# Prior target price changes, risk, and acquirer announcement returns*

Thomas Moeller

Neeley School of Business

Texas Christian University

**Abstract**

In a large sample of takeovers of public targets, target valuation changes between their 52-week highs and just prior to the acquisition announcements are positively related to acquirer announcement returns. Behavioral biases based on prospect theory can explain this relation. Yet, various proxies for target valuation uncertainty are substantially correlated with the prior target price changes and dominate them in explaining acquirer announcement returns. Risky targets are associated with lower acquirer announcement returns. These results support a rational explanation that has underdiversified acquirer shareholders react negatively to risk-increasing takeovers.

*JEL* Classification: G24, G34

*Keywords*: Mergers, acquisitions, valuation uncertainty, reference point, risk.

July 2012

* I thank Jack Cooney, Qianqian Du, Jan Jindra, Scott Linn, Mike Stegemoller, and seminar participants at the University of Oklahoma and the 2010 China International Conference in Finance for helpful comments. I appreciate the financial support for this research from the Neeley Summer Research Awards program and the Luther King Capital Management Center for Financial Studies at the Neeley School of Business at TCU. All errors are my own.
Contact information: Thomas Moeller, Neeley School of Business, TCU Box 298530, Fort Worth, TX 76129; email: t.moeller@tcu.edu; phone: 817.760.0050

# Prior target price changes, risk, and acquirer announcement returns

**Abstract**

In a large sample of takeovers of public targets, target valuation changes between their 52-week highs and just prior to the acquisition announcements are positively related to acquirer announcement returns. Behavioral biases based on prospect theory can explain this relation. Yet, various proxies for target valuation uncertainty are substantially correlated with the prior target price changes and dominate them in explaining acquirer announcement returns. Risky targets are associated with lower acquirer announcement returns. These results support a rational explanation that has underdiversified acquirer shareholders react negatively to risk-increasing takeovers.

## 1. Introduction

What do past share prices tell us about the current value of a firm? Nothing, if markets are efficient and all information, including past prices, is reflected in the current share price. Yet, many investors and managers seem to have emotional attachments to past share prices, e.g., firms' 52-week highs. Even more striking, these emotional attachments to past share prices appear to affect actual transaction values. For example, Baker, Pan, and Wurgler (2012) show that takeover prices cluster around targets' 52-week high share prices. This pull towards the targets' 52-week highs leads to higher takeover premiums (essentially more overpayment by acquirers) the farther targets trade below their 52-week highs immediately before the takeover announcements.

The behavioral explanation for this effect relies on prospect theory (Kahneman and Tversky, 1979). When target and acquirer anchor their target valuation on the 52-week high, they can interpret large declines from the 52-week high as undervaluation and "good deals," respectively. These biased believes can lead the target to negotiate harder for a higher takeover price and can tempt the acquirer to overpay, resulting in inflated takeover prices. Prospect theory can similarly explain the partial adjustment effect in initial public offerings (Hanley, 1993; Loughran and Ritter, 2002) where offer price revisions are positively related to underpricing.

While individuals' behavioral biases and their effects are well established in the psychology and economics literature, it is remarkable that they can apparently find their way into takeover outcomes. Usually, large amounts of money are usually at stake in takeover negotiations and experienced professionals, e.g., managers, directors, advisers, lawyers, and accountants, are involved. Many of these professionals routinely engage in takeover negotiations. Is it plausible that these professionals repeatedly let behavioral biases, that are harmful to their shareholders and clients, guide their advice and decisions? Do these behavioral "mistakes" even affect the outcomes of such large and important transactions as takeovers? In this paper, I shed some light on these questions by examining a non-behavioral alternative explanation for the empirically observed effect of prior target price changes on takeover outcomes.

First, I confirm that prior target price changes matter. I follow Baker et al. (2012) in using the 52-week high as the anchor target valuation. In my large sample of takeovers of public targets, target price changes between their 52-week highs and just before the takeover announcements are positively related to acquirer announcement returns. The farther target stock prices decline from their 52-week highs prior to the acquisition, the lower are the acquirer announcement returns. This result is consistent with Baker et al. (2012).

Next, I examine a non-behavioral explanation that relies on target risk. One aspect of target risk is the difficulty of valuing the target. Using a number of proxies for such risk, I find a strong empirical correlation between target price changes from their 52-week highs and these risk proxies. When a target's price changes dramatically from its recent high, we know that the recent high-price was wrong, the current price is wrong, or both are wrong. While it is usually not obvious which one of these options it is, we do know that there is great uncertainty regarding the correct target price. Thus, there is a link between changes from the target's 52-week high price and valuation risk.

With the 52-week high price potentially being both a behavioral anchor and a proxy for valuation risk, it is an empirical question which role has a stronger effect on takeover pricing. When used together to explain acquirer announcement returns, the proxies for target valuation risk dominate the target price change variable. Therefore, the target risk aspect seems to be at least as important as the behavioral component. While it is nearly impossible to prove that the behavioral aspect does not matter, the target risk aspect seems to dominate the behavioral anchor effect for acquirer announcement returns. On the target side, in light of the clustering of takeover prices around the 52-week high and its effect on takeover premiums in Baker et al. (2012), the anchor effect seems to play a more significant role.

It remains to clarify why acquisitions of risky targets can lead to lower acquirer announcement returns. After all, if the takeover price is fair, the riskiness of the target should not affect the acquirer shareholders' wealth. Yet, as Goetzmann and Kumar (2008) show, many shareholders are underdiversified and therefore require higher returns from stocks with higher idiosyncratic risk (Fu, 2008; Levy, 1978; Merton, 1987). Underdiversified acquirer shareholders should dislike an acquisition that adds risk to the acquirer and therefore place a lower value on the acquirer. Since acquirers are generally larger than targets and frequently more established, they are on average less risky than targets. Therefore, underdiversified shareholders should be more invested in typical acquirers than in typical targets. Since diversified target shareholders have no reason to give up takeover premium to unload their idiosyncratic risk, acquirer shareholders should not receive compensation for assuming these risks. Consistent with this risk explanation, I find a positive correlation between target risk and the risk of the merged firm.

Finally, why do acquirer managers pursue takeovers that hurt their shareholders? There are a number of potential explanations that have been extensively researched. I find weak evidence that principal-agent conflicts play a role but do not attempt to comprehensively answer this question in this paper.

The economic significance of the results is quite strong. My main measure of target price changes is *Target Δ high*, the target's share price one week prior to the acquisition announcement divided by the target's 52-week high share price (share prices are adjusted for stock splits and stock dividends ) minus one. Price changes from a target's 52-week high are positively related to acquirer announcement returns. Acquirers of targets in the bottom tercile of *Target Δ high* have average announcement returns of -2.8% compared to -1% in acquisition of targets in the top tercile. Regression results further show that the farther the target price just prior to the acquisition is below its 52-week high, the more negative is the acquirer announcement return. While this result is consistent with both behavioral biases and my rational explanation, I find that measures of target valuation uncertainty are strongly related to *Target Δ high* and that they dominate *Target Δ high* in affecting acquirer announcement returns.

The main proxies for target valuation uncertainty are *Target price range*, the 52-week high minus the 52-week low, standardized by the mid-point of the 52-week high and low, *Industry M/B stdev*, the standard deviation of the market-to-book ratios of similarly-sized firms in the target industry, and *Target price stdev*, the standard deviation of the target's share prices during the year before the acquisition announcement. For all three measures, higher target valuation uncertainty is significantly related to lower acquirer announcement returns with magnitudes similar to those for *Target Δ high*.

My paper is related to Cooney, Moeller, and Stegemoller (2009) who also find a positive relation between target valuation changes and acquirer announcement returns, albeit for private targets. Because few valuations of private firms are observable, they use the difference between the target's anticipated valuation at the time of its failed initial public offering (IPO) and the eventual takeover price. This data requirement limits their study to 68 observations of withdrawn IPO firms that are subsequently acquired. While Cooney et al. (2009) also favor a rational explanation in which target valuation changes proxy for target valuation risk, my large sample of almost 2,400 acquisitions of public targets should provide more general and robust evidence. Furthermore, Cooney et al.'s (2009) explanation relies on the target being private and does not obviously extend to acquisitions of public firms as much of the empirical literature shows remarkable differences between takeovers of public and private targets.

This study adds to our understanding of the determinants of acquirer announcement returns. Its main contribution is a rational, risk-based explanation for the empirically observed relation of prior target price changes and acquirer announcement returns. Proxies for target valuation uncertainty dominate prior target price changes in explaining acquirer announcement returns. While my results and interpretation contrast with Baker et al. (2012) who focus on a behavioral explanation, rational and behavioral explanations are not mutually exclusive. Therefore, my evidence should be regarded as supportive of a rational, risk-based explanation rather than a disproval of behavioral effects.

## 2. Data

I start with 6,142 completed takeovers, announced between 1982 and 2008, from Thomson Reuters' SDC Mergers & Acquisitions database where the target and the acquirer are public U.S. firms and the acquirer holds no more than 10% of the target's shares before the acquisition announcement and no less than 90% afterwards. Center for

Research in Security Prices (CRSP) and Compustat matches are available for targets and acquirers in 3,698 takeovers. I further require that the deal value is at least $30 million (in year 2000 dollars) and that the market value of the target's equity represents at least 1% of the acquirer's equity value (both measured at the last fiscal year-end before the acquisition announcement).[1] I exclude financial firms and banks (standard industrial classification (SIC) codes 6000 to 6999). Together with some missing data items, these requirements reduce the main sample to 2,394 observations.

Table 1 presents summary statistics. *Acquirer CAR* is the three-day return of the acquirer in excess of the CRSP equal-weighted index centered on the acquisition announcement. The mean of -1.8% is statistically significant. *Target Δ high* is the target's share price one week prior to the acquisition announcement divided by the target's 52−week high share price (also for the period ending one week prior to the acquisition announcement) minus one. One week before the acquisition announcement, the mean (median) target share price change from the 52-week high is a decline of 21.2% (13.4%).

To test whether the 52-week high is a unique anchor, I also analyze the target's change from its 52-week low. *Target Δ low* is the target's share price one week prior to the acquisition announcement divided by the target's 52-week low share price minus one. The target share price one week before the announcement increases by a mean (median) of 64.7% (45.4%) from the 52-week low.

I consider several target valuation risk measures. *Target price range* is the 52-week high minus the 52-week low, standardized by the mid-point of the 52-week high and low. The mean (median) *Target price range* is 66.6% (58.8%). *Industry M/B stdev* is the

[1] Jarrell and Poulsen (1989) report that acquisitions of relatively small targets have little impact on the value of the acquirer. I remove those acquisitions to reduce noise. The results are similar with 2%, 5%, and 10% relative size cutoffs.

standard deviation of the market-to-book ratios of firms in the target industry with assets between half and twice the target's assets. The market-to-book ratios are calculated as (market value of equity + book value of assets – book value of equity) divided by book value of assets. All Compustat variables are measured at the last fiscal year-end before the takeover announcement. I define industry using the four-digit SIC code and require at least ten matching firms. If there are fewer matches, I use the first three digits of the SIC code, then the first two, and if there are still fewer than ten matches only the first digit. *Industry M/B stdev* has a mean and median of 1.3 and 0.8, respectively. Finally, *Target price stdev*, the standard deviation of the target's share prices, measured from 370 to 15 days before the acquisition announcement, has a mean of 2.9 and a median of 2.1.

The market value of equity is calculated from Compustat data. Median *Acquirer market value* is $1.4 billion while median *Target market value* is $185 million, both in year 2000 dollars. *Relative size* is the ratio of target to acquirer market value of equity. The median target has approximately one sixth of the market value of the acquirer. The market-to-book ratio *Acquirer* (*Target*) *M/B* has a median of 1.5 (1.3). The average fraction of the takeover price that is paid with acquirer stock (*Stock pct*) is 56%. *Target cash flow/ cash*, the net cash flow from operating activities divided by cash and short-term investments, has a mean of 340.4% and a median of 63.5% while *Target net income/ assets*, the target's net income divided by its total assets, has a mean and median of -1% and 1.8%, respectively. *Target runup* is the return of the target from 60 calendar days before to the beginning of the announcement return window. Its mean is 10% and its median is 7.1%. I describe the variables *Target return stdev*, *Acquirer prior return stdev*, and *Acquirer post return stdev* below.

Panel B shows that the SDC Mergers & Acquisitions database classifies only 2.5% of the sample takeovers as hostile, while 19.5% involve tender offers. The acquisition is paid with at least 90% stock (*Stock*) in 65.5% of the observations. I describe the variable *Risk index* below.

Panel C shows the distribution of the sample takeovers over time. The highest activity is between 1994 and 2001, accounting for about 57% of the sample.

## 3. Main results

I test the effect of prior target price changes and target valuation uncertainty proxies on acquirer announcement returns.

### 3.1. Univariate results

In Table 2, I create subsamples by splitting the observations into terciles based on target price change measures and target valuation uncertainty proxies. Then I compare the mean and median *Acquirer CAR* of the bottom and top terciles.

*Target Δ high* has a strong positive relation with *Acquirer CAR*. Acquirers of targets in the bottom tercile of *Target Δ high* have mean and median announcement returns of −2.8% and -1.8% while the mean and median are -1% and -1.2% for the top tercile, respectively. Both means and medians are statistically different at the 0.01 level. The mean of *Acquirer CAR* is lower in the bottom tercile of *Target Δ low* than in the top tercile, but for the median the relation is reversed. Both mean and median differences are insignificant, indicating that the 52−week high is empirically more relevant than the 52−week low.

The target valuation uncertainty proxies *Target price range*, *Industry M/B stdev*, and *Target price stdev* have strong negative relations with *Acquirer CAR*, all significant at the 0.01 level. The mean (median) acquirer announcement returns for the bottom and top terciles of *Target price range* are -1% and -3.2% (-1.1% and -2.4%), respectively. The differences for *Industry M/B stdev* and *Target price stdev* are of similar magnitudes.

Next, I combine the three target valuation uncertainty proxies (*Target price range*, *Industry M/B stdev*, and *Target price stdev*) into a summary risk variable. *Risk index* ranges from zero to three and adds one point for each target valuation risk variable that ranks in the top tercile. Consistent with the results for the individual risk variables, acquirer announcement returns are significantly lower when *Risk index* equals two or three (about 28% of the sample), indicating high risk, than when it equals zero (about 38% of the sample). Mean and median differences are significant at the 0.01 level. This summary variable alleviates concerns that individual target valuation uncertainty proxies mismeasure risk. While it discards valuable information, it is useful to address concerns about nonlinearities and outliers in the regressions. Because *Risk index* is a convenient summary measure and seems to be robust, I use it as the main risk measure in the remainder of the paper.

Overall, Table 2 shows that the target's price change from its 52-week high to just prior to the acquisition announcement is positively related to acquirer announcement returns. This result is consistent with behavioral biases based on prospect theory. If the 52-week high serves as an anchor valuation for the target,[2] target management should negotiate harder, the further the target's current price is below this anchor. A tougher

[2] For ease of exposition, I frequently use only "acquirer" or "target" to refer to the respective decision makers instead of mentioning the acquirer's and target's management or shareholders explicitly.

negotiation stance of the target should lead to a worse deal for the acquirer, resulting in lower acquirer announcement returns. The behavioral bias can also occur on the acquirer side. If the acquirer anchors on the target's 52-week high, the further the target's price is below that level, the better the perceived deal for the acquirer, and presumably the more lax its negotiation approach.

The relations of the three target valuation uncertainty proxies and the combination measure *Risk index* to acquirer announcement returns are of similar magnitude and significance as the relation of prior target price changes (*Target Δ high*) and *Acquirer CAR*. These relations suggest that target valuation risk has a significantly negative effect on acquirer announcement returns. The interesting question is whether the target valuation uncertainty proxies measure essentially the same underlying effect as *Target Δ high*. I contend that *Target Δ high* can be related to both behavioral biases and target valuation risk while it is difficult to interpret the target valuation uncertainty proxies as measures related to behavioral biases. Therefore, the relations of *Target Δ high* and the target valuation uncertainty proxies and their joint effect on *Acquirer CAR* should help determine what fundamentally drives the relation of prior target price changes and acquirer announcement returns.

### 3.2. Regression results

To verify the univariate results in the presence of control variables, I regress *Acquirer CAR* separately on *Target Δ high* and the target valuation risk proxies. All regressions have acquisition year indicator variables (not reported in tables) and heteroskedasticity-adjusted standard errors that are clustered at the acquirer level. I use the natural logarithms of *Acquirer market value* and *Relative size*, indicated by “Log” in front of the variable names, because these variables have large positive skewness and outliers. To reduce the impact of outliers, *Target price range*, *Industry M/B stdev*, *Acquirer M/B*, *Target M/B*, *Target price stdev*, *Target return stdev*, *Acquirer prior return stdev*, *Acquirer post return stdev*, *Target cash flow/ cash*, and *Target net income/ assets* are winsorized at the 0.05 and 0.95 percentiles. The winsorizing is important because there are large outliers. Alternative methods for containing outliers, e.g., using the logarithms of the variables, lead to similar results. Returns, i.e., *Acquirer CAR*, *Target CAR*, and *Target runup* (the last two are defined below) only have few outliers, all of them positive. Therefore, I winsorize *Acquirer CAR* if it is larger than 0.5 (two observations), *Target CAR* if it is larger than one (24 observations), and *Target runup* if it is larger than one (13 observations).

In column 1 of Table 3, *Target Δ high* is positive and significant at the 0.01 level. The closer the target trades to its 52-week high one week before the acquisition announcement, the higher is the acquirer announcement return. This result is consistent with the partial adjustment effect for private targets found in Cooney et al. (2009).

Another potential explanation of the relation between prior target price changes and acquirer announcement returns is based on markup pricing (Schwert, 1996). Under markup pricing, the target’s pre-announcement runup is unrelated to post-announcement increases in the target’s stock price. Therefore, the pre-announcement runup constitutes an additional cost to acquirers. This explanation implies that acquirers do not take into account targets’ recent stock price runups when they determine what premium to offer. Consequently, they overpay for targets with positive price runups. Applied to my study, markup pricing implies that the acquirers' announcement returns should be lower when the targets experience larger prior price changes. However, I find the opposite when I add *Target runup*, the 60-day price change, in column 2. *Target runup* is significantly positive. The point estimate and significance of *Target Δ high* decline compared to the same regression without *Target runup* in column 1, but *Target Δ high* is still significant at the 0.05 level. I conclude that the markup pricing effect differs from my results for prior target price changes and, as the following regressions show, even more so for target valuation risk.

In columns 3 to 5, *Target price range*, *Industry M/B stdev*, and *Target price stdev* have negative coefficients and are significant at the 0.01, 0.01, and 0.05 levels, respectively. The combination target valuation uncertainty variable *Risk index* is also significantly negative at the 0.01 level in column 6. Therefore, Table 3 confirms the significant relations of acquirer announcement returns with *Target Δ high* and the target valuation risk proxies. It is noteworthy that the regression with *Risk index* has the highest adjusted $R^2$, although not by much.

While acquirer announcement returns are negatively related to target valuation risk in my sample of public targets, this relation is positive for the private targets in Cooney et al. (2009). Both papers contend that risk-averse acquirer managers require compensation for the assumption of valuation risk. The owners of the private targets in Cooney et al. (2009) are likely underdiversified, benefit from offloading valuation risk to acquirers, and are therefore willing to agree to lower acquisition prices, to the benefit of both acquirer managers and shareholders. The diversified owners of public targets in my study likely are less worried about valuation risk and less willing to give up takeover premium.

Consequently, the acquirer managers' compensation for assuming target valuation risk must come from the acquirer, to the detriment of acquirer shareholders.

Among the control variables, *Log relative size*, *Acquirer M/B x Stock*, and *Stock pct* are consistently negative and significant at the 0.01 or 0.05 levels. I include *Log relative size* as a control variable because Faccio, McConnell, and Stolin (2006) and Asquith, Bruner, and Mullins (1983) find positive relations between acquirer announcement returns and relative size in private and public acquisitions, respectively. The negative coefficient on *Log relative size* in Table 3 is inconsistent with these earlier studies.

Moeller, Schlingemann, and Stulz (2004) find that larger acquirers earn approximately 2% lower announcement returns than do smaller acquirers. They interpret this finding as evidence of hubris (Roll, 1986). Therefore, I include *Log acquirer market value*. It has significantly negative coefficients, except when *Target price stdev* is the target risk proxy in column 5.

For acquisitions of private firms, Fuller, Netter, and Stegemoller (2002) and Faccio et al. (2006) find higher acquirer returns when the acquirer pays with stock. Officer, Poulsen, and Stegemoller (2009) show that using stock as a method of payment mitigates asymmetric information about the target and leads to more positive acquirer returns. In univariate tests of acquisitions of public targets, Moeller et al. (2004) find lower acquirer announcement returns when the method of payment is stock. In my sample, *Stock pct* is significantly negatively related to *Acquirer CAR*. Lang, Stulz, and Walkling (1989) show that acquirers with high Tobin's *Q* gain more than acquirers with low Tobin's *Q*. In my sample, *Acquirer M/B* negatively affects *Acquirer CAR*, but only if the method of payment is stock (*Stock* equals one if at least 90% of the purchase price is paid with acquirer stock). While these results differ from those in Lang et al. (1989) and the findings in research focusing on private targets, they are consistent with investors realizing that overvalued acquirers have incentives to make stock acquisitions. Furthermore, when I control for selection effects in section 4.1., paying with stock has a positive effect on acquirer announcement returns.

Consider a one standard deviation drop in *Target Δ high*, an about 22% drop in the target price from the 52-week high, to assess the economic significance of the change for the average *Acquirer CAR*. The coefficient of 0.027 on *Target Δ high* in column 2 of Table 3 means that *Acquirer CAR* decreases by about 0.6%, about three quarters of one standard deviation of *Acquirer CAR* or about half of its negative median of -1.3%. For the median acquirer market value of equity of $1,410 million, the 0.6% represents $8 million. With a median deal value of $296 million, the $8 million account for approximately 2.8% of that value and 4.5% of the median target market value. For a one standard deviation increase in *Target price range*, *Industry M/B stdev*, and *Target price stdev*, *Acquirer CAR* decreases by 0.7%, 1.8%, and 0.8%, respectively. For a one point increase in *Risk index*, *Acquirer CAR* decreases by 0.9%.

My goal is to determine to what extent the target price change from its 52-week high and the target valuation uncertainty proxies measure the same underlying effect on acquirer announcement returns. In Table 4, I include *Target Δ high* and the target valuation risk variables together in the regressions. In column 1, *Risk index* is significantly negative at the 0.01 level while *Target Δ high* becomes insignificant. In column 2, I replace *Risk index* with the *High risk* indicator variable that equals one when *Risk index* is either two or three and zero otherwise. The result is almost identical to column 1 with *Target Δ high* being insignificant and *High risk* being negative at the 0.01 level of significance. In column 3, I add the interaction of *Target Δ high* and *High risk* to the regression. *Target Δ high x High risk* is significantly positive at the 0.05 level and both *Target Δ high* and *High risk* are statistically insignificant. This regression shows that *Target Δ high* only affects acquirer announcement returns when there is substantial uncertainty in valuing the target. It supports the claim that *Target Δ high* is largely a proxy of target valuation risk. Alternatively, behavioral biases based on the target price change from its 52-week high might only be relevant when there is sufficient uncertainty regarding the target value. However, the fact that *Risk index* dominates *Target Δ high* in column 1 favors the interpretation of *Target Δ high* as a risk measure. Yet, this dominance should be interpreted with caution. As columns 4 to 6 show, the dominance of the individual components of *Risk index* over *Target Δ high* is less substantial. In column 4, both *Target Δ high* and *Target price range* are insignificant but the *p*-value of *Target price range* of 0.12 is at least close to conventional significance levels. *Industry M/B stdev* is highly significant with a *p*-value of less than 0.01 in column 5 but does only diminish the significance of *Target Δ high* to the 0.05 level. In column 6, *Target Δ high* is actually more significant than *Target price stdev*. While the target valuation risk variables on average dominate *Target Δ high*, the substantial overlap in the effects of *Target Δ high* and the target valuation risk proxies on acquirer announcement returns raises multicollinearity concerns.

### 3.3. Correlations of target price change and target valuation risk measures

Because the results in Table 4 suggest substantial overlap of the target valuation uncertainty measures and *Target Δ high*, I examine the correlations among these variables (not tabulated). *Target price range* has correlations with *Industry M/B stdev* and *Target price stdev* of 0.46 and 0.36, respectively. By design, all three variables are highly correlated with *Risk index*, with correlations between 0.6 and 0.73. Among these four target risk variables, *Target price range* has the highest correlation with *Target Δ high* (−0.63), followed by *Risk index* (-0.45), *Industry M/B stdev* (-0.35), and *Target price stdev* (-0.16). Overall, these correlations are moderate to high and further support the contention that *Target Δ high* at least partially measures target valuation uncertainty. While the correlation of *Target Δ high* and *Target price range* is high, the other correlations are sufficiently low to alleviate multicollinearity concerns.

As a robustness test, I exclude *Target price range* from the calculation of *Risk index*, i.e., the alternative *Risk index alt* ranges from zero to two and adds one point each when *Industry M/B stdev* or *Target price stdev* rank in the top tercile of their in-sample distributions. The correlation between *Target Δ high* and *Risk index alt* is -0.28 versus the -0.45 between *Target Δ high* and *Risk index*. When I re-run the regression in column 6 of Table 3 with *Risk index alt* instead of *Risk index*, the coefficient of -0.0094 on *Risk index alt* is slightly higher than the -0.0088 on *Risk index* and the *p*-value is slightly lower at 0.001. When I repeat the analysis of column 1 of Table 4 with *Risk index alt*, *Target Δ high* is significant at the 0.05 level (versus insignificant with *Risk index*) and *Risk index alt* is significant at the 0.01 level. The results are similar when I replace *Risk index alt* with the *High risk alt* indicator variable that equals one when *Risk index alt* is two and zero otherwise. Finally, when I run the regression of column 3 of Table 4 with *High risk alt* and the interaction of *High risk alt* and *Target Δ high*, only the interaction variable is significant, similar to the results in column 3 of Table 4. Overall, there is not much change in results when I exclude *Target price range* from the definition of *Risk index*. Not surprisingly, the significance of *Target Δ high* increases, but there is still substantial overlap between the measure of prior target price changes and the target valuation uncertainty proxies. Both *Risk index* and *Risk index alt* dominate *Target Δ high*. A principal component analysis detects 73% overlap between *Target Δ high* and *Risk index* and still 64% overlap between *Target Δ high* and *Risk index alt*. These tests further support the claim that *Target Δ high* is primarily a measure of target risk.

Many factors can affect target price changes. Therefore, I repeat the correlation analysis with control variables in a regression framework in Table 5. I add acquisition year indicator variables to control for time effects and *Log Target market value* to address differences due to size. I also control for fundamental drivers of value with *Target cash flow/ cash* and *Target net income/ assets*, both of which have significantly positive effects on *Target Δ high*. *Log target market value* is significantly positive, except it is insignificant when *Target price range* is the risk proxy in column 1. Consistent with the correlation analysis, each risk variable has a highly significant negative coefficient, confirming the tight relations between my target valuation uncertainty proxies and *Target Δ high*.

While the prior target price change and target valuation uncertainty variables are negatively correlated in my study, this relation is positive in Cooney et al. (2009). The farther the target's stock price one week before the acquisition announcement is below its

52-week high, the higher is the target valuation uncertainty. This relation is intuitive in my study because a larger absolute distance from a prior price suggests that investors are uncertain about the appropriate target valuation. Cooney et al.'s (2009) target valuation change variable has positive and negative values (*Target Δ high* is by design always smaller than or equal to zero in my sample). The positive correlation of their target valuation risk proxy with positive prior target valuation changes is intuitive, but it is unintuitive for negative target valuation changes.

### 3.4. Effect of takeovers on acquirer risk

Acquirer announcement returns can be more negative the more risky the target is if acquisitions of riskier targets increase the risk of the acquirers more. The rationale is that (underdiversified) acquirer shareholders dislike risk and the risk added through the acquisition, even if it is largely idiosyncratic, leads the shareholders to place a lower value on the now riskier future cash flows. In Table 6, I test whether higher target valuation risk translates into higher risk of the merged firm. The dependent variable is *Acquirer post return stdev*, the standard deviation of the acquirer's daily stock returns from the effective date of the acquisition to 355 calendar days afterward. *Target price range*, *Industry M/B stdev*, and *Risk index* are positively related to *Acquirer post return stdev* and are significant at better than the 1% level. *Target price stdev* is marginally insignificant, but *Target return stdev*, the standard deviation of the target's daily stock returns from 370 to 15 calendar days before the takeover announcement, is as significant as the other target valuation risk variables. This analysis shows that riskier targets increase the risk of the merged firm more than less risky targets and can explain the negative reaction to takeovers of risky targets. Also consistent with this interpretation is that targets are significantly riskier than acquirers, as measured by the standard deviation of their stock returns, and that acquirer risk increases significantly after takeovers (see Panel A of Table 1 for summary statistics).

The regressions in Table 6 control for the pre-takeover level of acquirer risk with *Acquirer prior return stdev*, the standard deviation of the acquirer's daily stock returns from 370 to 15 calendar days before the takeover announcement. I also control for relative size because a (relatively) larger target should have a larger effect on the risk of the merged firm. Accordingly, *Log relative size* has a significantly positive coefficient. The positive point estimates with mixed significance of *Stock pct* suggest that riskier transactions more likely involve stock payments. Finally, *Tender* and *Hostile* are insignificant.

## 4. Method of payment and corporate governance

I examine the effects of the method of payment in more detail and provide evidence in support of a poor governance explanation.

### 4.1. Method of payment

The method of payment is an important determinant of acquirer announcement returns. In the earlier regressions, the use of stock as payment significantly reduces acquirer announcement returns, in particular when the acquirer's market-to-book ratio is high. These results suggest that the method of payment reveals information about the acquirer that affects acquirer announcement returns, e.g., that the acquirer management believes the acquirer is overvalued or that the acquirer does not have sufficient cash to make a cash acquisition. However, the method of payment can also be affected by the type of target. Officer et al. (2009) show that using stock is beneficial for acquirers when targets are difficult to value. Because the method of payment is likely correlated with the target valuation uncertainty that I focus on here, the regression results can be inconsistent and biased when this relation is not adequately addressed.

In Table 7, I use a treatment model to explicitly account for the correlation of method of payment and the error term in the acquirer announcement return regressions. The treatment model uses a two-step process to address the effects of endogeneity and selection. I use the maximum likelihood approach suggested by Maddala (1983) to estimate the model. In the first step, I estimate the probability of a stock acquisition, i.e., the likelihood that at least 90% of the deal value is paid with stock. Among the control variables, the relative target size should affect the method of payment because it is likely difficult to raise sufficient cash for relatively large acquisitions. Consistent with this rational, *Log relative size* is positive and significant at the 0.01 level in all columns of Table 7. Acquirers with high current market valuations have an incentive to make stock acquisitions. Accordingly, *Acquirer M/B* is positive and significant at the 0.01 level in all stock regressions.

Among my main variables, *Target Δ high* has a significantly negative coefficient in column 1 of Table 7. The further the target price is below the 52-week high, the higher is the probability of a stock offer. This result is consistent with *Target Δ high* being a measure of target valuation uncertainty because acquirers seem to prefer stock offers when they have difficulty valuing the target.[3] Alternatively, targets might prefer stock

[3] Note that all observations of *Target Δ high* are negative or zero. Therefore, the negative coefficient implies a higher probability of a stock offer the larger the absolute value of *Target Δ high*.

when they believe that they are undervalued because cash would lock in the low acquisition price.

Next, I add my target valuation uncertainty proxies one at a time. The results for *Target price range*, *Target price stdev*, and *Risk index* are similar. All three have significantly positive coefficients, indicating that acquirers tend to pay for harder-to-value targets with stock. Inconsistent with the other target risk variables, *Industry M/B stdev* has an insignificantly negative coefficient in column 3. The insignificance can be due to multicollinearity because *Industry M/B stdev* is highly correlated with *Acquirer M/B* (correlation of 0.56). When I remove *Acquirer M/B* from the regression, *Industry M/B stdev* becomes positive and significant at the 0.01 level.

The second step of the treatment model estimates regressions similar to those in Table 3. For consistency with the first step, it uses the indicator variable *Stock* instead of *Stock pct* and omits *Acquirer M/B x Stock*.[4] Most important, the treatment model accounts for the correlation between the method of payment (*Stock*) and the estimation error in the acquirer announcement return regression. It should therefore produce consistent and unbiased estimates.

The coefficients on *Target Δ high*, *Target price range*, *Target price stdev*, and *Risk index* are slightly larger (in absolute terms) than in Table 3 and at least as significant, except for *Target Δ high*. *Industry M/B stdev* is less significant, but it is more negative than in Table 3 when *Acquirer M/B* is excluded (not tabulated). Interestingly, *Stock* is now positive and significant at the 0.01 level, consistent with Officer et al. (2009) who find evidence that acquirers benefit when they acquire hard-to-value targets with equity.

[4] When I add *Acquirer M/B x Stock*, it is insignificant, and the effect on the other explanatory variables is negligible.

While the treatment model reverses the sign on the method of payment variable *Stock*, the other variables are qualitatively unchanged. The correlation between *Stock* and the error in the acquirer announcement return regression, as measured by ρ, is about -0.8. A Wald test of ρ being equal to zero is strongly rejected. Therefore, it is important to control for endogeneity and selection when analyzing the effects of the method of payment. However, since only the estimate of the method of payment variable changes with the treatment model, the simple ordinary least squares regressions appear robust for the analysis of prior target price changes and target valuation uncertainty, the main focus of the paper.

In column 6, I include both *Target Δ high* and *Risk index*. In the stock regression, both variables have the expected sign, but are both insignificant. In the *Acquirer CAR* regression, *Target Δ high* is insignificant while *Risk index* is significantly negative. Again, *Risk index* dominates *Target Δ high* in determining *Acquirer CAR*.

### 4.2. Corporate governance

As demonstrated here, acquisitions of risky targets are on average poorly received by the acquirers' shareholders. Risk-averse acquirer managers should only acquire risky target firms if they receive some economic benefit to offset the additional risk they become exposed to. These benefits can come in a variety of forms, from the tangible higher compensation to the less tangible improved job security, better ability to hide poor performance in a more complex firm, and reduced risk of becoming a target. Irrespective of form, the managerial benefits are costly. In a competitive takeover market, the cost of providing the managerial benefits are most likely borne by the acquiring firm's shareholders.

Table 8 examines this poor corporate governance explanation. My measure for the presence of agency conflicts is the entrenchment index (E-index) from Bebchuk, Cohen, and Ferrell (2009) which identifies the six most important governance characteristics from Gompers, Ishii, and Metrick's (2003) G-index.[5] Because both E- and G-index tend to be available for large firms only (generally S&P 1500 firms), I lose a substantial number of observations when I use these governance indicies. When I use the E-index for acquirers (targets), the sample shrinks to 919 (470) observations.

In column 1 of Table 8, I replicate the main regression with *Target Δ high* from Table 3 using the smaller subsample where the acquirer E-index is available. Not surprisingly, *Target Δ high* is less significant than in Table 3, but still at the 0.05 level. Next, I add the indicator variable *High Acq E-index* that equals one when the acquirer's E-index is higher than three and its interaction with *Target Δ high*. In column 2, *Target Δ high* remains significantly positive while *High Acq E-index* is insignificant. The interaction variable is negative and significant at the 0.1 level. Its negative point estimate almost exactly offsets the positive coefficient on *Target Δ high*. Columns 3 and 4 conduct similar tests with *High risk* instead of *Target Δ high* with similar results. *High risk* is significantly negative in columns 3 and 4. The interaction between *High risk* and *High Acq E-index* is positive and close to being significant with a *p*-value of 0.12. Again, the point estimates almost exactly offset each other. Agency conflicts of the acquirer seem to reduce, and almost eliminate, the negative effects of high risk targets. Why would acquirer agency conflicts

[5] The E-index uses to following provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. Masulis, Wang, and Xie (2007) use both the E-index and the G-index and generally find stronger results with the E-index. I download the E-index data from Lucian Bebchuk's website (http://www.law.harvard.edu/faculty/bebchuk/data.shtml).

benefit acquirer shareholders? The answer can be (involuntary) signaling. When an acquirer with entrenched management makes a bad (i.e., high risk) acquisition, investors are less surprised (because the E-index is observable and presumably known to investors) than when a better-governed acquirer makes such an acquisition. The bad acquisition of the (supposedly) better-governed acquirers indicates to investors the presence of poor governance that has not been captured by the E-index and therefore has not been known by investors.

In columns 5 and 6, I repeat the analysis with *High risk*,[6] but now I use the E-index of the target, *High Tar E-index*. In column 5, *High risk* is marginally insignificant with a *p*-value slightly above 0.1, likely due to the greatly reduced sample size. When I add *High Tar E-index* and its interaction with *Target Δ high*, *High risk* becomes significantly negative and *High risk x High Tar E-index* is significantly positive. These results suggest that while acquiring a risky target is bad for the acquiring firm, this effect is greatly reduced when the target likely suffers from substantial agency problems. One explanation for this result is that entrenched target managers sell the target for lower prices, maybe in return for private benefits as suggested by Hartzell, Ofek, and Yermack et al. (2004) and Moeller (2005).

Overall, Table 8 suggests that acquirer and target governance influence to what degree target valuation risk affects acquirer announcement returns. Therefore, they lend support to a governance-based explanation for the relation of prior target price changes and target valuation risk to acquirer announcement returns. Yet, the results are relatively

[6] There are no significant effects using *Target Δ high* with this small subsample.

weak, potentially due to the relatively small size of the governance subsamples and the relatively imprecise measurement of the agency conflicts.

## 5. Robustness

I examine the effect of the length of time since the 52-week high on the significance of the prior target price change variable, alternative anchors for the prior target price change variable, add target announcement returns, and discuss synergies.

### 5.1. Time since 52-week high

The time since the 52-week high can have an important impact on how relevant the 52-week high is as an anchor. Presumably, recent 52-week highs should matter more than distant ones. In Table 9, I repeat the regressions with *Target Δ high* and *Risk index* using two subsamples of almost equal size: acquisitions that are announced less than 100 days and more than 200 days after the 52-week high. For the shorter time span in columns 1 and 2, both *Target Δ high* and *Risk index* are significant at the 0.05 and 0.01 levels, respectively. For the deals that occur more than 200 days after the 52-week high, *Target Δ high* becomes insignificant while *Risk index* remains significantly negative at the 0.01 level. These results confirm the robustness of the relation between target valuation risk and *Acquirer CAR* and support target valuation risk as the more fundamental effect compared to target price changes from the 52-week high. The significance of *Target Δ high* behaves as expected. *Target Δ high* is clearly less important than target valuation risk when there is a longer lag between 52-week high and acquisition.

### 5.2. Alternative target valuation anchors

Column 1 of Table 10 is the same regression as column 1 of Table 3, except I replace *Target Δ high* with *Target Δ low*, i.e., instead of the 52-week high the 52-week low is the supposed anchor of the target price. *Target Δ low* has a positive coefficient and is significant at the 0.1 level. In column 2, I add *Target runup*. While *Target runup* is significantly positive, the *p*-value of *Target Δ low* increases from 0.1 to 0.94. In other words, the entire significance of *Target Δ low* is captured by the *Target runup* over the roughly last two months prior to the acquisition. Baker et al. (2012) argue that the 52-week high is a unique psychological anchor. The significance of *Target Δ high* and the insignificance of *Target Δ low* support their claim. If only the price change from some arbitrary base mattered, *Target Δ low* should be as significant as *Target Δ high*. Therefore, this result favors behavioral explanations. However, *Target Δ low* has much more variability than *Target Δ high*, with more than twice the range between its 0.05 and 0.95 percentiles and more than four times the standard deviation. These measurement issues can favor the significance of *Target Δ high* over *Target Δ low*.

In column 3, I add *High risk* and the interaction of *Target Δ low* and *High risk*, *Target Δ low x High risk*. *High risk* is significantly negative as before. The significantly positive coefficient of *Target Δ low x High risk* indicates that large target price changes from the 52-week low moderate the negative effects of high target valuation risk on acquirer announcement returns. Good target performance seems to counter the negative effects of target risk. The positive coefficient on *Target Δ low x High risk* indicates that *Target Δ low* measures a fundamentally different effect than *Target Δ high*.

Next, I adjust *Target Δ high* for market movements. Specifically, *Adjusted target Δ high* subtracts *Market return since high*, the CRSP equal-weighted index return between the target's 52-week high and one week prior to the acquisition announcement, from *Target Δ high*. There is no obvious prediction whether total target price changes or price changes in excess of market movements should have a stronger effect on acquirer announcement returns. In column 4, both *Adjusted target Δ high* and *Market return since high* are significantly positive at the 0.01 level. So both market and target-specific prior returns seem to matter. This result is consistent with both the behavioral and the risk−based explanations.

### 5.3. Target announcement returns

The target announcement return (*Target CAR*) can be an important determinant of *Acquirer CAR* because it indicates how good or bad a deal the acquisition is for the target. I have not included *Target CAR* in the regressions because it is likely endogenous and determined simultaneously with *Acquirer CAR*. However, as a robustness test I include it in columns 5 and 6 of Table 10 together with *Target Δ high* and *Risk index*, respectively. *Target CAR* is positive and significant at the 0.01 level, indicating that the favorable or unfavorable reception of deals by investors affects acquirers and targets in the same way. Important for this study, including *Target CAR* as a control variable leaves the other coefficients virtually unchanged.

### 5.4. Synergies

The negative reception of acquisitions of risky targets can be due to a lack of synergies. In fact, Devos, Kadapakkam, and Krishnamurthy (2009) suggest that synergies mainly result from reducing investment expenses and that these synergies are positively related to acquirer book-to-market, i.e., lower risk firms or industries. In untabulated results, I find significantly negative relations between synergies, as measured by the combined value change of acquirer and target, and the target risk variables. Therefore, differences in synergies can explain the negative relation of acquirer announcement returns and target risk. However, my synergy measure and *Acquirer CAR* are highly correlated (correlation coefficient of 0.76). This high correlation makes it difficult to attach different interpretations to the synergy measure and *Acquirer CAR*. In essence, the lack of synergies might be one mechanism how target risk negatively affects acquirers.

## 6. Conclusions

Using a broad sample of public-public acquisitions, I explore why prior target price changes affect acquirer announcement returns. This initially surprising phenomenon has been attributed to behavioral biases of managers or investors. However, I find that a rational explanation based on target valuation uncertainty dominates the behavioral explanation in my sample of public targets.

It is difficult to disentangle behavioral from rational effects. Yet, prior target price changes are natural measures of target valuation uncertainty. Large price changes essentially show that investors are uncertain about the value of a firm. The high correlations of prior target price changes with target valuation uncertainty measures, combined with the dominance of the target valuation uncertainty measures over the prior target price changes in acquirer announcement return regressions, suggest that prior target price change variables to a meaningful extent reflect target valuation uncertainty. While behavioral biases can explain the empirical findings regarding the effects of prior price changes, they do not explain why the valuation uncertainty variables matter. Therefore, the rational explanations based on valuation uncertainty can provide more comprehensive and appealing justifications for the observed effects than behavioral stories. This paper develops a potential rational explanation based on acquirer shareholder risk aversion and provides evidence that is consistent with this explanation.

## References

Asquith, P., Bruner, R., Mullins, D., 1983. The gains to bidding firms from merger. Journal of Financial Economics 11, 121-139.

Baker, M., Pan, X., Wurgler, J., 2012. The effect of reference point prices on mergers and acquisitions. Journal of Financial Economics, forthcoming.

Bebchuk, L., Cohen, A., Ferrell, A., 2009. What matters in corporate governance? Review of Financial Studies 22, 783-827.

Cooney, J., Moeller, T., Stegemoller, M., 2009. The underpricing of private targets. Journal of Financial Economics 93, 55-66.

Devos, E., Kadapakkam, P., Krishnamurthy, S., 2009. How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies. Review of Financial Studies 22, 1179-1211.

Faccio, M., McConnell, J., Stolin, D., 2006. Returns to acquirers of listed and unlisted targets. Journal of Financial and Quantitative Analysis 41, 197-220.

Fu, F., 2009. Idiosyncratic risk and the cross-section of expected stock returns. Journal of Financial Economics 91, 24-37.

Fuller, K., Netter, J., Stegemoller, M., 2002. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. Journal of Finance 57, 1763-1793.

Goetzmann, W., Kumar, A., 2008. Equity portfolio diversification. Review of Finance 12, 433-463.

Gompers, P., Ishii, J., Metrick, A., 2003. Corporate governance and equity prices. Quarterly Journal of Economics 118, 107-155.

Hanley, K., 1993. The underpricing of initial public offerings and the partial adjustment phenomenon. Journal of Financial Economics 34, 231-250.

Hartzell, J., Ofek, E., Yermack, D., 2004. What's in it for me? CEOs whose firms are acquired. Review of Financial Studies 17, 37-61.

Jarrell, G., Poulsen, A., 1989. The returns to acquiring firms in tender offers: evidence from three decades. Financial Management 18, 12–19.

Kahneman, D., Tversky, A., 1979. Prospect theory: An analysis of decision under risk. Econometrica 47, 263-292.

Loughran, T., Ritter, J., 2002. Why don't issuers get upset about leaving money on the table in IPOs? Review of Financial Studies 15, 413-443.

Lang, L., Stulz, R., Walkling, R., 1989. Managerial performance, Tobin's q, and the gains from successful tender offers. Journal of Financial Economics 24, 137-154.

Levy, H., 1978. Equilibrium in an imperfect market: a constraint on the number of securities in the portfolio. American Economic Review 68, 643-658.

Maddala, G.,1983. Limited-dependent and qualitative variables in econometrics. Cambridge University Press.

Masulis, R., Wang, C., Xie, F., 2007. Corporate governance and acquirer returns. Journal of Finance 62, 1851-1889.

Merton, R., 1987. A simple model of capital market equilibrium with incomplete information. Journal of Finance 42, 483-510.

Moeller, S., Schlingemann, F., Stulz. R., 2004. Firm size and the gains from acquisitions. Journal of Financial Economics 73, 201-228.

Moeller, T., 2005. Let's make a deal! How shareholder control impacts merger payoffs. Journal of Financial Economics 76, 167-190.

Officer, M., Poulsen, A., Stegemoller, M., 2009. Target-firm information asymmetry and acquirer returns. Review of Finance 13, 467-493.

Roll, R., 1986. The hubris hypothesis of corporate takeovers. Journal of Business 59, 197-216.

Schwert, W., 1996. Markup pricing in mergers and acquisitions. Journal of Financial Economics 41, 153-192.

Table 1

Descriptive statistics

Panel A contains the mean, median, standard deviation, and the 0.05 and 0.95 percentiles of the main variables before any winsorizing. *Acquirer CAR* is the three-day return of the acquirer in excess of the CRSP equal-weighted index centered on the acquisition announcement. *Target Δ high* is the target's share price one week prior to the acquisition announcement divided by the target's 52-week high share price (for the period ending one week prior to the acquisition announcement) minus one. *Target Δ low* is the target's share price one week prior to the acquisition announcement divided by the target's 52-week low share price minus one. *Target price range* is the 52-week high minus the 52-week low, standardized by the mid-point of the 52-week high and low. *Industry M/B stdev* is the standard deviation of the market-to-book ratios of firms in the target industry with assets between half and twice the target's assets. All Compustat variables are measured as of the last fiscal year-end before the takeover announcement. *Target price stdev* is the standard deviation of the target's share prices, measured from 370 to 15 days before the acquisition announcement. *Acquirer market value* and *Target market value* are the market value of equity from Compustat (in year 2000 dollars). *Relative size* is the ratio of *Target* to *Acquirer market value*. *Acquirer M/B* and *Target M/B* are calculated as (market value of equity + book value of assets – book value of equity) divided by book value of assets. *Stock pct* is the fraction of the acquisition price that is paid with acquirer stock. *Target cash flow/ cash* is the target's net cash flow from operating activities divided by cash and short-term investments. *Target net income/ assets* is the target's net income divided by its total assets. *Target runup* is the return of the target from 60 calendar days before to the beginning of the announcement return window. *Target return stdev* is the standard deviation of the target's daily stock returns from 370 to 15 calendar days before the takeover announcement. *Acquirer prior return stdev* is the standard deviation of the acquirer's daily stock returns from 370 to 15 calendar days before the takeover announcement. *Acquirer post return stdev* is the standard deviation of the acquirer's daily stock returns from the effective date to 355 calendar days afterward. Panel B shows the proportions with which the indicator variables equal one and with which the categorical variable *Risk index* takes on its possible values. *Risk index* ranges from zero to three and adds one point for each target valuation risk variable (*Target price range*, *Industry M/B stdev*, and *Target price stdev*) that ranks in the top tercile of its in-sample distribution. *Hostile* and *Tender* are from the SDC Mergers & Acquisitions database. *Stock* is an indicator variable that equals one when *Stock pct* is at least 90%, and zero otherwise. Panel C shows the distribution of the acquisition announcements over time.

Panel A

| Variable | Mean | Median | St. Dev. | 5% | 95% |
|---|---|---|---|---|---|
| Acquirer CAR | -0.018 | -0.013 | 0.081 | -0.142 | 0.095 |
| Target Δ high | -0.212 | -0.134 | 0.217 | -0.677 | 0.000 |
| Target Δ low | 0.647 | 0.454 | 0.902 | 0.052 | 1.769 |
| Target price range | 0.666 | 0.588 | 0.337 | 0.260 | 1.351 |
| Industry M/B stdev | 1.331 | 0.767 | 2.630 | 0.030 | 3.680 |
| Target price stdev | 2.947 | 2.079 | 3.423 | 0.516 | 7.664 |
| Acquirer market value ($ million) | 5,776 | 1,410 | 15,467 | 96 | 23,699 |
| Target market value ($ million) | 955 | 185 | 4,043 | 24 | 3,208 |
| Relative size | 0.339 | 0.163 | 0.532 | 0.017 | 1.162 |
| Acquirer M/B | 2.337 | 1.495 | 4.042 | 0.985 | 5.625 |
| Target M/B | 1.937 | 1.324 | 2.184 | 0.909 | 4.752 |
| Stock pct | 0.560 | 0.709 | 0.450 | 0.000 | 1.000 |
| Target cash flow/ cash | 3.404 | 0.635 | 134.412 | -0.816 | 18.870 |
| Target net income/ assets | -0.009 | 0.018 | 0.194 | -0.333 | 0.146 |
| Target runup | 0.100 | 0.071 | 0.238 | -0.234 | 0.499 |
| Target return stdev | 0.034 | 0.030 | 0.018 | 0.014 | 0.071 |
| Acquirer prior return stdev | 0.027 | 0.023 | 0.015 | 0.011 | 0.058 |
| Acquirer post return stdev | 0.029 | 0.024 | 0.018 | 0.012 | 0.063 |

Panel B

| Variable | Proportion |
|---|---|
| Hostile = 1 | 0.0246 |
| Tender = 1 | 0.1951 |
| Stock = 1 | 0.6550 |
| Risk index = 0 | 0.3826 |
| Risk index = 1 | 0.3375 |
| Risk index = 2 | 0.1859 |
| Risk index = 3 | 0.0940 |

Panel C

| Acquisition year | Observations | Acquisition year | Observations |
|---|---|---|---|
| 1982 | 17 | 1995 | 153 |
| 1983 | 23 | 1996 | 165 |
| 1984 | 45 | 1997 | 221 |
| 1985 | 56 | 1998 | 226 |
| 1986 | 59 | 1999 | 203 |
| 1987 | 67 | 2000 | 169 |
| 1988 | 46 | 2001 | 122 |
| 1989 | 42 | 2002 | 67 |
| 1990 | 25 | 2003 | 87 |
| 1991 | 35 | 2004 | 107 |
| 1992 | 35 | 2005 | 78 |
| 1993 | 43 | 2006 | 72 |
| 1994 | 116 | 2007 | 77 |
| | | 2008 | 38 |
| | | Total | 2,394 |

Table 2

Univariate tests for acquirer announcement returns

The sample is split into terciles based on the variables in the first column, except for *Risk index* (split into 0 versus 2 or 3). The next two columns show the means and medians of *Acquirer CAR* for the bottom and top terciles. The first (second) value in the last column is the *p*-value from a *t*-test (Wilcoxon signed-rank test) of the difference in means (medians) of *Acquirer CAR* between the bottom and top terciles. All variables are defined in the prior table. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| Terciles based on | | Bottom tercile | Top tercile | p-value |
|---|---|---|---|---|
| *Prior target valuation changes* | | | | |
| Target Δ high | Mean | -0.0281 | -0.0097 | 0.000*** |
| | Median | -0.0180 | -0.0123 | 0.000*** |
| Target Δ low | Mean | -0.0233 | -0.0207 | 0.507 |
| | Median | -0.0129 | -0.0167 | 0.913 |
| *Target risk proxies* | | | | |
| Target price range | Mean | -0.0098 | -0.0323 | 0.000*** |
| | Median | -0.0106 | -0.0243 | 0.000*** |
| Industry M/B stdev | Mean | -0.0129 | -0.0317 | 0.000*** |
| | Median | -0.0135 | -0.0182 | 0.003*** |
| Target price stdev | Mean | -0.0114 | -0.0293 | 0.000*** |
| | Median | -0.0096 | -0.0218 | 0.000*** |
| | | 0 | 2 or 3 | |
| Risk index | Mean | -0.0094 | -0.0390 | 0.000*** |
| | Median | -0.0097 | -0.0297 | 0.000*** |

Table 3

Regression results for acquirer announcement returns

*Acquirer CAR* is the dependent variable. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. *Acquirer M/B x Stock* is the interaction of *Acquirer M/B* and *Stock*. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Target Δ high | 0.0347*** | 0.0269** | | | | |
| | [0.000] | [0.011] | | | | |
| Target price range | | | -0.0196*** | | | |
| | | | [0.004] | | | |
| Industry M/B stdev | | | | -0.0069*** | | |
| | | | | [0.001] | | |
| Target price stdev | | | | | -0.0023** | |
| | | | | | [0.032] | |
| Risk index | | | | | | -0.0088*** |
| | | | | | | [0.000] |
| Target runup | | 0.0171* | 0.0279*** | 0.0267*** | 0.0269*** | 0.0273*** |
| | | [0.071] | [0.002] | [0.002] | [0.002] | [0.002] |
| Log acquirer market value | -0.0038*** | -0.0035*** | -0.0037*** | -0.0035*** | -0.0013 | -0.0027** |
| | [0.001] | [0.003] | [0.002] | [0.003] | [0.328] | [0.022] |
| Log relative size | -0.0068*** | -0.0064*** | -0.0067*** | -0.0064*** | -0.0047*** | -0.0057*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.002] | [0.000] |
| Acquirer M/B | 0.0007 | 0.0002 | 0.0000 | 0.0008 | -0.0005 | 0.0010 |
| | [0.788] | [0.948] | [0.986] | [0.764] | [0.848] | [0.720] |
| Acquirer M/B x Stock | -0.0078*** | -0.0076*** | -0.0070** | -0.0072** | -0.0073** | -0.0073*** |
| | [0.006] | [0.007] | [0.013] | [0.011] | [0.011] | [0.010] |
| Target M/B | 0.0006 | 0.0005 | 0.0010 | 0.0026 | 0.0005 | 0.0024 |
| | [0.809] | [0.833] | [0.663] | [0.286] | [0.843] | [0.315] |
| Stock pct | -0.0213*** | -0.0215*** | -0.0223*** | -0.0228*** | -0.0222*** | -0.0220*** |
| | [0.001] | [0.001] | [0.001] | [0.000] | [0.001] | [0.001] |
| Tender | 0.0037 | 0.0030 | 0.0028 | 0.0038 | 0.0020 | 0.0031 |
| | [0.430] | [0.528] | [0.552] | [0.422] | [0.669] | [0.508] |
| Hostile | 0.0111 | 0.0116 | 0.0105 | 0.0114 | 0.0110 | 0.0112 |
| | [0.229] | [0.205] | [0.250] | [0.208] | [0.226] | [0.212] |
| Adjusted $R^2$ | 0.0982 | 0.0999 | 0.1003 | 0.1002 | 0.0981 | 0.1042 |
| Observations | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 |

Table 4
Interaction of prior target price changes and target valuation risk variables
*Acquirer CAR* is the dependent variable. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. *High risk* is an indicator variable that equals one when *Risk index* is two or three and zero otherwise. *Target Δ high x High risk* is the interaction of *Target Δ high* and *High risk*. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Target Δ high | 0.0127 | 0.0124 | -0.0151 | 0.0147 | 0.0213** | 0.0240** |
| | [0.252] | [0.272] | [0.347] | [0.254] | [0.046] | [0.024] |
| Risk index | -0.0076*** | | | | | |
| | [0.000] | | | | | |
| High risk | | -0.0177*** | -0.0048 | | | |
| | | [0.000] | [0.433] | | | |
| Target Δ high x High risk | | | 0.0514** | | | |
| | | | [0.011] | | | |
| Target price range | | | | -0.0130 | | |
| | | | | [0.117] | | |
| Industry M/B stdev | | | | | -0.0056*** | |
| | | | | | [0.007] | |
| Target price stdev | | | | | | -0.0018* |
| | | | | | | [0.100] |
| Target runup | 0.0227** | 0.0223** | 0.0219** | 0.0222** | 0.0190** | 0.0182* |
| | [0.017] | [0.019] | [0.022] | [0.027] | [0.045] | [0.054] |
| Log acquirer market value | -0.0031*** | -0.0032*** | -0.0031*** | -0.0038*** | -0.0041*** | -0.0024* |
| | [0.010] | [0.007] | [0.009] | [0.001] | [0.001] | [0.075] |
| Log relative size | -0.0060*** | -0.0061*** | -0.0060*** | -0.0067*** | -0.0067*** | -0.0054*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] |
| Acquirer M/B | 0.0012 | 0.0010 | 0.0014 | 0.0003 | 0.0013 | 0.0002 |
| | [0.668] | [0.701] | [0.605] | [0.917] | [0.645] | [0.928] |
| Acquirer M/B x Stock | -0.0074*** | -0.0073*** | -0.0079*** | -0.0072** | -0.0073*** | -0.0074*** |
| | [0.009] | [0.010] | [0.005] | [0.010] | [0.009] | [0.009] |
| Target M/B | 0.0023 | 0.0021 | 0.0019 | 0.0010 | 0.0026 | 0.0009 |
| | [0.324] | [0.370] | [0.411] | [0.676] | [0.286] | [0.707] |
| Stock pct | -0.0218*** | -0.0218*** | -0.0201*** | -0.0220*** | -0.0223*** | -0.0218*** |
| | [0.001] | [0.001] | [0.002] | [0.001] | [0.001] | [0.001] |
| Tender | 0.0034 | 0.0039 | 0.0036 | 0.0030 | 0.0042 | 0.0028 |
| | [0.471] | [0.405] | [0.438] | [0.517] | [0.375] | [0.548] |
| Hostile | 0.0115 | 0.0106 | 0.0100 | 0.0110 | 0.0117 | 0.0114 |
| | [0.207] | [0.243] | [0.266] | [0.231] | [0.199] | [0.212] |
| Adjusted $R^2$ | 0.1045 | 0.1062 | 0.1098 | 0.1006 | 0.1022 | 0.1007 |
| Observations | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 |

Table 5

Relation of prior target price changes with target valuation uncertainty variables

The dependent variable is *Target Δ high*. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. All variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Target price range | -0.3948*** | | | |
| | [0.000] | | | |
| Industry M/B stdev | | -0.0562*** | | |
| | | [0.000] | | |
| Target price stdev | | | -0.0255*** | |
| | | | [0.000] | |
| Risk index | | | | -0.0837*** |
| | | | | [0.000] |
| Log target market value | -0.0005 | 0.0072*** | 0.0230*** | 0.0160*** |
| | [0.829] | [0.005] | [0.000] | [0.000] |
| Target cash flow/ cash | 0.0014** | 0.0024*** | 0.0026*** | 0.0013* |
| | [0.029] | [0.001] | [0.000] | [0.068] |
| Target net income/ assets | 0.2723*** | 0.5484*** | 0.6299*** | 0.4848*** |
| | [0.000] | [0.000] | [0.000] | [0.000] |
| Adjusted $R^2$ | 0.4422 | 0.2615 | 0.2376 | 0.3221 |
| Observations | 2,364 | 2,364 | 2,364 | 2,364 |

Table 6
Acquirer post-takeover risk
*Acquirer post return stdev* is the dependent variable. All regressions include acquisition year indicator variables. “Log” in front of the variable name indicates the natural logarithm of the variable. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Target price range | 0.0038*** | | | | |
| | [0.000] | | | | |
| Industry M/B stdev | | 0.0018*** | | | |
| | | [0.000] | | | |
| Target price stdev | | | 0.0002 | | |
| | | | [0.129] | | |
| Target return stdev | | | | 0.1212*** | |
| | | | | [0.000] | |
| Risk index | | | | | 0.0011*** |
| | | | | | [0.000] |
| Acquirer prior return stdev | 0.7934*** | 0.7689*** | 0.8520*** | 0.7436*** | 0.8119*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Log relative size | 0.0007*** | 0.0008*** | 0.0005*** | 0.0009*** | 0.0006*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Stock pct | 0.0008* | 0.0007 | 0.0007 | 0.0008* | 0.0006 |
| | [0.082] | [0.109] | [0.141] | [0.070] | [0.160] |
| Tender | 0.0002 | -0.0002 | 0.0002 | 0.0001 | 0.0001 |
| | [0.702] | [0.708] | [0.660] | [0.886] | [0.849] |
| Hostile | -0.0001 | -0.0003 | -0.0003 | 0.0001 | -0.0004 |
| | [0.939] | [0.782] | [0.767] | [0.909] | [0.752] |
| Adjusted $R^2$ | 0.7000 | 0.7068 | 0.6963 | 0.7040 | 0.7001 |
| Observations | 2,381 | 2,381 | 2,381 | 2,381 | 2,381 |

Table 7

Regression results for acquirer announcement returns with treatment model

*Stock* is the dependent variable in the first step and *Acquirer CAR* is the dependent variable in the second step. The second step regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. The correlation between *Stock* and the error in the *Acquirer CAR* regression is measured by ρ. The Wald test of ρ being equal to zero is rejected in all columns. All variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. $^{***}$, $^{**}$, and $^{*}$ denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 7 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable: Acquirer CAR | | | | | | |
| Target Δ high | 0.0281** | | | | | 0.0125 |
| | [0.019] | | | | | [0.312] |
| Target price range | | -0.0267*** | | | | |
| | | [0.001] | | | | |
| Industry M/B stdev | | | -0.0044* | | | |
| | | | [0.073] | | | |
| Target price stdev | | | | -0.0036*** | | |
| | | | | [0.004] | | |
| Risk index | | | | | -0.0097*** | -0.0085*** |
| | | | | | [0.000] | [0.001] |
| Target runup | 0.0187* | 0.0244*** | 0.0241*** | 0.0242*** | 0.0248*** | 0.0236** |
| | [0.051] | [0.005] | [0.006] | [0.005] | [0.004] | [0.014] |
| Log acquirer market value | -0.0035** | -0.0040*** | -0.0034** | -0.0005 | -0.0026* | -0.0030** |
| | [0.014] | [0.005] | [0.018] | [0.734] | [0.062] | [0.037] |
| Log relative size | -0.0138*** | -0.0145*** | -0.0136*** | -0.0114*** | -0.0130*** | -0.0132*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Acquirer M/B | -0.0120*** | -0.0110*** | -0.0120*** | -0.0121*** | -0.0105*** | -0.0104*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Target M/B | 0.0005 | 0.0008 | 0.0023 | 0.0006 | 0.0022 | 0.0022 |
| | [0.843] | [0.734] | [0.338] | [0.793] | [0.353] | [0.360] |
| Stock | 0.0805*** | 0.0817*** | 0.0783*** | 0.0803*** | 0.0790*** | 0.0794*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Tender | 0.0043 | 0.0040 | 0.0051 | 0.0036 | 0.0045 | 0.0045 |
| | [0.317] | [0.352] | [0.229] | [0.390] | [0.294] | [0.297] |
| Hostile | 0.0088 | 0.0084 | 0.0090 | 0.0085 | 0.0088 | 0.0088 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Correlation ρ | -0.771 | -0.777 | -0.763 | -0.770 | -0.766 | -0.768 |
| Wald test ρ = 0 | 86.130 | 92.155 | 76.193 | 88.496 | 82.027 | 83.281 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Dependent variable: Stock | | | | | | |
| Target Δ high | -0.3078** | | | | | -0.2318 |
| | [0.037] | | | | | [0.128] |
| Target price range | | 0.3756*** | | | | |
| | | [0.001] | | | | |
| Industry M/B stdev | | | -0.0287 | | | |
| | | | [0.415] | | | |
| Target price stdev | | | | 0.0423** | | |
| | | | | [0.016] | | |
| Risk index | | | | | 0.0615* | 0.0399 |
| | | | | | [0.078] | [0.269] |
| Log acquirer market value | -0.0043 | 0.0045 | -0.0120 | -0.0370 | -0.0134 | -0.0074 |
| | [0.830] | [0.823] | [0.547] | [0.101] | [0.506] | [0.713] |
| Log relative size | 0.2006*** | 0.2124*** | 0.1982*** | 0.1746*** | 0.1957*** | 0.1987*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Acquirer M/B | 0.2000*** | 0.1813*** | 0.2256*** | 0.2011*** | 0.1904*** | 0.1883*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Observations | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 |

Table 8

Corporate governance effects

*Acquirer CAR* is the dependent variable. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. *High Acq* (*Tar*) *E-index* equals one when the acquirer's (target's) E-index is higher than three. The E-index is the entrenchment index as defined in Bebchuk, Cohen, and Ferrell (2009). It ranges from zero to six, with higher values indicating poorer governance. *Target Δ high x High Acq E-index* is the interaction of *Target Δ high* and *High Acq E-index*. *High risk x High Acq* (*Tar*) *E-index* is the interaction of *High risk* and *High Acq* (*Tar*) *E-index*. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Target Δ high | 0.0297** | 0.0400** | | | | |
| | [0.042] | [0.012] | | | | |
| Target Δ high x High Acq E-index | | -0.0427* | | | | |
| | | [0.075] | | | | |
| High risk | | | -0.0125** | -0.0155*** | -0.0119 | -0.0205** |
| | | | [0.017] | [0.010] | [0.103] | [0.013] |
| High risk x High Acq E-index | | | | 0.0158 | | |
| | | | | [0.121] | | |
| High Acq E-index | | -0.0053 | | -0.0010 | | |
| | | [0.301] | | [0.809] | | |
| High risk x High Tar E-index | | | | | | 0.0453** |
| | | | | | | [0.016] |
| High Tar E-index | | | | | | -0.0013 |
| | | | | | | [0.891] |
| Target runup | 0.0069 | 0.0072 | 0.0164 | 0.0159 | 0.0300 | 0.0314 |
| | [0.554] | [0.522] | [0.130] | [0.141] | [0.122] | [0.102] |
| Log acquirer market value | -0.0017 | -0.0018 | -0.0007 | -0.0007 | -0.0032 | -0.0036 |
| | [0.347] | [0.290] | [0.687] | [0.677] | [0.425] | [0.367] |
| Log relative size | -0.0082*** | -0.0084*** | -0.0078*** | -0.0078*** | -0.0060* | -0.0064* |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.085] | [0.060] |
| Acquirer M/B | -0.0014 | -0.0010 | -0.0013 | -0.0011 | -0.0013 | -0.0001 |
| | [0.664] | [0.764] | [0.688] | [0.746] | [0.822] | [0.984] |
| Acquirer M/B x Stock | -0.0044 | -0.0044 | -0.0040 | -0.0039 | -0.0055 | -0.0056 |
| | [0.172] | [0.172] | [0.207] | [0.230] | [0.338] | [0.338] |
| Target M/B | 0.0027 | 0.0024 | 0.0032 | 0.0030 | -0.0044 | -0.0041 |
| | [0.284] | [0.339] | [0.218] | [0.246] | [0.371] | [0.403] |
| Stock pct | -0.0240*** | -0.0234*** | -0.0240*** | -0.0240*** | -0.0286* | -0.0273* |
| | [0.001] | [0.002] | [0.001] | [0.001] | [0.070] | [0.097] |
| Tender | -0.0032 | -0.0032 | -0.0022 | -0.0025 | 0.0137 | 0.0137 |
| | [0.540] | [0.535] | [0.668] | [0.629] | [0.293] | [0.291] |
| Hostile | 0.0218 | 0.0229 | 0.0200 | 0.0201 | 0.0119 | 0.0109 |
| | [0.120] | [0.101] | [0.155] | [0.148] | [0.456] | [0.484] |
| Adjusted $R^2$ | 0.1224 | 0.1242 | 0.1216 | 0.1220 | 0.1212 | 0.1285 |
| Observations | 919 | 919 | 919 | 919 | 470 | 470 |

Table 9
Impact of time since 52-week high
*Acquirer CAR* is the dependent variable. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. All variables are defined in prior tables. The regressions in columns 1 and 2 (3 and 4) contain only observations with less than 100 (more than 200) days between the target's 52-week high and the acquisition announcement date. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Target Δ high | 0.0829** | | 0.0155 | |
| | [0.029] | | [0.316] | |
| Risk index | | -0.0076*** | | -0.0104*** |
| | | [0.005] | | [0.003] |
| Target runup | -0.0012 | 0.0213* | 0.0335** | 0.0362*** |
| | [0.938] | [0.099] | [0.021] | [0.007] |
| Log acquirer market value | -0.0031* | -0.0020 | -0.0048** | -0.0047** |
| | [0.067] | [0.221] | [0.019] | [0.019] |
| Log relative size | -0.0045** | -0.0035* | -0.0096*** | -0.0092*** |
| | [0.017] | [0.061] | [0.000] | [0.000] |
| Acquirer M/B | 0.0113** | 0.0123** | -0.0074* | -0.0055 |
| | [0.025] | [0.014] | [0.067] | [0.180] |
| Acquirer M/B x Stock | -0.0139*** | -0.0144*** | -0.0033 | -0.0033 |
| | [0.003] | [0.002] | [0.422] | [0.426] |
| Target M/B | -0.0027 | -0.0019 | 0.0020 | 0.0047 |
| | [0.482] | [0.632] | [0.577] | [0.198] |
| Stock pct | -0.0105 | -0.0101 | -0.0276** | -0.0271** |
| | [0.212] | [0.227] | [0.024] | [0.026] |
| Tender | -0.0035 | -0.0037 | 0.0038 | 0.0042 |
| | [0.572] | [0.559] | [0.626] | [0.586] |
| Hostile | -0.0050 | -0.0034 | 0.0298** | 0.0308** |
| | [0.719] | [0.801] | [0.034] | [0.026] |
| Time since 52-week high | < 100 days | < 100 days | > 200 days | > 200 days |
| Adjusted $R^2$ | 0.0850 | 0.0846 | 0.1051 | 0.1137 |
| Observations | 1,057 | 1,057 | 976 | 976 |

Table 10

Robustness tests

*Acquirer CAR* is the dependent variable. All regressions include acquisition year indicator variables. "Log" in front of the variable name indicates the natural logarithm of the variable. *Target Δ low x High risk* is the interaction of *Target Δ low* and *High risk*. *Adjusted target Δ high* subtracts *Market return since high*, the CRSP equal-weighted index return between the target's 52-week high and one week prior to the acquisition announcement, from *Target Δ high*. *Target CAR* is the three-day return of the target in excess of the CRSP equal-weighted index centered on the acquisition announcement. All other variables are defined in prior tables. Several variables are winsorized to limit the impact of outliers. *p*-Values, based on heteroskedasticity-adjusted standard errors that are clustered at the acquirer level, are in brackets. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Target Δ low | 0.0094* | -0.0004 | -0.0001 | | | |
| | [0.097] | [0.944] | [0.988] | | | |
| Target Δ low x High risk | | | 0.0268** | | | |
| | | | [0.031] | | | |
| Target Δ high | | | | | 0.0326*** | |
| | | | | | [0.003] | |
| Adjusted target Δ high | | | | 0.0298*** | | |
| | | | | [0.006] | | |
| Market return since high | | | | 0.0501*** | | |
| | | | | [0.007] | | |
| Risk index | | | | | | -0.0090*** |
| | | | | | | [0.000] |
| High risk | | | -0.0375*** | | | |
| | | | [0.000] | | | |
| Target runup | | 0.0271*** | 0.0189* | 0.0167* | 0.0221** | 0.0338*** |
| | | [0.006] | [0.060] | [0.078] | [0.020] | [0.000] |
| Target CAR | | | | | 0.0404*** | 0.0371*** |
| | | | | | [0.000] | [0.000] |
| Log acquirer market value | -0.0026** | -0.0027** | -0.0028** | -0.0035*** | -0.0033*** | -0.0023* |
| | [0.028] | [0.025] | [0.018] | [0.004] | [0.006] | [0.052] |
| Log relative size | -0.0061*** | -0.0059*** | -0.0057*** | -0.0064*** | -0.0048*** | -0.0041*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] | [0.004] |
| Acquirer M/B | -0.0003 | -0.0007 | 0.0011 | 0.0002 | -0.0003 | 0.0003 |
| | [0.904] | [0.783] | [0.673] | [0.934] | [0.898] | [0.898] |
| Acquirer M/B x Stock | -0.0080*** | -0.0075*** | -0.0076*** | -0.0076*** | -0.0075*** | -0.0071** |
| | [0.005] | [0.008] | [0.007] | [0.007] | [0.007] | [0.011] |
| Target M/B | -0.0005 | -0.0001 | 0.0020 | 0.0004 | 0.0013 | 0.0031 |
| | [0.823] | [0.963] | [0.398] | [0.860] | [0.577] | [0.197] |
| Stock pct | -0.0212*** | -0.0218*** | -0.0212*** | -0.0214*** | -0.0195*** | -0.0203*** |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.002] | [0.002] |
| Tender | 0.0027 | 0.0021 | 0.0037 | 0.0030 | 0.0002 | 0.0004 |
| | [0.562] | [0.660] | [0.433] | [0.520] | [0.970] | [0.938] |
| Hostile | 0.0110 | 0.0111 | 0.0112 | 0.0110 | 0.0083 | 0.0081 |
| | [0.231] | [0.223] | [0.216] | [0.230] | [0.359] | [0.362] |
| Adjusted $R^2$ | 0.0917 | 0.0959 | 0.1084 | 0.1007 | 0.1099 | 0.1127 |
| Observations | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 | 2,394 |