Relative Values, Announcement Timing, and Shareholder Returns in Mergers and Acquisitions*

Sangwon Lee† Vijay Yerramilli‡

August 2017

Abstract

We show that M&A deals that are announced when the bidder's relative value (ratio of bidder's equity value to target's equity value) is closer to its 52-week high feature higher offer premium, lower (higher) announcement returns for the bidding (target) firm, and are more likely to fail, all else equal. Yet, bidders in such deals also experience large abnormal returns in the two-year period surrounding the announcement. Our results suggest that bidders strategically choose announcement timing to exploit relative misvaluation, and cast doubt on the idea that announcement returns represent the gains to long-term shareholders of bidding firms.

*We thank Vikas Agarwal, Itzhak Ben-David, Anusha Chari, Bhagwan Chowdhry, Radha Gopalan, Jarrad Harford, Praveen Kumar, Micah Officer, David Offenberg, Paul Povel, Rik Sen (discussant), and seminar participants at the 2016 Summer Conference at Indian School of Business and the University of Houston for their helpful comments and discussions on issues examined in the paper. All remaining errors are our responsibility.

†C. T. Bauer College of Business, University of Houston; email: slee@bauer.uh.edu

‡C. T. Bauer College of Business, University of Houston; email: vyerramilli@bauer.uh.edu

Introduction

Announcement returns are widely used to assess shareholder gains in merger and acquisition (M&A) deals. The general consensus in the literature is that, on average, target shareholders experience large gains, whereas bidding shareholders either do not gain or appear to be at the losing end.[1] The implicit assumption in the announcement study approach is that the timing of the M&A announcement is exogenous with respect to the valuations of the two firms. However, past literature highlights that stock market misvaluation has important effects on M&A activity, and determines who buys whom and the method of payment (Rhodes-Kropf et al. (2005), Dong et al. (2006), Ang and Cheng (2006), and Ben-David et al. (2015)). Extending this reasoning, it is possible that, at the margin, misvaluation affects not just who buys whom, but also the timing of deal announcement for a given bidder-target pair as the bidder seeks to benefit from relative misvaluation. If so, then any assessment of whether bidding and target shareholders gain or lose from the deal must take into account not just the market's reaction to the announcement but also the changes in relative value leading up to the announcement.[2]

Our objective in this paper is to examine whether bidders strategically choose the timing of M&A announcements, and how timing affects deal terms, likelihood of success, and shareholder returns. We examine the timing of M&A announcements in terms of the relative equity market value of the bidder with respect to the target (RV) at which the deal is announced, and how it compares with the range of relative value during a 52-week reference window preceding the announcement. The relative value is important in practice because it may affect the method of payment, the exchange ratio in stock deals, and the bidder's ability to raise financing. We focus on the 52-week reference window because, given

[1]See Jensen and Ruback (1983), Jarrell et al. (1988), and Andrade et al. (2001) for surveys of this literature. Indeed, Moeller et al. (2005) show that bidding shareholders collectively lost over $220 billion at the announcement of merger bids from 1980 to 2001.

[2]For instance, in the often cited example of the AOL-Time Warner merger, it is acknowledged that CEO of AOL served his shareholder well because he "chose the moment, almost to the day, when his stock was most valuable and then used it as currency." (see the article titled "Time Warner, Don't Blame Steve Case" in *Fortune* on February 3, 2003).

the inherent subjectivity in valuation, key decision makers in the bidding and target firms and investors are known to use recent prices as reference points (see Baker et al. (2012)). To adjust for differences in relative bidder-target size and to facilitate comparison across deals, for each bidder-target pair, we define a *normalized relative value* at announcement, $NRV_{ann} = \frac{Log(RV_{ann})-Log(RV_{low})}{Log(RV_{high})-Log(RV_{low})}$, where RV_{ann} denotes the relative value at announcement, and RV_{low} and RV_{high} denote the low and high values, respectively, of RV for the bidder-target pair over the 52-week reference window.[3] Hence, NRV_{ann} of close to one (zero) implies that the deal is announced when the bidder's RV is close to its 52-week high (low) value.

Our main hypothesis is that changes in bidder's relative value are at least partly driven by stock market misvaluation, and hence, bidders may strategically choose the timing of deal announcements to exploit relative misvaluation. We refer to this as the *market-timing hypothesis*, and note that it does not necessarily contradict the neoclassical or Q hypothesis of takeovers (see Lang et al. (1989), Servaes (1991), and Jovanovic and Rousseau (2002)), which emphasizes the efficiency gains from mergers. This is because even if the merger is mainly motivated by efficiency gains or tax considerations, the bidder may still choose to announce the deal when the relative valuation is to its advantage. As per the market-timing hypothesis, a higher NRV_{ann} indicates that the timing of the deal is more to the relative advantage of the bidding firm. Therefore, all else equal, deals announced at a higher NRV should feature more stock payment, higher offer premium to compensate the target shareholders for the disadvantageous timing from their perspective, and lower (higher) announcement returns for the bidding (target) firm as the market corrects the perceived misvaluation. Moreover, deals announced at a higher NRV should be more likely to fail, especially due to the target's refusal which may believe that the timing is to its relative disadvantage.

The main alternative hypothesis is that the markets are efficient, and hence, changes in relative value are entirely driven by changes in the underlying fundamentals of the two

[3] To account for possible delays between the time the decision is made and the actual announcement of the merger, we define RV_{ann} using the closing stock prices of the two firms 21 trading days prior to the date of announcement. This choice is not crucial for our results.

firms, such as growth opportunities and future prospects. If stock prices never deviate from fundamentals, then it shouldn't matter how the relative value at announcement compares with its 52-week reference points. Gains from a merger should mainly depend on how the bidder's Q compares to the target's Q at announcement, and NRV_{ann} should not have any additional effect on deal terms and shareholder returns. We use these differential predictions to distinguish the market-timing hypothesis from the alterative hypothesis.

We note that there is substantial cross-sectional variation in NRV_{ann} across deals: while the median deal is announced at an NRV of 0.619, the $25^{th}-$percentile and $75^{th}-$percentile values are 0.312 and 0.84, respectively. Moreover, deals announced at higher NRV are not clustered in specific years or in specific industries. We provide examples of four high-NRV_{ann} deals and four low-NRV_{ann} deals in Figures 1 and 2, respectively, where we plot the variation in normalized relative value, normalized bidder value, and normalized target value over the 52-week period preceding the announcement day.[4]

We begin our analysis by showing that changes in relative value affect the timing of deal announcement as well as the timing of the start of negotiations ("deal initiation") between the bidder and target firms.[5] Formally, we use a Cox proportional hazard model to show that NRV has a positive effect on both the deal announcement hazard and the deal initiation hazard. Moreover, deals progress quicker from initiation to announcement when the bidder's relative value at initiation is closer to its 52-week high.

Consistent with the market-timing hypothesis, we find that, all else equal, deals announced at a higher NRV are less likely to be pure-cash deals, and are likely to pay for a larger fraction of the deal in stock. But, if a high NRV_{ann} suggests that the timing of the announcement is to the bidder's relative advantage, why would target shareholders enter-

[4]The deals illustrate in Figures 1 and 2 correspond to the four highest-NRV_{ann} and four lowest NRV_{ann}, respectively, among all deals announced over the 2002–2015 period with deal value of over \$10 billion. As we did with *NRV*, we normalize bidder value V^B and target value V^T using their respective 52-week high and low values over the 52-week reference window.

[5]For a subset of deals in our sample, we are able to identify the date on which the bidder and target started negotiations (the "deal initiation" date) by hand-collecting this information from the SEC filings made by the bidder at deal announcement.

tain such an offer, especially when the payment is in the form of the bidder's potentially overvalued stock?

The answer lies, in part, in our finding that target shareholders receive a higher offer premium and higher exchange ratio (in case of stock deals) when the deal is announced at a higher NRV, possibly as a partial compensation for the disadvantageous timing from their perspective. This finding is also consistent with the finding in Baker et al. (2012) that the target's 52-week high price serves as an important reference point in determining the offer price. However, our finding cannot be fully explained by this reference-point hypothesis, because we also find that the gap between the offer price and target's 52-week high reference price is wider in deals that are announced at a higher NRV. This latter finding may also explain why deals announced at a higher NRV are more likely to fail ex post, especially due to target's refusal.

Examining the cumulative abnormal returns (CAR) for the bidding and target firms over the window $[-1, +1]$ surrounding the announcement date, we find that, all else equal, bidder $CAR[-1, +1]$ is negatively related to NRV_{ann}, whereas target $CAR[-1, +1]$ is positively related to NRV_{ann}. As argued above, these patterns are consistent with the market-timing hypothesis, and can arise as the market corrects the perceived misvaluation and reacts to the higher offer premium in deals announced at higher NRV.

Past studies highlight that bidders experience large and negative long-run abnormal returns following deal announcements (e.g., Asquith (1983), Agrawal et al. (1992), Loughran and Vijh (1997) and Rau and Vermaelen (1998)). When we examine long-run returns to bidding firms using the calendar-time portfolio approach (see Fama (1998)), we find that the negative long-run abnormal returns are present only among "high-NRV_{ann}" deals (i.e., deals with $NRV_{ann} \geq 0.5$). Moreover, the negative long-run abnormal returns among the high-NRV_{ann} deals are significantly stronger in case of deals that fail ex post, especially when the failure occurs for reasons beyond the control of bidding and target firms.

The patterns that we have documented so far are strongly consistent with the market-timing hypothesis that, at the margin, bidders try to strategically choose the timing of M&A announcements to exploit relative misvaluation. If so, any assessment of whether long-term shareholders of the bidding firm gain or lose from the deal must take into account not just the market's reaction to the announcement but also the changes in relative value leading up to the announcement. Accordingly, we examine the long-run abnormal returns to bidding firms over the 24-month period surrounding the announcement date, and find that these are large and positive for bidders in high-NRV_{ann} deals, but are negative for bidders in low-NRV_{ann} deals. These results suggest that bidder shareholders in high-NRV_{ann} deals experience superior long-run performance in the 24-month period surrounding the announcement date, even after accounting for the negative short- and long-run announcement returns.

To better illustrate the connection between NRV_{ann} and long-term shareholder returns, we turn to Figure 1(a) where we examine the case of Oracle's hostile tender offer for PeopleSoft, which was announced when Oracle's relative value with respect to Peoplesoft was close to its 52-week high. As per the traditional metrics, Oracle's $CAR[-1, +1]$ of -4.29% suggests that the company destroyed shareholder value by announcing this deal. However, Oracle announced the deal following a large run-up in its price and a large decrease in Peoplesoft's price, so that even after accounting for the negative announcement return, it generated a return of 51.79% in excess of the S&P500 return over the window from one year before announcement to one day after announcement. Therefore, after taking into account the strategic timing of the deal announcement, it is not clear that this deal destroyed Oracle's shareholder value.

The key contribution of our paper is to show that, at the margin, bidders strategically choose the timing of M&A announcements to exploit relative misvaluation. Our results complement the findings in Rhodes-Kropf et al. (2005), Ang and Cheng (2006), and Dong et al. (2006), who use model-based measures of fundamental value to identify if firms are misvalued (i.e., overvalued or undervalued relative to their fundamental value), and show that misvaluation affects who buys whom, as well as the method of payment; Ben-David et al. (2015) make a similar point by using short interest to measure misvaluation.[6] Instead, we identify potential relative misvaluation using a novel measure, NRV_{ann}, which compares the bidder's relative value at announcement to the range of relative values over the 52-week reference window preceding the announcement date. The key advantage of this measure is that it can be computed easily on a periodic basis, and allows us to isolate the effect of timing after controlling for the valuations and other characteristics of the bidder and target firms at announcement. We extend the findings in these papers by showing that misvaluation affects not just who buys whom, but also the timing of announcement for a given bidder-target pair. In this respect, our paper is related to Baker et al. (2009) who show that cross-border M&A activity by U.S. multinational firms is affected by the source-country's market-to-book ratio, which they use as a proxy for the source country's stock market overvaluation.

Another important contribution of our paper is to highlight that announcement returns may not fully reflect the gains to long-term shareholders because bidders may strategically choose the timing of announcements to exploit relative misvaluation. Therefore, any evaluation of returns to long-term shareholders must also take into account the endogeneity of the timing of the announcement and the returns preceding the announcement. Among other things, this insight has implications for the debate over whether overvalued acquirers create value for their long-term shareholders by using their equity as currency in takeovers: Savor and Lu (2009) argue that they do, but Fu et al. (2013) dispute this conclusion by pointing out that bidder overvaluation is associated with higher offer premiums and higher target $CAR[-1, +1]$ (also see Akbulut (2013)), which they attribute to CEO-related agency problems. Consistent with Fu et al. (2013), we find that higher NRV_{ann} is associated with higher offer premiums and higher target $CAR[-1, +1]$. However, if the deal was announced following a large increase (decrease) in the bidder's (target's) stock price (e.g., see the Oracle-

[6] The Rhodes-Kropf et al. (2005) approach, which is fine-tuned by Fu et al. (2013), uses sector-level cross-sectional regressions of firm-level equity value on firm fundamentals each year to derive model-based measures of fundamental value, which they use to decompose the market-to-book ratio into a market-to-value ratio, which proxies for misvaluation, and a value-to-book ratio, which proxies for growth opportunities. The Dong et al. (2006) approach uses the residual income model of Ohlson (1995) to estimate fundamental value.

PeopleSoft example in Figure 1), then it is hard to interpret the negative bidder $CAR[-1,+1]$ or positive target $CAR[-1,+1]$ as evidence that long-term shareholders of the bidding firm are at the losing end of the transaction. While CEO-related agency problems are no doubt important, our analysis points to another likely explanation which may also be important: if the timing of the deal is to the bidder's relative advantage, then the bidder may have to offer a higher premium as a sop to get the approval of the target shareholders to compensate them for their relative disadvantage, which, in turn, causes the bidder's (target's) announcement return to be lower (higher).

1 Theoretical Background

1.1 Market-timing hypothesis

A long literature going as far back as Keynes (1936) suggests that stock prices may irrationally diverge from fundamentals, and that such misvaluation affects the financing and investment choices of firms (e.g., see Morck et al. (1990), Baker and Wurgler (2000), and Baker et al. (2003)). Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) present theoretical arguments to show that stock market misvaluation affects M&A activity, and offer predictions for how misvaluation affects who buys whom, the method of payment, and other deal terms. They predict that bidding firms are more likely to be overvalued than target firms. Bidders are likely to pay for undervalued targets using cash. On the other hand, overvalued bidders are likely to use stock as method of payment when acquiring targets that are also overvalued, but less so than the bidder. Therefore, periods of high stock market valuations are likely to see heightened M&A activity largely paid for with bidding firms' stock.

Extending this reasoning, it is possible that, at the margin, misvaluation affects not just who buys whom, but also the timing of deal announcement for a given bidder-target pair. If stock markets are inefficient, then the bidder firm's management could benefit its long-term shareholders by choosing to announce the deal when it perceives that its stock is overvalued relative to the target's stock (i.e., by choosing a high NRV_{ann}). We refer to this as the *market-timing hypothesis*. Apart from the AOL-Time Warner merger example mentioned in the introduction, the following excerpts from a news article regarding the proposed acquisition of C&S/Sovran Corporation by NCNB Corporation starkly highlight the importance of relative values and market timing:

> "Shareholders of the target bank have plenty of reasons to be disappointed by the past, and to regret that NCNB did not buy the C&S part of C&S/Sovran two years ago…It is not so much the current absolute value of the NCNB offer in cash that needs to be considered, as the relative valuations of the two stocks and companies. Last fall, C&S/Sovran price, at \$18.375 a share, was 96 percent of the NCNB level of \$19.125. On a relative basis, C&S/Sovran hit bottom on May 31 (roughly one month before the deal announcement), when its price of \$18.75 was just 45 percent of NCNB price of \$42.125. …The NCNB offer thus is generous based on this spring's stock market perception, but stingy based on last fall's …they are getting an offer with a price that is effectively 30 percent below the original one, in terms of NCNB shares."[7]

As per the market-timing hypothesis, a higher NRV_{ann} indicates that the timing of the deal is more to the relative advantage of the bidding firm. Therefore, NRV_{ann} should affect the bidder-target match, deal terms, shareholder returns, and likelihood of successful completion, even after controlling for the values of the two firms at announcement and other firm characteristics.

All else equal, deals announced at a higher NRV should feature more stock payment as the bidder seeks to use its relatively overvalued stock as currency. At the same time, the bidders in such deals should offer a higher bid premium to partially compensate the target

[7] From the article "Market Place; On NCNB's Bid, a Waiting Game" published in New York Times on July 10, 1991 (article available at http://www.nytimes.com/1991/07/10/business/market-place-on-ncnb-s-bid-a-waiting-game.html)

shareholders for the disadvantageous timing from their perspective, and to convince them to accede to the deal. Moreover, the higher offer premium combined with the perceptions of relative misvaluation also predict that there should be a negative (positive) relationship between NRV_{ann} and bidder (target) announcement returns. Finally, deals announced at a higher NRV should be more likely to fail, especially due to the target's refusal which may believe that the timing is to its relative disadvantage.

1.2 Alternative hypothesis

The neoclassical or Q theory of mergers, based on an extension of the Q theory of investments (Brainard and Tobin (1968)), focuses on how acquisitions redeploy target assets (see Lang et al. (1989), Servaes (1991), and Jovanovic and Rousseau (2002)). As per the Q theory, a firm's Tobin's Q is an indicator of the degree to which it has good opportunities to create shareholder value from invested resources. Hence, as per the Q theory of mergers, gains from a merger mainly depend on how the bidder's Q compares to the target's Q at announcement, and takeovers of low-Q targets by high-Q bidders tend to improve efficiency more than takeovers of high-Q targets by low-Q bidders.

In practice, mergers may be motivated both by efficiency gains and market-timing considerations. Therefore, these two hypotheses are not mutually exclusive. However, a stark alternative to the market-timing hypothesis is that stock markets are always efficient, and stock prices never deviate from fundamentals. Under this alternative hypothesis, changes in relative value are entirely driven by changes in the underlying fundamentals of the two firms, such as growth opportunities and future prospects. Clearly, there is no role for market timing under the alternative hypothesis because it does not admit any misvaluation. Therefore, the extent of deviation in relative prices from their 52-week reference levels (i.e., NRV_{ann}) does not contain any additional information. Hence, gains from the merger mainly depend on how the bidder's Q compares to the target's Q, and NRV_{ann} should not have any additional effect on deal terms and shareholder returns.

2 Sample Collection and Construction of Variables

2.1 Data sources

We obtain data on mergers and acquisitions from the Securities Data Company (SDC) U.S. M&A database, financial data from COMPUSTAT, and stock price data from the Center for Research in Security Prices (CRSP) daily stock price database. We use the following criteria to select our final sample:

1. The deal is announced between 1985 and 2015.[8]

2. Both the acquirer and the target are public firms listed on the NYSE, AMEX, or Nasdaq. Moreover, neither firm belongs to either the utilities sector (SIC code between 4900 and 4999) or the financial services sector (SIC codes between 6000 and 6999).

3. The deal value is at least $1 million and at least 1% of the acquirer's market capitalization.

4. The bidder owns less than 50% of the target firm shares outstanding prior to the transaction and owns 100% after the transaction.[9]

5. Both the acquirer and target have share price and shares outstanding data available in the CRSP daily stock price database.

There are 3,644 deals that meet these sample requirements. Note that we do not exclude deals that were announced but were subsequently withdrawn. This is because we also want to examine the link between announcement timing and the probability of successful deal completion. Moeller et al. (2005) point out that deals announced during the merger wave of 1998–2001 destroyed shareholder value on an massive scale. Therefore, in unreported tests,

[8] Our sample period starts from 1985 mainly due to the coverage and completeness issues of the SDC data for the periods before 1984 (see Barnes et al. (2014) for details).

[9] Note that this condition also excludes deals that are classified as recapitalization, repurchase or buyback, minority stake purchase, and acquisitions of remaining interest.

we verify that all our results below are robust to the exclusion of deals announced during this period.

2.2 Key variables

Timing of M&A announcements:

We define the bidder's relative value on date t as $RV_t = \frac{V_t^B}{V_t^T}$, where V_t^B and V_t^T denote the market value of equity (computed using the day's closing stock prices) of the bidder and target, respectively. The main focus of our paper is to examine the timing of M&A announcements in terms of the bidder's relative value at which the deal is announced, and how it compares with recent values of RV_t. Formally, let RV_{ann} denote the relative value 21 trading days prior to the announcement date (i.e., day -21 where day 0 is the announcement date); the 21-day lag is to account for possible delays between the decision date and the actual announcement date.[10] We will focus on how RV_{ann} compares to the range of RV_t over the preceding 52 weeks. We choose the 52-week reference window in line with Baker et al. (2012).

All else equal, RV_t will depend on the relative size of the bidder with respect to the target. Therefore, to adjust for differences in relative size and to facilitate comparison across deals, we define a normalized relative value (NRV) for each bidder-target pair as follows:

$$NRV_t \equiv \frac{Log(RV_t) - Log(RV_{low})}{Log(RV_{high}) - Log(RV_{low})}, \quad (1)$$

where RV_{high} and RV_{low} denotes the high and low values, respectively, of RV for the bidder-target pair over the 52-week reference window.

We measure announcement timing using NRV_{ann}, which is the bidder's normalized relative value 21 trading days prior to the announcement date. Note that NRV_{ann} of close to one (zero) implies that the deal is announced when the bidder's relative value is close to its 52-week high (low). Therefore, if changes in relative value are driven by misvaluation,

[10] Our qualitative results are not sensitive to the choice of date -21 for defining RV_{ann}. We obtain very similar results if we use other dates to define RV_{ann}, such as -10, -5 or -2.

then a higher NRV_{ann} indicates that the timing of the announcement is more to the bidder's advantage.

Along similar lines, we define normalized bidder value, $NV_t^B \equiv \frac{Log(V_t^B)-Log(V_{low}^B)}{Log(V_{high}^B)-Log(V_{low}^B)}$, which is obtained by normalizing the bidder's equity value (V_t^B) using its 52-week high (V_{high}^B) and low (V_{low}^B) values. We also define normalized target value $NV_t^T \equiv \frac{Log(V_t^T)-Log(V_{low}^T)}{Log(V_{high}^T)-Log(V_{low}^T)}$ along similar lines. Therefore, a higher value of NV_{ann}^B (NV_{ann}^T) indicates that the bidder's (target's) equity value at announcement is closer to its 52-week high.

Another way to illustrate potential market timing is to examine the bidding and target firms' *Pre-announcement Return*, which we define as the difference between the raw return and the return on the value-weighted CRSP market index over the period from 52 weeks before announcement to 21 days before the announcement (i.e., the $[-1YR, -21]$ window).

Shareholder returns:

As is standard in the literature, we assess short-run performance of the bidding and target firms using their cumulative abnormal return (CAR) over the $[-1, +1]$ window surrounding the announcement (date 0), where CAR is defined as raw return minus the return on the value-weighted CRSP index.

To examine long-run performance of the bidding firms, we adopt the calendar-time portfolio approach advocated by Fama (1998), which is standard in the literature (see Savor and Lu (2009) and Malmendier et al. (2016) for two recent examples).[11] Each month we form equally-weighted portfolios consisting of all firms that announced a bid within the last n months, where n is the length of the holding period and takes on three possible values – 12, 24, and 36 months. The portfolios are rebalanced monthly, with those bidders that reach the end of the holding period dropping out and new bidders coming in. We then calculate

[11] Fama (1998) advocates a calendar-time portfolio approach instead of the buy-and-hold abnormal returns methodology proposed by Barber and Lyon (1996) on the grounds that the buy-and-hold methodology exacerbates any bad model problems through compounding and ignores potential cross-sectional correlation of event-firm abnormal returns. Mitchell and Stafford (2000) show that the latter issue can significantly bias test statistics calculated using buy-and-hold abnormal returns, especially when holding periods for different stocks overlap in calendar time.

the mean monthly abnormal portfolio return (α) for each portfolio by regressing its excess return on the three Fama and French (1993) factors.

3 Descriptive Statistics and Preliminary Results

3.1 Summary statistics

Our sample includes 3,644 deals announced over the period 1985-2015. We present summary statistics for our sample in Panel A of Table 1.

[Insert Table 1 here]

The median (average) value of NRV_{ann} is 0.619 (0.571), which suggests that the median (average) M&A deal is announced when the relative market valuation is more favorable to the bidder firm than to the target firm; that is, the bidder's relative value at announcement is closer to its 52-week high than its 52-week low. This seems reasonable since bidder firms may often choose when to make M&A bids (see, e.g., Schwert (1996)). However, there is substantial cross-sectional variation in NRV_{ann} across deals. In particular, the 25^{th}−percentile value of NRV_{ann} is 0.312, which indicates that a quarter of all deals are announced when the bidder's relative value is much closer to its 52-week low than than its 52-week high. Along similar lines, we note that the bidder's *Pre-announcement Return* is on average, significantly, higher than that of the target, although there is substantial cross-sectional variation across deals.

In terms of deal characteristics, we note that distribution of deal size (measured in 2014 dollars) is highly skewed. For instance, the average deal size is $2,714 million, whereas the median deal size is only $422 million. Similar skewness is also observed in the distribution of bidder and target sizes in terms of their market value of assets (measured in 2014 dollars), and the distribution of relative size (ratio of bidder's size to target's size). Given the skewness in the size variables, we will use the natural logarithm of these variables as controls in our regressions.

Among the deals for which we have information on offer premium, the average offer premium is 31%. In terms of method of payment, 31.4% of the deals in our sample are cash-only offers (identified using the *All Cash* dummy), whereas 56.7% of deals involve some stock payment (identified using the *Stock* dummy). As per the two-digits SIC code industry classification, 63.3% of our sample deals are between two firms in the same industry. *Failed* is a dummy variable that identifies deals that were not successfully completed. In our sample, 653 deals (17.9% of all deals announced) failed to be completed. Based on a reading of news reports from the Lexis-Nexis database, we classify the reasons for deal failure as follows: 167 deals (25.57%) failed due to the target's refusal; 59 deals (9.04%) failed because the bidder withdrew the offer; 108 deals (16.54%) failed because a competitor won the bid; 113 deals (17.30%) were terminated by "mutual consent"; 48 deals failed due to regulatory issues (7.35%); and in 206 deals (31.55%), we did not have sufficient information to determine the reason for failure. We note that this composition is similar to that of the previous studies which hand-collected the reasons for deal failure (e.g., Savor and Lu (2009)).

The summary statistics on short-run announcement returns are largely consistent with previous studies (see Betton et al. (2008) for a recent survey). On average, bidders experience negative short-run announcement returns, whereas the short-run announcement returns to the target firm are large and positive. We discuss long-run announcement returns in Section 4.5 below because these are constructed for portfolios rather than for individual bidders.

The pairwise correlations in Panel B indicate that high NRV_{ann} deals are, on average, more likely to be conducted following large increase (decrease) in the bidder's (target's) stock price in the 52-week period preceding the announcement. The small positive (negative) correlation between NRV_{ann} and Q^B_{ann} (Q^T_{ann}) is to be expected because the bidder (target) is likely to have a higher (lower) Q at announcement in high NRV_{ann} deals.

3.2 Preliminary results

We conduct univariate tests to investigate how deal characteristics, probability of success, and shareholder returns vary with announcement timing (NRV_{ann}). Accordingly, we split our sample into five subsamples corresponding to the five quintiles of NRV_{ann} and examine how the mean values of key variables vary across these subsamples. The results are presented in Table 2 where Q1 and Q5 correspond to the lowest and highest quintile of NRV_{ann}, respectively. In the last column, we report the $t-$statistic for the difference in means between Q1 and Q5.

[Insert Table 2 here]

Table 2 starkly highlights the cross-sectional variation in NRV_{ann}: deals in Q1 are announced when the bidder's relative value is very close to its 52-week low, whereas deals in Q5 are announced when the bidder's relative value is very close to its 52-week high. Examining pre-announcement returns across the five quintiles, it is clear that, on average, high NRV_{ann} deals are announced following a large increase (decrease) in the bidder's (target's) share price over the 52-week period preceding the announcement.

The average deal size does not vary significantly across the NRV_{ann} quintiles. Consistent with the real options argument of Morellec and Zhdanov (2005), deals with the highest NRV_{ann} also involve the greatest relative valuation uncertainty σ^{RV}, although σ^{RV} does not increase monotonically from Q1 to Q5. Note that probability of successful deal completion decreases monotonically from Q1 through Q5. Also, high NRV_{ann} deals are more likely to be hostile deals, less likely to feature tender offers, less (more) likely to feature cash (stock) as method of payment, and are likely to feature significantly higher offer premium.

Just for comparison, we compute the bidder and target overvaluation measures using the model-based methods proposed by Rhodes-Kropf et al. (2005) and Dong et al. (2006); we denote these using the acronyms RRV and $DHRT$, respectively (see footnote 6 for details). We find that NRV_{ann} correlates well with the RRV and DHRT measures of misvaluation.

As can be seen, both the bidder overvaluation measures (RRV_OV^B and $DHRT\_OV^B$) increase monotonically from Q1 to Q5, whereas the target overvaluation measure (RRV_OV^T) decreases monotonically from Q1 to Q5. Despite the caveats about model-based measures of misvaluation, these patterns suggest that high NRV deals are more likely to involve overvalued bidders and undervalued targets.

Examining announcement returns, it is clear that short-term announcement returns for the target firms ($CAR[-1,+1]^T$) are significantly more positive in high NRV_{ann} deals compared to low NRV_{ann} deals. On the other hand, bidders experience more negative short-run announcement returns ($CAR[-1,+1]^B$) in high NRV_{ann} deals compared to low NRV_{ann} deals.

In the next section, we conduct multivariate analysis to see if these patterns are robust to controlling for important deal and firm characteristics.

4 Empirical Results

4.1 Relative values and announcement timing

We begin our multivariate analysis by examining the effect of relative values on announcement timing.[12] The results of our analysis are presented in Table 3.

[Insert Table 3 here]

For each deal, we create 12 observations corresponding to each calendar month $t \in [-1,-12]$ before the announcement date, and compute the NRV_t corresponding to each of

[12]In an unreported test, we use the conditional logit approach in Bena and Li (2014) to show that normalized relative value also affect who buys whom. For each actual bidder-target pair, we create five control pairs in which the actual target is paired with five non-bidders that are very similar to the bidder in terms of size, Q and industry classification, and five control pairs in which the actual bidder is paired with five non-targets that are very similar to the target firm. We define a dummy variable *Actual Pair Dummy*, which takes the value of 1 for the actual bidder-target pair that announced a merger, and the value 0 for the ten control pairs that did not. We then show using a logit specification that NRV has a significant positive effect on the *Actual Pair Dummy*. That is, even after controlling for the effects of size, Q and industry, a bidder is more likely to make an offer for a target if its relative value with respect to the target has increased recently.

these observations. Note that $NRV_{-1M} = NRV_{ann}$ because NRV_{ann} is computed based on equity values 21 trading days (i.e., approximately a calendar month) prior to the announcement date. We then estimate a Cox proportional hazard model with deal fixed effects to understand how NRV_t affects deal announcement hazard. The positive and significant coefficient on NRV_t in column (1) indicates that deal announcement becomes more likely as NRV_t increases.

For a subset of deals in our sample, we are able to identify the date on which the bidder and target started negotiations (the "deal initiation" date) by hand-collecting this information from the SEC filings made by the bidder at deal announcement (see Ahern and Sosyura (2014) and Masulis and Simsir (2015)). We are able to obtain this information for 1,039 deals. Using a similar approach as in column (1), we estimate a Cox proportional hazard model with deal fixed effects to understand how NRV_t (for $t \in [-1, -12]$ months) affects deal initiation hazard. The positive and significant coefficient on NRV_t in column (2) indicates that deal initiation becomes more likely as NRV_t increases.

Let $NRV_{initation}$ denote the normalized relative value for the bidder-target pair on the deal initiation date. In column (3), we estimate an OLS specification to understand how the time between deal initiation and deal announcement (in months) varies with $NRV_{initation}$, conditional on the following bidder and target characteristics at announcement (our qualitative results are unchanged if we control for characteristics at deal initiation): bidder's Q, target's Q, target size, and relative size. The negative coefficient on $NRV_{initation}$ indicates that deals progress quicker from initiation to announcement when the bidder's relative value at initiation is closer to its 52-week high.

4.2 Announcement timing and deal terms

The next step is to examine the effect of announcement timing (NRV_{ann}) on deal terms, such as the method of payment, offer premium, and exchange ratio in case of pure-stock deals. Accordingly, we estimate regressions that are variants of the following form:

$$Y_{jt} = \alpha + \beta * NRV_{ann} + \sum_{i \in \{B,T\}} \psi_i * Q^i_{ann} + \boldsymbol{\gamma} X^B_{t-1} + \boldsymbol{\lambda} X^T_{t-1} + \mu_{industry} + \mu_t + \epsilon_{j,t} \tag{2}$$

Note that the above regression controls for the bidder's Q and target's Q at announcement, and other relevant characteristics of the two firms. Hence, the coefficient β captures the effect of announcement timing on deal terms.

Effect on method of payment

In Table 4 we present the results of regressions aimed at understanding how the method of payment varies with NRV_{ann}. In columns (1) and (2), we estimate Probit regressions with *All Cash* and *Stock*, respectively, as dependent variables. In column (3) and (4), we estimate OLS specifications with *% Stock Payment* as the dependent variable, which denotes the percentage of total consideration that is paid in the form of stock.[13] We include year fixed effects in all specifications because method of payment may be affected by macroeconomic conditions, such as stock market valuations and interest rates.

[Insert Table 4 here]

Our results indicate that NRV_{ann} has a significant effect on the method of payment, even after controlling for bidder's Q and target's Q at announcement and other relevant characteristics. All else equal, high-NRV_{ann} deals are less likely to be pure-cash deals, more likely to involve stock payment, and are likely to have a larger fraction of the payment made in the form of stock.[14] Moreover, the results in column (4) indicate that the effect on *% Stock Payment* are largely driven by a decrease in the target's pre-announcement return

[13]The sample size in columns (3) through (4) is smaller because the *% Stock Payment* variable is not available for every deal. We also estimate a Tobit specification in an unreported test because *% Stock Payment* is censored below at 0 and censored above at 100. The results are qualitatively similar.

[14]A related finding from unreported tests is that high NRV_{ann} deals are less likely to be tender offers. Given that tender offers have to be completed with cash, these results are consistent with our results on method of payment and with the theoretical predictions in Offenberg and Pirinsky (2015).

rather than by an increase in the bidder's pre-announcement return. These results are also economically significant: for instance, the coefficient estimate in column (3) indicates that a one-standard deviation increase in NRV_{ann} is associated with a 5.23% increase in *% Stock Payment*, which is large compared to its sample average of 53.3%. The coefficients on control variables indicate that stock is more likely to be used when relative valuation uncertainty is high, and when the target is large relative to the bidder. The coefficients on Q^B and Q^T are also consistent with prior studies, such as Dong et al. (2006).

Effect on offer premium

If a high NRV_{ann} suggests that the timing of the announcement is to the bidder's relative advantage, why would target shareholders entertain such an offer, especially when the payment is in the form of the bidder's potentially overvalued stock? One possible explanation is that the bidder offers a higher premium to the target shareholders in such situations to compensate them for their perceived disadvantage. To investigate this possibility, we estimate regression (2) with *Offer Premium* as the dependent variable. The results of our estimation are presented in Panel A of Table 5. We use year fixed effects and industry fixed effects in all specifications. Moreover, we also include the target's 52-week high price as an additional control because Baker et al. (2012) show that this is an important determinant of the offer price.

[Insert Table 5 here]

The positive coefficient on NRV_{ann} in column (1) indicates that the offer premium paid to the target is higher in deals with higher NRV_{ann}, even after controlling for bidder's Q and target's Q at announcement and other relevant characteristics. The coefficient estimate in column (1) suggests that a one-standard deviation increase in NRV_{ann} is associated with a 5.05% increase in the offer premium, which is large compared to the average offer premium of 31%. Consistent with the reference-point argument in Baker et al. (2012), we find that offer premium has a strong positive relation with the Target's 52-week high price. The offer premium is also high in deals where the bidder is large compared to the target.

In column (2), we repeat the regression in column (1) after replacing NRV_{ann} with the *Pre-announcement Return* of the bidding and target firms. We find that offer premium is higher in deals where the bidder (target) has experienced a large increase (decrease) in its share price in the 52-week period preceding the announcement of the deal, even after controlling for the valuations of the two firms at announcement.

In columns (3) and (4), we estimate the regression in column (1) separately for pure-cash deals (i.e., *All_Cash* = 1) and deals that feature stock payment (i.e., *Stock* = 1), respectively. As can be seen, the positive relationship between offer premium and NRV_{ann} is present in both subsamples, but is significantly stronger among deals that involve some stock payment. Indeed, a χ^2 test for the difference in coefficients on NRV_{ann} between columns (3) and (4) reveals that the difference is statistically significant with a $p-$value of 0.002. This difference is to be expected because target shareholders should be more concerned about the bidder's relative overvaluation if they are being compensated using the bidder's stock.

Baker et al. (2012) argue that offer prices in M&A transactions (P^T_{offer}) often cluster around the target's 52-week high price (P^T_{52High}), which is an important reference price used by target shareholders to assess the offer. If so, this can lead to a mechanical positive relation between NRV_{ann} and *Offer Premium*, because targets in high NRV_{ann} deals are likely to be trading farther away from their 52-week high price. To investigate this possibility, we estimate the regression in column (1) with $Log(P^T_{offer}/P^T_{52High})$ as the dependent variable. As per the reference-point story, there is no reason for $Log(P^T_{offer}/P^T_{52High})$ to vary with NRV_{ann}. However, the negative coefficient on NRV_{ann} in column (5) indicates that targets in high-NRV_{ann} deals receive a lower price relative to their 52-week high price. Moreover, this effect holds for both pure-cash deals and stock deals (column (6) and (7)). Taken together, the results in columns (1) and (5) indicate that although the offer price in high NRV_{ann} deals is more attractive relative to the target's pre-announcement price (i.e., the offer premium is higher), it is still significantly lower relative to the target's 52-week high price.

In Panel B, we focus on pure-stock deals only and examine how the exchange ratio varies with NRV_{ann}. Note that the exchange ratio varies across deals based on ratio of target's stock price to bidder's price. To adjust for these differences, we follow the approach in Fu et al. (2013) and scale the exchange ratio reported in SDC (ER) using the ratio of target's stock price to bidder's price at announcement (P^T_{ann}/P^B_{ann}). Accordingly, the dependent variable in columns (1) through (3) is $Log(\frac{ER}{(P^T_{ann}/P^B_{ann})})$. The positive coefficient on NRV_{ann} in column (1) indicates that the exchange ratio offered to target shareholders in pure-stock deals is higher in deals with higher NRV_{ann}, even after controlling for bidder's Q and target's Q at announcement and other relevant characteristics. The results in column (2) indicate that this effect is driven mainly by higher pre-announcement returns for the bidder's stock.

We have shown that target shareholders in high-NRV_{ann} stock deals receive a higher exchange ratio relative to the ratio of stock prices at announcement. But how does this exchange ratio compare with the highest exchange ratio that target shareholders could have received based on stock price movements over the 52-week reference window? To investigate this question, we define ER_{52High} as the 52-week high value of the ratio, P^T/P^B, which is used as a reference for determining exchange ratios in stock deals. We then estimate the regression in column (1) with $Log(ER/ER_{52High})$ as the dependent variable. The negative coefficient on NRV_{ann} in column (3) indicates that target shareholders in high-NRV_{ann} deals receive a lower exchange ratio relative to the 52-week high value of P^T/P^B. Taken together, the results in columns (1) and (3) indicate that although target shareholders in high-NRV_{ann} deals receive a higher exchange ratio in comparison to the target's relative stock price at announcement (P^T_{ann}/P^B_{ann}), it is still significantly lower relative to the 52-week high value of P^T/P^B.

Overall, the results in Table 5 suggest that bidders in high-NRV_{ann} deals offer higher bid premium and higher exchange ratios (in case of stock deals) to target shareholders to partially compensate them for their perceived disadvantage. However, despite this, the gap between the valuation offered to the target and the target's 52-week high is wider in deals with higher NRV_{ann}.

4.3 Announcement timing and short-run announcement returns

Next, we use regression (2) to examine the relation between NRV_{ann} and the short-term announcement returns ($CAR[-1,+1]$) of the bidding and target firms. The results of our estimation are presented in Table 6.

[Insert Table 6 here]

The dependent variable in columns (1) through (4) is *Bidder* $CAR[-1,+1]$. We estimate the regression on the full sample in columns (1) and column (2), and then separately for pure-cash deals and stocks deals in columns (3) and (4), respectively. The only difference between columns (1) and (2) is that the specification in column (2) also controls for whether the deal failed ex post (*Failed*). Although success or failure is not observed at time of announcement, we include *Failed* as an additional control because it could be argued that $CAR[-1,+1]$ is affected by expectations of failure. We find a negative relation between *Bidder* $CAR[-1,+1]$ and NRV_{ann}, which is robust to whether the deal fails ex post, but is confined to stock deals only and is absent among pure-cash deals. These patterns are consistent with the market-timing hypothesis, and may arise as the market corrects for the perceived relative overvaluation of the bidder in high NRV_{ann} deals.

The dependent variable in columns (5) through (8) is *Target* $CAR[-1,+1]$. The positive coefficient on NRV_{ann} in all four columns indicates a positive relation between *Target* $CAR[-1,+1]$ and NRV_{ann}, which is robust to whether the deal fails ex post, and holds regardless of the method of payment. Again, these patterns are consistent with the market-timing hypothesis, and may arise partly as correction for the target's perceived undervaluation and partly in response to the higher offer premium in high NRV_{ann} deals.

4.4 Announcement timing and likelihood of deal failure

Next, we examine how the probability of the deal failure varies with NRV_{ann}, all else equal. The market-timing hypothesis predicts that, all else qual, high NRV_{ann} deals should be more likely to fail because target shareholder should be less likely to approve the deal if the timing and terms of the deal are to their disadvantage. To test this, we estimate regression (2) using a Probit specification with *Failed* as the dependent variable. The estimation results are presented in Table 7.

[Insert Table 7 here]

The positive and significant coefficient on NRV_{ann} in column (1) indicates that, all else equal, deals announced at a higher NRV are more likely to fail ex post. Recall that for a subset of failed deals, we are able to categorize the reasons for deal failure (see Section 3 above for details). We define the dummy variable *Failed due to Target's Refusal* to identify deals that failed due to the target's refusal. In column (2), we estimate the Probit regression with *Failed due to Target's Refusal* as the dependent variable. Consistent with the more precise prediction of the market-timing hypothesis, we find that deals announced at a higher NRV are more likely to fail due to lack of target's approval.

In column (3), we estimate the Probit model in column (2) after replacing NRV_{ann} with the *Pre-announcement Return* of the bidding and target firms, and find that the likelihood of deal failure due to the target's refusal is higher (lower) for deals announced following a large increase (decrease) in the bidder's (target's) share price.

The negative relation between NRV_{ann} and deal failure is highly economically significant: the coefficient estimate in column (1) indicates that a one-standard deviation increase in NRV_{ann} from its mean value, while holding all other covariates fixed at their respective means, increase the likelihood of deal failure by 1.69%, which is large in comparison to its mean value of 17.9%.

4.5 Announcement timing and long-run announcement returns

In this section, we examine the long-run performance of the bidding firms for different time horizons, and investigate how these vary with the NRV at announcement and the success or failure of the deal. As we described in Section 2, we adopt the calendar-time portfolio approach advocated by Fama (1998) to compute long-run abnormal returns for different horizons, where the portfolios are also stratified by NRV_{ann} and deal outcomes. We report the mean monthly abnormal portfolio return (α) for the different portfolios in Table 8, where the α of each portfolio is obtained by regressing its excess return on the three Fama and French (1993) factors. Columns (1), (2) and (3) list the α for the 12-month, 24-month, and 36-month period, respectively, following the deal announcement. Column (4) listed the α for the 24-month period surrounding the deal announcement, that is, from 12 months before announcement to 12 months after announcement.

[Insert Table 8 here]

We define "High NRV_{ann}" and "Low NRV_{ann}" to identify deals with $NRV_{ann} \geq 0.5$ and $NRV_{ann} < 0.5$, respectively. As can be seen, bidders in high-NRV_{ann} deals experience negative and significant abnormal returns over all three time horizons (12, 24 and 36 months) following the deal announcement, whereas bidders in low-NRV_{ann} deals do not. Interestingly, however, the statistics in column (4) indicate that bidders in high-NRV_{ann} deals experience large and positive abnormal returns over the 24-month period surrounding the announcement, whereas bidders in low-NRV_{ann} deals experience negative abnormal returns over the same time period. This indicates that the abnormal returns experienced by shareholders of high-NRV_{ann} bidders in the 12-month period leading up to the announcement of the deal far outweigh the negative abnormal returns they experience over the next 12 months.

Next, we further stratify the high-NRV_{ann} and low-NRV_{ann} portfolios based on whether deal was successfully completed or failed ex post. Moreover, we distinguish between "exogenous failures" and other types of failures, where exogenous failures are defined to include failures due to regulatory issues or competing bidders (see Savor and Lu (2009)). In other words, exogenous failures are driven by factors that are more likely to be beyond the control of the bidding and target firms.

As can be seen from the rows labeled (1), (3) and (4), bidders in high-NRV_{ann} deals experience more negative abnormal returns over all three time horizons following the deal announcement in case of deals that fail ex post (row (3)), especially when the failure occurs for exogenous reasons (column (4)). Indeed, the difference in α between rows labeled (1) and (4) is positive and significant for all three time horizons following the deal announcement. Note that these patterns are consistent with the evidence in Savor and Lu (2009). The same pattern is evident for abnormal return over the 24-month period surrounding the deal announcement (i.e., $[-12M, +12M]$).

On the other hand, the long-run abnormal returns experienced by bidders in low-NRV_{ann} deals do not seem to vary significantly between successful deals (row (2)) and deals that failed for exogenous reasons (row (6)). The difference in α between rows labeled (2) and (6) is also insignificant for all three time horizons following the deal announcement.

5 Conclusion

Theories of merger activity suggest that the timing of the merger announcement, in terms of the bidder's relative value (ratio of bidder's equity value to target's equity value) at which the deal is announced, may have a significant bearing on whether long-term shareholders of the bidding and target firms gain from the deal. In this paper, we examine the endogenous timing of M&A announcements in terms of the bidder's relative value at which the deal is announced, and how it compares with the range of relative value during a 52-week reference window preceding the announcement. Accordingly, we create a normalized relative value measure, NRV_{ann}, which takes a higher (lower) value if the bidder's relative value at announcement is closer to its 52-week high (low).

We show that changes in relative value effect announcement timing. Moreover, the announcement timing has significant effects on offer price, method of payment, and announcement returns, even after controlling for the valuations of the bidding and target firms at announcement and other relevant factors. Deals announced at a higher NRV are more likely to include stock payment, feature a higher offer premium relative to the target's pre-announcement price, are more likely to fail ex post, and are associated with lower (higher) short-run announcement returns for the bidding (target) firm. Overall, our results are consistent with the market-timing hypothesis that bidding firms strategically choose the timing of M&A announcements to exploit relative misvaluation. Therefore, any assessment of whether long-term shareholders of the bidding firm gain from M&A transactions must take into account not only the market's reaction to the announcement, but also the endogeneity of the announcement timing and the changes in relative value leading up to the announcement of the bid.

References

Agrawal, A., J. F. Jaffe, and G. N. Mandelker (1992). The Post-Merger Performance of Acquiring Firms: A Re-examination of an Anomaly. *Journal of Finance 47*, 1605–1621.

Ahern, K. and D. Sosyura (2014). Who Writes the News? Corporate Press Releases during Merger Negotiations. *Journal of Finance 69*, 241–291.

Akbulut, M. E. (2013). Do Overvaluation-Driven Stock Acquisitions Really Benefit Acquirer Shareholders? *Journal of Financial and Quantitative Analysis 48*, 1025–1055.

Andrade, G., M. Mitchell, and E. Stafford (2001). New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives 15*, 103–120.

Ang, J. S. and Y. Cheng (2006). Direct Evidence on the Market-Driven Acquisition Theory. *Journal of Financial Research 29*, 199–216.

Asquith, P. (1983). Merger Bids, Uncertainty and Stockholder Returns. *Journal of Financial Economics 11*, 51–83.

Baker, M., C. F. Foley, and J. Wurgler (2009). Multinationals as Arbitrageurs: The Effect of Stock Market Valuations on Foreign Direct Investment. *Review of Financial Studies 22*, 337–369.

Baker, M., X. Pan, and J. Wurgler (2012). The Effect of Reference Point Prices on Mergers and Acquisitions. *Journal of Financial Economics 106*, 49–71.

Baker, M., J. Stein, and J. Wurgler (2003). When does the Market Matter? Stock Prices and the Investment of Equity-Dependent Firms. *Quarterly Journal of Economics 118*, 969–1005.

Baker, M. and J. Wurgler (2000). The Equity Share in New Issues and Aggregate Stock Returns. *Journal of Finance 55*, 2219–2257.

Barber, B. M. and J. D. Lyon (1996). Detecting Amnormal Operating Performance: The Empirical Power and Specification of Test Statistics. *Journal of Financial Economics 41*, 359–399.

Barnes, B. G., N. L. Harp, and D. Oler (2014). Evaluating the SDC mergers and acquisitions database. *Financial Review 49*, 793–821.

Bebchuk, L., A. Cohen, and A. Ferrell (2009). What Matters in Corporate Governance? *Review of Financial Studies 22*, 783–827.

Ben-David, I., M. S. Drake, and D. T. Roulstone (2015). Acquirer Valuation and Acquisition Decisions: Identifying Mispricing Using Short Interest. *Journal of Financial and Quantitative Analysis 50*, 1–32.

Bena, J. and K. Li (2014). Corporate Innovations and Mergers and Acquisitions. *Journal of Finance 69*, 1923–1960.

Betton, S., B. E. Eckbo, and K. S. Thorburn (2008). Corporate Takeovers. In B. Eckbo (Ed.), *Handbook of Empirical Corporate Finance*. Elsevier B.V.

Brainard, W. C. and J. Tobin (1968). Pitfalls in Financial Model Building. *American Economic Review: Papers and Proceedings 58*, 99–122.

Dong, M., D. Hirshleifer, S. Richardson, and S. H. Teoh (2006). Does Investor Misvaluation Drive the Takeover Market? *Journal of Finance 61*, 725–762.

Fama, E. F. (1998). Market Efficiency, Long-Term Returns, and Behavioral Finance. *Journal of Financial Economics 49*, 283–306.

Fama, E. F. and K. R. French (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics 33*, 3–56.

Fu, F., L. Lin, and M. S. Officer (2013). Acquisitions Driven by Stock Overvaluation: Are They Good Deals? *Journal of Financial Economics 109*, 24–39.

Jarrell, G., J. Brickley, and J. Netter (1988). The Market for Corporate Control: The Empirical Evidence Since 1980. *Journal of Economic Prespectives 2*, 49–68.

Jensen, M. and R. Ruback (1983). The Market for Corporate Control: The Scientific Evidence. *Journal of Financial Economics 11*, 5–50.

Jovanovic, B. and P. L. Rousseau (2002). The Q-Theory of Mergers. *American Economic Review: Papers and Proceedings 92*, 198–204.

Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*. Macmillan and Co., Ltd.

Lang, L. H. P., R. Stulz, and R. A. Walkling (1989). Managerial Performance, Tobin's Q, and the Gains from Successful Tender Offers. *Journal of Financial Economics 24*, 137–154.

Loughran, T. and A. M. Vijh (1997). Do Long-Term Shareholders Benefit from Corporate Acquisitions? *Journal of Finance 52*, 1765–1790.

Malmendier, U., M. Opp, and F. Saidi (2016). Target Revaluation after Failed Takeover Attempts: Cash versus Stock. *Journal of Financial Economics 119*, 92–106.

Masulis, R. W. and S. A. Simsir (2015). Deal Initiation in Mergers and Acquisitions. Working Paper.

Mitchell, M. L. and E. Stafford (2000). Managerial Decisions and Long-Term Stock Price Performance. *Journal of Business 73*, 287–329.

Moeller, S., F. Schlingemann, and R. Stulz (2005). Wealth Destruction on a Massive Scale? A Study of the Acquiring-Firm Returns in the Recent Merger Wave. *Journal of Finance 60*, 757–782.

Morck, R., A. Shleifer, and R. W. Vishny (1990). The Stock Market and Investment: Is the Market a Sideshow? *Brookings Papers on Economic Activity 2*, 157–215.

Morellec, E. and A. Zhdanov (2005). The Dynamics of Mergers and Acquisitions. *Journal of Financial Economics 77*, 649–672.

Offenberg, D. and C. Pirinsky (2015). How do Acquirers Choose between Mergers and Tender Offers? *Journal of Financial Economics 116*, 331–348.

Ohlson, J. A. (1995). Earnings, Book Values, and Dividends in Equity Valuation. *Contemporary Accounting Research 11*, 661–687.

Rau, P. R. and T. Vermaelen (1998). Glamour, Value and the Post-Acquisition Performance of Acquiring Firms. *Journal of Financial Economics 49*, 223–253.

Rhodes-Kropf, M., D. T. Robinson, and S. Viswanathan (2005). Valuation Waves and Merger Activity: The Empirical Evidence. *Journal of Financial Economics 77*, 561–603.

Rhodes-Kropf, M. and S. Viswanathan (2004). Market Valuation and Merger Waves. *Journal of Finance 59*, 2685–2718.

Savor, P. G. and Q. Lu (2009). Do Stock Mergers Create Value for Acquirers? *Journal of Finance 64*, 1061–1097.

Schwert, G. W. (1996). Markup Pricing in Mergers and Acquisitions. *Journal of Financial Economics 41*, 153–192.

Servaes, H. (1991). Tobin's Q and the Gains from Takeovers. *Journal of Finance 46*, 409–419.

Shleifer, A. and R. W. Vishny (2003). Stock Market Driven Acquisitions. *Journal of Financial Economics 70*, 295–311.

Appendix A Definitions of Variables

A.1 Deal Characteristic Variables

Deal characteristic variables are calculated using the items reported on the SDC U.S. Mergers and Acquisitions database. All the ratio variables we calculate are winsorized at the 1st and 99th percentiles.

- Deal Value: Deal value reported by the SDC, in million 2014 dollars.
- Offer Premium: Log difference between initial offer price per common shares (SDC item 'PR_INITIAL') and the target price one month prior to the announcement date.
- All Cash: A dummy variable that equals to 1 if the method of payment of a deal is fully comprised of cash payment and 0 otherwise.
- Stock: A dummy variable that equals to 1 if the method of payment of a deal includes stock payment and 0 otherwise.
- % Stock Payment: SDC reported percentage of the value of stock payment, compared with the total deal value, divided by 100.
- Failed: A dummy variable that equals to 0 if the deal is eventually consummated (SDC "Deal Status" code 'C' and 'U') and 1 otherwise.
- SameInd: A dummy variable that equals to 1 if both bidder and target firms are in the same industry, as per the two-digits SIC code industries, and 0 otherwise.
- Compete: A dummy variable that equals to 1 if a competing offer is reported by the SDC and 0 otherwise.
- Hostile: A dummy variable that equals to 1 if the SDC codes the deal attitude as hostile and 0 otherwise.
- Tender: A dummy variable that equals to 1 if the SDC codes the deal as a tender offer and 0 otherwise.

A.2 Timing-related Variables

Stock data are from the CRSP Daily Stock Files database. Volatility variables use stock price or return observations over the trading day window $[-273, -21]$, where day 0 is the announcement date. We require a bidding firm to have at least 120 non-missing (stock return or price) observations during the window to be included in our analyses. 52-week variables are also obtained over the trading day window $[-273, -21]$. Superscripts 'B' and 'T' denote bidder and target firm variables, respectively.

- $NRV_{ann} = \frac{Log(RV_{ann}) - Log(RV_{low})}{Log(RV_{high}) - Log(RV_{low})}$, where $RV_t = V_t^B / V_t^T$ and 'low' ('high') indicates 52-week low (high) value.

- $NV^X_{ann} = \frac{Log(V^X_{ann})-log(V^X_{low})}{Log(V^X_{high})-Log(V^X_{low})}$, where $X \in \{B,T\}$, 'V' denotes the firm's market value of equity, and 'low' ('high') indicates 52-week low (high) value.

- High NRV_{ann}: A dummy variable that equals to 1 if NRV_{ann} is greater than or equal to 0.5 and 0 otherwise.

- σ^{RV}: Standard deviation of the daily percentage changes in RV, annualized by multiplying $\sqrt{252}$.

- Target 52 High: Log difference between a target firm's 52-week high price and the target share price one month prior to the announcement, similar to Baker et al. (2012).

- RRV_OV: Misvaluation measure of Rhodes-Kropf et al. (2005), calculated following the procedure of Fu et al. (2013).

- $DHRT\_OV$: Misvaluation measure of Dong et al. (2006), which is the ratio of price to "residual income value," where the residual income value is calculated using analyst earnigns forecasts.

A.3 Firm-level Variables

Stock data are from the CRSP Daily Stock Files database. Other firm-level financial data, as of the fiscal year-end immediately preceding a M&A announcement, are from COMPUSTAT. Superscripts 'B' and 'T' denote bidder and target firm variables, respectively. All the ratio variables we calculate are winsorized at the 1st and 99th percentiles.

- $CAR[-1,+1]$: Difference between a firm's raw return and market return over the window $[-1,+1]$ (i.e., from one day before announcement to one day after announcement). We use value-weighted S&P 500 portfolio returns for the market returns.

- Pre-announcement Return: Difference between a firm's raw return and market return over the $[-273,-21]$ reference window.

- Size: Market value of equity one month prior to the date of announcement.

- Relative Size: Ratio of bidder size to target size.

- Leverage: Ratio of long-term debt ('dltt') to total assets ('at').

- Q_{ann}: Ratio of the sum of a firm's market value of equity one month prior to the announcement and its book value of debt ('dltt'+'dlc') to the sum of book values of equity ('seq') and debt.

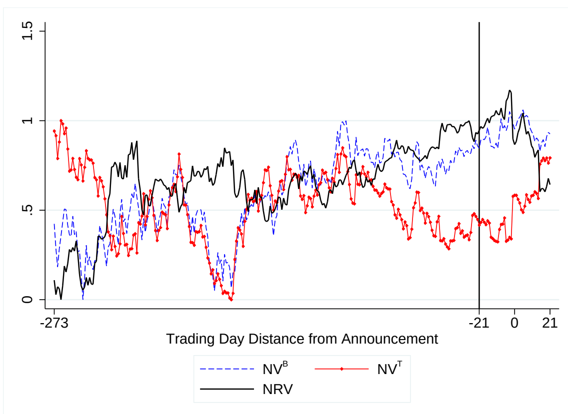
- Market Value: Market value of equity one month prior to the announcement plus book value of debt.

- E-Index: 'Entrenchment Index' of Bebchuk et al. (2009), constructed using the items from ISS database. When E-Index is missing for a certain year, we use the most recent non-missing E-Index for the year's index value.

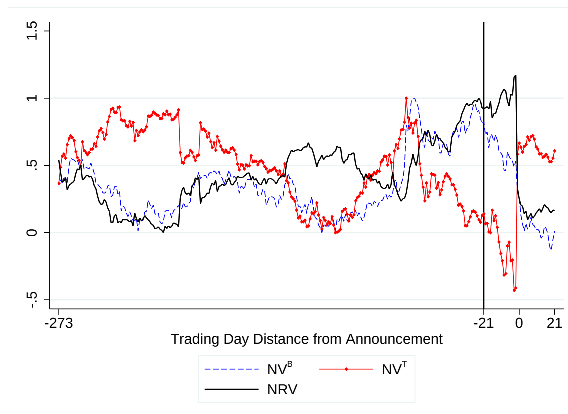
- Insider (Institutional) Holdings: Insider (institutional owner) shareholdings (in the fraction of the firm's total number of shares outstanding), obtained from Thomson Reuters ownership database.

Figure 1: Plot of Normalized Valuations: High NRV_{ann} Deals

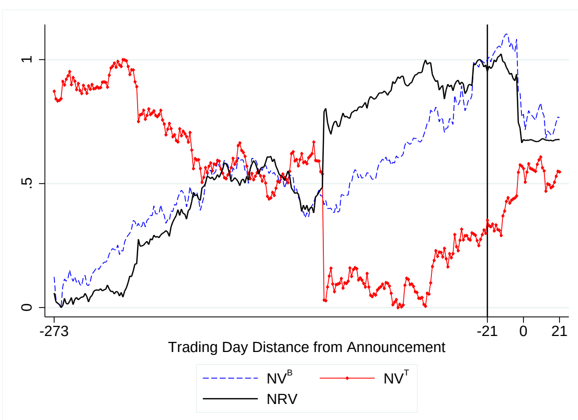
This figure presents the daily plots of normalized valuations for large U.S. M&A deals (whose deal values are at lest $10 billion) with the highest NRV_{ann} values that were announced after 2001 and resolved during our sample period. All the variables are defined in the Appendix.



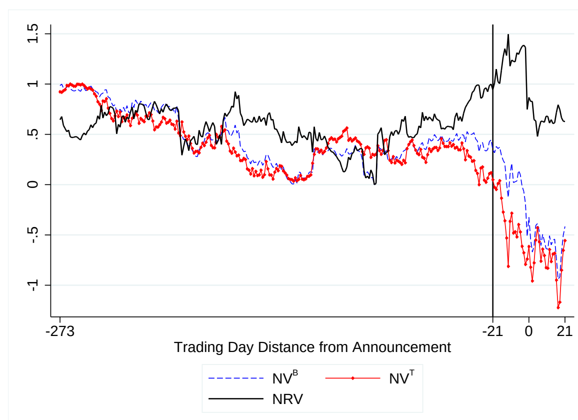
(a) Oracle & Peoplesoft (2003)
$NRV_{ann} = 0.93;\ NV^B = 0.86;\ NV^T = 0.45$



(b) Microsoft & Yahoo (2008)
$NRV_{ann} = 0.93;\ NV^B = 0.81;\ NV^T = 0.13$



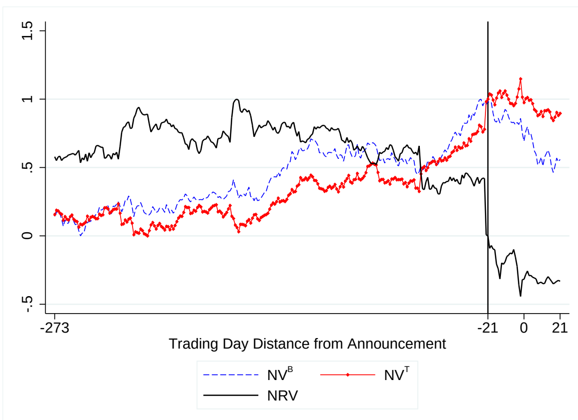
(c) Symantec & Veritas Software (2004)
$NRV_{ann} = 0.98;\ NV^B = 0.99;\ NV^T = 0.30$



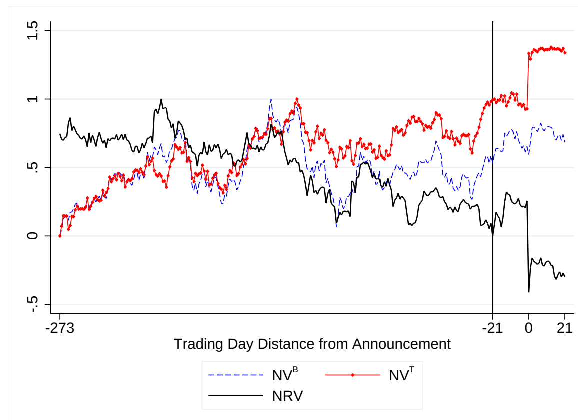
(d) Centurylink & Embarq (2008)
$NRV_{ann} = 1;\ NV^B = 0.45;\ NV^T = 0.12$

Figure 2: Plot of Normalized Valuations: Low NRV_{ann} Deals

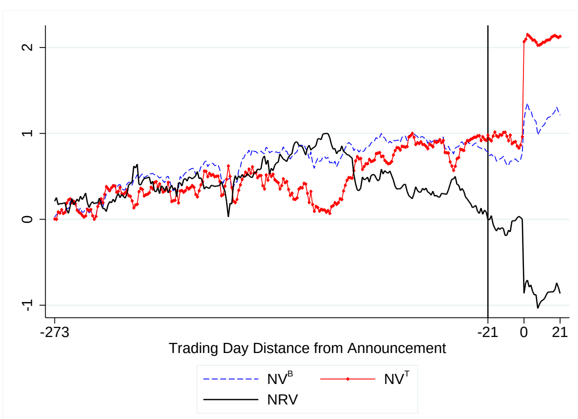
This figure presents the daily plots of normalized valuations for large U.S. M&A deals (whose deal values are at lest $10 billion) with the lowest NRV_{ann} values that were announced after 2001 and resolved during our sample period. All the variables are defined in the Appendix.



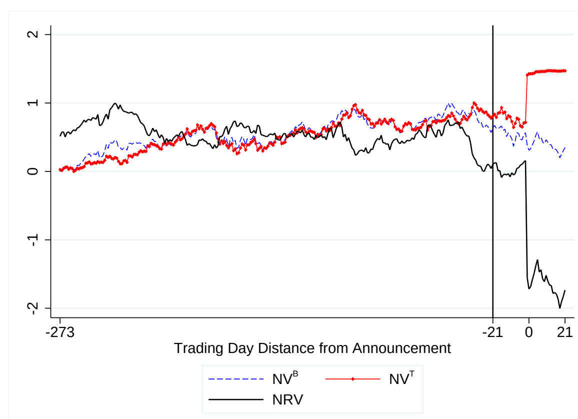
(a) Chevron & Unocal (2005)
$NRV_{ann} = 0;\ NV^B = 0.96;\ NV^T = 1$



(b) Freeport-McMoRan & Phelps Dodge (2006)
$NRV_{ann} = 0;\ NV^B = 0.51;\ NV^T = 0.99$



(c) Becton Dickinson & Carefusion (2014)
$NRV_{ann} = 0;\ NV^B = 0.79;\ NV^T = 0.98$



(d) Anadarko Petroleum & Kerr-McGee (2006)
$NRV_{ann} = 0.04;\ NV^B = 0.58;\ NV^T = 0.79$

Table 1: Summary Statistics

Our sample includes 3,644 M&A announcements reported by SDC, for the period 1985-2015. Panel A presents the descriptive statistics and Panel B lists the pair-wise correlations between the key variables used in our analysis. All the variables are defined in the Appendix. Asterisks in Panel B denote significance at the 10% level.

Panel A. Descriptive Statistics

	N	Mean	Std. Dev.	P25	Median	P75
Timing Variables:						
NRV_{ann}	3,644	0.571	0.306	0.312	0.619	0.840
NV^B_{ann}	3,644	0.654	0.298	0.418	0.734	0.920
NV^T_{ann}	3,644	0.564	0.316	0.286	0.594	0.862
Pre-Announcement Return^B	3,644	0.147	0.628	-0.201	0.031	0.318
Pre-Announcement Return^T	3,642	-0.025	0.624	-0.417	-0.124	0.187
Deal Characteristics:						
Deal Value	3,644	2714.274	10209.193	117.823	422.118	1535.283
Offer Premium	2,380	0.310	0.280	0.169	0.293	0.449
All Cash	3,644	0.314	0.464	0.000	0.000	1.000
Stock	3,644	0.567	0.496	0.000	1.000	1.000
% Stock Payment	3,210	0.533	0.447	0.000	0.609	1.000
Failed	3,644	0.179	0.384	0.000	0.000	0.000
SameInd	3,644	0.633	0.482	0.000	1.000	1.000
Compete	3,644	0.095	0.293	0.000	0.000	0.000
Hostile	3,644	0.045	0.208	0.000	0.000	0.000
Tender	3,644	0.244	0.430	0.000	0.000	0.000
σ^{RV}	3,644	8.259	28.303	0.236	0.441	1.215
Firm Characteristics:						
Market Value^B ($ million)	3,564	16613.109	47265.200	653.807	2812.864	11107.599
Market Value^T	3,461	2835.044	9927.447	134.131	435.037	1625.739
Relative Size	3,644	17.586	30.219	2.003	5.385	17.738
Q^B_{ann}	3,559	3.096	3.365	1.365	2.051	3.398
Q^T_{ann}	3,461	2.456	2.552	1.140	1.657	2.699
Leverage^B	3,560	0.192	0.184	0.032	0.159	0.289
Announcement Returns:						
Bidder $CAR[-1,+1]$	3,644	-0.011	0.088	-0.053	-0.009	0.028
Target $CAR[-1,+1]$	3,644	0.220	0.267	0.059	0.177	0.331

Panel B. Correlations

	NRV_{ann}	NV^B_{ann}	NV^T_{ann}
NRV_{ann}	1.000		
NV^B_{ann}	0.357*	1.000	
NV^T_{ann}	-0.545*	0.380*	1.000
Pre-Announcement Return^B	0.285*	0.527*	0.221*
Pre-Announcement Return^T	-0.433*	0.240*	0.629*
σ^{RV}	0.087*	0.009	-0.056*
Log of Relative Size	0.047*	0.089*	-0.065*
Log of Target Size	-0.116*	0.169*	0.300*
Q^B_{ann}	0.134*	0.211*	0.062*
Q^T_{ann}	-0.130*	0.142*	0.245*
Leverage^B	0.013	0.096*	0.107*

Table 2: Mean Deal Characteristics Sorted by $\mathbf{NRV_{ann}}$ Quintiles

This table presents the mean values of our key variables across the subsamples corresponding to the five quintiles of NRV_{ann}. 'Q1' and 'Q5' correspond to the lowest and highest quintile of NRV_{ann}, respectively. Mean differences between the values of Q1 and Q5, along with the t-statistics, are reported in the last two columns. All the variables are defined in the Appendix.

	Mean by NRV_{ann} Quintiles					Mean Difference	
	Q1	Q2	Q3	Q4	Q5	Q1 − Q5	t-stat
Timing Measures:							
NRV_{ann}	0.109	0.380	0.617	0.801	0.949	-0.841	-268.28
NV^B_{ann}	0.507	0.584	0.641	0.725	0.813	-0.307	-21.03
NV^T_{ann}	0.823	0.662	0.543	0.451	0.340	0.483	35.42
Pre-Announcement Return^B	-0.076	0.008	0.096	0.271	0.435	-0.511	-15.95
Pre-Announcement Return^T	0.445	0.077	-0.117	-0.229	-0.304	0.749	22.70
Deal Characteristics:							
Deal Value	3119.208	3075.779	2182.946	2682.745	2510.411	608.797	1.07
Failed (%)	16.461	14.952	18.381	20.988	18.956	-2.495	-1.25
Hostile (%)	2.743	3.704	4.664	5.624	5.907	-3.163	-2.98
Tender (%)	29.355	26.200	22.222	23.457	20.879	8.476	3.75
All-Cash (%)	42.250	32.373	30.316	25.789	26.099	16.151	6.59
Stock (%)	44.033	55.144	56.927	63.374	64.148	-20.115	-7.86
Offer Premium	0.230	0.286	0.301	0.339	0.394	-0.164	-9.29
Exchange Ratio Premium	0.140	0.296	0.293	0.424	0.531	-0.391	-5.35
Firm Characteristics:							
Log of Bidder Size	7.371	6.994	6.975	6.899	6.987	0.384	3.45
Log of Target Size	5.614	5.328	5.153	5.085	5.074	0.540	5.56
Log of Relative Size	1.777	1.665	1.826	1.814	1.931	-0.153	-1.91
Q^B_{ann}	2.432	2.767	3.179	3.519	3.580	-1.148	-6.84
Q^T_{ann}	3.030	2.525	2.302	2.409	2.002	1.028	7.23
Leverage^B	0.191	0.186	0.191	0.181	0.205	-0.014	-1.43
σ^{RV}	4.735	6.866	7.368	10.620	11.711	-6.976	-4.66
Institutional Holdings^B	0.496	0.468	0.484	0.443	0.434	0.063	3.98
Insider Holdings^B	0.013	0.017	0.028	0.021	0.021	-0.008	-2.31
E-Index^T	1.878	1.727	1.787	1.815	1.758	0.120	0.90
Overvaluation Measures:							
RRV_OV^B	-0.021	0.097	0.241	0.390	0.465	-0.486	-9.38
RRV_OV^T	0.278	0.094	0.021	-0.027	-0.140	0.419	9.44
$DHRT\_OV^B$	8.910	11.493	12.197	11.638	13.870	-4.960	-5.88
$DHRT\_OV^T$	8.201	6.884	7.959	8.006	7.168	1.033	1.79
Announcement Returns:							
Bidder $CAR[-1,+1]$	0.002	-0.010	-0.011	-0.017	-0.017	0.019	3.94
Target $CAR[-1,+1]$	0.185	0.205	0.214	0.228	0.270	-0.084	-5.82

Table 3: Timing of Deal Initiation, Timing of Announcement, and $\mathbf{NRV_{ann}}$

This table reports the result of Cox proportional hazard models and an OLS regression that examine the relationship between the timing of deal announcement or initiation and NRV_{ann}. Column (1) (Column (2)) estimates a Cox proportional hazard model of the number of months between day t and the day of deal announcement (initiation), T, where $t \in [T-1M, T-2M, \ldots, T-12M]$ and M equals to thirty calendar days. Hence, each deal has up to twelve observations with different "Time to Announcement" ("Time to Initiation"), where deal-specific characteristics are controlled by deal fixed-effects. The coefficient estimates, along with their z-statistics that are robust to heteroskedasticity and clustered at the deal level, are reported. Column (3) estimates an OLS regression of the number of months from deal initiation to announcement ("Time from initiation to announcement") on $NRV_{initiate}$, where *initiate* denotes the beginning of the month of deal initiation. All the variables are defined in the Appendix. Standard errors are robust to heteroskedasticity and are clustered at the level of the bidding firm. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Model of:	Time to Announcement	Time to Initiation	Time from Initiation to Announcement
	(1)	(2)	(3)
NRV_t	0.151***	0.322***	
	(2.85)	(3.18)	
$NRV_{initiate}$			-1.155**
			(-2.03)
Q^B_{ann}			-0.059
			(-1.61)
Q^T_{ann}			-0.165***
			(-3.17)
Log of Relative Size			0.271**
			(1.99)
Log of Target Size			0.004
			(0.04)
Constant			6.519***
			(8.77)
Deal FE	Yes	Yes	No
Specification	Cox hazard	Cox hazard	OLS
Pseudo R^2 (R^2)	0.002	0.003	0.024
N	41,086	11,406	999

Table 4: Determinants of Method of Payment

This table reports the result of regressions that examine the relationship between the method of payment and NRV_{ann}. We estimate variants of the regression

$$Y_{jt} = \alpha + \beta * NRV_{ann} + \sum_{i \in \{B,T\}} \psi_i * Q^i_{ann} + \boldsymbol{\gamma} X^B_{t-1} + \boldsymbol{\lambda} X^T_{t-1} + \mu_t + \epsilon_{j,t}$$

The dependent variables of interest are *All Cash* in column (1), *Stock* in column (2), and *% Stock Payment* in columns (3) and (4). We estimate Probit regressions in columns (1) and (2) and OLS regressions in columns (3) and (4). We include year dummies in all columns. All the variables are defined in the Appendix. Standard errors are robust to heteroskedasticity and are clustered at the level of the bidding firm. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Dependent Variable:	All Cash	Stock	% Stock Payment	
	(1)	(2)	(3)	(4)
NRV_{ann}	-0.453***	0.524***	0.171***	
	(-5.34)	(6.49)	(6.80)	
σ^{RV}	-0.001	0.002**	0.001**	0.001***
	(-1.25)	(2.08)	(2.17)	(2.68)
Q^B_{ann}	-0.075***	0.107***	0.022***	0.024***
	(-5.03)	(6.64)	(7.98)	(7.74)
Q^T_{ann}	-0.006	0.025*	0.011***	0.010***
	(-0.47)	(1.92)	(3.41)	(2.94)
Log of Relative Size	0.240***	-0.237***	-0.073***	-0.073***
	(11.22)	(-10.70)	(-11.78)	(-11.63)
Log of Target Size	-0.031*	0.017	-0.006	-0.007
	(-1.83)	(0.99)	(-1.25)	(-1.31)
Leverage^B	-0.478***	0.243	-0.030	-0.009
	(-3.14)	(1.60)	(-0.66)	(-0.20)
Pre-Announcement Return^B				0.019
				(1.29)
Pre-Announcement Return^T				-0.041***
				(-3.02)
Constant	0.205	-0.658***	0.402***	0.484***
	(1.12)	(-3.54)	(6.20)	(7.60)
Year Effects	Yes	Yes	Yes	Yes
Specification	Probit	Probit	OLS	OLS
Pseudo R^2	0.164	0.154		
R^2			0.242	0.232
N	3,383	3,383	2,984	2,984

Table 5: Pricing of Mergers and Acquisitions

This table reports the result of regressions that examine the relationship between the pricing of target firms and NRV_{ann}. We estimate variants of the regression

$$Y_{jt} = \alpha + \beta * NRV_{ann} + \sum_{i\in\{B,T\}} \psi_i * Q^i_{ann} + \boldsymbol{\gamma} X^B_{t-1} + \boldsymbol{\lambda} X^T_{t-1} + \mu_{industry} + \mu_t + \epsilon_{j,t}$$

Panel A estimates the OLS regressions of *Offer Premium* in columns (1) through (4) and the regressions of $Log(P^T_{offer}/P^T_{52\ High})$ in columns (5) through (7). Columns (3) and (6) estimate regressions for all cash deals ($All\ Cash = 1$) and columns (4) and (7) estimate regressions for the deals that feature stock payment ($Stock = 1$). Panel B estimates the OLS regressions of $Log(\frac{ER}{P^T_{ann}/P^B_{ann}})$ in columns (1) and (2) and the regression of $Log(ER/ER_{52High})$ in column (3) for the deals that feature stock payment ($Stock = 1$), where ER is the exchange ratio reported in SDC. We include bidder industry fixed-effects and year dummies in all columns. All the variables are defined in the Appendix. Standard errors are robust to heteroskedasticity and are clustered at the level of the bidding firm. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Panel A. Offer Premium and NRV_{ann}

Dependent Variable:	Offer Premium				$Log(P^T_{offer}/P^T_{52\ High})$		
Samples Inluded:	All Deals		$All\ Cash = 1$	$Stock = 1$	All Deals	$All\ Cash = 1$	$Stock = 1$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
NRV_{ann}	0.165***		0.064*	0.210***	-0.289***	-0.330***	-0.240***
	(7.57)		(1.78)	(6.68)	(-8.31)	(-7.03)	(-4.42)
σ^{RV}	-0.000**	-0.000**	-0.000	-0.000**	-0.001***	-0.001**	-0.001*
	(-2.50)	(-2.36)	(-0.25)	(-1.98)	(-3.01)	(-2.06)	(-1.67)
Target 52 High	0.045**	0.079***	0.153***	0.031			
	(2.36)	(3.84)	(4.22)	(1.34)			
Log of Relative Size	0.037***	0.037***	0.035***	0.039***	0.045***	0.004	0.055***
	(7.03)	(6.96)	(4.79)	(4.57)	(5.22)	(0.43)	(3.63)
Log of Target Size	-0.011**	-0.009**	-0.015**	-0.008	0.067***	0.014	0.097***
	(-2.41)	(-2.05)	(-2.10)	(-1.21)	(8.64)	(1.38)	(8.83)
Q^B_{ann}	-0.001	-0.003	-0.009***	0.001	0.005	-0.004	0.009*
	(-0.51)	(-1.11)	(-2.76)	(0.31)	(1.29)	(-0.56)	(1.83)
Q^T_{ann}	0.001	-0.002	-0.001	0.001	0.008**	0.004	0.009
	(0.25)	(-0.58)	(-0.27)	(0.38)	(2.16)	(0.94)	(1.50)
Leverage^B	-0.038	-0.034	-0.060	-0.044	0.219***	0.171**	0.264***
	(-1.10)	(-0.98)	(-1.12)	(-0.84)	(3.48)	(2.10)	(2.85)
$\text{Pre-Announcement Return}^B$		0.057***					
		(5.18)					
$\text{Pre-Announcement Return}^T$		-0.027**					
		(-2.28)					
Constant	0.378***	0.461***	0.454***	0.200	0.123	0.409***	-0.573***
	(6.69)	(8.57)	(5.45)	(1.05)	(1.37)	(3.41)	(-3.04)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS
R^2	0.162	0.149	0.282	0.168	0.262	0.319	0.308
N	2,239	2,239	715	1,287	2,239	715	1,287

Panel B. Exchange Ratios and NRV_{ann}

Dependent Variable:	$Log(\frac{ER}{P^T_{ann}/P^B_{ann}})$		$Log(ER/ER_{52High})$
	(1)	(2)	(3)
NRV_{ann}	0.224***		-1.649***
	(2.82)		(-10.84)
σ^{RV}	-0.001	-0.001	-0.001
	(-1.22)	(-1.15)	(-0.62)
Target 52 High	0.138***	0.186***	
	(3.10)	(3.67)	
Log of Relative Size	0.119***	0.122***	1.496***
	(5.46)	(5.60)	(38.79)
Log of Target Size	0.018	0.019	0.286***
	(0.92)	(0.99)	(9.74)
Q^B_{ann}	0.021**	0.015	-0.018
	(2.32)	(1.54)	(-1.48)
Q^T_{ann}	-0.025***	-0.028***	0.020
	(-3.08)	(-3.14)	(1.16)
Leverage^B	-0.172	-0.180	0.126
	(-1.44)	(-1.49)	(0.44)
$\text{Pre-Announcement Return}^B$		0.099***	
		(2.64)	
$\text{Pre-Announcement Return}^T$		-0.029	
		(-0.72)	
Constant	1.685***	1.722***	-5.839***
	(3.94)	(4.13)	(-17.00)
Industry FE	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Specification	OLS	OLS	OLS
R^2	0.181	0.181	0.632
N	1,445	1,445	1,445

Table 6: Announcement Returns and M&A Announcement Timing

This table reports the result of regressions that examine the relationship between the bidding and target shareholders returns and NRV_{ann}. We estimate variants of the regression

$$Y_{jt} = \alpha + \beta * NRV_{ann} + \sum_{i \in \{B,T\}} \psi_i * Q^i_{ann} + \boldsymbol{\gamma} X^B_{t-1} + \boldsymbol{\lambda} X^T_{t-1} + \mu_{industry} + \mu_t + \epsilon_{j,t}$$

The dependent variable is *Bidder* $CAR[-1,+1]$ in columns (1) through (4) and *Target* $CAR[-1,+1]$ in columns (5) through (8). Columns (3) and (7) estimate regressions for all cash deals (*All Cash* $= 1$), whereas columns (4) and (8) estimate regressions for the deals that feature stock payment (*Stock* $= 1$). We include bidder industry fixed-effects and year dummies in all columns. All the variables are defined in the Appendix. Standard errors are robust to heteroskedasticity and are clustered at the level of the bidding firm. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Dependent Variable:	Bidder $CAR[-1,+1]$				Target $CAR[-1,+1]$			
Samples Included:	All Deals		*All Cash* $= 1$	*Stock* $= 1$	All Deals		*All Cash* $= 1$	*Stock* $= 1$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NRV_{ann}	-0.018***	-0.018***	0.001	-0.021***	0.093***	0.095***	0.100***	0.096***
	(-3.50)	(-3.50)	(0.14)	(-2.66)	(6.56)	(6.69)	(3.52)	(5.50)
σ^{RV}	-0.000	-0.000	0.000	-0.000	-0.000**	-0.000**	-0.000	-0.000
	(-1.31)	(-1.31)	(0.56)	(-1.28)	(-2.42)	(-2.39)	(-0.20)	(-1.44)
Q^B_{ann}	-0.002**	-0.002**	0.000	-0.002**	-0.004**	-0.004**	-0.020***	0.001
	(-2.42)	(-2.40)	(0.26)	(-2.08)	(-2.36)	(-2.23)	(-3.95)	(0.33)
Q^T_{ann}	0.000	0.000	-0.000	0.001	-0.009***	-0.009***	-0.010***	-0.007**
	(0.13)	(0.12)	(-0.16)	(1.33)	(-4.21)	(-4.28)	(-2.65)	(-2.56)
Log of Relative Size	0.001	0.001	-0.009***	0.003	0.047***	0.046***	0.048***	0.050***
	(0.53)	(0.48)	(-2.89)	(1.60)	(12.26)	(11.82)	(6.24)	(9.82)
Log of Target Size	-0.005***	-0.005***	-0.009***	-0.004***	0.000	-0.000	-0.000	-0.001
	(-4.67)	(-4.73)	(-4.97)	(-2.65)	(0.16)	(-0.10)	(-0.02)	(-0.15)
Leverage^B	0.018	0.018	0.024	0.008	-0.024	-0.022	-0.110*	0.001
	(1.47)	(1.47)	(0.97)	(0.56)	(-0.87)	(-0.81)	(-1.79)	(0.02)
Failed		-0.002				-0.035***		
		(-0.47)				(-3.25)		
Constant	-0.000	0.000	0.030	0.011	-0.202**	-0.194*	0.027	-0.353***
	(-0.01)	(0.01)	(0.93)	(0.52)	(-1.99)	(-1.85)	(0.38)	(-7.36)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
R^2	0.081	0.081	0.147	0.092	0.147	0.150	0.174	0.179
N	3,383	3,383	1,042	1,942	3,383	3,383	1,042	1,942

Table 7: Success of Mergers and Acquisitions

This table reports the result of regressions that examine the relationship between the deal's success and NRV_{ann}. We estimate variants of the regression

$$Y_{jt} = \alpha + \beta * NRV_{ann} + \sum_{i \in \{B,T\}} \psi_i * Q^i_{ann} + \boldsymbol{\gamma} X^B_{t-1} + \boldsymbol{\lambda} X^T_{t-1} + \mu_t + \epsilon_{j,t}$$

The dependent variable of interest is specified at the heading of each column. "*Failed*" equals to 1 if the deal is failed and equals to 0 if the deal is consummated. "*Failed due to Target's Refusal*" equals to 1 if the deal is failed due to the target firm's refusal and 0 otherwise. We estimate Probit regressions that include year dummies in all columns. All the variables are defined in the Appendix. Standard errors are robust to heteroskedasticity and are clustered at the level of the bidding firm. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Dependent Variable:	Failed	Failed due to Target's Refusal	
	(1)	(2)	(3)
NRV_{ann}	0.215**	0.542***	
	(2.39)	(3.91)	
σ^{RV}	0.000	0.000	0.000
	(0.32)	(0.16)	(0.28)
Q^B_{ann}	0.018*	0.004	-0.002
	(1.88)	(0.26)	(-0.13)
Q^T_{ann}	-0.019	-0.031	-0.027
	(-1.29)	(-1.02)	(-0.90)
Log of Relative Size	-0.195***	-0.195***	-0.193***
	(-9.36)	(-6.25)	(-6.18)
Log of Target Size	-0.089***	-0.026	-0.020
	(-5.03)	(-1.09)	(-0.84)
Leverage^B	0.247*	-0.042	-0.021
	(1.69)	(-0.20)	(-0.10)
Pre-Announcement Return^B			0.202***
			(3.15)
Pre-Announcement Return^T			-0.272***
			(-3.21)
Constant	-0.066	-1.367***	-1.112***
	(-0.36)	(-5.39)	(-4.43)
Year Effects	Yes	Yes	Yes
Specification	Probit	Probit	Probit
Pseudo R^2	0.061	0.080	0.078
N	3,383	3,383	3,383

Table 8: Long-term Shareholder Returns and M&A Announcement Timing

This table reports mean monthly percentage abnormal returns of the specified calendar-time portfolio, estimated over the indicated holding period. We follow the procedure of Savor and Lu (2009) to compute the abnormal returns ("alpha") for each portfolio. Specifically, monthly excess returns of an equal-weighted portfolio are regressed on the Fama-French three-factors to estimate the intercept or alpha. "High NRV_{ann}" ("Low NRV_{ann}") indicates the deals with $NRV_{ann} \geq 0.5$ ($NRV_{ann} < 0.5$). "Exgoneous Failed" indicates the deals failed due to exogenous reasons, including regulators intervention and competing outbids. The numbers in parentheses denote t-statistics. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) level.

Holding Period:	$[0M, +12M]$	$[0M, +24M]$	$[0M, +36M]$	$[-12M, +12M]$
Deals included in the portfolio:				
High NRV_{ann}	-0.374***	-0.354***	-0.325***	0.608***
	(-2.68)	(-2.92)	(-2.78)	(5.50)
Low NRV_{ann}	-0.129	-0.086	-0.082	-0.218**
	(-0.93)	(-0.71)	(-0.72)	(-2.08)
High $NRV_{ann}\times$ Success (1)	-0.208	-0.289**	-0.277**	0.633***
	(-1.46)	(-2.40)	(-2.37)	(5.45)
Low $NRV_{ann}\times$ Success (2)	0.004	-0.054	0.033	-0.121
	(-0.03)	(-0.45)	(-0.29)	(-1.14)
High NRV_{ann} × All Failed (3)	-0.962***	-0.496**	-0.486***	0.570***
	(-3.83)	(-2.49)	(-2.71)	(3.02)
High NRV_{ann} × Exogenous Failed (4)	-1.621***	-1.179***	-0.793**	0.113
	(-3.25)	(-2.65)	(-2.36)	(0.34)
Low NRV_{ann} × All Failed (5)	-0.835**	-0.205	-0.416*	-0.777***
	(-2.27)	(-0.74)	(-1.92)	(-3.09)
Low NRV_{ann} × Exogenous Failed (6)	-0.214	-0.143	-0.231	-0.276
	(-0.47)	(-0.40)	(-0.75)	(-0.86)
Mean differences:				
(1) − (2)	-0.205	-0.235**	-0.243***	0.754***
	(-1.31)	(-2.27)	(-2.78)	(6.49)
(1) − (3)	0.754***	0.207	0.209	0.063
	(3.11)	(1.14)	(1.37)	(0.36)
(1) − (4)	1.383***	0.894**	0.560*	0.548*
	(2.76)	(2.09)	(1.77)	(1.69)
(2) − (5)	0.828**	0.151	0.383*	0.661***
	(2.25)	(0.57)	(1.95)	(2.64)
(2) − (6)	0.125	0.111	0.233	0.117
	(0.27)	(0.31)	(0.76)	(0.36)
(3) − (5)	-0.120	-0.290	-0.070	1.346***
	(-0.29)	(-0.98)	(-0.29)	(5.02)
(4) − (6)	-1.544**	-0.984*	-0.613	0.522
	(-2.32)	(-1.77)	(-1.41)	(1.16)