Cash is King
Revaluation and the Medium of Exchange in Merger Bids*

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Abstract

Returns to merger announcements are commonly used to measure the expected value created by mergers. We provide evidence that a significant portion reflects, instead, a revaluation of the target. Using a sample of unsuccessful merger bids from 1980 to 2008, we show that targets of cash offers are revalued by +15% after deal failure. Stock bids, on the other hand, do not seem to provide target information: targets with equity offers revert to their pre-announcement levels after deal failure. The results are not driven by future takeover activity since cash targets are not significantly more likely to receive future merger bids. The results are also independent of the specific type of reason for deal failure. Our findings, as well as the observed value changes in acquirers, are consistent with cash bids indicating target undervaluation while stock bids signal acquirer overvaluation.

JEL classification: G14, G34, D03, D82

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1 Introduction

Much of the research on mergers and acquisitions revolves around the question: do mergers create value? With mergers being among the most important and, possibly, most disruptive events in a corporation's lifetime, this question has been of foremost interest to policymakers and researchers alike, including a recent debate about "massive wealth destruction" through mergers in the late 1990s and at the beginning of this century (Moeller, Schlingemann, and Stulz (2005)). Empirically, the measurement of value creation is challenging. Using stock market data is standard in the literature, and has the advantage of being available on a day-to-day basis. However, stock market reactions to merger announcements do not only reflect the present value of synergies, but also encode information about the stand-alone value of the entities as well as information about the closure of the deal. To the extent that a) markets are efficient, b) mergers are unanticipated (and very likely to go through) and c) little information about the stand-alone value of the two merging entities is revealed, the combined change in market values should capture total value creation. In fact, various studies document a small positive combined announcement return of targets and bidders, and interpret this finding as evidence in favor of surplus creation.[1]

Our paper implicitly sheds light on this central question, by revealing that the last above-mentioned assumption – lack of information revelation – is not warranted by the data. We provide evidence that a bid reveals economically and statistically important information about the stand-alone value of the target. Our empirical analysis is motivated by a significant body of existing theories that predict that the bidder's private information will be reflected in his choice of acquisition currency, i.e., cash or stock.[2] While the negative information effect of stock bids on the bidder's stand-alone value is well understood at least since Myers and Majluf (1984), we focus on information revelation about the target's (under)valuation and show empirically that there is a large revaluation effect for cash targets (+15%) but no effect for stock targets. For the average deal completed between 1980 and 2008 this translates into approximately $132m (in 2010 dollars). These results imply that traditional synergy estimates are downward biased for stock deals and upward biased for cash deals, if our identified information effects are not properly accounted for. Taken together, our evidence runs counter to the conventional wisdom that stock deals are value-destructive, at least from a total-surplus perspective, since since a large fraction of losses is triggered by processing of negative information that would come out eventually.

Our identification strategy uses the sample of unsuccessful merger bids to measure information revelation: we compare the value of targets prior to the announcement and after deal failure. To see the intuition for our approach, consider the following thought experiment. Suppose a target company is currently trading at $100 and obtains a takeover offer in cash for $125. Moreover, assume that the deal fails exogenously within a short time period.[3] After the exogenous failure of the deal, the information revealed through the choice of the medium of exchange is no longer confounded with merger effects, including the split-up of surplus between target and acquirer and match-specific synergies. If the stock price trades at $115 after deal

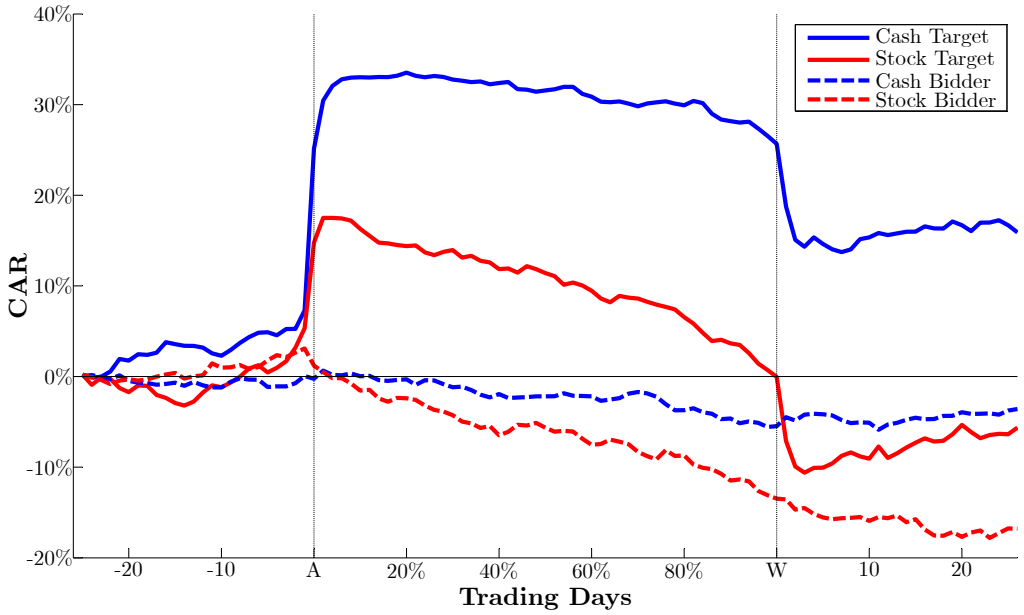
[1] See Jensen and Ruback (1983), Jarrell, Brickley, and Netter (1988), or Andrade, Mitchell, and Stafford (2001).

[2] In Fishman (1989), bidders use cash offers for valuable targets to preempt competing offers. If the first bidder signals a sufficiently high valuation for the target by using cash, bidder 2 does not find it worthwhile to start a bidding war. In Hansen (1987) as well as the extension by Eckbo, Giammarino, and Heinkel (1990), the bidder's choice of the medium of exchange reflects private information about his own value.

[3] We will address the issue of exogeneity in our empirical methodology.

failure, we can attribute \$15 to the revision of beliefs about the stand-alone value of the target as a result of the offer. This enables us to identify information revelation in the sample of unsuccessful bids.

Figure 1: Deal Announcement and Failure Effects



Notes: Cumulative Abnormal Returns (CARs) from 25 trading days pre-announcement to 25 trading days after deal failure. The sample consists of 86 cash and 108 stock deals. See Table 1 for the construction of the sample.

Figure 1 previews our key empirical result. It plots the evolution of cumulative abnormal returns for pure stock or pure cash failed merger bids in the US between 1980 and 2008, separately for acquirers and targets.[4] The pre-announcement and post-failure differences are striking. Starting 25 trading days prior to the announcement, we observe a run-up among targets of stock offers and targets of cash offers, yielding announcement effects of 15% and 25%, respectively – consistent with earlier evidence by Huang and Walkling (1987). At the time of deal failure, however, which is normalized to occur 50 synthetic trading days (the median of the sample) later in the graph,[5] the value of stock targets falls below the pre-announcement level, to which it ultimately returns, while the value of cash targets remains significantly higher than prior to the bid: cash targets earn 15% cumulative abnormal returns relative to the pre-announcement level. Hence, despite the small upward trend for both cash and stock targets after deal failure, stock target returns remain more than 15% below cash target returns. In

[4] The underlying raw sample consists of "exogeneous" and "endogeneous" cancelations. Using the entire sample provides the advantage that the raw result is not driven by our own subjective classification. We will carefully address sample selection in a second step.

[5] We use linear interpolation to normalize deals with different window lengths to the same number of synthetic trading days (see Appendix B).

addition, we find that stock acquirers trade at significantly lower prices post-failure (−15%) while cash acquirers return to their pre-announcement level, consistent with findings in previous studies.[6]

Our results indicate that cash bids induce the market to positively revalue the target. One explanation for the revaluation is positive private information of the acquirer about the target, which is revealed by the cash bid. A related explanation is limited attention, i.e., bids drawing investors' attention to the target company and inducing them to process information about the target that was already available. Since in both cases the market learns from the bidder's action, we will dub both interpretations *information revelation* in a broad sense. A more refined explanation is that the value increase in cash targets does not reflect a revaluation of the target stand-alone values but of their being lucrative merger opportunities relative to stock targets. However, we find that failed cash deals are not significantly more likely than failed stock deals to be followed by another takeover attempt over the next two years.

While our main empirical result presented in Figure 1 is consistent with the just described information-based explanation, there are two major challenges to our identification approach which we need to address: sample selection and multivariate robustness. Sample selection is potentially a major concern as we estimate our results on the subsample of failed deals and deal failures are generally not exogenous to the valuations of the target and bidder. Multivariate robustness is important because our univariate results presented in Figure 1 could be driven by the spurious correlation of the medium of exchange with the real underlying economic driver. We provide several layers of evidence.

First, based on an extensive news search of deal failures, we sort deals into relevant failure categories. Using a smaller subsample of categories indicating exogenous cancelation (such as regulatory interventions) strongly confirms our main revaluation result. Note that some failures, e.g., negative shocks to the bidder, can be reasonably interpreted as exogenous to the target's stand-alone value, but obviously not to the bidder's stand-alone value. In turn, negative shocks to the target leading to cancelation, such as the uncovering of negative information about the target in the due-diligence process, could be reasonably treated as exogenous to the bidder's value, but not to the target's value. It is even more reassuring that a positive revaluation differential between cash vs. stock targets (and cash vs. stock bidders) holds for virtually every failure category. In that sense, our results are robust to the specific classification of "exogeneity."

Moreover, while a sizable fraction of deals could not be confidently included in the sample of exogenous failures with respect to target (or bidder) value, the *differential* revaluation effect between cash and stock deals is unbiased as long as there is no *differential* sorting into the failed sample. This weaker exogeneity requirement results from the fact that we are comparing cash and stock deals *within* the sample of unsuccessful deals and not across the unsuccessful- *and* completed-deal samples (vs. Savor and Lu (2009)). For example, a material adverse shock to the target should lead to cancelation irrespective of whether the deal was financed with cash or stock.[7] Following this theoretical reasoning, we might be able to extend our estimates of the revaluation difference beyond the "truly exogenous" sample. Empirically, the point estimates are remarkably similar, so that we feel comfortable using the large sample for the multivariate

[6] For example, Savor and Lu (2009) compare the stock price performance of stock bidders in the *unsuccessful* deal sample to that of stock bidders in the *completed* deal sample, and find that bidders in the unsuccessful deal sample do worse. Further evidence on stock market driven acquisitions is provided in Friedman (2006).

[7] Our approach is thus very similar to a standard difference-in-difference methodology.

analysis. To further address sorting, we test whether cash deals are more or less prone to deal failure. Consistent with our identification, the medium of exchange does not predict deal failure, whereas hostile and large deals (in terms of relative size of the transaction) are more likely to be associated with deal failure.

The checks so far mainly addressed sample selection, i.e., whether the univariate results could be driven by sorting. To address the second concern of multivariate robustness, we run multivariate regressions of the revaluation effect on the fraction of cash offered in a transaction and important other control variables that seem to be important from an ex-ante perspective, e.g., the deal premium, target and relative deal size. In particular, we address the alternative explanation that the revaluation effect of cash bids may be due to a "disciplinary" effect of the bid itself. This is a reasonable hypothesis, since hostile bids are usually associated with disciplinary pressure on target management and are predominantly cash-financed. Our results remain robust in a multivariate context, even after controlling for "hostility," which provides further evidence for our information-based interpretation. The theoretical foundation for the link between information and the medium of exchange does not only provide us with an explanation of our results, but also helps address concerns about data mining.

Beyond providing new empirical facts about the informational content of merger bids, our findings have important implications for the efficiency of mergers and acquisitions. From a policymaker's perspective, it is crucial to know whether these deals quantitatively affect total surplus (allocative role), as in the Q-theory model of Jovanovic and Rousseau (2002), or whether they merely have distributional consequences, such as in the model of Shleifer and Vishny (2003), including value adjustment due to the revelation of information. Since the positive revaluation difference of cash vs. stock deals applies to both acquirers and targets, our results oppose conventional wisdom. While stock deals may be associated with significant declines in stock-market capitalization, a large fraction is due to a surplus-neutral revaluation of the bidder. As a result, synergy estimates for stock deals are downward biased if information adjustment is not properly accounted for. Put differently, society might not be that concerned about the "massive wealth destruction" highlighted by Moeller, Schlingemann, and Stulz (2005). In fact, even bidder shareholders might not oppose if their "wealth destruction" is largely due to negative information that would come out eventually.[8] In contrast, cash deals are to a large extent motivated by undervaluation of the target, so part of their estimated "surplus creation" is simply due to revaluation of the target.

While total value creation might be the most relevant measure of the desirability of merger activities, the (ex-post irrelevant) split-up of surplus influences the ex-ante incentives to engage in value-maximizing transactions. If target shareholders can extract all the surplus from a transaction, a value-maximizing bidder would have no incentive to start a takeover attempt. This is the powerful logic of Grossman and Hart (1980). The rationale applies regardless of the source of the gains, that is, also if the bidder simply has private information about the value of the target: if a bidder's private information about the target is fully revealed to the market and target shareholders would, once the bidder has announced his bid, demand the full price, potential acquirers may abstain from bidding in the first place. An initial stake in the target company (see Shleifer and Vishny (1986) and Hirshleifer and Titman (1990)) dampens this mechanism as the bidder would benefit from a revaluation of his initial stake. In summary, the division of surplus, including a valuation increase due to information revelation, affects ex-ante incentives and thus the efficiency of the takeover market mechanism.

[8] This argument is similar in spirit to Savor and Lu (2009).

In addition to the research cited above, our findings relate to several strands of the prior literature. A large literature evaluates the returns to mergers and acquisitions. Most studies based on announcement returns find that tender offers generate small overall value with virtually all the gains accruing to the target (see overview papers by Jensen and Ruback (1983), Andrade, Mitchell, and Stafford (2001), and Betton, Eckbo, and Thorburn (2008)). Using probability scaling methods, Bhagat, Dong, Hirshleifer, and Noah (2005) find larger estimates of combined value creation (7.3%) than the conventional CAR estimate (5.3%) by Bradley, Desai, and Kim (1988). Following Travlos (1987), studies of announcement returns distinguish between cash and stock transactions. Consistent with the pecking order model of Myers and Majluf (1984), bidders using stock reveal negative private information about themselves, which manifests itself in negative announcement returns for the bidder.[9]

Most closely related to our analysis are earlier papers by Dodd (1980), Bradley, Desai, and Kim (1983), Davidson, Dutia, and Cheng (1989) and Sullivan, Jensen, and Hudson (1994) which examine failed acquisitions to study information revelation about the *target*. For example, Davidson, Dutia, and Cheng (1989) find that targets of unsuccessful bids trade higher than before the announcement only because they are more likely to become future targets, whereas stock prices of targets that do not obtain a future offer revert to pre-announcement levels. They interpret this result as evidence against information revelation about the stand-alone value of the target. In contrast to our analysis, their study does not distinguish between cash and stock transactions. This conditioning information allows us to separate targets for which (almost) no information is revealed (stock targets) and targets that are revalued (cash targets). The striking difference between stock and cash targets has already been documented in a paper by Sullivan, Jensen, and Hudson (1994). However, due to limited sample size (22 stock and 44 cash deals), lack of relevant control variables (such as any accounting data) and lack of failure categorization, their suggestive results were not cleanly identified. Our extensive analysis of reasons for deal failure, robustness checks, and identification discussion reveal that their main raw result holds up in a multivariate context and can be reasonably attributed to information revelation through the bidder's choice of currency. Our analysis indicates that this effect is not driven by cash targets being more prone to becoming takeover targets in the future. Moreover, our results are robust to controlling for hostile deals even though these deals are more likely to be financed with cash. Thus, the disciplinary channel of hostile bids (see Franks and Mayer (1996)) does not drive our results either.[10]

Long-run post-takeover performance studies by Rau and Vermaelen (1998) and Loughran and Vijh (1997) document strong negative abnormal returns for *bidders* of stock transactions and positive abnormal returns for bidders using cash. As Savor and Lu (2009) note, this result does not necessarily imply that stock transactions are value-destructive from the bidder's perspective. Since market timing stories suggest that stock bidders are on average overvalued, Savor and Lu (2009) use the performance of bidders in failed transactions as the natural counterfactual. Indeed, their results confirm that bidders of successful transactions perform significantly better than bidders of (exogenously) failed transactions. Malmendier, Moretti, and Peters (2010) use a similar identification strategy by comparing the long-run returns of competing bidders – winners and losers – in contested mergers.

[9] Jovanovic and Braguinsky (2004) generate bidder discounts in a Q-theory framework without resorting to the informational content revealed through the medium of exchange.

[10] Bhagat, Shleifer, Vishny, Jarrel, and Summers (1990) interpret the hostile takeover activity in the 1980s mostly as a return to corporate specialization and deconglomeration.

However, apart from statistical issues in computing long-run abnormal returns (see Barber and Lyon (1997), Fama (1998), and Brav (2000)), long-run post-takeover studies face a fundamental problem: if markets respond efficiently to stock mergers, even a value-destructive merger (attempt) should be correctly incorporated in the price immediately after announcement. Thus, stock bidders should not exhibit negative abnormal returns after the announcement. In an efficient market, long-run empirical studies would solely pick up the extent of asset pricing model misspecification. If stock markets are not efficient, it is not clear how to use stock market data to make quantitative assessments.

The remainder of the paper is organized as follows. In Section 2, we outline our main identification assumptions and rationalize it in light of a simple theoretical framework. In Section 3, we describe the selection and composition of our data set. Section 4 contains the main results of our empirical analysis, and discusses robustness checks. Section 5 concludes.

2 Motivation of Approach

The key idea behind our approach is as follows. The change in the total market value of the combined entity of bidder B and target T as a response to a merger announcement can be decomposed into expected synergies, S, and the revaluation of the hypothetical respective stand-alone entities, $\Delta\widetilde{V}_B$, and $\Delta\widetilde{V}_T$, due to information revelation:[11]

$$\Delta V_B + \Delta V_T = S + \Delta\widetilde{V}_B + \Delta\widetilde{V}_T. \tag{1}$$

For a successful deal, we observe only two variables, namely ΔV_B and ΔV_T, so that the decomposition, in particular the synergies estimate S, is not identified. If a deal fails, match-specific synergies should no longer be priced post-failure, so that the difference between the post-failure price and the pre-announcement price should reflect the revealed informational content about the stand-alone values of the bidder and the target. Using exogenous failures (with respect to $\Delta\widetilde{V}_B$ and $\Delta\widetilde{V}_T$), we can then extract estimates for $\Delta\widetilde{V}_B$ and $\Delta\widetilde{V}_T$. In our empirical analysis, we will perform this exercise separately for cash and stock deals. By taking the difference between cash and stock deals, $\Delta V_T^{Cash} - \Delta V_T^{Stock}$, our estimate for the revaluation difference between cash and stock deals is unbiased as long as deal failure is exogenous with respect to $\Delta V_T^{Cash} - \Delta V_T^{Stock}$. We will entertain this weaker assumption (relative to requiring exogeneity with respect to the two components) when we extend our analysis beyond the hand-collected data set of exogenously failed deals (see Section 4.1.1).

Our empirical distinction between cash and stock deals is motivated by various theories suggesting that the medium of exchange is related to private information of the bidder relative to the market (see Myers and Majluf (1984), Hansen (1987), or Fishman (1989)). Also, Rhodes-Kropf and Viswanathan (2004) introduce private information between the bidder and the target by breaking down misvaluation into a firm-specific and a separate industry-wide component.

In order to gain intuition, we develop a simple market-timing model in Appendix C that captures the main ingredients of mispricing-driven transactions. We extend Shleifer and Vishny

[11] Theoretically, one would like to include estimates of consumer surplus for estimates of value creation. However, the effect of mergers on consumer surplus is difficult to measure in large-scale studies because consumer surplus is non-traded. With that caveat in mind, Jensen and Ruback (1983) document that merger transactions do not systematically lead to an abuse of market power.

(2003) by allowing for (exogenous) deal failures and the market's ability to rationally process the terms of the offer price.[12] We introduce "noise" in the bidder's decision on the medium of exchange, so that the market cannot perfectly back out the private information. The model predicts that the use of stock is more likely if the (hypothetical) combined entity of the bidder and the target is overvalued, and the use of cash if it is undervalued. A bidder is willing to buy an overvalued target with stock as long as the target is less overvalued than the bidder's own stock. On the other hand, a bidder prefers to use cash for undervalued targets because it enables him to fully extract the long-run price appreciation. By receiving a fixed payment, target shareholders in cash deals do not benefit from a positive long-run revaluation.

3 Data

Our main sources are CRSP, Compustat, LexisNexis and SDC. We match CRSP market data with targets and acquirers in the SDC database using the six-digit CUSIP provided in the SDC database. In determining which CUSIP identifier to use from the CRSP database, we always choose the CUSIP with the lowest possible 7th digit (typically 1). Regarding the deals in the SDC database, we drop those for which the announcement and/or completion/failure dates are missing. Furthermore, we also drop deals with announcement dates after their completion/failure (this criterion is labeled as "valid deal dates" in Table 1). To research the deal synopses and reasons for deal failure, we ran a news search in LexisNexis.

Sample. We focus on merger agreements and tender offers between 1980 and 2008 that were completed/canceled within at least five and at most 250 trading days. Out of 12,846 deals that fulfill the criteria listed so far, 1,478 deals are dropped due to the deal window restriction. Note that, for effective deals, if targets stopped trading before the announcement date, we use the last trading day to calculate the number of trading days between deal announcement and completion. Lastly, we restrict our analysis to deals for which no competing offers were outstanding (i.e., deals for which SDC does not report a competing deal number). The conventional rationale for this is to avoid capturing new deal announcements when calculating returns after an offer for the same target was withdrawn. In few instances, our news search in LexisNexis revealed competing bids when SDC did not recognize them as such, and indicated whether a deal actually went through shortly after it was recorded as being canceled. We subsequently dropped the respective deals from our sample.

Table 1 summarizes the sample construction outlined above, and displays the composition of the final regression sample of unsuccessful deals involving public acquirers and targets (as in Figure 1). Henceforth, we refer to the "regression sample" as the subsample of 249 unsuccessful merger bids comprising balance sheet data up to the level of the acquirer's and target's q ratios, but excluding their Kaplan and Zingales (1997) indices. That is, the samples in our main tables vary only in dependence of whether we consider successful bids (alongside unsuccessful ones), whether we include the KZ indices on the right-hand side of the regression specifications, and/or whether we consider the subsample of pure cash and stock deals, i.e., deals that are financed either with 100% cash or with 100% stock.

[12] In the irrational model of Shleifer and Vishny (2003), the stock market does not respond to the medium of exchange offered in a transaction. As a result, one would not expect to see any revaluation effects.

Variable definitions. In our analysis, we use the following return measures:

$$CAR_{it} = \sum_{j=1}^{t} (r_{ij} - r_{mj}) \tag{2}$$

$$1 + BHR_{it} = \prod_{j=1}^{t} (1 + r_{ij}) \tag{3}$$

$$BHAR_{it} = \prod_{j=1}^{t} (1 + r_{ij}) - \prod_{j=1}^{t} (1 + r_{mj}) \tag{4}$$

where r_{ij} and r_{mj} denote firm i's equity return and the CRSP value-weighted market return at time j, respectively.

For most of our analysis, we focus on the CAR, but our main finding is robust to using buy-and-hold returns, buy-and-hold abnormal returns, and to using industry rather than market returns for the specification of abnormal returns.[13] Note that cumulative abnormal returns can be meaningfully compared across deals with different window lengths as long as the underlying equilibrium asset pricing model is correctly specified. Due to the relatively short time length of our event window (see summary statistics in Table 2a), the misspecification of the asset pricing model to compute "normal" returns is a second-order concern. Thus, the short horizon is a strength for our identification.[14]

Table 1 reveals that the availability of deal premia is an important constraint for the sample construction. In particular, whenever SDC does not report the deal premium (over the target's stock price one month prior to the bid) but the transaction value, we divide the latter by the target's market capitalization one month prior to the bid, and regress SDC premia on the resulting measure based on transaction values to predict out-of-sample premia. Furthermore, as suggested by Officer (2003), we truncate deal premia below 0 and above 200%. Other important variables in our analysis are the firms' q ratios and KZ indices. The former are defined as the market value of equity plus assets minus the book value of equity all over assets. As a measure of financial constraints, we use the four-variable version of the KZ index given in Lamont, Polk, and Saa-Requejo (2001) and Baker, Stein, and Wurgler (2003), namely:

$$KZ_{it} = -1.002\frac{CF_{it}}{A_{i,t-1}} - 39.368\frac{DIV_{it}}{A_{i,t-1}} - 1.315\frac{C_{it}}{A_{i,t-1}} + 3.139LEV_{it} \tag{5}$$

where CF_{it}, DIV_{it}, C_{it}, and LEV_{it} denote cash flows, cash dividends, cash balances, and leverage, respectively, and $A_{i,t-1}$ is the firm's lagged assets.

Summary statistics. The summary statistics are in Tables 2a and 2b. We summarize the characteristics of completed and unsuccessful deals separately for the entire regression sample in Table 2a, and then focus on the subsample of unsuccessful pure cash and stock bids in Table 2b.

In general, completed and unsuccessful deals are similar along many dimensions. Naturally, they differ (and significantly so at the 1% level) in their time to completion/failure, the proportions of hostile deals and tender offers, and the acquirer's KZ index (the respective difference

[13] Figure 2 also plots the CARs for 100 days pre-announcement and post-failure. The results are robust.

[14] Detailed discussions of the statistical issues with calculating long-run returns are given by Barber and Lyon (1997), Fama (1998), and Brav (2000).

is significant at the 6% level): deals take longer to be completed than to be withdrawn or rejected, and financing constraints on the part of the acquirer can cause deals to fail. Most importantly, the firms' q ratios and the target's KZ index do not vary significantly between the completed and unsuccessful samples. While unsuccessful bids are more likely to be financed with stock rather than cash, the regression analysis in Table 4 will reveal that this difference can be explained by deal characteristics (most notably the log of the relative deal size).

The pure cash and stock subsamples add up to roughly four-fifths of the total regression sample, revealing that the majority of deals do not involve hybrid financing structures. As can be seen in Table 2b, among unsuccessful bids,[15] pure cash deals differ from pure stock ones in that the former are more likely to be hostile (significant at the 1% level), and involve acquirers and targets with lower q ratios (significant at the 2% level). The differences in the q ratios resemble the findings of Rhodes-Kropf, Robinson, and Viswanathan (2005) who, by decomposing pre-announcement market-to-book ratios (also in unsuccessful deals), argue – in line with this paper – that cash targets are more undervalued than stock targets whereas stock acquirers are more overvalued than cash acquirers, and that these differences are primarily due to firm-specific idiosyncratic misvaluations.

4 Empirical Results

4.1 Sample Selection of Failed Deals

4.1.1 Reasons for Deal Failure

We collected deal synopses as provided in the SDC database and by means of a detailed news search in LexisNexis to categorize the failure reasons in Table 3.[16] A rigorous classification of failure reasons is instrumental in addressing potential endogeneity concerns about our identification. Our categories capture the most important reasons for deal failure. For presentation purposes, we have summarized various subcategories in broader categories. For example, the category "target rejection" refers to the adoption of poison pills, a repurchase of shares by the target from the bidder (greenmail), or the deliberate breach of merger covenants by the target.[17] The category "target news" usually refers to the situation in which the bidder discovered negative information about the target in the course of the due-diligence process. Only in one instance the deal failed due to positive news about the target: in August 1996, US Diagnostic Labs called off discussions to acquire Alliance Imaging because of a run-up in Alliance's stock price. Common "market problems" in our sample are the "October 1987" crash, "September 11" and the subprime crisis, as well as real shocks to *both* the acquirer's and the target's industry. If target management and acquirer management cannot agree on organizational issues, such as the nomination of a CEO of the future company, we classify the reason for deal failure as "management terms." "Bidder problems" could result from financing problems of the bidder

[15] The characteristics of completed pure cash and stock deals can be found in Table A.1.

[16] Note that multiple categories could be assigned to a single deal. However, the number of deals in Table 3 does not add up to (at least) 249 as in our regression sample. This is because for 38 of 249 deals, we were unable to retrieve any information on the reasons for deal failure, and had no information beyond which party canceled the merger for another 54 deals.

[17] An even more detailed breakdown is available upon request.

or other negative news about its business.[18] In three instances, deals were canceled because the bidder itself became the target of an acquisition.

While this information provides important insights into the (underresearched) economics of failed transactions, we are mainly interested in whether our cash result depicted in Figure 1 is specific to certain failure categories. To this end, we estimate the regression of the target's and the bidder's cumulative abnormal return from 25 days before announcement until 25 days after withdrawal, $CAR\,(A-25, W+25)$, on the fraction of cash offered in a transaction separately for each category. The results for the target and the bidder, respectively, are reported in the second and third columns of Table 3, and could not be more reassuring: except for the category "market problems," the cash coefficient is always positive for both the target and the bidder.

Finally, to obtain clean measures of revaluation, it is important to think about subsamples of merger bids whose cancelation and medium of exchange are more likely to be orthogonal to the stand-alone value of the entity in question. Since our main cash result holds for (virtually) all subsamples, the qualitative predictions are unaffected by our decision to label certain categories as exogenous. In general, deals that are canceled due to regulatory intervention are considered exogenous with respect to target and bidder values (Savor and Lu (2009)). A prime example of such a deal in our sample is General Electric's proposed acquisition of Honeywell in October 2000 which was eventually blocked by the European Commission – a decision that deviated from the U.S. Department of Justice's view and, by and large, triggered criticism. Further examples of failure reasons that seem unrelated to the target's stand-alone value comprise deal cancelations due to financing problems, other bad news on the part of the bidder, or even the acquisition of the bidder by a third party. On the other hand, target news is a deal-failure category that is more likely to be unrelated to the bidder's stand-alone value. Lastly, the inability of the negotiating parties to agree on terms other than the price typically leads to deal cancelation by mutual consent, which is primarily driven by organizational concerns (such as the nomination of a CEO of the future company) and can, therefore, be considered unrelated to both the bidder's and the target's stand-alone value.

In the remainder of the paper, we will typically use our entire deal sample, but will exclude deals whose cancelation is clearly endogenous to the target's value– namely those that are canceled due to market/industry problems or news regarding the target – from our regression sample as a robustness check in Section 4.2.1.

4.1.2 Predicting Deal Failure

Before measuring the impact of cash bids on post-failure returns, we first investigate whether the medium of exchange has explanatory power for deal failure. Note that it is (in theory) not necessarily problematic if the probability of deal failure is different given a cash or a stock offer, i.e., as long as this is unrelated to the target valuation.[19] However, as argued in Section 2, different failure probabilities are a cause of concern to the extent that they potentially reflect

[18] Note that while the categories of both bidder and target news reflect new information about the respective entity, they do not distinguish between different sources of information. Although it is beyond the scope of this paper, it might be insightful to analyze the relationship between the medium of exchange and active information disclosure by companies during merger negotiations (as has been done for stock deals by Ahern and Sosyura (2011)).

[19] Consider the following extreme example. Suppose x% of stock deals fail exogenously and y% of cash deals fail exogenously. Then, clearly, our revaluation estimates are unbiased despite the different failure probabilities.

differential sample selection.

To this end, we estimate a linear probability model for the event that a deal fails as a function of a continuous cash variable, which indicates what fraction of the total payment was offered in cash. The results are presented in Table 4. The impact of the medium of exchange on deal failure is insignificant, whereas the relative deal size is a major determinant of deal failure. Not surprisingly, hostile deal announcements are also less likely to be successful. In the last specification, we include the target's announcement return, $CAR\,(A-25, A+1)$, which should control for market expectations of deal failure that are based on all other publicly available information at the time of the announcement (but are unavailable to the econometrician).[20] Again, the cash coefficient remains insignificant. Our results are also robust to reducing our sample to the subset of pure cash and stock deals only (cf. Table A.3), where without any controls, cash deals are less likely to be canceled; however, after controlling for the relative deal size, the impact of the medium of exchange on deal failure becomes insignificant. Thus, stock deals do not seem to be more likely to be canceled than cash deals. This is an important validity check for our identification procedure.

4.2 Multivariate Revaluation Estimates

Our robust univariate evidence of a cash premium (across all failure categories) and the fact that the medium of exchange does not predict deal failure (see previous section) motivate the use of the full sample in the multivariate analysis. The main result is presented in Table 5. We regress the target CAR from 25 days before announcement until 25 days after withdrawal, $CAR\,(A-25, W+25)$, on the fraction of cash offered as well as other control variables: bids with higher cash fractions are associated with higher post-failure target CARs compared to their pre-announcement levels.

In the second and third columns – besides the q ratios, the target's market value of equity, and the relative deal size – we control for deal characteristics that are correlated with the medium of exchange and potentially reflect the target's stand-alone value.[21] First, we control for the offer premium (over the target's share price one month prior to the bid). Moreover, we include leveraged buyouts, some of which are management buyouts, as these deals are naturally in cash and involve well-informed bidders. However, due to the seldom occurrence of LBOs in the regression sample, the respective coefficient – although it has the predicted positive sign – is not precisely estimated. We also control for the disciplinary channel of hostile bids, which are more likely to be in cash (see summary statistics in Table 2b) and turn out to have a positive impact on target revaluation.

In the fourth column of Table 5, we add the acquirer's KZ index to control for financial constraints. We do so because, for instance, post-announcement news about the target might differentially affect the withdrawal decision of financially constrained acquirers offering cash rather than stock. However, if financial constraints of the acquirer were driving our results, one would expect the interaction of the medium of exchange with the acquirer's KZ index to show

[20] The announcement return should approximately be given by the return captured if the deal goes through, i.e., the premium, weighted by the probability of a successful takeover, p, plus the return that results from learning if the deal does not go through, i.e., $CAR_T\,(a) \approx p\cdot\text{Premium} + (1-p)\cdot\text{Learning}(a)$ where $a \in \{cash, stock\}$ denotes the medium of exchange. Since we control for the premium and learning encoded in the choice of the medium of exchange, a, variations in CAR should capture variations in the deal probability.

[21] Further correlates of cash deals are investigated in Table A.2.

up significantly, which is not the case. We also control for the target's KZ index, as its financial constraints might impact its attractiveness to potential buyers, but the respective coefficient is not significant either. Despite a rich variety of deal- and entity-specific controls, only the medium of exchange and the deal premium consistently matter for target CARs. Intuitively, these two variables reflect the value of the target.

When comparing only pure cash and stock deals, we yield the maximum distinction and, therefore, expect the revaluation effect of cash to be strongest in the respective subsample. This is because the implicit linearity assumption of the revaluation effect (as reflected by the use of the cash fraction variable) is likely inappropriate and can, thus, generate additional noise. Consistent with this explanation, we find our results to be stronger in the subsample of pure cash and stock deals (see last two columns of Table 5). We also find that while hostile mergers tend to be in cash, the hostility dummy loses its explanatory power for target revaluation in the subsample of pure cash and stock deals where, instead, the cash effect seems stronger for targets with low q ratios (cf. fifth as opposed to third column). This can be interpreted as reflecting the idea that the revaluation process is more emphasized for potentially undervalued targets once cash is offered for them.

4.2.1 Robustness

To further address sample selection, we restrict our analysis to a subclass of deals in which the endogeneity concern is muted. According to our discussion in Section 2, the inclusion of such deals might bias our estimates if they were caused by differential selection. While our univariate evidence in Table 3 significantly alleviates these concerns – as our main cash result holds for virtually every deal-failure category – we confirm the robustness of our findings to the specific nature of deal failure in a multivariate framework.

Since there is a trade-off between the degree of the exogeneity requirement and the sample size, we consider two samples. The most conservative deal sample (Sample C) is limited to deals for which we have robust information about an exogenous failure reason with respect to target value, i.e., regulatory intervention (including deals for which the SDC database indicates that they were subject to regulatory approval), bidder problems, and disagreement on management terms/positions (cf. Table 3). The larger but less restricted sample (Sample N) only excludes deals from the full sample whose cancelation was clearly endogenous to target value, i.e., cancelations due to target news and market problems. In Table 7, we re-run relevant specifications from Table 5 for Sample C and Sample N. The results strongly confirm the robustness of the previous analysis on the full sample.

Moreover, our results are robust to using industry-adjusted abnormal returns, buy-and-hold abnormal returns, and buy-and-hold returns. In Table 6, we first show the raw cash effects in the subsample of pure cash and stock deals (cf. first, third, and fifth columns), which match the magnitude encountered in Figure 1. In the remaining columns, we re-run the regression of the fifth column of Table 5: while the estimates for industry-adjusted abnormal returns are closest to those of the previous regression, the main cash effect is significant for all three dependent variables.

4.3 Importance of the Revaluation Effect

One of the main implications of our revaluation estimates is that stock-market-based synergy estimates of *successful* deals can be significantly biased. Our results suggest that the direction of the bias depends on the medium of exchange offered. Rearranging (1), we yield that synergies scaled by the total market capitalization can be estimated as the percentage change in the total combined market capitalization (i.e., the joint announcement return of the bidder and the target) net of the percentage revaluation estimate:

$$s = \underbrace{\frac{\Delta V_B + \Delta V_T}{V_B + V_T}}_{\text{Joint Announcement Return}} - \underbrace{\frac{\Delta \widetilde{V}_B + \Delta \widetilde{V}_T}{V_B + V_T}}_{\text{Joint Revaluation}}. \tag{6}$$

Our goal is to provide a back-of-envelope calculation for a synergies estimate adjusted by the revaluation effects. We first compute the average joint announcement return of the bidder and the target on the $[-25, 1]$ window for the sample of successful deals separately for all cash and all stock deals. For the purpose of computing our revaluation estimates, we restrict ourselves to our most conservative estimates, i.e., based on Sample C for targets (cf. Section 4.2.1). To arrive at joint revaluation estimates, which can be compared to the joint announcement returns, we also need to compute the bidder-revaluation effect separately for cash and stock deals. Following the logic of the construction of Sample C, we only include deals that are exogenous to the bidder's stand-alone value, i.e., deal failures due to regulatory intervention, target news, and disagreement on management terms/positions. Due to the small sample size of 82 deals (76 deals for targets), we solely reproduce the analogous bidder specification from the first column of Table 7. The respective regression estimates imply a revaluation estimate of -1.1% for pure cash bidders and -16.7% for pure stock bidders (the difference is significant at the 8% level). We use these estimates in conjunction with the target-revaluation estimate from the first column of Table 7 and the average relative size of the bidder and the target in the sample of successful pure-cash and pure-stock deals to compute the average estimated joint revaluation. The following table provides an overview of joint announcement returns, revaluation estimates, and implied synergies for different target sizes (measured as a fraction of the joint market capitalization).

	Cash deals			Stock deals		
Minimum target size	0%	10%	30%	0%	10%	30%
Announcement return	4.9%	10.0%	15.3%	3.8%	5.0%	6.7%
Revaluation estimate	0.2%	2.0%	4.1%	-16.4%	-16.1%	-15.8%
Synergies s	4.7%	8.0%	11.2%	20.2%	21.1%	22.5%
N	1,019	370	135	1,232	677	252

Given that the revaluation in cash deals is driven primarily by targets, the explanatory power of the revaluation effect for the announcement return is increasing in the relative target size, and ranges from 5% to 27% (when restricting deals to those involving targets that make for at least 30% of the total market capitalization). Even for targets as small as 10% of the total market capitalization, the revaluation effect accounts for one-fifth of the joint announcement return, which implies that synergy estimates based on announcement returns of cash deals might be significantly upward biased. Conversely, for stock deals, we find that announcement returns

lead to an underestimation of synergies by as much as 16%. As these figures are derived from a back-of-the-envelope calculation, we wish to present them rather as evidence of the importance of the revaluation channel than as cast-in-stone synergy estimates.

4.4 Revaluation Channels

4.4.1 Future Takeover Activity

Our results so far suggest that a cash bid reveals private information of the bidder about the target. It is important to disentangle whether this private information is related to the revaluation of existing target assets, i.e., the stand-alone value, or whether it reveals to the market that the target is a particularly attractive takeover object, e.g., through high synergies with other companies in the sector. In the latter case, our revaluation estimates should be driven by (expected) future takeover activity (as found by Davidson, Dutia, and Cheng (1989)).

To investigate this, we consider the sample of unsuccessful bids, and run OLS regressions with a dummy variable indicating another merger bid within the next two years (but after a grace period of half a year to avoid capturing bidding wars) as the dependent variable.[22] The results are summarized in Table 8. We find that cash targets are not more likely to receive future merger bids. Targets with high previous market capitalizations and with low q ratios are significantly more likely to become targets in the future, which shows that we have in part controlled for future merger bids in Table 5 by including the respective variables. In order to test directly whether the revaluation effect, i.e., the total return from announcement to failure, captures future merger activity, we also add the target $CAR\,(A-25, W+25)$ in the last specification. We cannot find evidence for this. Once again, our results are also robust to considering the subset of pure cash and stock deals only (cf. Table A.4).

Furthermore, we also replace the dependent variable by the actual takeover premium in future deals, and consider OLS regressions with the same set of control variables as before. The results in Table A.5, and in Table A.6 for the subsample of pure cash and stock deals, demonstrate that cash targets do not receive significantly higher future takeover premia. We therefore conclude that the positive impact of cash offers on post-failure target CARs is not an artifact of future merger activity.

4.4.2 Information Proxies

Table 9 presents further robustness checks. It might be insightful to relate our revaluation estimates to channels of private information. To this end, we incorporate interaction effects with variables that proxy for the availability of insider information such as the existence of an initial stake (toehold), within-industry mergers, or the quality of advice by an investment-banking firm. Before discussing the results, it is important to note that the signs of the information proxies and the respective interaction effects are not obvious ex ante. For example, while it seems intuitive that a firm is more likely to have private information about another firm within the same industry, it is unclear whether this effect still holds true once we *condition* on the fact that we observe an offer. In fact, if the medium of exchange is a sufficient statistic for private

[22] Our results are robust to other specifications of the grace period (such as one month, six weeks, or three months).

information, any variable that is correlated with the availability of information should not matter in itself or through its interaction with cash. Thus, the selection effect into our sample through the announcement of a merger makes it difficult to relate information to revaluation.

The empirical results in the first three columns of Table 9 confirm the non-triviality of these interaction effects. Our first information proxy is given by the toehold, indicating whether the bidder has an initial stake in the target before launching the bid. It seems natural that a bidder can more likely obtain private information if he already possesses a stake in the company (see also Betton, Eckbo, and Thorburn (2009)). The individual effect of the toehold variable is positive, and the interaction effect with cash is negative at a lower absolute value. These effects are even stronger in the subsample of pure cash and stock deals (cf. Table A.7). Our second information proxy is given by an investment-banking dummy variable which indicates whether the bidder was advised by a tier-one investment bank (as a proxy for the quality of due diligence). We define the top 4 investment banks by their total deal volume in our data set: Goldman Sachs, Morgan Stanley, Merrill Lynch, and JPMorgan. The resulting variable does not seem to be related to revaluation effects. Our last information proxy is given by a within-industry (horizontal) merger dummy. This information variable is also unrelated to revaluation. To summarize, we cannot establish a clear pattern between information proxies and our revaluation estimates. The previous discussion reveals that these results are not surprising, even if cash drives revaluation through information.

4.5 Alternative Explanations

4.5.1 Accounting

While mispricing is first-order related to the medium of exchange, there exist other rationales for choosing cash or stock (for an overview of theories, see Section 3.2 in Betton, Eckbo, and Thorburn (2008)). We consider one particular alternative. The use of stock might be driven by accounting interests rather than by overvaluation. A popular accounting motivation used to be the pooling-of-interests method (valid until 2001) to avoid the creation and subsequent amortization of goodwill (as required under the purchase method of accounting).[23] As goodwill is increasing in the offer premium, we interact the interaction between the premium and our cash variable with a dummy for the two decades (the 1980s and 1990s) in which paying a high premium in stock might not necessarily have been a sign of overvaluation. Indeed, in the last two columns of Table 9, we find that the triple interaction is significantly negative, indicating that targets of stock offers involving high premia in the 1980s and 1990s were not as overvalued as the more recent ones in the 2000s. Note that the intercept effect of cash offers on post-failure target CARs remains robust.

4.5.2 Undervaluation vs. Undermanagement

So far, the cash premium in the revaluation estimates has been interpreted as evidence in favor of private information of the bidder about the stand-alone value of the target. However, our results may also be interpreted as a variant of an undermanagement story.[24] While the

[23] See Lys and Vincent (1995) for an extreme case – AT&T's acquisition of NCR – of the bidder's interest in having the acquisition qualify as a pooling of interests.

[24] We thank Jeremy Stein for bringing up this alternative potential explanation.

distinction seems almost semantic (since both explanations do not relate to synergies), there is one subtle difference. According to the undervaluation story, a cash bid *signals* better operating performance of the target, whereas according to the undermanagement story, the cash bid *induces* better operating performance. Let us elaborate.

From an ex-ante perspective, i.e., at the time the bidder decides on the medium of exchange, it is irrelevant for the bidder whether the post-takeover outperformance (relative to pre-bid market expectations) is driven by actual managerial improvement of operational performance or simply by market underestimation of actual performance. Thus, in both instances a bidder is more likely to choose cash to prevent the target shareholders from partially participating in the upside.[25]

An actual improvement of operating performance of an undermanaged target may be achieved through either 1) superior management skills of the bidder or 2) a reduction in target managerial slack present at the time of the bid. Since we focus on failed deals, superior management skills of the bidder (1) could not be the source of operational improvement. However, it is conceivable that even existing target management may improve operational performance simply due to the disciplinary effect of a merger bid (2). For such a story to explain our results, cash and stock bids would need to have differential disciplinary effects. Since cash bids are more likely to be hostile bids (see Tables 2a and A.2), which are usually associated with disciplinary pressure, such a differential effect is plausible.[26] However, we also find that the effect of cash on post-failure target CARs remains significant even after controlling for hostile and LBO bids (see Tables 5 and 9). Since cash bids and hostility are highly correlated, we can compare these effects best in the subsample of pure cash and stock deals (cf. last two specifications of Table 5, as well as Table 7). Our results indicate that, within this subsample, the revaluation channel clearly dominates the disciplining channel. Thus, unless one interprets the cash variable as a better proxy for the disciplinary channel than "hostility," this evidence points in favor of the undervaluation explanation rather than any disciplinary effect of cash bids. Anecdotally, Warren Buffet, one of the most prominent value investors with a series of well-performing cash acquisitions, tends to be particularly concerned about purchasing "undervalued" well-managed rather than undermanaged companies.

Finally, we aim to test directly for (observable) operational changes of the target as a response to a (failed) takeover bid. One prominent restructuring activity that may be induced by a disciplining bid is recapitalization (as measured by the change in the target's leverage ratio). This may be interpreted as a way to reduce managerial slack (Jensen and Meckling (1976)) or evidence that target managers lever up to deter (further) takeover attempts, as described in Hirshleifer and Thakor (1992).[27] An investigation of the determinants of post-failure changes in the target's debt is presented in Table A.8. The estimates reveal that hostile bids and LBOs are associated with greater changes in target leverage (the effects are, however, not significant in all specifications). More importantly, cash seems to be unrelated to these kinds of managerial changes, which is consistent with the view that cash bids are not disciplinary (controlling for hostility).

[25] Obviously, as noted in our simple theory in Appendix C, there has to be some other exogenous motivation for the medium of exchange, so that the price paid in a rational stock market does not already fully reflect the potential gains.

[26] Consistent with this line of reasoning, Mikkelson and Partch (1997) provide evidence of the positive relationship between takeover activity and top-management turnover during the hostile-merger wave in the 1980s.

[27] While the first explanation is most likely associated with a value increase, the second rationale is presumably either value-neutral or destructive.

Note that our default regression sample (adopted in the first and third columns of Table A.8) requires the acquirer to be public. The corresponding LBOs are relatively seldom in the sample of unsuccessful bids, and non-public financial sponsors might exhibit characteristics that distinguish them from public ones. As similar concerns hold for all acquirers in general, we re-run previous regression specifications for which the constraints of the regression sample are binding, and drop the sample restrictions (as in the second and fourth columns of Table A.8) to include private bidders. The corresponding results for Tables 4, 5, 8, and A.5 can be found in Tables A.9, A.10, A.11, and A.12, respectively, and demonstrate that all our findings – when imposing the regression-sample size across all tables – are robust to not dropping the respective observations.

5 Conclusion

In this paper, we have presented robust evidence that the medium of exchange used by the bidder in merger transactions provides economically and statistically significant information about the stand-alone value of the target: targets of cash offers trade 15% above pre-announcement levels, whereas targets of stock offers are not revalued upwards. The previous literature has primarily focused on the information content of the medium of exchange related to the bidder and, thus, ignored this channel. Our analysis therefore has momentous implications for the quantitative assessment of value creation in merger transactions.

Building on the findings of this paper, an important next step would be the generalization of our results to completed deals along the lines of our back-of-the-envelope calculation provided in Section 4.3. Exploiting exogenous variation in the probability of deal failure in a subsample of our cases, and other sources of identification, it might be possible to build a structural model that allows to jointly estimate the endogenous deal-withdrawal selection, information revelation, and value creation for cash and stock transactions. Such an analysis would deepen our understanding of these important company decisions, and would help quantify the economic benefits of mergers.

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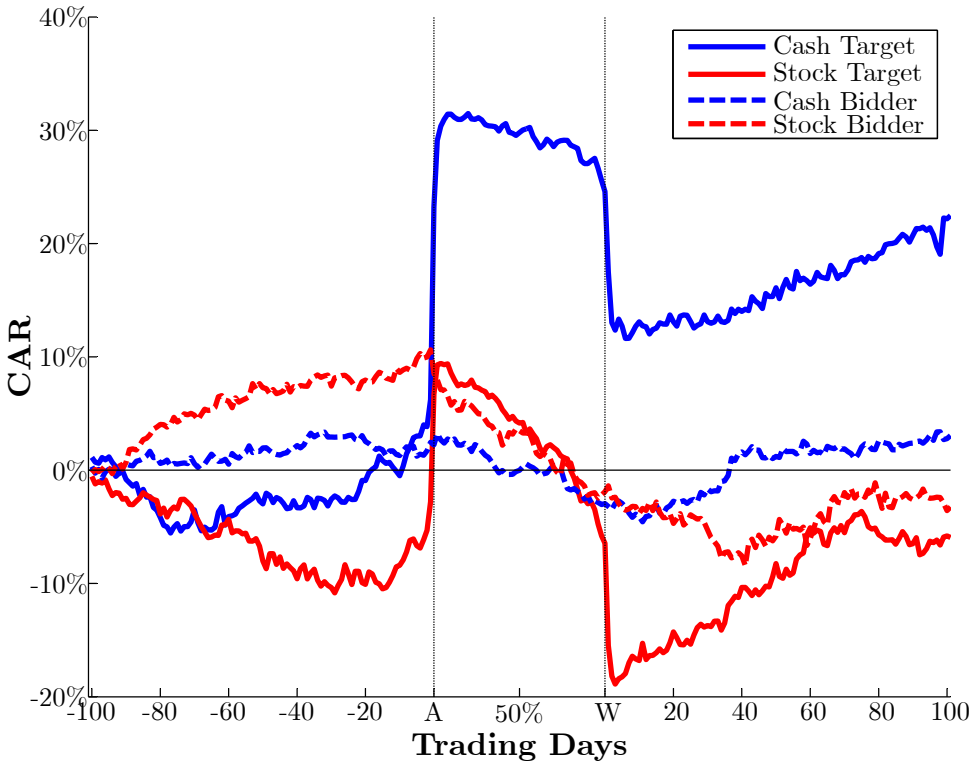
6 Figures

Figure 2: Deal Announcement and Failure Effects



Notes: Cumulative Abnormal Returns (CARs) from 100 trading days pre-announcement to 100 trading days post-failure. The sample consists of 73 cash and 96 stock deals. See Table 1 for the construction of the sample; note that there are fewer than 194 deals fulfilling the stock market data availability requirement for 100 rather than 25 trading days.

7 Tables

Table 1: Sample Construction (Merger Bids in 1980-2008)

Criterion	# Deals	
Availability of any CRSP data for target	14,552	
Availability of valid deal dates	12,846	
Deal window of 5 to 250 trading days (between announcement and completion/failure)	11,368	
No competing offers	10,260	
	of which	
	completed	unsuccessful
	7,078	3,182
Subsamples		
Unsuccessful bids	3,182	
Availability of major deal characteristics (premium, medium of exchange, etc.)	1,174	
Availability of stock data for target (at least 25 days before announcement and 25 days after deal failure)	1,029	
Availability of stock data for acquirer (at least 25 days before announcement and 25 days after deal failure)	347	
Regression sample (including target's and acquirer's q ratios, but not their KZ indices)	249	
	of which	
Unsuccessful pure cash and stock bids	194	
Regression sample (including KZ indices)	217	
	of which	
Unsuccessful pure cash and stock bids	171	

Notes: The availability of valid deal dates requires that announcement and failure/completion dates are not missing and consistent, e.g., completion not prior to announcement of original bid.

Table 2a: Summary Statistics – All Deals

	Completed deals				Unsuccessful deals				
Variable	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	p-value
Cash in %	47.92	45.94	0	100	42.00	45.80	0	100	0.073
Stock in %	45.43	45.83	0	100	57.52	45.89	0	100	0.000
Other payment in %	6.65	17.11	0	100	0.49	6.18	0	100	0.000
Time to completion/failure	76.11	43.84	5	245	62.90	49.84	5	238	0.000
LBO in %	0.11	3.38	0	100	0.46	6.79	0	100	0.218
Premium (to 1 month prior) in %	46.41	38.23	0	200	46.43	42.66	0	200	0.996
Hostile deal in %	1.83	13.42	0	100	12.44	33.08	0	100	0.000
Tender offer in %	25.89	43.81	0	100	9.68	29.63	0	100	0.000
Transaction value in 2010 $bn	1.45	4.38	0.00	70.51	1.66	7.30	0.01	77.04	0.543
Relative deal size	1.10	16.89	0.00	682.90	1.12	2.21	0.00	17.57	0.988
% of target sought	95.27	16.99	1.80	100	94.19	15.93	15.80	100	0.373
New deal announced within 2 years in %	n/a	n/a	n/a	n/a	22.28	41.72	0	100	n/a
Experienced acquirer in %	81.96	38.46	0	100	70.05	45.91	0	100	0.000
Target MVE in 2010 $bn	0.94	3.05	0.00	65.16	1.32	5.83	0.00	56.04	0.119
q of acquirer	2.50	2.39	0.51	15.20	2.29	2.33	0.51	15.20	0.229
q of target	2.07	1.73	0.50	9.91	1.88	1.64	0.50	9.91	0.140
q of acquirer $>$ q of target in %	62.08	48.53	0	100	59.45	49.21	0	100	0.451
KZ index of acquirer	-0.09	1.47	-10.46	3.73	0.12	1.46	-5.26	3.73	0.051
KZ index of target	0.11	1.67	-10.05	5.22	0.22	1.47	-6.44	4.28	0.356
Same industry (1 digit SIC) in %	74.40	43.66	0	100	70.97	45.50	0	100	0.277
Same industry (2 digits SIC) in %	60.42	48.92	0	100	54.84	49.88	0	100	0.114
N	1,746				217				

Notes (Tables 2a and 2b): Time to completion/failure is in trading days. The historical transaction value was converted using Consumer Price Index (CPI) Conversion Factors. Relative deal size is the transaction value over market value of equity of the acquirer. New deal announced within 2 years is conditional on the deal being announced at least half a year after the previous one. Experienced acquirers appear at least five times in the data set. MVE stands for market value of equity. KZ index is the four-variable version in Lamont, Polk, and Saa-Requejo (2001). All non-deal-related variables (e.g., q ratios) are measured at the end of the year prior to the deal's announcement. Premia are truncated between 0 and 2, and all q and KZ variables are winsorized at the 1st and 99th percentiles. The sample is restricted to deals that include all variables used in any of the specifications in Tables 4-9, except for New deal announced within 2 years (193 observations in the unsuccessful-deal sample of which 58 are pure cash and 95 are pure stock deals).

Table 2b: Summary Statistics – Unsuccessful Bids

	Cash deals				Stock deals				
Variable	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	p-value
Time to failure	63.01	47.73	5	188	57.99	47.11	5	232	0.495
LBO in %	1.39	11.79	0	100	0	0	0	0	0.242
Premium (to 1 month prior) in %	54.00	40.52	0	200	42.93	40.99	0	200	0.081
Hostile deal in %	23.61	42.77	0	100	4.04	19.79	0	100	0.000
Tender offer in %	22.22	41.87	0	100	1.01	10.05	0	100	0.000
Transaction value in 2010 $bn	0.68	1.53	0.01	8.88	1.39	5.86	0.01	55.64	0.317
Relative deal size	1.26	2.40	0.00	11.42	0.84	1.19	0.01	8.49	0.137
% of target sought	93.70	14.81	20.00	100	93.47	17.83	19.10	100	0.930
New deal announced within 2 years in %	24.14	43.17	0	100	18.95	39.40	0	100	0.447
Experienced acquirer in %	65.28	47.94	0	100	70.71	45.74	0	100	0.454
Target MVE in 2010 $bn	0.42	0.75	0.00	4.09	1.43	5.84	0.00	56.04	0.149
q of acquirer	1.78	1.69	0.51	13.72	2.64	2.62	0.58	15.20	0.016
q of target	1.41	1.18	0.50	9.91	2.33	1.86	0.55	9.91	0.000
q of acquirer $>$ q of target in %	65.28	47.94	0	100	53.54	50.13	0	100	0.125
KZ index of acquirer	0.16	1.41	-3.51	3.41	0.04	1.44	-4.55	3.73	0.567
KZ index of target	0.27	1.13	-2.29	2.90	0.02	1.64	-6.44	4.28	0.279
Same industry (1 digit SIC) in %	76.39	42.77	0	100	71.72	45.27	0	100	0.496
Same industry (2 digits SIC) in %	54.17	50.18	0	100	56.57	49.82	0	100	0.757
N	72				99				

Table 3: Synopses of Unsuccessful Bids

Failure reason	Avg. % cash	Cash coefficient target	Cash coefficient acquirer	N
Alliance	35.9%	0.146	0.247	11
Price too low	54.4%	0.209*	0.049	28
Target rejection	59.0%	0.235	0.087	28
Target news	37.8%	0.367	0.100	29
Market problems	39.4%	-0.387	0.526**	21
Regulator	50.6%	0.368*	0.162	21
Regulator (SDC only)	46.2%	0.279*	0.310**	28
Management terms	35.4%	0.105	0.204	14
Bidder problems	20.5%	0.090	0.787*	22
Bidder acquired	33.3%	0.789	0.422	3

Notes: The first column indicates the average fraction of the transaction value offered in cash. For each failure-reason category, the second and third columns regress, respectively, the target's and acquirer's CAR from 25 days before announcement to 25 days after deal failure on a continuous cash variable (the fraction offered in cash). Alliance denotes the subset of failed deals whereafter bidder and target entered other cooperations. Price too low indicates that the deal had to be withdrawn because the parties could not agree on the transaction price. Target rejection comprises deals that involved share repurchases, the adoption of a shareholder rights plan, and the breach of pre-agreed merger covenants by the target. Target news involves both good and bad information discovered by the acquirer in the due-diligence process. Market problems denotes the subset of deals that were canceled due to shifting market conditions (typically stock market plunges). Regulator comprises all deals that were canceled explicitly due to the lack of regulatory approval, whereas Regulator (SDC only) is based on all deals for which there was no other information regarding regulatory intervention but the indication in the SDC database that the deal was subject to regulatory approval. Management terms describes all bids that were withdrawn because the acquirer and the target were unable to agree on terms other than the price (e.g., the nomination of a CEO of the future company). Under Bidder problems we summarize deal cancelations due to financing problems or other bad news on the part of the bidder. The last category includes sudden cancelations triggered by the acquisition of the bidder (which naturally leads to a withdrawal of the bidder's offer).

Table 4: Determinants of Deal Failure (All Deals)

	Deal failure				
Cash $\in [0, 1]$	-0.015	0.012	0.022	0.006	0.008
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Log(relative deal size)		0.029***	0.026***	0.022***	0.024***
		(0.00)	(0.00)	(0.00)	(0.00)
Premium to 1 month prior			-0.003	-0.008	0.058*
			(0.02)	(0.02)	(0.03)
Hostile				0.328***	0.290***
				(0.06)	(0.06)
LBO					0.047
					(0.22)
Log(target MVE)					-0.015***
					(0.01)
% of target sought					-0.000
					(0.00)
q of acquirer					0.006*
					(0.00)
q of target					0.002
					(0.01)
KZ index of acquirer					0.003
					(0.01)
KZ index of target					0.000
					(0.00)
Experienced acquirer					-0.025
					(0.02)
Target CAR (A-25, A+1)					-0.133***
					(0.04)
Industry & year FE	N	N	Y	Y	Y
N	2,206	2,206	2,200	2,200	1,967

Notes: OLS regressions with a dummy variable for deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. An acquirer is experienced if the firm appears at least five times in the data set. Target CAR is measured on the [-25, 1] window around deal announcement. All non-deal-related independent variables are measured at the end of the year prior to the deal's announcement. Robust standard errors are in parentheses.

Table 5: Target Returns (Unsuccessful Bids)

	Target CAR (A-25, W+25)					
Cash	0.292***	0.193**	0.464***	0.314*	0.552***	0.345*
	(0.08)	(0.08)	(0.17)	(0.16)	(0.20)	(0.20)
LBO		0.236	0.273	0.049	0.353	0.097
		(0.19)	(0.21)	(0.24)	(0.31)	(0.28)
Premium to 1 month prior		0.347***	0.398***	0.321***	0.372***	0.260**
		(0.11)	(0.10)	(0.12)	(0.11)	(0.13)
Premium × Cash			-0.223	-0.112	-0.228	-0.097
			(0.24)	(0.23)	(0.25)	(0.25)
Hostile		0.119*	0.133*	0.142	0.028	0.012
		(0.07)	(0.07)	(0.09)	(0.10)	(0.13)
Log(target MVE)			-0.031	-0.030	-0.038*	-0.033
			(0.02)	(0.02)	(0.02)	(0.03)
Log(relative deal size)			0.011	0.021	0.007	0.021
			(0.02)	(0.03)	(0.02)	(0.03)
q of acquirer			0.022	0.024	0.031	0.037
			(0.02)	(0.03)	(0.02)	(0.04)
q of target		-0.010	0.009	0.002	0.017	0.001
		(0.02)	(0.03)	(0.04)	(0.03)	(0.04)
q of target × Cash			-0.090**	-0.057	-0.118**	-0.057
			(0.04)	(0.04)	(0.05)	(0.04)
KZ index of acquirer				-0.019		-0.034
				(0.04)		(0.04)
KZ index of acquirer × Cash				0.012		0.057
				(0.05)		(0.06)
KZ index of target				0.026		0.044
				(0.03)		(0.04)
Industry & year FE	Y	Y	Y	Y	Y	Y
Deal sample	All	All	All	All	Pure C/S	Pure C/S
N	249	249	249	217	194	171

Notes: OLS regressions with target CAR from 25 days before announcement to 25 days after deal failure as the dependent variable. Cash is expressed as a fraction of the total payment (and hence equal to a dummy for cash in the sample of pure cash and stock deals in the last two columns). MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table 6: Target Returns (Unsuccessful Pure Cash & Stock Bids) – Alternative Return Specifications

	Ind. CAR (A-25, W+25)		BHAR (A-25, W+25)		BHR (A-25, W+25)	
Cash $\in \{0, 1\}$	0.197***	0.548***	0.201***	0.296*	0.209***	0.351**
	(0.07)	(0.19)	(0.07)	(0.15)	(0.07)	(0.15)
LBO		0.204		0.513		0.580
		(0.29)		(0.34)		(0.35)
Premium to 1 month prior		0.390***		0.016		0.069
		(0.11)		(0.16)		(0.15)
Premium × Cash		-0.284		0.164		0.100
		(0.24)		(0.22)		(0.22)
Hostile		0.016		0.203**		0.205**
		(0.11)		(0.09)		(0.09)
Log(target MVE)		-0.039*		-0.008		-0.002
		(0.02)		(0.02)		(0.02)
Log(relative deal size)		0.007		-0.006		-0.011
		(0.02)		(0.02)		(0.02)
q of acquirer		0.032		-0.015		-0.016
		(0.02)		(0.02)		(0.02)
q of target		0.018		0.064**		0.061*
		(0.03)		(0.03)		(0.03)
q of target × Cash		-0.107**		-0.146***		-0.152***
		(0.04)		(0.05)		(0.05)
Industry & year FE	N	Y	N	Y	N	Y
N	194	194	194	194	194	194

Notes: OLS regressions with industry-adjusted target CAR (first two columns), buy-and-hold abnormal return (third and fourth columns), and buy-and-hold return (last two columns) from 25 days before announcement to 25 days after deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table 7: Target Returns (Unsuccessful Pure Cash & Stock Bids) – Restricted Deal Sample

	Target CAR (A-25, W+25)					
Cash	0.240**	0.212	0.192***	0.311**	0.219**	0.320**
	(0.10)	(0.15)	(0.07)	(0.13)	(0.09)	(0.15)
LBO			0.199	0.286	0.189	0.297
			(0.18)	(0.19)	(0.28)	(0.29)
Premium to 1 month prior			0.375***	0.339***	0.350***	0.281***
			(0.08)	(0.10)	(0.10)	(0.10)
Premium × Cash				0.044		0.104
				(0.16)		(0.20)
Hostile			0.037	0.059	-0.077	-0.037
			(0.07)	(0.07)	(0.09)	(0.10)
Log(target MVE)				-0.031		-0.038
				(0.02)		(0.02)
Log(relative deal size)				0.017		0.015
				(0.02)		(0.02)
q of acquirer				0.004		0.010
				(0.03)		(0.03)
q of target			-0.007	0.018	-0.008	0.018
			(0.03)	(0.04)	(0.03)	(0.04)
q of target × Cash				-0.082*		-0.084*
				(0.04)		(0.04)
Industry & year FE	N	Y	Y	Y	Y	Y
Deal sample	C	C	N	N	N, Pure C/S	N, Pure C/S
N	76	76	201	201	159	159

Notes: OLS regressions with target CAR from 25 days before announcement to 25 days after deal failure as the dependent variable. Deal sample C is limited to bids that were canceled due to (potential) regulatory intervention (i.e., even if only indicated in the SDC deal synopsis), bidder news, or disagreement on management terms. Deal sample N is limited to all bids that were not withdrawn due to market problems or news regarding the target. Cash is expressed as a fraction of the total payment (and hence equal to a dummy for cash in the sample of pure cash and stock deals in the last two columns). MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table 8: Future Takeover Attempts (Unsuccessful Bids)

	New deal announced 2 years after failure				
Cash $\in [0,1]$	0.067	0.039	0.050	0.044	0.061
	(0.06)	(0.07)	(0.08)	(0.08)	(0.09)
Premium to 1 month prior			-0.020	-0.023	-0.024
			(0.07)	(0.07)	(0.08)
Hostile			-0.070	-0.052	-0.084
			(0.12)	(0.14)	(0.14)
Log(target MVE)			0.033*	0.031*	0.022
			(0.02)	(0.02)	(0.02)
q of target			-0.039***	-0.035**	-0.034**
			(0.01)	(0.02)	(0.02)
KZ index of target				0.009	0.010
				(0.02)	(0.02)
Target CAR (A-25, W+25)					-0.056
					(0.06)
Industry & year FE	N	Y	Y	Y	Y
N	227	227	227	213	206

Notes: OLS regressions with a dummy variable indicating another merger bid within the next two years as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table 9: Target Returns (Unsuccessful Bids) – Robustness Checks

	Target CAR (A-25, W+25)				
Cash $\in [0,1]$	0.497***	0.447***	0.405**	0.453***	0.420**
	(0.17)	(0.17)	(0.16)	(0.16)	(0.17)
LBO	0.288	0.282	0.271	0.283	0.292
	(0.24)	(0.22)	(0.22)	(0.23)	(0.27)
Premium to 1 month prior	0.387***	0.400***	0.394***	0.418***	0.406***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Premium × Cash	-0.221	-0.221	-0.212	0.136	0.138
	(0.23)	(0.24)	(0.23)	(0.24)	(0.25)
Hostile	0.097	0.122*	0.126*	0.122*	0.077
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Log(target MVE)	-0.037*	-0.023	-0.030	-0.017	-0.017
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log(relative deal size)	0.015	0.008	0.012	0.003	0.004
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
q of acquirer	0.026	0.024	0.022	0.018	0.024
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
q of target	0.010	0.005	0.009	0.011	0.009
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
q of target × Cash	-0.100**	-0.093**	-0.092**	-0.093**	-0.104**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Toehold	0.228**				0.194**
	(0.09)				(0.09)
Toehold × Cash	-0.104				-0.061
	(0.13)				(0.13)
Tier-one IB		-0.191			-0.146
		(0.16)			(0.17)
Tier-one IB × Cash		0.217			0.122
		(0.22)			(0.24)
Same industry (2 digits SIC)			-0.049		-0.047
			(0.08)		(0.08)
Same industry × Cash			0.096		0.081
			(0.12)		(0.12)
1980s & 1990s × Premium × Cash				-0.507**	-0.499**
				(0.25)	(0.25)
Industry & year FE	Y	Y	Y	Y	Y
N	249	249	249	249	249

Notes: OLS regressions with target CAR from 25 days before announcement to 25 days after deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is the transaction value over the market value of equity of the acquirer. Toehold is an indicator equal to one if the acquirer owned a share of the target before announcement, and Tier-one IB indicates whether the acquirer was advised by Goldman Sachs, Morgan Stanley, Merrill Lynch, or JPMorgan. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

A Appendix Tables

Table A.1: Summary Statistics (Completed Deals)

	Cash deals				Stock deals				
Variable	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	p-value
Time to completion	58.34	37.52	5	230	83.32	38.64	16	239	0.000
LBO in %	0.31	5.55	0	100	0	0	0	0	0.188
Premium (to 1 month prior) in %	46.73	35.14	0	200	48.74	42.97	0	200	0.373
Hostile deal in %	2.77	16.43	0	100	0.89	9.39	0	100	0.016
Tender offer in %	50.23	50.04	0	100	3.91	19.39	0	100	0.000
Transaction value in 2010 $bn	0.70	1.51	0.00	17.40	1.47	5.37	0.00	70.51	0.001
Relative deal size	0.70	6.06	0.00	137.03	0.58	3.39	0.00	79.38	0.662
% of target sought	91.96	22.29	1.80	100	96.38	14.70	7.70	100	0.000
New deal announced within 2 years in %	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Experienced acquirer in %	83.05	37.55	0	100	78.86	40.86	0	100	0.063
Target MVE in 2010 $bn	0.53	1.13	0.00	11.40	0.97	3.78	0.00	65.16	0.005
q of acquirer	2.09	1.69	0.51	15.20	3.41	3.29	0.51	15.20	0.000
q of target	1.85	1.38	0.50	9.91	2.62	2.27	0.50	9.91	0.000
q of acquirer $>$ q of target in %	60.09	49.01	0	100	64.48	47.90	0	100	0.117
KZ index of acquirer	-0.14	1.29	-6.03	3.73	-0.41	1.69	-10.46	3.01	0.002
KZ index of target	-0.04	1.57	-10.05	5.22	-0.28	1.89	-9.57	4.70	0.016
Same industry (1 digit SIC) in %	69.65	46.01	0	100	75.13	43.26	0	100	0.034
Same industry (2 digits SIC) in %	53.31	49.93	0	100	63.41	48.21	0	100	0.000
N	649				563				

Notes: Time to completion is in trading days. The historical transaction value was converted using Consumer Price Index (CPI) Conversion Factors. Relative deal size is the transaction value over market value of equity of the acquirer. New deal announced within 2 years is conditional on the deal being announced at least half a year after the previous one. Experienced acquirers appear at least five times in the data set. MVE stands for market value of equity. KZ index is the four-variable version in Lamont, Polk, and Saa-Requejo (2001). All non-deal-related variables (e.g., q ratios) are measured at the end of the year prior to the deal's announcement. Premia are truncated between 0 and 2, and all q and KZ variables are winsorized at the 1st and 99th percentiles. The sample is restricted to deals that include all variables used in any of the specifications in Tables 4-9, except for New deal announced within 2 years (193 observations in the unsuccessful-deal sample).

Table A.2: Determinants of Cash Offers (All Deals)

	Cash $\in [0,1]$			Cash $\in \{0,1\}$		
Log(relative deal size)	-0.053***	-0.061***	-0.063***	-0.066***	-0.071***	-0.074***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
% of target sought	-0.002***	-0.001**	-0.002**	-0.002***	-0.001*	-0.001**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Experienced acquirer	-0.006	-0.011	-0.017	-0.010	-0.008	-0.021
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Log(target MVE)		0.003	0.002		0.004	0.001
		(0.01)	(0.01)		(0.01)	(0.01)
q of acquirer		-0.028***	-0.030***		-0.029***	-0.028***
		(0.00)	(0.00)		(0.00)	(0.01)
q of target		-0.032***	-0.034***		-0.037***	-0.038***
		(0.01)	(0.01)		(0.01)	(0.01)
LBO			0.410***			0.376***
			(0.09)			(0.11)
Premium to 1 month prior			0.060**			0.041
			(0.03)			(0.03)
Hostile			0.232***			0.288***
			(0.05)			(0.06)
KZ index of acquirer			-0.001			0.002
			(0.01)			(0.01)
KZ index of target			-0.014**			-0.011
			(0.01)			(0.01)
Industry & year FE	Y	Y	Y	Y	Y	Y
Deal sample	All	All	All	Pure C/S	Pure C/S	Pure C/S
N	2,200	2,200	1,967	1,563	1,563	1,417

Notes: OLS regressions include acquirer and target industry controls. Cash is expressed as a fraction of the total payment (and hence equal to a dummy for cash in the sample of pure cash and stock deals in the last three columns). MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. An acquirer is experienced if the firm appears at least five times in the data set. All non-deal-related independent variables are measured at the end of the year prior to the deal's announcement. Robust standard errors are in parentheses.

Table A.3: Determinants of Deal Failure (All Pure Cash & Stock Bids)

	Deal failure				
Cash $\in \{0, 1\}$	-0.033*	0.002	0.012	-0.007	-0.007
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log(relative deal size)		0.037***	0.033***	0.028***	0.031***
		(0.00)	(0.00)	(0.00)	(0.01)
Premium to 1 month prior			0.010	0.004	0.049
			(0.02)	(0.02)	(0.04)
Hostile				0.346***	0.297***
				(0.07)	(0.07)
LBO					0.054
					(0.22)
Log(target MVE)					-0.016**
					(0.01)
% of target sought					-0.000
					(0.00)
q of acquirer					0.005
					(0.00)
q of target					0.002
					(0.01)
KZ index of acquirer					0.009
					(0.01)
KZ index of target					0.003
					(0.00)
Experienced acquirer					-0.015
					(0.03)
Target CAR (A-25, A+1)					-0.093**
					(0.05)
Industry & year FE	N	N	Y	Y	Y
N	1,566	1,566	1,563	1,563	1,417

Notes: OLS regressions with a dummy variable for deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. An acquirer is experienced if the firm appears at least five times in the data set. Target CAR is measured on the [-25, 1] window around deal announcement. All non-deal-related independent variables are measured at the end of the year prior to the deal's announcement. Robust standard errors are in parentheses.

Table A.4: Future Takeover Attempts (Unsuccessful Pure Cash & Stock Bids)

	New deal announced 2 years after failure				
Cash $\in \{0, 1\}$	0.059	0.026	0.016	0.008	0.033
	(0.07)	(0.07)	(0.08)	(0.09)	(0.09)
Premium to 1 month prior			-0.010	-0.009	0.003
			(0.08)	(0.09)	(0.10)
Hostile			0.014	0.065	0.019
			(0.15)	(0.17)	(0.17)
Log(target MVE)			0.023	0.020	0.010
			(0.02)	(0.02)	(0.02)
q of target			-0.035*	-0.033	-0.027
			(0.02)	(0.02)	(0.02)
KZ index of target				-0.003	-0.003
				(0.03)	(0.03)
Target CAR (A-25, W+25)					-0.067
					(0.07)
Industry & year FE	N	Y	Y	Y	Y
N	176	176	176	166	161

Notes: OLS regressions with a dummy variable indicating another merger bid within the next two years as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.5: Future Takeover Premia (Unsuccessful Bids)

	New offer premium 2 years after failure				
Cash $\in [0,1]$	0.022	0.021	0.001	-0.001	0.006
	(0.03)	(0.04)	(0.05)	(0.05)	(0.06)
Premium to 1 month prior			0.045	0.055	0.052
			(0.06)	(0.07)	(0.07)
Hostile			0.018	0.006	-0.023
			(0.05)	(0.06)	(0.05)
Log(target MVE)			0.007	0.006	0.001
			(0.01)	(0.01)	(0.01)
q of target			-0.016**	-0.016**	-0.015**
			(0.01)	(0.01)	(0.01)
KZ index of target				-0.007	-0.008
				(0.01)	(0.01)
Target CAR (A-25, W+25)					-0.003
					(0.03)
Industry & year FE	N	Y	Y	Y	Y
N	220	220	220	206	199

Notes: OLS regressions with future offer premium (to 1 month prior) in case of another merger bid within the next two years (and zero otherwise) as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.6: Future Takeover Premia (Unsuccessful Pure Cash & Stock Bids)

	New offer premium 2 years after failure				
Cash $\in \{0, 1\}$	0.028	0.033	0.003	0.004	0.009
	(0.04)	(0.04)	(0.05)	(0.06)	(0.07)
Premium to 1 month prior			0.071	0.084	0.084
			(0.08)	(0.09)	(0.09)
Hostile			0.046	0.040	0.002
			(0.06)	(0.07)	(0.07)
Log(target MVE)			0.008	0.005	0.001
			(0.01)	(0.01)	(0.01)
q of target			-0.018**	-0.021*	-0.018
			(0.01)	(0.01)	(0.01)
KZ index of target				-0.018	-0.019
				(0.01)	(0.01)
Target CAR (A-25, W+25)					0.017
					(0.04)
Industry & year FE	N	Y	Y	Y	Y
N	171	171	171	161	156

Notes: OLS regressions with future offer premium (to 1 month prior) in case of another merger bid within the next two years (and zero otherwise) as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.7: Target Returns (Unsuccessful Pure Cash & Stock Bids) – Robustness Checks

	Target CAR (A-25, W+25)				
Cash $\in \{0, 1\}$	0.561***	0.520***	0.438**	0.552***	0.453**
	(0.21)	(0.20)	(0.20)	(0.19)	(0.21)
LBO	0.382	0.367	0.346	0.339	0.371
	(0.33)	(0.32)	(0.33)	(0.31)	(0.34)
Premium to 1 month prior	0.353***	0.372***	0.360***	0.410***	0.378***
	(0.11)	(0.12)	(0.11)	(0.12)	(0.12)
Premium × Cash	-0.189	-0.213	-0.210	0.176	0.224
	(0.26)	(0.26)	(0.25)	(0.27)	(0.28)
Hostile	-0.006	0.014	0.024	0.043	0.010
	(0.11)	(0.11)	(0.11)	(0.10)	(0.11)
Log(target MVE)	-0.046*	-0.036	-0.038*	-0.018	-0.022
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Log(relative deal size)	0.008	0.007	0.008	-0.007	-0.007
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
q of acquirer	0.036	0.033	0.031	0.026	0.034
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
q of target	0.020	0.018	0.018	0.017	0.019
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
q of target × Cash	-0.126***	-0.115**	-0.114**	-0.124***	-0.123***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Toehold	0.278***				0.258**
	(0.10)				(0.10)
Toehold × Cash	-0.136				-0.150
	(0.14)				(0.14)
Tier-one IB		-0.142			-0.113
		(0.21)			(0.23)
Tier-one IB × Cash		0.235			0.146
		(0.28)			(0.31)
Same industry (2 digits SIC)			-0.110		-0.127
			(0.10)		(0.10)
Same industry × Cash			0.163		0.132
			(0.14)		(0.14)
1980s & 1990s × Premium × Cash				-0.649**	-0.642**
				(0.27)	(0.28)
Industry & year FE	Y	Y	Y	Y	Y
N	194	194	194	194	194

Notes: OLS regressions with target CAR from 25 days before announcement to 25 days after deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is the transaction value over the market value of equity of the acquirer. Toehold is an indicator equal to one if the acquirer owned a share of the target before announcement. Tier-one IB indicates whether the acquirer was advised by Goldman Sachs, Morgan Stanley, Merrill Lynch, or JPMorgan. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.8: Determinants of Target Debt Change (Unsuccessful Bids)

	Δ lnDebt			
Cash	-0.002	-0.102	-0.107	-0.080
	(0.16)	(0.09)	(0.16)	(0.11)
LBO	3.899***	0.107	3.908***	0.141
	(0.49)	(0.09)	(0.52)	(0.11)
Premium to 1 month prior	0.034	0.101	0.161	0.140
	(0.13)	(0.07)	(0.15)	(0.09)
Hostile	0.199	0.185*	0.126	0.066
	(0.18)	(0.10)	(0.21)	(0.10)
q of target	0.017	0.034	-0.090	0.006
	(0.05)	(0.03)	(0.06)	(0.03)
KZ index of target	-0.013	-0.046**	-0.079	-0.057**
	(0.05)	(0.02)	(0.05)	(0.02)
Industry & year FE	Y	Y	Y	Y
Deal sample	(I)	(II)	(III)	(IV)
N	203	687	160	525

Notes: OLS regressions with the one-year change (from the end of the year before deal announcement to the end of the year of deal failure) in the log of the sum of the target's long-term and short-term debt as the dependent variable, which is winsorized at the 1st and 99th percentiles. Deal samples are as follows: (I) regression sample; (II) no restrictions on sample; (III) regression sample, pure cash and stock deals; (IV) no restrictions on sample other than pure cash and stock deals. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.9: Determinants of Deal Failure (All Deals and No Sample Restrictions)

	Deal failure				
Cash $\in [0,1]$	-0.131***	0.018	0.018	0.004	0.008
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Log(relative deal size)		0.044***	0.027***	0.023***	0.024***
		(0.00)	(0.00)	(0.00)	(0.00)
Premium to 1 month prior			0.001	-0.003	0.058*
			(0.02)	(0.02)	(0.03)
Hostile				0.335***	0.290***
				(0.05)	(0.06)
LBO					0.047
					(0.22)
Log(target MVE)					-0.015***
					(0.01)
% of target sought					-0.000
					(0.00)
q of acquirer					0.006*
					(0.00)
q of target					0.002
					(0.01)
KZ index of acquirer					0.003
					(0.01)
KZ index of target					0.000
					(0.00)
Experienced acquirer					-0.025
					(0.02)
Target CAR (A-25, A+1)					-0.133***
					(0.04)
Industry & year FE	N	N	Y	Y	Y
N	9,216	4,380	3,248	3,248	1,967

Notes: OLS regressions with a dummy variable for deal failure as the dependent variable. MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. An acquirer is experienced if the firm appears at least five times in the data set. Target CAR is measured on the [-25, 1] window around deal announcement. All non-deal-related independent variables are measured at the end of the year prior to the deal's announcement. Robust standard errors are in parentheses.

Table A.10: Target Returns (Unsuccessful Bids and No Sample Restrictions)

	Target CAR (A-25, W+25)					
Cash	0.107***	0.103**	0.464***	0.314*	0.552***	0.345*
	(0.03)	(0.04)	(0.17)	(0.16)	(0.20)	(0.20)
LBO		0.017	0.273	0.049	0.353	0.097
		(0.04)	(0.21)	(0.24)	(0.31)	(0.28)
Premium to 1 month prior		0.363***	0.398***	0.321***	0.372***	0.260**
		(0.06)	(0.10)	(0.12)	(0.11)	(0.13)
Premium × Cash			-0.223	-0.112	-0.228	-0.097
			(0.24)	(0.23)	(0.25)	(0.25)
Hostile		0.095***	0.133*	0.142	0.028	0.012
		(0.03)	(0.07)	(0.09)	(0.10)	(0.13)
Log(target MVE)			-0.031	-0.030	-0.038*	-0.033
			(0.02)	(0.02)	(0.02)	(0.03)
Log(relative deal size)			0.011	0.021	0.007	0.021
			(0.02)	(0.03)	(0.02)	(0.03)
q of acquirer			0.022	0.024	0.031	0.037
			(0.02)	(0.03)	(0.02)	(0.04)
q of target		-0.020	0.009	0.002	0.017	0.001
		(0.02)	(0.03)	(0.04)	(0.03)	(0.04)
q of target × Cash			-0.090**	-0.057	-0.118**	-0.057
			(0.04)	(0.04)	(0.05)	(0.04)
KZ index of acquirer				-0.019		-0.034
				(0.04)		(0.04)
KZ index of acquirer × Cash				0.012		0.057
				(0.05)		(0.06)
KZ index of target				0.026		0.044
				(0.03)		(0.04)
Industry & year FE	Y	Y	Y	Y	Y	Y
Deal sample	All	All	All	All	Pure C/S	Pure C/S
N	1,363	872	249	217	194	171

Notes: OLS regressions with target CAR from 25 days before announcement to 25 days after deal failure as the dependent variable. Cash is expressed as a fraction of the total payment (and hence equal to a dummy for cash in the sample of pure cash and stock deals in the last two columns). MVE stands for market value of equity in 2010 $bn, and Relative deal size is equal to transaction value over market value of equity of acquirer. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.11: Future Takeover Attempts (Unsuccessful Bids and No Sample Restrictions)

	New deal announced 2 years after failure				
Cash $\in [0,1]$	0.067***	0.051***	-0.011	-0.013	-0.015
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)
Premium to 1 month prior			-0.039	-0.030	-0.052
			(0.04)	(0.04)	(0.04)
Hostile			-0.125**	-0.125**	-0.135**
			(0.06)	(0.06)	(0.06)
Log(target MVE)			0.011	0.010	0.004
			(0.01)	(0.01)	(0.01)
q of target			-0.027**	-0.024**	-0.023*
			(0.01)	(0.01)	(0.01)
KZ index of target				0.010	0.013
				(0.01)	(0.01)
Target CAR (A-25, W+25)					0.014
					(0.04)
Industry & year FE	N	Y	Y	Y	Y
N	2,310	2,310	707	663	642

Notes: OLS regressions with a dummy variable indicating another merger bid within the next two years as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

Table A.12: Future Takeover Premia (Unsuccessful Bids and No Sample Restrictions)

	New offer premium 2 years after failure				
Cash $\in [0,1]$	0.021***	0.024***	-0.011	-0.011	-0.010
	(0.01)	(0.01)	(0.03)	(0.03)	(0.03)
Premium to 1 month prior			-0.016	-0.015	-0.022
			(0.03)	(0.03)	(0.03)
Hostile			-0.041	-0.049	-0.057*
			(0.03)	(0.03)	(0.03)
Log(target MVE)			-0.000	-0.001	-0.005
			(0.00)	(0.01)	(0.01)
q of target			-0.010*	-0.008	-0.007
			(0.00)	(0.01)	(0.01)
KZ index of target				0.004	0.005
				(0.01)	(0.01)
Target CAR (A-25, W+25)					-0.001
					(0.02)
Industry & year FE	N	Y	Y	Y	Y
N	2,224	2,224	660	619	598

Notes: OLS regressions with future offer premium (to 1 month prior) in case of another merger bid within the next two years (and zero otherwise) as the dependent variable. We exclude observations with merger bids within half a year after failure since their classification as competing bid (in the previous takeover attempt) versus new bid is ambiguous. MVE stands for market value of equity in 2010 $bn. Target CAR (A-25, W+25) is the cumulative abnormal return from 25 days before announcement until 25 days after deal failure. All non-deal-related independent variables are measured at the end of the year prior to the unsuccessful deal's announcement. Robust standard errors are in parentheses.

B Linear Approximation

To account for the different length of the time interval between the announcement and withdrawal for each deal, we normalize this window to $T_S = 50$ synthetic trading days. Each synthetic trading day corresponds to $\frac{1}{T_S} = 2\%$ of the time elapsed between announcement and withdrawal. To determine the CAR of deal i with window length T_i after n synthetic trading days, we first need to determine the CAR after $\hat{n} = n\frac{T_i}{T_S}$ days:

$$\widehat{CAR}_i(n) = CAR_i(\hat{n}). \tag{7}$$

Thus, for a deal with $T_i = 100$, the CAR after 10 synthetic trading days, $\widehat{CAR}_i(10)$, would be given by the the CAR after 20 actual trading days for deal i. If $\hat{n}$ is not an integer number, we use a linear approximation between the relevant integer numbers, i.e.,

$$\widehat{CAR}_i(n) = \left(1 - w_{(i,n)}\right) CAR_i(\lfloor \hat{n} \rfloor) + w_{(i,n)} CAR_i(\lfloor \hat{n} \rfloor + 1) \tag{8}$$

with $w_{(i,n)} = \hat{n} - \lfloor \hat{n} \rfloor$ where $\lfloor x \rfloor$ refers to the floor function.

Hence, for a deal with $T_j = 10$, the CAR after 8 synthetic trading days is given by: $\widehat{CAR}_j(3) = \frac{2}{5} CAR_j(1) + \frac{3}{5} CAR_j(2)$ as $\hat{n} = n\frac{T_j}{T_S} = 8\frac{10}{50}$ and $w_{(j,n)} = \frac{8}{5} - 1$.

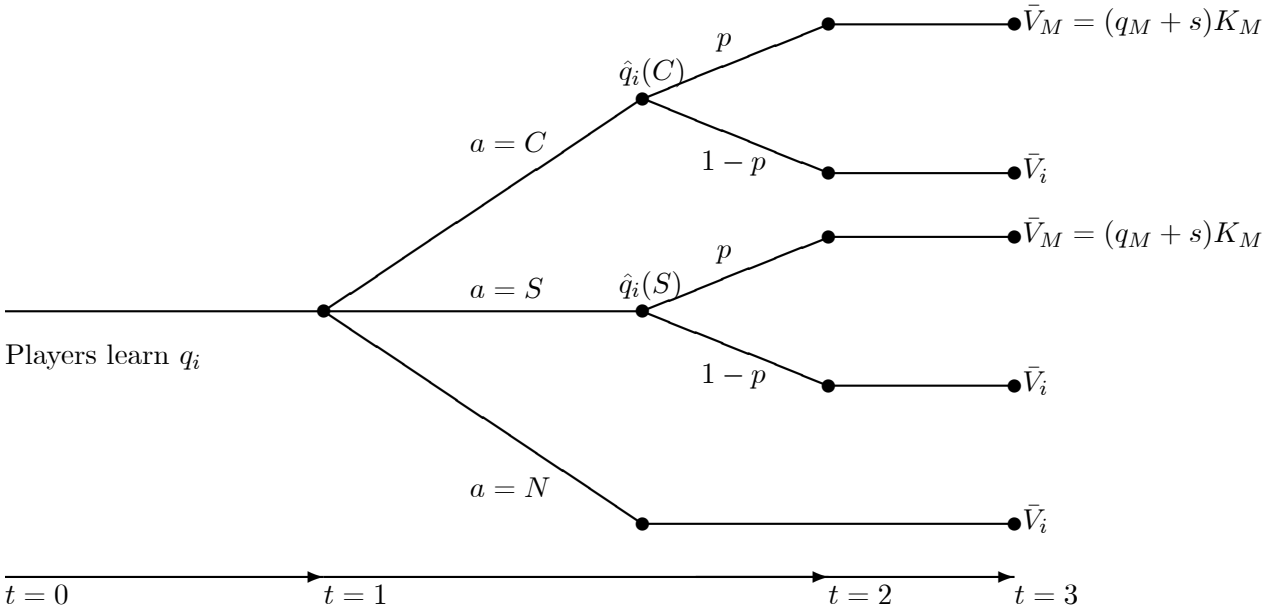
C Theory: Mispricing and Learning

We consider an asymmetric information environment in which a bidder, B, possesses private information about his own value, the value of a potential target, T, and potential synergies between the two firms. Our setting allows both for the possibility that stocks are (on average) fairly valued, and for systematic misvaluation. In either case, the assumption of asymmetric information only requires that some firms have access to information that is not fully reflected by the stock price. For ease of exposition, we assume that there are no information asymmetries, instead, between the bidder and the target. Intuitively, these assumptions could be motivated by industry-specific knowledge that is shared by the bidder and the target but is not known to the market (yet).

Building on the modeling framework and notation of Shleifer and Vishny (2003), we study how market misvaluations affect the probability of merger bids and the form of payment, i.e., the choice between a cash and a stock acquisition. However, in contrast to Shleifer and Vishny (2003), we allow market participants to learn from actions that are (potentially) motivated by misvaluations, including the form of payment offered by the bidder. This learning channel generates testable predictions for our empirical examination of stock market reactions to cash and stock offers.

Apart from information-based deals, which induce market learning, we also assume that a fraction of deals is (exogenously) motivated by unobserved managerial considerations. One can think about these deals as "noise deals." These noise deals help the informed bidder to not fully reveal his private information by his offer and his choice of the medium of exchange in particular. For the purpose of our analysis, we focus on the decisions of the informed bidder. The noise bidder will only matter for the market reaction to the deal announcement.

Figure 3: Timeline of the Model



Since we model the noise in reduced form, consider the following motivating example in which a target currently trading at \$100 is worth either \$80 or \$120 with equal probability. Now suppose that, *conditional* on a cash offer for the target, there is a 50% chance that the bidder is (perfectly) informed, i.e., the true value of the target is \$120, and a 50% chance that the bid was driven by uninformed managerial considerations, implying that the fair value is still \$100. Then, the market would update its beliefs about the target's stand-alone value (not accounting for the takeover premium) to \$110. This allows the bidder with private information to make a potential private gain, namely if the transaction succeeds with an offer price between \$110 and \$120. Thus, it is the existence of an uninformed bidder that enables the informed bidder to gain financially from such a deal.[28]

For expositional reasons, we express market valuations of firm i, V_i, in terms of valuation multiples, $\hat{q}_i$, and the capital stock in place, K_i:

$$V_i = \hat{q}_i K_i \tag{9}$$

where $i \in \{B, T, M\}$ and M refers to the merged firm.

The capital stock is observable to the market, so that potential initial misvaluations must be caused by false market assessments of the valuation multiple. The fair long-run multiple of each firm is denoted by q_i and the true long-run synergies are given by $sK_M = s\,(K_B + K_T)$, whereas we assume the time-0 market beliefs about the valuations to be independently distributed with means $\hat{q}_i^0$ and $\hat{s}$, respectively.

The timeline (see Figure 3) is as follows:

0. The bidder and the target learn the fair values of their firms, q_i, including the value of

[28] Moreover, an uninformed bidder with an empire-building objective may actually prefer to hide behind the informed bidder, so that his true intentions (empire building) do not become public.

the merged firm.

1. The bidder can choose between three possible actions, a. The market updates the valuation multiple and synergies estimate after observing a, denoted by $\hat{q}_i(a)$ and $\hat{s}(a)$:
   (a) All-**C**ash acquisition, $a = C$
   (b) All-**S**tock acquisition, $a = S$
   (c) **N**o acquisition, $a = N$.
2. The deal succeeds with probability p.
3. Market prices adjust to their long-run values (indicated by $\bar{V}_i$ and $\bar{V}_M$).

Since periods 1 and 2 are close events, we do not incorporate an additional learning stage after deal failure. Eventually, long after deal failure (in period 3), market prices revert to fundamentals. As in Shleifer and Vishny (2003), we assume that the target management is only concerned about short-run valuations whereas bidder management is concerned about long-run valuations.[29] Consequently, target shareholders will accept any offer price PK_T as long as $P > \hat{q}_T(a)$. Assuming that the target offer premium, P, is identical for cash and stock offers, a cash payment of PK_T corresponds to a stock deal with an exchange ratio such that a fraction x of the merged company is owned by target shareholders:

$$x = \frac{P}{\hat{q}_M(S) + \hat{s}(S)} \frac{K_T}{K_M} \tag{10}$$

where $\hat{q}_M(S) = \hat{q}_B(S) \frac{K_B}{K_M} + \hat{q}_T(S) \frac{K_T}{K_M}$ and $K_M = K_B + K_T$.

Intuitively, the target share is the ratio of the takeover premium multiple, P, relative to the combined-firm valuation multiple, $\hat{q}_M(S) + \hat{s}(S)$, times the fraction of the capital stock that the target contributes to the merged firm. Note that this specification is consistent with our data (see Section 3): the premia do not vary significantly (at least not at the 5% level) between the cash- and stock-deal samples (comprising completed and unsuccessful deals).[30] Furthermore, deal failure is modeled exogenously with respect to the choice of the medium of exchange; Section 2 critically discusses this important assumption.

With a slight abuse of notation, we denote the long-run value of shares owned by the acquiring company's shareholders as $\bar{V}_B$, also in the cases where the deal goes through:

Lemma 1 *The long-run market value of shares owned by the bidder's shareholders is:*

$$\bar{V}_B(S) = (1 - x)(q_M + s) K_M \tag{11}$$
$$\bar{V}_B(C) = (q_M + s) K_M - PK_T \tag{12}$$
$$\bar{V}_B(N) = q_B K_B. \tag{13}$$

Note that if the transaction fails, the long-run market valuation of the bidder is simply the long-run stand-alone value, $\bar{V}_B(N)$.

[29] Our model yields the original Shleifer and Vishny (2003) model for the following parameters: $p = 1$, $\hat{q}_i(C) = \hat{q}_i(S) = \hat{q}_i^0$, $q_B = q_T = q$, $\hat{s}(C) = \hat{s}(S) > 0$, and $s = 0$.

[30] Theoretically, the effective value of the offer could be a function of the medium of exchange.

Proposition 1 *Given the updating functions of the market, $\hat{q}_M(S)$ and $\hat{s}(S)$, a bidder chooses stock over cash if:*

$$\underbrace{\hat{q}_M(S)+\hat{s}(S)}_{\text{Post-Stock Offer Combined Firm Valuation}} > \underbrace{q_M+s}_{\text{Long-run Combined Firm Valuation}}. \tag{14}$$

A transaction is made at all as long as:

$$sK_M \geq \begin{cases} (P-q_T)K_T & \text{for} \quad q_M+s > \hat{q}_M(S)+\hat{s}(S) \\ \left(P\frac{q_M+s}{\hat{q}_M(S)+\hat{s}(S)}-q_T\right)K_T & \text{otherwise} \end{cases}. \tag{15}$$

Proof: Since the payoffs in case of failure (and the probabilities of failure) are the same for cash and stock transactions, the bidder only needs to compare the valuations upon a completed deal (see Lemma 1). The bidder chooses stock if:

$$\left(1-\frac{PK_T}{(\hat{q}_M(S)+\hat{s}(S))K_M}\right)(q_M+s)K_M > (q_M+s)K_M - PK_T. \tag{16}$$

Simple algebra yields the desired result. ■

Thus, stock is more likely to be used if both the target and the bidder are overvalued or if the market is too optimistic about synergies, i.e., $\hat{s}(S) > s$. Intuitively, a transaction is made if either the true synergies, sK_M, are high or if the target can be purchased at a discount ($P < q_T$). For stock bidders, the price P is shaded by the long-run devaluation ratio $\frac{q_M+s}{\hat{q}_M(S)+\hat{s}(S)} < 1$. As long as the combined firm is currently overvalued (relative to market expectations), i.e., $\hat{q}_M(S)+\hat{s}(S) > q_M+s$, the long-run effective price of a stock offer is lower. Note that both cash and stock bidders would prefer to buy the target at a discount ($P < q_T$). In that case, the deal adds value for the bidder regardless of the medium of exchange. However, the choice between cash and stock depends on the combined overvaluation of the bidder and the target. If the bidder is undervalued, he would not like to let the target shareholders benefit from his own undervaluation, so he uses cash. On the other hand, bidders in stock deals are willing to overpay for targets ($P > \hat{q}_T > q_T$) if and only if their own overvaluation is even higher (or synergies are high). This case exemplifies the similar logic and predictions of our model and that of Rhodes-Kropf and Viswanathan (2004) despite the different (information) setups, as alluded to earlier (see Section 2).

Since the informed bidder takes the updating functions of the market, $\hat{q}_i(a)$ and $\hat{s}(a)$, as given, these functions were treated as exogenous for the decision making behavior of the bidder. Assuming that the *uninformed* bidder is on average fairly valued and buys on average a fairly valued target, the market reaction will only partially reflect the information of the informed bidder. This allows the *informed* bidder to benefit from the transaction.

With partial updating by the market, the market will update all terms in the same direction upon seeing a stock offer. Define the overvaluation of a firm as:

$$v_i(a) = \hat{q}_i(a) - q_i. \tag{17}$$

Then, under the assumption that all priors are independent, the learning component of our model predicts:

Corollary 1 *Partial updating implies:*

$$v_i(S) \geq v_i(C) \tag{18}$$

$$\hat{s}(S) - s \geq \hat{s}(C) - s. \tag{19}$$

While we remain agnostic about the exact nature of the updating process (and the distribution of the market's priors about the long-run valuations q_B and q_T of the bidder and the target, respectively) in the formulation of the theory, the raw evidence in Figure 1, while consistent with our theory, implies that cash offers induce the market to update its beliefs exclusively about the target.

The model, however, predicts that the choice of acquisition currency is a function of the overvaluation of the (hypothetical) *combined* entity of the bidder and the target. One may argue that the graph sample contains many proposed mergers of equals (the mean equity ratio, i.e., the market capitalization of the target over that of the acquirer, turns out to be 0.84 for unsuccessful bids), which would justify the magnitude of the cash effect for targets. At the same time, the cash effect also holds in samples including non-public acquirers that are typically smaller and about which the market potentially has less information. That is, even when there is greater information asymmetry between the market and the bidder, the cash effect on post-failure target CARs remains robust (although the respective coefficient is somewhat lower).[31] Thus, one may conclude that the market focuses entirely on targets when considering cash offers, and the degree of updating should be independent of the target's relative size.

To see this, assume that there are no synergies as they are not priced after deal failure, so the acquirer's optimal choice of acquisition currency according to Proposition 1 is to use cash as long as $\frac{K_T}{K_M}\hat{q}_T(C) + \frac{K_B}{K_M}\hat{q}_B(C) < \frac{K_T}{K_M}q_T + \frac{K_B}{K_M}q_B$. In order not to complicate notation, let $\hat{q}_B^0$ and $\hat{q}_T^0$ be constants (i.e., the market's priors are distributed with zero variance). The market observes K_B, K_T, $\hat{q}_B^0$ and $\hat{q}_T^0$, and upon seeing a cash offer, updates its beliefs about the target's stand-alone value. The market updates $\hat{q}_T^0$ to $\hat{q}_T(C)$ where the updating function $\hat{q}_T(C)$ is equal to:

$$\begin{aligned}\mathbb{E}(q_T|\, a = C) &= \mathbb{E}\left(q_T|\, \hat{q}_M^0 < q_M\right) \\ &= \mathbb{E}\left(q_T|\, \frac{K_T}{K_M}\hat{q}_T^0 + \frac{K_B}{K_M}\hat{q}_B^0 < \frac{K_T}{K_M}q_T + \frac{K_B}{K_M}q_B\right).\end{aligned} \tag{20}$$

Note that this expectation is conditional on the market's assessment of q_B. However, we argue that the market does not update its beliefs about acquirers once they offer cash rather than stock, that is:

$$\mathbb{E}(q_B|\, a = C) = \hat{q}_B^0. \tag{21}$$

Therefore, equation 20 simplifies to:

$$\mathbb{E}\left(q_T|\, \frac{K_T}{K_M}\hat{q}_T^0 + \frac{K_B}{K_M}\hat{q}_B^0 < \frac{K_T}{K_M}q_T + \frac{K_B}{K_M}\hat{q}_B^0\right) = \mathbb{E}\left(q_T|\, \hat{q}_T^0 < q_T\right). \tag{22}$$

[31] To see this, compare the first and, particularly, second columns of Tables 5 and A.10.

The market updates its beliefs according to equation 22, so that $\hat{q}_T(C) > \hat{q}_T^0$. Most importantly, the updating function is independent of the target's relative size, and so will be the degree of updating, i.e., $\left(\hat{q}_T(C) - \hat{q}_T^0\right) \perp \frac{K_T}{K_M}$. Had we not assumed (as documented empirically) that relationship (21) holds, then the degree of updating would indeed have been a function of $\frac{K_T}{K_M}$: given that the market cannot observe the long-run valuations (and under the assumption of independence of the market's beliefs about q_B and q_T), it would have inferred a greater degree of undervaluation for the entity that is relatively larger in terms of capital.