-(4)	-0.046***	-0.039***	0.216	0.005	0.006	0.205

APPENDIX

VARIABLE DEFINITIONS

Table A1: Variable Definitions

Variable	Definition
Runup	BHAR (-42, -2)
	I construct 5 different measures for each of the above variable:
	Measure 1: $\Pi_t^{t+i}(1 + R_{i,t} - R_{f,t}) - \Pi_t^{t+i}(1 + \hat{\alpha}_i + \hat{\beta}_{1i}(R_{Mkt,t} - R_{f,t}) + \hat{\beta}_{2i}R_{SMB,t} + \hat{\beta}_{3i}R_{HML,t} + \hat{\beta}_{4i}R_{UMD,t})$ where $\hat{\alpha}_i$, $\hat{\beta}_i$ are the estimates from the Fama-French 4-factor model over a 252 day window (-294, -43).
	Measure 2: $\Pi_{-42}^{-2}(1 + R_{i,t} - R_{f,t}) - \Pi_{-42}^{-2}(1 + R_{Mkt,t} - R_{f,t})$
	Measure 3: $\Pi_{-42}^{-2}(1 + R_{i,t} - R_{f,t}) - \Pi_{-42}^{-2}(1 + R_{\text{Size and B/M Match Portfolio,t}} - R_{f,t})$. I sort the targets / the bidders into size (Book-to-market) deciles based on their respective market value of equity (BVE/MVE) values in the fiscal year that ended just prior the announcement of the deal. The size and book-to-market cutoff values are based on NYSE listed stocks (obtained from Kenneth French's website). The runup measure is hence the difference between the buy-and-hold excess return on the target (or the bidder) and the buy-and-hold excess return on the size and B/M match portfolio.
	Measure 4: $\Pi_{-42}^{-2}(1+R_{i,t}-R_{f,t})-\Pi_{-42}^{-2}(1+R_{10 \text{ Firm Match Portfolio,t}} - R_{f,t})$. For each target (bidder) I identify which belong to the same industry, have a market value of equity between 80% and 120% of the target (the bidder) MVE.I then shortlist a portfolio of 10 firms which are closest in BVE/MVE to the target (the bidder). he matching is done based on market value of equity and BVE/MVE values in the year prior to the announcement of the deal. If 10 firms are not available in the same 4-digit SIC code and within the size threshold, I look for potential matches in the same 3-digit or 2-digit SIC code as the target (the bidder).
	Measure 5: $Log(P_{i,-2}/P_{i,-42}) - Log(MarketIndex_{i,-2}/MarketIndex_{i,-42})$. Where, P_i is the target (the bidder) price on day t (=-42 or -2).
Announcement Return	*CAR (-1, 1)* and *CAR(-1, 42)* : I construct measures (1) through (5) discussed above for the announcement window.

Variable	Definition
Total Gain	BHAR (-42, 42) I construct measures (1) through (5) discussed above for the (-42, 42) window.
Deal Surplus	**Measure 1:** $\frac{\text{Bidder MVE}_{-42}\times\text{Bidder BHAR (-42, 2)}+\text{Target MVE}_{-42}\times\text{Target BHAR (-42,+42)}}{\text{Bidder MVE}_{-42}+\text{Target MVE}_{-42}}$ In the event that the bidder already has a toehold in the target the weights are adjusted to account for the toehold. **Alternative Measures:** $\frac{\text{(Bidder Mkt. Val. Post + Target Mkt. Val. Post) - (Bidder Mkt. Val. Pre + Target Mkt. Val. Pre)}}{\text{Bidder Mkt. Val. Pre + Target Mkt. Val. Pre}}$ Thee bidder / the target market value *Pre* is the market value of assets of the bidder/target 42 days prior to deal announcement. The bidder/target market value *Post* is the market value of the bidder/target 42 days, 1 year and 2 years following the deal announcement. Following the completion of a deal the target market value is set to zero. Industry adjusted measures are calculated by subtracting the change in the market value of matched-firms (matched on industry, size, B/M and ROA) over the same period.
Anticipated Premium	$\frac{\text{Ln(Target Price (-2)/Target Price (-42))}}{\text{Ln(Offer Price/Target Price (-42))}}$
Unanticipated Premium	1 - Anticipated Premium
Deal Value	SDC deal value in millions of 2010 dollars.
Relative Size	SDC deal value scaled by the bidder market value of equity in the year that ended just prior to deal announcement.
Log Target MVE	Log of target market value of equity in the fiscal year that ended just prior to deal announcement.
Target (bidder) BVE/ MVE	Target (bidder) book value of equity scaled by target (bidder) market value of equity. The BVE and MVE values from the fiscal year that ended just prior to deal announcement.
Target (Bidder) Idiosyncratic Volatility	The standard deviation of the market model residuals. The market model is
Idiosyncratic	estimated over the window (-294,-43).
Same Industry	If the target and the bidder share one or more 4-digit or 3-digit SIC codes then same industry dummy is set equal to 1 and 0 otherwise.

Variable	Definition
Toehold	Percentage of target stock held by the bidder prior to deal announcement
Hostile Deal	Dummy is set equal to 1 if the target stance to the deal is hostile and 0 otherwise.
Tender Offer	Dummy is set equal to 1 if the deal is a tender offer and 0 otherwise.
Target (Bidder) Price Low	Dummy is set equal to 1 if the price of target (bidder) stock 42-days prior to deal announcement is less than \$5 and 0 otherwise.
Industry Abnormal Return	Market-adjusted median return of all firms in the target's 2-digit SIC code over the runup period.
Industry B/M	Median BVE/MVE of all firms in the target's 2-digit SIC code in the calendar year prior to deal announcement.
Wave	Dummy is set equal to one if the deal is announced in an year where the number of deals in the industry (using Fama French 49 industry classification) lies in the top quartile of the distribution of deals in the industry.
Change in Bidder Implied Volatility	$=$Bidder Implied Volatility$_{0,5}$ $-$ Bidder Implied Volatility$_{-83,-63}$. *Bidder Implied Volatility*$_{0,5}$ is the median implied volatility of 91-day Volatility at-the-money option of the bidder stock over a 5-day window following deal announcement. *Bidder Implied Volatility*$_{-83,-63}$ is the median implied volatility of 91-day at-the-money option of the bidder stock over a 21-day window starting 83-days prior to deal announcement.
Change in Portfolio Volatility	$=$ Bidder Impl. Vol.$_{0,5}$ - Bidder Impl. Vol.$_{-1}$ - Bidder Impl. Vol.$_{-83,-63}$ + $\big[(W^2_{\text{Bidder}} \times \text{Bidder Impl. Vol.}^2) + (W^2_{\text{Target}} \times \text{Target Impl. Vol.}^2) + 2 \times W_{\text{Bidder}} \times W_{\text{Target}} \times$ Corr(Bidder,Target) $\times$ Bidder Impl. Vol. $\times$ Target Impl. Vol. $\big]^{0.5}$ where: $W_{\text{Bidder}} = \text{Target MVE}_{-42}/(\text{Bidder MVE}_{-42} + \text{Target MVE}_{-42})$ $W_{\text{Target}} = 1 - W_{\text{Bidder}}$ *Corr (Bidder, Target)* is the correlation between the bidder and target return over a 21-day window starting 83-days prior to deal announcement. *Bidder (Target) Implied Volatility*$_{-1}$ is the bidder implied volatility 1-day prior to deal announcement. *Bidder (Target) Implied Volatility*$_{0,5}$ is the median implied volatility of 91-day at-the-money option of the bidder (target) stock over a 5-day window following deal announcement. *Bidder (Target) Implied Volatility*$_{-83,-63}$ is the median implied volatility of 91-day at-the-money option of the bidder (target) stock over a 21-day window starting 83-days prior to deal announcement.