The effect of reference point prices on mergers and acquisitions*

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Abstract

The use of the target's recent peak prices as reference points or judgmental anchors affects several aspects of merger and acquisition activity including offer prices, deal success, market reaction, and merger waves. Offer prices are biased toward the target's recent peak prices although such prices are economically unremarkable. The offer's probability of acceptance jumps discontinuously when it exceeds a peak price, a real effect of the use of peak prices. Conversely, bidder shareholders react more negatively as the offer price is influenced upward toward a peak price. Merger waves occur when high recent returns on the stock market and on likely targets make it easier for bidders to offer a peak price.

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I. Introduction

The price that a bidding firm offers for a target is generally the outcome of a negotiation with the target's board. The standard textbook story emphasizes synergies. The offer price starts with an estimate of the increased value of the combined entity under the new corporate structure, deriving from cost reductions in labor or capital equipment, supply chain reliability, debt tax shields, market power, market access and expertise, improved management, internal finance, and other economic factors (e.g., Lang, Stulz, and Walkling 1989 or Jovanovic and Rousseau (2002)). This value gain is then divided between the two entities' shareholders according to their relative bargaining power. In theory, the textbooks suggest, all of this leads to an objective and specific price for the target's shares.

In practice, valuing a company is subjective. A large number of assumptions are needed to justify any particular valuation of the combination. In addition, relative bargaining power may not be fully established. Boards can bluff in the negotiation. Other bidders may emerge. These real-life considerations mean the appropriate target price cannot be set with precision, but established only to be within a broad range. We hypothesize that this indeterminacy, in turn, creates space for the price offered and its reception to reflect other influences, in particular the psychological influences on the board of the target and the bidder and target shareholders, who ultimately must approve the price.

In particular, we propose a "reference point" view of mergers which holds that salient but largely irrelevant reference point stock prices of the target contribute to mergers and acquisition activity through both the prices and the types and quantities of firms traded. This psychological motivation has well-established roots in the anchoring-and-conservative-adjustment estimation method (Tversky and Kahneman (1974)), the salience of initial anchor positions in negotiations,

and the prospect theory tenet that the utility of an outcome is a function of the outcome's distance from a reference point.

The reference point stock prices that we focus on are the peak prices that the target has achieved over various horizons, such as the 13-week high, 26-week high, and so on. The 52-week high price, for example, is very widely reported in the financial press and is salient to executives, boards, and investors. Importantly, and in contrast to target shareholders' individual cost bases, other natural reference points for individuals, these peak prices are reference prices that are common across stakeholders. We start with some anecdotes that suggest that practitioners do indeed give special weight to recent peak prices in target valuations: Target firm boards that are discouraging the deal often point out that the bid is below the recent high, while those that are encouraging the deal often note when the bid compares favorably with that price.

The most obvious dimension of mergers that may be affected by reference prices is the offer price. Our results show a visually and statistically obvious effect of recent peak prices. Histograms of offer prices shows spikes at the 13-week high, 26-week high, 39-week high, 52-week high, and 104-week high. In other words, a peak price often serves not merely as a subtle psychological anchor but as one sufficiently heavy that there is no "adjustment" from it at all. Offer prices also cluster at 25% and 50% above recent peaks. There is even an identifiable spike in the distribution of offer prices at 50% *below* the 52-week high. For targets that have fallen very far since their recent high, "halfway back to the peak" is not an uncommon offer; while the 52-week high is water under the bridge and no longer a plausible price, it nonetheless serves as an exact reference point for a determination of a more appropriate price.

These peak prices are of incremental importance to the offer price decision. Controlling for the 13-week high, the 26-week high price has a statistically and economically significant effect on offer prices, and the 39- and 52-week high prices also have independent explanatory

power. Having documented that multiple reference points matter, we focus on the 52-week high for simplicity. For 52-week highs of a typical size, a 10% increase in the 52-week high is associated with a 3% increase in the offer premium. A crude estimate is that the effect of the 52-week high leads to an arbitrary value transfer of $179 billion in the 5,135 completed mergers and acquisitions in our sample, or 18% of the total offer premium paid.

The effect of peak prices is apparent under a variety of control variables, robustness tests, and falsification tests. We examine the 52-week high's effect on offer prices in various subsamples and consider non-psychological alternative explanations. For example, perhaps this price could simply be highly correlated with the objective, but unobserved value gain from combination—e.g. it is the value to which the target assets could return if only they were managed as well by the bidder in the future as they were by the target in the past. However, the 52-week high of the market index also affects offer prices. Because the market component of the target's 52-week high cannot be recovered merely by changing management, this alternative does not provide a complete explanation for the 52-week high effect on offer prices. And of course one would also have to explain why it is that prices that are precisely 25% above, 50% above, and 50% below recent peak prices are also critical measures of fundamental value.

The second dimension of merger activity we consider is deal success—what distinguishes bids that succeed from those that fail. We find that the probability of deal success is significantly and discontinuously increased by 3% to 4% when the bidder makes an offer price above the target's 52-week high.

The cross-section of market reactions to bid announcements is also not well understood. One hypothesis is that bidder announcements reflect the market's estimate of overpayment. The offer premium itself is not a clean measure of overpayment, as better combinations may attract higher offer premia. We find that the bidder's announcement effect becomes more negative with

the target's distance from its 52-week high. Given the connection between 52-week highs and offer prices, shareholders of the bidder appear to view the bidder as more likely to be overpaying when the target has fallen far below this reference price. The 52-week high is an ideal instrument for the effects of overpayment in mergers and acquisitions, separate from synergies or misvaluation in the bidder for example. The bidder announcement effect is 2% to 3% worse for each 10% increase in the component of offer premium that is explained by the 52-week high.

Apart from its impact on deal success and the value transfer in successful deals, high peak prices may deter bidders from appearing in the first place. The fourth and last aspect of merger activity that we examine is merger waves. It is well known that merger waves coincide with higher stock market valuations. From the reference point perspective, higher market valuations mean that more targets are trading closer to their peak prices, so these reference points become easier to satisfy (from the perspective of targets) and to justify (from the perspective of bidders) than when valuations have fallen. Here, our tests are less refined. Not surprisingly, we find that the market's 52-week high relative to its current value is inversely related to the level of merger activity. Somewhat more interesting is that the 52-week high matters controlling for the past twelve individual monthly returns. Furthermore, the effects are somewhat stronger using the 52-week high premium on firms that ex ante have typical characteristics of targets.

The reference point view complements other perspectives on mergers. Its special strength is its account of offer premia; other theories of merger activity make few testable predictions here. The deal success and market reaction implications of reference points are also somewhat unique. There are other explanations for the coincidence of stock market valuations and merger activity, however, such as the market timing theories of mergers by Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004). Reference points don't shed light on the nature of deal synergies, although nor do several other merger theories, and in any case it should be noted

that synergies have long proved difficult to document empirically.[2] Jovanovic and Rousseau's (2002) Q-theory considers mergers as vehicles for technology transfer and capital reallocation, addressing the market valuations-merger waves link and incorporating a synergies story, but is silent on some other aspects of the evidence. Jensen's (1986) agency theory has few overlapping predictions with reference points, nor do the managerial theories of Amihud and Lev (1981) and Morck, Shleifer, and Vishny (1990), nor do the overconfidence views of Roll (1986), Ben-David, Graham, and Harvey (2007), and Malmendier and Tate (2008).[3] An important difference between the reference point view and other merger theories is that it embraces considerations of the target rather than those of the bidder alone or features of the combination. While it is clear that no single theory will never be able to address the full range of merger phenomena, reference points fill in some of the blanks.

Section II proposes some hypotheses based on the anchoring and adjustment phenomenon and briefly reviews related scientific and anecdotal evidence. Section III reviews the basic data. Sections IV, V, VI, and VII report how reference points affect offer prices, deal success, offer announcement effects, and merger waves, respectively. Section VIII concludes.

II. The Psychology of Reference Points, Loss Aversion, and Anchoring and Adjustment

The psychology of pricing is a recognized subfield of marketing research. There, the focus is on identifying prices or "price points" that lead to discontinuous jumps in demand. The M&A context has several parallels. The bidder wants to offer the lowest price that the target will accept: the target is the consumer to whom the bidder markets.

[2] See Rajan, Volpin, and Zingales (2000) and the other chapters in Kaplan (2000) for recent progress.

[3] Baker, Ruback, and Wurgler (2007) survey behavioral theories of mergers (not including reference points) and Andrade and Stafford (2004) review non-behavioral theories.

Unlike in retail pricing, of course, the target shareholders in a merger transaction are selling not buying. The bidder is therefore looking for announced price points that will lead to discontinuous jumps in supply. We briefly review some of the psychology and economics relevant to the use of reference point prices.

A. Reference Points, Loss Aversion, and Anchoring and Adjustment

The empirically-motivated prospect theory of Kahneman and Tversky (1979) identifies a departure from preference specifications that emphasize levels of goods and wealth as the sole drivers of value or utility. Their theory holds that changes in status relative to particular reference points are also a carrier of perceived value. The reference point in their theory is derived from the context at hand. It may be influenced by normatively-irrelevant frames of reference, or it may be based on an aspirational level or expectation as opposed to the status quo (Kahneman (1992)).

Another component of preferences that Kahneman and Tversky emphasize is loss aversion. This refers to a kink in prospect theory's value function at its origin, specifically that losses are disliked more than equal-size gains are liked. Furthermore, they set the shape of their theory's value function to include convexity in the domain of losses and concavity in gains to help it explain finer features of observed choice. To summarize, their value function is shaped like a kinked "S" and is defined over changes in value relative to a reference point.

The related phenomenon of anchoring and adjustment is associated with Tversky and Kahneman (1974). It refers to a belief formation process (not a utility perception) under which one begins at a specific initial value, salient but perhaps entirely irrelevant, and then adjusts toward a final estimate based on other considerations. The bias typically observed is that the final estimate is insufficiently adjusted from the initial value, hence its term "anchor." The bias may be used to advantage in negotiations. Kahneman (1992) notes that "negotiators commonly have

an interest in misleading their counterpart about their reservation prices.… High claims and low offers are therefore made in the hope of anchoring the other side's view of one's true position…. The moral of studies of anchoring is that such efforts at deception can succeed … even when these messages are neither accepted nor even believed" (p. 309-310).

Economic applications of these ideas are plentiful. Neale and Bazerman (1991) consider the setting of union negotiations over wages and review strategems that appear to take advantage of the anchoring phenomenon. Babcock, Wang, and Loewenstein (1996) similarly report on the self-serving use of comparison groups as reference points in wage bargaining. Camerer and Malmendier (2007) consider reference point effects in organizational economics generally. Northcraft and Neale (1987) show that the asking price affects estimates of the value of a house, even among professional real estate agents who claim to view it as uninformative; but List (2004, 2005) and Plott and Zeiler (2005) qualifies this with evidence that experience attenuates or eliminates the endowment effect.[4] Genesove and Mayer (2001) find that homeowners' cost bases significantly affects negotiations and thus outcomes of real estate transactions. The large literature on money illusion is based centrally on nominal reference point pricing.

The use of reference points among investors and other financial actors appears, for example, in Shefrin and Statman (1985), who note that prospect theory and loss aversion imply that investors have a "disposition effect" and are more reluctant to sell stocks showing paper losses than they are stocks showing gains. This effect is demonstrated in Odean (1998), Grinblatt and Keloharju (2001), Grinblatt and Han (2005), Ivkovich, Poterba, and Weisbenner (2005), and Birru (2009).[5] Shefrin and Statman (1984) suggest a view of dividends based on loss aversion

[4] In this connection, it is noteworthy that most executives and investors are not involved in merger transactions with any frequency, although their bankers may be.

[5] In unreported tests we considered the trading volume-weighted average price (e.g. Grinblatt and Han (2005)) as another reference price that may be relevant to merger activity. However, perhaps because of the inherent noisiness

and framing effects. Barberis, Huang, and Santos (2001) discuss asset pricing implications of prospect theory, and Barberis and Xiong (2008) emphasize that the 52-week high is a price where investors are particularly willing to realize gains. DeGeorge, Patel, and Zeckhauser (1999) show that executives strain to exceed salient EPS thresholds. Baker and Xuan (2009) find that the price at which the CEO joined the company is an important reference point for raising outside equity. Loughran and Ritter (2002) propose that reference-point preferences and mental accounting help to explain IPO underpricing, a view tested by Ljungqvist and Wilhelm (2005). Hart and Moore (2008) develop contracting theory based on parties' use of anchoring and psychological reference points.

Certain of these actions are efforts to cater to investors who notice reference points such as earnings per share and 52-week highs—for example, Huddart, Lang, and Yetman (2009) find stock market volume and price effects around this reference stock price, and Heath, Huddart, and Lang (1999) find that employee exercise of stock options doubles when their company's stock price exceeds its 52-week high. Baker, Greenwood and Wurgler (2009) argue that managers cater to shareholder preference for certain nominal share price ranges.

B. The Target

In a sufficiently large merger or acquisition, the transaction must be approved by the management and shareholders of the target as well as those of the bidder. We start by discussing empirical hypotheses that derive from the psychology outlined above.

The most obvious application involves the disposition effect, or the reluctance to realize losses relative to a reference point. While for some investors the reference point is likely to be

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of our measure, as well as the fact that it pertains exclusively to target shareholders rather than a wider range of stakeholders, we found weaker results than those for the 52-week high.

their purchase price, i.e. the disposition effect documented in papers mentioned above, other important reference points—and, importantly for our purposes, ones that are common across shareholders—are the firm's recent peak prices. The 52-week high price, for example, is widely reported in the financial media. Furthermore, because it by definition is a fairly recent price, it seems attainable by target shareholders even in the absence of a merger. This logic predicts that targets are more likely to approve mergers in which the offer price approaches or exceeds a recent peak price. More subtly, the S-shaped value function predicts that the further is the current price from a recent high, the less influence the marginal dollar away from that reference will have in terms of the perception of losses.

Belief formation via anchoring and adjustment may reinforce the utility effects—and at least three levels, two psychological and one practical. First, target shareholders must form an estimate of target value when deciding whether to accept the offer. Lacking time, information, and ability to accurately compute present values of future cash flows under alternative ownership and management scenarios, some of them will consult recent peak prices as references. Second, targets seek and attempt to justify the highest possible price. Whether or not the target board views it as relevant, a recent peak price can be used as a negotiating anchor. The 52-week high may be the highest salient and specific price at hand. Third, the target's management and board faces a risk of shareholder litigation if they recommend selling at a price that is viewed as too low. That they did not sell below a recent peak price provides some rhetorical cover.

C. The Bidder

The bidder's psychology can also be affected by anchoring and adjustment both directly and strategically. When pursuing a target, the bidder has to decide how much it is willing to pay, and that in turn depends on how it values the target. It is not possible to pin this down with

certainty. An input to this estimation must be the target's recent valuations, and as such its own recent peak prices may enter as anchors. The bidder may reason, if the target was valued at a certain level just a few months ago, shouldn't we, with our ability to realize synergies, value it near or above that same level? Thus a peak price can become an anchor, and as mentioned above insufficient adjustment from that level becomes the norm.

Reinforcing predictions arise from the fact that bidder management must justify their offer to shareholders and financiers. The management may reassure such stakeholders with the simple argument that the target was worth that price in the past and so, of course, it must be possible to realize that in the future. On the other hand, if the bidder's investors do not think as hard as its board about the target's potential valuation, they may be less biased by the anchoring phenomenon and so more likely to view peak-price-driven bids as overpaying.

And there is the bidder's perception of the target's psychology. Once a target valuation is established by any means, the bidder must estimate the minimum price that the target will accept. Boards may predict that the target's 52-week high will be used both as a strategic anchor against them in negotiations and as a reference point that their own investors care about.[6] Or, bidders may appreciate that targets want a "fair" offer and, knowing that targets have a biased notion of fairness (Babcock et al. (1995)), offer a recent peak price even if they view it as too high.

D. Anecdotes from Shareholder Communications

The 52-week high price is often cited in communications between managements and shareholders about pending mergers or acquisitions. It is also cited by the media as a simple

[6] In an interview with one of the authors, Gerald Rosenfeld, CEO of the investment bank Rothschild North America, stated that in his experience the target's current price is the most important reference for valuation while the 52-week high is the second-most critical reference.

yardstick with which to put the bid price in context. Here are three of many anecdotal examples we have encountered.

The management of Taro Pharmaceutical Industries, in a July 28, 2008, amendment to its SEC SC 14D-9 filing recommending against the tender offer from Sun Pharmaceutical Industries, made the following statement: *"*Beyond what was written in the 14D-9, I would add only the obvious: that Sun's offer of $7.75 per share is significantly below the price at which our shares are trading today, which is at a 52-week high, and even further below the price that Sun paid to get blocks of Taro shares in recent private transactions with investors. Given our performance year to date and our outlook, I believe the Sun offer significantly undervalues our Company and deprives you of what we believe your shares are worth." Left unmentioned is the fact that Sun's bid itself contributed to Toro's high price today.

The media often reinforce these claims. For example, on February 1, 2008, the *Wall Street Journal* reported, "Microsoft's $31-per-share offer – $44.6 billion – represented a 62 percent premium to Yahoo's closing price late Thursday, although it's below Yahoo's 52-week high of $34.08 reached less than four months ago." The article failed to explain why an historical price more than 78% higher than the current price should be relevant, however.

The 52-week high can of course also be cited as reason to embrace, not reject, an offer. Figure 1 shows an example slide from a shareholder presentation by Cablevision to its shareholders on October 24, 2007. In arguing for acceptance of the offer from the family which already controlled the company, Cablevision management highlights the fact that the bid price is at a premium to a variety of 52-week high and low prices, an appeal both to anchoring as an estimate of value and reference point utility.

These anecdotes give some suggestive color to the salience of reference points to target agents and the media and the contexts in which they are employed. It is precisely because

reference point prices may affect many stakeholders in a merger transaction—advisors, boards, and investors and financiers of both the bidder and the target—that we focus the empirical work on documenting the effects of reference point prices on specific merger outcomes. In other words, the odds of success in our empirical work increases from the numerous overlapping and reinforcing predictions noted above. At the same time this makes it difficult to provide a full attribution of our results to particular psychological mechanisms and negotiating strategies.

III. Data

A. Merger and Acquisition Sample

The sample of deals is described in Table 1. Our source for mergers and acquisitions is Thomson Financial. We start with 23,350 unique deals where the announcement date is between January 1, 1984, and December 31, 2007, where the target is a public company, where the offer price is not missing, and where the bidder purchased at least 85% of the target firm shares outstanding or else the percentage acquired is unknown. We exclude deals that are missing an offer price or have been classified by Thomson as recapitalizations, repurchases, rumors, or target solicitations. These constitute the minimal set of exclusions required for our analysis.

Of these deals, we were able to compute the target's 52-week high price from CRSP for a final sample of 7,498. We define the offer premium as the total consideration offered scaled by the target's price as of 30 days prior to the announcement. Similarly, the 52-week target (market index) high is the 52-week high stock price (market index) over the 365 calendar days ending 30 days prior to the announcement date expressed as a percentage difference from the CRSP stock price (market index) 30 calendar days prior to the announcement date. The CRSP market index is formed using total market value-weighted returns.

The purpose of scaling these prices by a common factor is to eliminate heteroskedasticity that would otherwise result from comparing these two prices in raw form. The purpose of choosing a 30-day lagged price as this scaling factor is to attenuate the upward "rumors" effect on the offer premium.

For all deals, Thomson gives information on whether the offer is a tender offer and whether the bidder is a financial buyer (LBO). For a subset of deals, we have information on the form of payment is cash, stock, or other, whether the deal is completed or withdrawn, and whether the bidder attitude is hostile, friendly, or neutral. Data on the form of payment and attitude of the deal are not available before 1990, but we are able to determine the form of payment for 4,361 deals and attitude for 4,346 deals, 220 of which were hostile. Of our main sample, 1,522 are tender offers and 192 are acquisitions by financial firms. It is likely that Thomson is underreporting these deals, particularly the frequency of leveraged buyouts in recent years. We keep track of the success of specific offers, not whether the target is ultimately acquired. Of the 6,926 deals that Thomson records as either completed or withdrawn, 26% are withdrawn. Of course, this includes situations where a competing or revised offer emerged, so the rate of overall success is much higher than these averages would indicate.

B. Summary Statistics

Table 2 reports means, standard deviations, medians, and extreme values for deal pricing, outcome variables, and control variables. Regarding prices, the median offer premium is 29.4%, the median 13-week high target price is 9.34%, etc. Peak prices increase monotonically with horizon, reaching a median of 30.10% over the past two years. The median 52-week high market price is 3.2%. These are all expressed in log terms. For the peak prices, which of course are positive by definition, we Winsorize at the 1% and 99% levels, but wide variation remains.

In addition to the primary variables of interest, we record secondary deal outcome variables in Panel B, and deal, target, and bidder characteristics in Panel C. All continuous variables among these are also Winsorized. We calculate the three-day announcement return of the bidder by compounding the daily holding period return from CRSP (CRSP: RET) centered on the announcement date from Thomson. The median is -0.81%. About 74% of the offers are successfully completed.

The target and bidder characteristics are from standard sources. Return on equity is defined as net income (Compustat: NI) divided by shareholders' equity (Compustat: SEQ). The return on assets is defined as net income (NI) divided by total assets (Compustat: AT). The book-to-market ratio is defined as book equity divided by market equity, where book equity is total shareholders' equity (Compustat: SEQ) plus deferred taxes and investment tax credit (Compustat: TXDITC) minus the redemption value of preferred stock (Compustat: PSRKRV) and market equity is calculated by multiplying shares outstanding (CRSP: SHROUT) and price (CRSP: PRC) at fiscal year end. The earnings price ratio is defined as earnings before interest and taxes (Compustat: EBIT) divided by market equity (ME). Because not all target and bidder companies within the main sample of 7,498 deals were tracked by Compustat in the year before the announcement of the deal, we have financial ratios of the target for only 5,108 deals and of the bidder for only 2,048 deals.

The price volatility, two-month return, and one-year return of the target are from CRSP. Volatility is defined as the standard deviation of daily returns for the 365 calendar days ending 30 days prior to the announcement date. Returns are calculated by compounding the daily holding period return (CRSP: RET) for the appropriate period ending 30 days prior to the announcement date. Market capitalization is price (CRSP: PRC) times shares outstanding (CRSP: SHROUT) from CRSP at the fiscal year end prior to Thomson's announcement date.

Panel C of Table 2 summarizes the our battery of controls. Over the sample period, 43% of the deals are financed with cash, 33% are financed with stock, 20% are tender offers, 5% are hostile, and 3% are acquired by financial firms. As one would expect, targets are generally financially weaker than bidders, including in valuation ratios with targets relatively more likely to be value firms. One explanation is, of course, that poorly-managed firms become targets (e.g., Lang and Stulz (1984) and Mitchell and Lehn (1990)).

IV. Bid Prices

A. Basic Results

We begin by documenting the effect of past peak prices on offer prices, because this relationship is central to the reference point perspective. Figure 2 simply plots the density of offer prices relative to the 13-, 26-, 39-, 52-, and 104-week highs. To keep the scale of the x-axis manageable, we do not plot offer premia that exceed 500% in absolute value.

The plots are compelling. There are spikes at the 13-week high, 26-week high, 39-week high, 52-week high, and 104-week (two-year) high. The first price is weakly less than the second, which is weakly less than the third, and so on, so we will use regressions to verify the incremental importance of peaks at each horizon. What the figures can prove is that it is common to offer exactly a recent peak price. To be clear, these peaks are not mechanically related to the offer price setting its own peak price, because the most recent peak price we allow is 30 days before the offer's announcement.

A closer look at the plots reveals a richer set of conventions. The second spike in the distribution of offer prices around the 13-week high occurs at 50%; many offers take place at a 50% premium to the 13-week high. The third most-frequent price, around which a majority of offers cluster, is a 25% premium. This center of mass is apparent in all of the distributions.

The 52-week high graph indicates a different sort of practice. There is a distinguishable spike at exactly 50% *under* the 52-week high. These are cases in which the target has fallen very far, very fast, and receives an offer to get "halfway back" to its 52-week high. Apparently, when the 52-week high is too far away to be realistic, halfway there becomes a relatively focal price.

Figure 3 presents a formal discontinuity analysis of the 52-week high (for brevity we focus on a single peak). Not only is the modal outcome equal to the 52-week high, but now another feature is revealed, which is that many other offers tend to collect just above the 52-week high. This is most apparent when we divide offers into fewer bins in Panel B. This jump in the distribution is statistically significant, with a p-value of 0.01 or less.[7] Panel A shows yet another interpretable feature. There is a slight decline in the density as we approach the 52-week high from below, and a surge as we pass it. Some bidders may reason that if they were already considering a bid around this level, they may as well push it to just above the 52-week high to increase the likelihood of acceptance—and this actually works, as we show later on.[8]

The vast majority of offer prices of course do not equal the 52-week high. We examine the overall shape of the relationship between these prices nonparametrically in Figure 4. We estimate Gaussian kernel regressions of the model

$$Offer_{it} = a + b52WeekHigh_{i,t-30} + e_{it} \quad (1)$$

with varying bandwidths and estimation points.

[7] One concern is whether the discontinuity reflects discreteness in prices. Shares are quoted in sixteenths, eighths, and decimals in our sample. The 52-week high is a price that has been observed in the price history of the target, so it falls on what might naturally be a mass point. A few refined show that this is not driving our discontinuity results. A discontinuity is apparent even when we drop the bin that contains the 52-week high. The p-value is 0.016 in Panel A and below 0.000 in Panel B. We have also estimated a bootstrap p-value by computing z-statistics for discontinuities around randomly chosen past target stock prices. Using this distribution, we find a p-value of 0.013.

[8] One question is why *any* bidder would locate just below the 52-week high. This could reflect the bidder's anticipation of a difficult negotiation and the preservation of a psychological "option value" of being able to cross a salient threshold as a "concession" in later rounds. Alternatively, mass here may be the result of stock deals—cash deals would have a more uneven mass on the left and right sides of the distribution; we study cash and stock deals separately below. Or, the peak price that agents in a given deal focus on is a 13-week high, for example, which may by chance be near the 52-week high. In any case, such behavior is likely to make the outcome effects here weaker.

Both panels in the figure suggest that the offer premium rises by approximately 3 to 3.5% with every 10% increase in the 52-week high. Panel A limits the sample to situations where the 52-week high is less than 50% higher than the pre-offer price. Beyond this level, with a long right tail and limited data, the estimated incremental effect of the 52-week high is much noisier and both statistically and economically weaker, as shown in Panel B. This might be consistent with the shape of the prospect theory value function—as "losses" increase, the marginal pain of additional loss decreases, so target shareholders may acquiesce more easily. Or, targets which have fallen substantially from their 52-week high may fail to persuade the bidder of the relevance of this past price; Figure 2 suggests that halfway back is a natural focal point.

The first columns of Table 3 report least-squares estimates of Eq. (1) and, with the nonlinearity of Figure 4 in mind, piecewise linear specifications:

$$Offer_{it} = a + b_1 \min\left(52WkHi_{i,t-30}, 25\right) + \tag{2}$$

$$b_2 \max\left(0, \min\left(52WkHi_{i,t-30} - 25, 50\right)\right) + b_3 \max\left(0, 52WkHi_{i,t-30} - 75\right) + e_{it}$$

with standard errors are clustered by month. This specification allows for a marginal effect of b_1 for 52-week high premia up to 25%, b_2 for premia between 25% and 75%, and b_3 for premia above 75%. We scale the prices by the 30-day lagged price to reduce heteroskedasticity, but to the extent that investors and boards don't think of these prices in terms of the 30-day lagged price, this practice can also lead to a type of measurement error that induces a spurious positive correlation. We therefore include the inverse of the 30-day lagged price in all specifications.

The simple linear specification shows that offer prices rise about 1% for every 10% rise in the 52-week high. This is statistically significant but not large. The true size of the effect is masked by large outliers in the independent variable, which even when Winsorized includes observations with values exceeding 250%. The piecewise linear specifications address this. They

show a magnitude similar to that suggested in Figure 4, with a 10% higher 52-week high effecting a roughly 3.3% higher offer price over the typical range of 52-week highs. As the 52-week high reference price exceeds 25%, however, it exerts a smaller influence, rising at 1.1% for each additional 10% increase in the 52-week high between 25% and 75%. Beyond 75%, the effect is approximately 0.7%. There are other interpretations of this shape, but one interpretation is the S-shaped value function of prospect theory, which implies that the further is the current price from the reference point, the less the marginal perceived loss.

The remaining columns test whether there is a specific interval over which peak prices affect offer prices or whether peaks over several intervals have incremental explanatory ability. We start with the 13-week high as a baseline regressor and add "incremental" high regressors at 13-week intervals until we reach back two years from the offer date. To estimate the incremental 26-week high regressor, for example, we essentially take the residual of a first-stage regression of the 26-week high on the 13-week high. However, to allow for the incremental high to have a diminishing marginal effect, we run this model three times to estimate the residual effects in cases in which the 26-week high premium is below 25%, between 25% and 75%, and above 75%. The header to Table 3 gives complete details of the empirical approach.

As Figure 2 suggested, but could not show formally, there are incremental effects of peak prices well beyond that achieved in the most recent 13 weeks. As an example, consider a hypothetical Target A whose 13-week high (ending 30 days prior to a deal announcement) is 10% higher than the period end price. Compare this target with another Target B whose 13-week high premium is 0%. All else equal, the offer price for Target A will be higher than the offer price for Target B by 4.2% to 4.3% on average. Subsequent peaks have somewhat distinct effects on the offer price. Extending the example, suppose that Target A's 26-week high is 10% higher than one would expect, in a statistical sense, given its 13-week high and Target B's 26-week high

is exactly what one would expect given its 13-week high. Then, the offer price for Target A would be higher by a further 2.4% to 2.9%. Incremental peaks beyond 52 weeks are generally not statistically significant. It is intuitive that long-past peaks are of progressively less relevance; the results here suggest that there is a decline after one year. However, within the more recent period, a variety of peak prices matter. Having shown this, we focus on the 52-week high for the rest of the paper for simplicity.

The peak price effect does not arise simply because it reflects target firm returns over a pre-specified period. Table 4 adds controls for each of the twelve months ending at *t*-30. The peak price effects are little changed. This indicates in another way that it is indeed the return *since the 52-week high*, i.e. the 52-week high premium, that drives the results, not that past returns were low over some fixed interval.

The last specifications in Table 4 help to evaluate a possible non-psychological alternative explanation. This explanation holds that the 52-week high price is particularly relevant because it represents a clear level of value that the bidder could hope to obtain by returning the target to "optimal" investment policy, where optimal is defined as the policies prevailing as of the time the high was reached. This explanation suffers from evidence of the importance of incremental peaks shown before, and the arbitrary spikes in the offer price distribution at 25% and 50% above peak prices or 50% below the 52-week high. In any case, we evaluate this "rational" story further by replacing the target's 52-week high premium with the overall stock market's 52-week high. The fact that this is also a statistically and similarly economically significant predictor of offer prices casts more doubt on the alternative explanation, because the bidder cannot hope to recapture the market component of the target's 52-week high by returning to a particular investment policy.

If we take the sensitivity of the offer premium to the 52-week high as an arbitrary transfer of value, we can compute the total value transfer for our sample. For each the 5,135 completed deals in our sample, we multiply the 52-week high by the piecewise linear coefficients *b* in the second column to estimate the component of the offer premium that is driven by the 52-week high. To convert this quantity to dollars, we multiply it by the target market capitalization at *t*-30 to arrive at the transfer. The total value transfer is $179 billion, $34.9 million per deal, or 18.0% of the total offer premium. Even under the assumption that the variation in the 52-week high is entirely arbitrary, we cannot clearly identify whether this is overpayment or underpayment without knowing the stand alone fundamental value of the targets and the value of synergies from the combinations. It is possible, for example, that on average the bidder gets a good deal, but overpays when the target 52-week high is especially large relative to its current price.

B. Robustness and Other Subsamples

We report additional robustness and falsification tests in Table 5. We first examine the influence of characteristics of the proposed transaction itself—whether it is for cash, stock, hostile, a tender, or a financial bidder. Tender offers are associated with large increases in offer prices, while financial buyers are associated with even larger large decreases. These control variables do not diminish the effect of the 52-week high, nor do they increase the total regression R^2 as much as one might expect, presumably due to the relative scarcity of tenders and financial buyers in our sample.

We examine how the 52-week high effect compares with bidder and target firm fundamentals as key inputs to offer premia. We control for seven characteristics of the bidder and the target. Large bidders bid more, while large targets receive less, as is intuitive when one considers bids in dollar terms. A notable control is the target's return volatility. This is correlated

with the 52-week premium and other peaks and perhaps reflects aspects of the target's value to the bidder. But the inclusion of this and the several other controls does not much reduce the effect that we focus on. Remarkably, even together these many firm and deal characteristics cannot even double the explanatory power of a model with a single reference price.

The remaining columns conduct a falsification test. We look for a specific effect of the 52-week high in another way. We ask whether that price, as the 100th percentile price over the past year, represents an effect distinct from the 90th percentile price, with which it is highly correlated. The results show that despite this high correlation, the 52-week high effect comes through. Furthermore, to the extent that the 90th percentile price also serves as an appropriate proxy for fundamental valuation, this test, like that involving the market component of the 52-week high, also casts doubt on the view that the 52-week high price effect reflects only that channel. Results are similar for the 80th, the 95th, and even the 99th percentile of the target past stock price distribution. Taken together, the figures and tables to this point provide convincing evidence that offer prices are influenced by past peaks.

Results for a variety of subsamples are in Table 6. The first column shows that the effect is stronger in tender offers. Because a tender offer is an appeal directly to target shareholders, this reflects the perception of the bidder of the relevance of the reference point to target shareholders, as opposed to the outcome of a negotiation with the target board or its advisors. A related effect, perhaps, involves the attitude of target management. Hostile offers' prices are a bit more influenced by the 52-week high than friendly offers when the 52-week premium is relatively high. This could also relate to an effort to appeal directly to target shareholders.

Reference points have similar effects on first offer and subsequent offers. (Most offers in the sample are first offers, and indeed last offers also because most offers are successful. Be mindful that what we can observe are public first offers. Boone and Mulherin (2007) show that

on the order of half of targets are sold in a competitive auction process that takes place prior to the first public offer; in other words, we often observe the outcome of that process.) The success of the offer itself, while clearly endogenous as we show later (when we study the effect of the offer price on the probability of success), provides an interesting sample split. Within the sample of successful offers, bids more strictly adhere to the 52-week high price.

The form of payment is relevant to the reference point effect, although the results and their interpretation are also murky in this case. The offer price in stock deals is more prone to reflect the 52-week high when that price is relatively modest, while cash deals are more responsive to it when it is higher, in other words when the target has recently fallen more sharply. One possibility is that this reflects the communication between bidders and their cash-providing bankers. The bidders could be justifying the offer price in part on the basis of the target's recent high.

The effect is strong in both halves of the sample, but somewhat lower in the latter half. It is hard to know, but the second half result might reflect somewhat more detailed due diligence or the increasing ease of sophisticated analysis and valuation modeling. On the other hand, the effect has actually increased for medium-size 52-week high premia. Last, in unreported results, we consider large (above the median cap of $100 million) and small targets separately. The effect is particularly strong for large targets, including the effect of the market's 52-week high. In light of the strong results both for recent years and within large firms, the effects would appear to be of ongoing economic importance.

V. Deal Success

The previous tests address the division of value between the bidding and target shareholders. Another important question is whether peak pricing affects deal success, leading to

"real" economic effects via capital reallocation. While evidence exists that investor psychology affects numerous financial decisions such as corporate and mutual fund name changes, dividend policy, nominal share pricing, and financing choices, strong evidence of behavioral phenomena having real effects is not plentiful.[11] A second feature of this analysis is that, like the tender offer differential in the subsamples table, it focuses on the reception of the bid by the target's management, board, investors, and advisors. It thus may identify another aspect of merger activity sensitive to anchoring and reference point utility considerations of those agents as opposed to those of the bidder.

The precision of our prediction here makes for a straightforward test for such real effects, and earlier anecdotes suggest that this is a plausible hypothesis. Suggestive of such an effect, the probability of success across our sample is 69.9% if the offer price is below the 52-week high and 76.9% if it is above.[12] Table 7 tests for a discontinuity in a probit regression. Where $S = 1$ if the deal is successful, we model

$$pr(S) = a + bOffer_{it} + c(Offer_{it} > 52WkHi_{i,t-30}) + e_{it} \quad (3)$$

including control variables. This specification allows us to control for the *absolute* level of the offer premium, unlike the cross-tab just reported, and thus to test whether offer prices that are high *relative* to the 52-week high specifically enjoy an increased probability of success. To ensure that c identifies a true discontinuity, we control for a quartic polynomial of the offer price.

The results do indicate a discontinuous increase in the probability of target acceptance as the offer price passes the 52-week high threshold. The effect remains identifiable upon the inclusion of additional control variables that contain explanatory power for deal success, such as

[11] An exception is Polk and Sapienza (2009) who propose that catering to investor sentiment directly affects corporate investment.

[12] Bear in mind that this is the success of a particular offer, not the overall rate of success in selling the target to a given bidder.

hostility (reducing success probability), tender (increasing), and bidder size (increasing). The magnitude of the effect is a nontrivial 3.0% to 4.3% percentage point discontinuous increase in success probability. One way to think about the economic significance of this is to consider that our sample consists of 7,498 deals. An effect of this magnitude implies that, all else equal, between 224 to 322 bids failed or were accepted simply because they were on one side or the other of this reference point price. Were we to include other peak prices that are important to offer prices, such as the 13-week high, the 26-week high, and so on, the economic significance would only increase.

VI. Bidders' Announcement Returns

We next investigate how the bidder's shareholders react to the news of bids, particularly the component that reflects the target's 52-week high. We compute the 3-day cumulative market-adjusted return at each bidder's announcement and assess its sensitivity to the offer premium

$$r_{t-1\to t+1} = a + bOffer_{it} + e_{it} \ . \tag{4}$$

We start with OLS but we are more interested in IV slope estimates in which the 52-week high is used as an instrument for the offer price. In particular, we use Eq. (2) as the first stage.

Table 8 shows the results of both approaches.[13] Not surprisingly, the least-squares estimates indicate that bidding shareholders react more negatively as the offer premium increases. The magnitude of this effect does not appear overwhelming, as the third specification indicates that a 10% increase in the offer premium is associated with a 0.2% (20 basis points) lower bidder announcement effect. One way to think about this small effect is that particularly good combinations of bidders and targets may warrant a high offer premium. If so, the market in

[13] Note that the sample in Table 8 is smaller than in previous analyses because we are limited by the availability of the bidder's announcement return (recall that our sample is not limited to publicly-traded bidders, only publicly-traded targets).

general and bidder shareholders in particular recognize that a 10% higher offer price does not mean 10% overpayment. Rather, the higher offer price reflects the omitted effect of deal quality.

However, bidders' shareholders are considerably more disappointed about the component of the offer price that depends on a historical reference point. The last IV regression implies that when the component of the offer premium driven by the 52-week high increases by 10%, the bidder's shareholders react with a considerable -2.2% announcement effect relative to the average. This is large relative to the unconditional average announcement effect of -1.5% and it is almost ten times larger than the comparable OLS estimate.[14] The large difference between the OLS and IV results implies that bidder shareholders consider 52-week-high-driven bids as overpaying – and that the first stage piecewise linear specification makes an excellent instrument for pure overpayment, as opposed to simply higher offers. This distinction between the bidder shareholders and other stakeholders may reflect their greater objectivity, given that they are likely to suffer less from the anchoring or reference point utility effects of past target prices .

If we take the sensitivity of the offer premium to the 52-week high as an arbitrary transfer of value, we have another opportunity to estimate of the total value transfer for our sample. In the case of bidder announcement returns, there is also the possibility of an incremental value *loss*. The bidder return can reflect the loss to its shareholders from overpayment for this deal and also a revaluation if shareholders come to expect a bias toward overpayment in any future deals.

For each the 5,135 deals in our sample that are completed, we multiply the 52-week high by the piecewise linear coefficients *b* in the second column of Table 3 to estimate the component of the offer premium that is driven by the 52-week high as before. We then multiply this effect

[14] Summarizing several studies of merger announcement effects, Jensen and Ruback conclude that "corporate takeovers generate positive gains, that target firm shareholders benefit, and that bidding firm shareholders do not lose" (p.5, 1983). Apparently, the last statement about announcement returns is no longer valid in cases when the offer premium is high, at least in our more recent data, and is particularly invalid when the high offer premium may have been driven up by a reference point price.

on the offer premium by the coefficient *b* in the third column of Table 8 to determine the bidder announcement return. To convert this to dollars, we multiply this quantity by the bidder market capitalization at *t*-2 to arrive at the value transferred or lost. The total is $757 billion, 147.5 million per deal, or 4.2 times the simple value transfer. This suggests either a market overreaction or an incremental value loss stemming from a realization that the bidder management has a tendency to overbid in mergers and acquisitions. Again, these economic significance calculations include only the effect of the 52-week high price, not other peak prices.

VII. Merger Waves

We have documented that a given deal is more likely to go through if the bidder offers at least the target's 52-week high. But whether an offer appears in the first place depends on market valuations. A bidder will all else equal find it easier to pay the 52-week high when it is at a relatively small premium to current prices. A merger requires both an offer and its acceptance, so a reference point channel may help to explain the coincidence of aggregate merger waves and stock market valuations: 52-week high reference prices for targets will generally be more affordable to bidders, relative to current prices, when the market has recently done well.

Those who are most knowledgeable about merger dynamics discuss precisely this mechanism. For example, in April 2010 the head of investment banking at J.P. Morgan cited several reasons to expect an increase in merger activity from prevailing levels. Among them was the fact that "the gap between buyers and sellers has narrowed. At last year's Tulane conference, Mr. Braunstein pointed out, many of the companies in the S&P had share prices that were within 10% of the 52-week low. Now, many of those companies are within 10% of the 52-week high. That means sellers are more likely to believe they can get a fair value for their companies, while buyers won't have to shell out hefty premiums to narrow the price gap" (Corkery (2010)).

To test for an effect of reference point prices on aggregate merger activity, we study quarterly data on the number of mergers from *Mergerstat Review* 1973 through 2007 and examine its sensitivity to the 52-week market index high price.

$$Mergers_t = a + b52WkHi_{t-30} + e_t \tag{5}$$

We normalize the raw number of mergers by the total number of firms on the NYSE and then detrend by subtracting the average normalized level of quarterly merger activity over the trailing two and one-half year period starting before the 365 calendar days over which the market's 52-week high is calculated. The *Mergerstat* data include all mergers involving public and private firms, so the annual total is often more than 100% of the firms on the NYSE. The 52-week market index high price, now measured at quarterly frequency, is again calculated from CRSP.

The first regression in Table 9 shows that the market 52-week high is a negative predictor of quarterly merger activity, consistent with the most basic prediction. Specifically, when market prices are 10 percentage points below their 52-week high, the merger rate falls by 18% relative to its trend. This fall represents 70% of the merger rate's time-series standard deviation. Panel A of Figure 5 graphs this relationship. The inverse relationship is apparent.

We test finer predictions. We calculate quarterly 52-week high series for high and low book-to-market portfolios using monthly returns and value-sorted portfolios constructed by Ken French. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) explain acquisitions in terms of market timing, with richly-valued bidders pursuing lower-valued targets, and Rhodes-Kropf et al. (2005) and Baker et al. (2009) confirm that targets do indeed have higher book-to-market ratios than bidders. Forming these portfolios thus allows us, to some extent, to separate firms that are relatively more likely to be targets from those more likely to be bidders, which allows us to add a cross-sectional dimension to the analysis. For simplicity, we

refer below to low book-to-market firms as "bidders" and high book-to-market firms as "targets," while recognizing that the classifications are extremely coarse.

The next column shows that the decline in the merger rate associated with reference point prices is even stronger when one calculates the reference price of targets alone. This is shown in Panel B of Figure 5. This result is unaffected by including the contemporaneous valuation *level* of bidders, which is important for identifying an effect of the reference point theory incremental to the market timing theory or any other explanation that predicts merger activity is positively correlated with recent returns.

The remaining columns test further aspects of robustness. We include both the 52-week high of bidding firms and the valuation level of target firms. Consistent with predictions, these variables are unimportant in themselves and, more importantly, they do not alter inferences about the importance of bidders' reference prices. Finally, we control for lagged monthly returns, which again have no effect on key inferences. In other words, it is the specific drop from the 52-week high that matters, not the past return over any fixed past interval. Overall, the results suggest that the reference point view helps to explain why merger waves arise and coincide with stock market valuations and recent returns.

VIII. Conclusions

Mergers and acquisitions are the largest transactions that take place in a modern capitalist economy. It is often suggested that when real money is on the line, behavioral biases matter less or not at all. Therefore one might expect that such high-stakes deals are unlikely to be influenced by simple psychological phenomena. But it appears that several important aspects of merger and acquisition activity appear to be shaped by psychological reference points and anchors. A variety of recent peak prices help to explain the bidder's offer price. Other aspects of merger activity are

also explained from a reference point price perspective. Bidders' shareholders appear to view bids driven by the target's 52-week high price as overpaying, reacting especially negatively to the component of the offer price driven by the target's 52-week high.

From an allocational perspective, the most important finding is the fact that psychological pricing has real effects. Bids that exceed the 52-week high discontinuously increase the probability of deal success and thus the distribution of capital across firms' alternative investment policies. This represents some of the clearest evidence of real effects of behavioral corporate finance to date. The use of peak prices as reference points may also help to explain why merger activity is associated with high market valuations and thus comes in waves.

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Table 1. Sample. The sample consists of merger or acquisition announcements. We start with 23,350 unique deals from Thomson Financial, where the announcement date is between January 1, 1984, and December 31, 2007, where the target is a public company, where the offer price is not missing, and where the bidder purchased at least 85% of the target firm shares outstanding or the percentage of shares acquired is unknown. Of these, we were able to compute 52-week high prices from CRSP for a final sample of 7,498. We have information on whether the offer is a tender offer and whether the bidder is a financial buyer from Thomson *for all deals*. We have information on whether the form of payment is cash, stock, or other, whether the deal is completed or withdrawn, and whether the bidder attitude is hostile, friendly, or neutral from Thomson *for a subset of deals*.

				Form of Payment			*Attitude*		*Completed*			
Year	**Total Deals**	**Log Offer Premium %**	**Tender**	**Cash**	**Stock**	**Other**	**Friendly**	**Hostile**	**Yes**	**No**	**?**	**LBO**
1984	221	29.9	61						115	97	9	3
1985	241	25.5	67						121	93	27	2
1986	260	28.2	98						152	93	14	3
1987	284	27.9	82						153	112	19	4
1988	450	35.2	160						219	194	34	8
1989	330	27.0	94						158	129	41	1
1990	179	35.0	30						91	63	17	4
1991	135	38.2	10	1	3	0	4	0	77	44	10	0
1992	149	33.8	9	6	14	5	23	1	92	33	6	1
1993	201	32.5	23	18	22	11	51	0	125	52	12	2
1994	285	30.5	42	32	56	20	106	2	187	77	14	0
1995	357	29.3	64	81	112	40	224	9	256	86	13	2
1996	375	27.7	53	77	133	75	277	8	282	72	18	6
1997	473	27.6	94	103	187	95	376	9	374	81	17	11
1998	520	28.8	98	131	206	103	430	10	417	90	13	10
1999	612	34.5	139	200	203	129	503	27	474	106	28	17
2000	516	37.3	126	202	159	101	430	30	377	101	32	15
2001	334	38.3	80	126	94	90	294	13	267	44	22	2
2002	229	33.0	44	110	40	61	188	22	159	47	20	3
2003	237	27.2	39	122	51	52	204	21	181	40	14	6
2004	221	22.4	18	94	59	60	199	13	184	26	8	8
2005	256	22.7	26	150	37	63	226	23	204	33	18	16
2006	313	22.5	18	202	37	71	291	17	238	34	37	34
2007	320	21.6	47	203	40	74	300	15	232	44	40	34
Total	7498	29.9	1522	1858	1453	1050	4126	220	5135	1791	483	192

Table 2. Summary Statistics. Means, standard deviations, medians, and extreme values for the pricing of mergers and acquisitions and control variables. Panel A shows the offer premium, the 13-, 26-, 39-, 52-, 65-, 78-, 91-, and 104-week target high, and the 52-week market index high. The offer premium is the offer price from Thomson expressed as a log percentage difference from the CRSP stock price 30 calendar days prior to the announcement date. The X-week target (market index) high is the X-week high stock price (market index) over the X weeks ending 30 days prior to the announcement date expressed as a log percentage difference from the CRSP stock price (market index) 30 calendar days prior to the announcement date. The CRSP market index is formed using total market value-weighted returns. Panel B shows two other outcome variables: whether the deal was recorded as completed from Thomson and the log bidder 3-day announcement return from CRSP centered on the announcement date from Thomson. Panel C shows control variables. The form of payment (cash, stock), the bidder attitude (hostile), the offer type (tender), and the identity of the bidder (financial buyer) are from Thomson. The target and bidder return on equity, return on assets, book-to-market equity, and earnings price ratio are from Compustat, expressed in log terms. The return on equity is defined as net income (Compustat: NI) divided by shareholders' equity (Compustat: SEQ). The return on assets is defined as net income (NI) divided by total assets (Compustat: AT). The book-to-market ratio is defined as book equity divided by market equity, where book equity is total shareholders' equity (Compustat: SEQ) plus deferred taxes and investment tax credit (Compustat: TXDITC) minus the redemption value of preferred stock (Compustat: PSRKRV) and market equity is calculated by multiplying shares outstanding (CRSP: SHROUT) and price (CRSP:PRC) at fiscal year end. The earnings price ratio is defined as earnings before interest and taxes (Compustat: EBIT) divided by market equity (ME). The target's volatility is the standard deviation of daily returns for the 365 calendar days ending 30 days prior to the announcement date from CRSP. Target market capitalization is equal to price times shares outstanding from CRSP at *t*-30. Bidder market capitalization is equal to price times shares outstanding from CRSP at *t*-30. The past two-month and one-year target returns are computed ending 30 days prior to the announcement date. Continuous independent variables are Winsorized at the 1% and 99% levels.

	N	Mean	SD	5%	Median	95%	Winsorized
Panel A: Merger and Acquisition Pricing							
Offer Premium %	7498	32.54	27.92	-3.28	29.39	78.85	No
13-Week Target High Price %	7388	16.20	19.90	0.12	9.34	56.62	Yes
26-Week Target High Price %	7358	24.56	29.36	0.83	13.87	86.63	Yes
39-Week Target High Price %	7296	30.66	36.49	1.28	17.33	106.14	Yes
52-Week Target High Price %	7498	36.73	44.26	1.56	21.19	125.39	Yes
65-Week Target High Price %	7052	40.24	47.18	1.68	23.38	138.29	Yes
78-Week Target High Price %	6889	43.93	51.39	1.75	25.78	151.50	Yes
91-Week Target High Price %	6746	46.89	53.69	1.79	28.35	160.52	Yes
104-Week Target High Price %	6570	49.17	55.98	1.82	30.10	165.38	Yes
52-Week Market Index High Price %	7498	6.72	8.53	0.00	3.19	26.44	Yes
Panel B: Other Outcome Variables							
Completed	6926	0.74	0.44	0.00	1.00	1.00	No
Bidder 3-day Announcement Return %	3937	-1.46	8.25	-14.43	-0.81	9.76	No
Panel C: Control Variables							
Cash	4361	0.43	0.49	0.00	0.00	1.00	No
Stock	4361	0.33	0.47	0.00	0.00	1.00	No
Hostile	4361	0.05	0.22	0.00	0.00	1.00	No
Tender	7498	0.20	0.40	0.00	0.00	1.00	No
Financial Buyer	7498	0.03	0.16	0.00	0.00	0.00	No
Target ROE %	4917	-0.23	40.51	-62.63	7.45	28.58	Yes
Target ROA %	5108	0.86	26.42	-35.03	6.41	19.14	Yes
Target B/M %	5108	66.11	74.46	1.64	48.84	219.69	Yes
Target E/P %	4971	3.33	45.10	-41.67	3.75	47.18	Yes
log(Target Market Capitalization)	5108	11.71	1.84	8.84	11.62	14.84	Yes
Target Volatility %	5108	3.76	2.08	1.39	3.29	7.86	Yes
Target 2-Month Return %	7498	0.75	25.00	-43.72	2.25	37.81	Yes
Target 1-Year Return %	7498	-4.01	55.04	-105.61	3.91	70.09	Yes
Bidder ROE %	2001	7.05	32.44	-32.89	10.88	31.61	Yes
Bidder ROA %	2048	3.16	15.63	-14.77	3.75	20.24	Yes
Bidder B/M %	2048	59.30	81.04	0.60	36.94	228.46	Yes
Bidder E/P %	2029	11.60	47.03	-13.61	4.30	74.57	Yes
log(Bidder Market Capitalization)	2048	13.86	2.34	10.04	14.00	17.66	Yes

Table 3. The Pricing of Mergers and Acquisitions. Regressions of the offer premium on the 52-week target high price. We run ordinary least squares and piecewise linear regressions.

$$Offer_{it} = a + b52WkHi_{i,t-30} + e_{it}$$

$$Offer_{it} = a + b_1 \min\left(52WkHi_{i,t-30},25\right) + b_2 \max\left(0, \min\left(52WkHi_{i,t-30} - 25,50\right)\right) + b_3 \max\left(0,52WkHi_{i,t-30} - 75\right) + e_{it}$$

where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price (*P*) 30 calendar days prior to the announcement date. All regressions control for 1/*P*, and all ratios are expressed in log terms. Column 1 shows basic OLS results. Column 2 shows a piecewise linear regression *52WkHi*. Columns 3 and 4 replace the piecewise *52WkHi* with the piecewise *13WkHi* and piecewise residuals for high prices over periods greater than 13 weeks, which we label *incremental* effects, for example $e_{1,J,}$ is estimated with the following regression:

$$\min\left(JWkHi_{i,t-30},25\right) = c +$$

$$\sum_{j=13,26,\ldots}^{J-13} d_1 \min\left(jWkHi_{i,t-30},25\right) + d_2 \max\left(0, \min\left(jWkHi_{i,t-30} - 25,50\right)\right) + d_3 \max\left(0, jWkHi_{i,t-30} - 75\right) + e_{1,J,it}$$

The other residuals, $e_{2,J}$ and $e_{3,J}$, are estimated by changing the dependent variable accordingly to be the second or third part of the piecewise decomposition of the *JWkHi*. The coefficients $b_{1,J}$, $b_{2,J}$, $b_{3,J}$, measure the impact of adding the residuals $e_{1,J}$, $e_{2,J}$, $e_{3,J}$, to the baseline *13WkHi* regression. Robust t-statistics with standard errors clustered by month are in parentheses.

		OLS	*Piecewise*	*Piecewise*	*Piecewise*
		1	**2**	**3**	**4**
52-Week Target High Price %:					
b		0.094***			
		(5.82)			
b_1			0.327***		
			(7.60)		
b_2			0.114***		
			(3.28)		
b_3			0.070**		
			(2.41)		
13-Week Target High Price %:	$b_{1,13}$			0.415***	0.428***
	$b_{2,13}$			0.157**	0.195**
	$b_{3,13}$			-0.159	-0.149
Incremental 26-Week Target High Price %	$b_{1,26}$			0.242***	0.291***
	$b_{2,26}$			0.170***	0.134**
	$b_{3,26}$			0.229*	0.287*
Incremental 39-Week Target High Price %	$b_{1,39}$			0.313***	0.350***
	$b_{2,39}$			-0.028	0.003
	$b_{3,39}$			0.080	0.073
Incremental 52-Week Target High Price %	$b_{1,52}$			0.319***	0.369***
	$b_{2,52}$			-0.044	-0.055
	$b_{3,52}$			-0.009	0.012
Incremental 65-Week Target High Price %	$b_{1,65}$				0.154
	$b_{2,65}$				0.056
	$b_{3,65}$				0.026
Incremental 78-Week Target High Price %	$b_{1,78}$				0.247**
	$b_{2,78}$				-0.039
	$b_{3,78}$				-0.040
Incremental 91-Week Target High Price %	$b_{1,91}$				0.047
	$b_{2,91}$				0.087
	$b_{3,91}$				0.040
Incremental 104-Week Target High Price %	$b_{1,104}$				0.014
	$b_{2,104}$				0.131*
	$b_{3,104}$				0.023
Time Effects		No	No	No	No
N		7498	7498	7127	6503
R^2		0.087	0.093	0.100	0.103

Table 4. The Pricing of Mergers and Acquisitions. Regressions of the offer premium on the 52-week target high price. We run piecewise linear regressions:

$$Offer_{it} = a + b_1 \min(52WkHi_{i,t-30}, 25) + b_2 \max(0, \min(52WkHi_{i,t-30} - 25, 50)) + b_3 \max(0, 52WkHi_{i,t-30} - 75) + e_{it}$$

where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price (*P*) 30 calendar days prior to the announcement date. All regressions control for 1/*P*, and all ratios are expressed in log terms. Column 1 includes controls for target past returns, measured in logs. Column 2 controls for monthly fixed effects. Column 3 repeats Column 1 of Table 3, replacing *52WkHi* with the high market index price. Column 4 includes the portion of *52WkHi* that is idiosyncratic to the market index high price in the same piecewise specification as Columns 1 and 2. Robust t-statistics with standard errors clustered by month are in parentheses.

	OLS	*Piecewise*	*Piecewise*	*Piecewise*
	1	**2**	**3**	**4**
52-Week Target High Price %:				
b_1	0.320***	0.231***		
	(6.75)	(4.65)		
b_2	0.104***	0.086**		
	(2.84)	(2.44)		
b_3	0.055*	0.045**		
	(1.78)	(2.31)		
52-Week Market Index High Price %:				
b			0.269***	0.374***
			(4.70)	(6.14)
Idiosyncratic Portion of Target High Price %:				
c_1				0.169***
				(8.07)
c_2				-0.016
				(-0.29)
c_3				0.074
				(1.46)
Inverse Price	3.675***	3.721***	6.561***	4.292***
	(7.37)	(9.74)	(14.34)	(9.21)
Target Return$_{t-1}$ %	0.000	-0.022		
Target Return$_{t-2}$ %	-0.026	-0.032		
Target Return$_{t-3}$ %	-0.032	0.000		
Target Return$_{t-4}$ %	-0.012	-0.015		
Target Return$_{t-5}$ %	-0.043*	-0.016		
Target Return$_{t-6}$ %	-0.015	-0.019		
Target Return$_{t-7}$ %	-0.032	-0.037		
Target Return$_{t-8}$ %	-0.019	-0.018		
Target Return$_{t-9}$ %	0.012	-0.008		
Target Return$_{t-10}$ %	0.011	-0.012		
Target Return$_{t-11}$ %	0.012	-0.009		
Target Return$_{t-12}$ %	0.028	0.006		
Time Effects	No	Yes	No	No
N	7172	7172	7498	7498
R^2	0.091	0.152	0.079	0.094

Table 5. The Pricing of Mergers and Acquisitions: Robustness. Piecewise linear regressions of the offer premium on the 52-week target high price. We run regressions:

$$Offer_{it} = a + b_1 \min\left(52WkHi_{i,t-30}, 25\right) + b_2 \max\left(0, \min\left(52WkHi_{i,t-30} - 25, 50\right)\right) + b_3 \max\left(0, 52WkHi_{i,t-30} - 75\right) + e_{it}$$

where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price (*P*) 30 calendar days prior to the announcement date. Column 1 is the baseline (Column 3) from Table 3. Column 2 adds deal characteristics (tender, attitude, form of payment, bidder identity) as controls to the baseline. Column 3 adds target specific controls to the baseline. Column 4 adds bidder specific financial controls to the baseline. Column 5 includes all controls. Columns 6-9 add the *x* percentile versions of *52WkHi*, in the same piecewise linear specification as *52WkHi*, to Column 2. All columns control for target past returns and 1/*P*, and all ratios are expressed in log terms. Robust t-statistics with standard errors clustered by month are in parentheses.

	Piecewise	*Piecewise*	*Piecewise*	*Piecewise*	*Piecewise*	*80%*	*90%*	*95%*	*99%*
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
52-Week Target High Price %:									
b_1	0.320***	0.328***	0.377***	0.399***	0.320***	0.353***	0.364***	0.483***	0.476**
	(6.75)	(5.80)	(7.77)	(5.24)	(3.63)	(4.70)	(4.24)	(4.03)	(2.20)
b_2	0.104***	0.0995**	0.109***	0.0781	0.136**	0.048	0.059	0.105	0.063
	(2.84)	(2.36)	(2.69)	(1.38)	(2.01)	(1.00)	(1.06)	(1.43)	(0.73)
b_3	0.0547*	0.0751**	0.0783**	0.0316	0.0127	-0.040	0.051	0.165	0.162
	(1.78)	(2.12)	(2.32)	(0.83)	(0.23)	(-0.54)	(0.54)	(0.83)	(0.61)
x-% Target Price %:									
c_1						-0.010	-0.027	-0.155	-0.146
						(-0.18)	(-0.40)	(-1.48)	(-0.71)
c_2						0.108*	0.060	0.016	0.044
						(1.81)	(1.04)	(0.23)	(0.58)
c_3						0.155	0.015	-0.121	-0.108
						(1.20)	(0.10)	(-0.48)	(-0.35)
Cash		-0.0893			1.922	0.001	-0.036	-0.024	-0.067
		(-0.09)			(1.12)	(0.00)	(-0.04)	(-0.02)	(-0.07)
Stock		1.498			2.565	1.565	1.464	1.409	1.431
		(1.27)			(1.35)	(1.36)	(1.27)	(1.22)	(1.24)
Hostile		-3.572**			9.298***	-3.628**	-3.661**	-3.579**	-3.581**
		(-2.05)			(3.27)	(-2.10)	(-2.11)	(-2.06)	(-2.06)
Tender		8.021***			4.922***	8.045***	7.995***	7.906***	7.977***
		(7.32)			(2.96)	(7.26)	(7.24)	(7.14)	(7.26)
Financial Buyer		-10.53***			-6.253	-10.63***	-10.53***	-10.42***	-10.53***
		(-6.89)			(-0.66)	(-6.88)	(-6.84)	(-6.75)	(-6.89)
Target ROA %			0.0352		-0.00522				
			(1.32)		(-0.10)				
Target B/M %			0.00525		0.0144				
			(0.93)		(1.36)				
log(Target Market Capitalization)			-1.626***		-3.661***				
			(-5.39)		(-5.13)				
Target Volatility %			0.947**		1.170				
			(2.37)		(1.60)				
Bidder ROA %				0.0734	0.0314				
				(1.39)	(0.34)				
Bidder B/M %				-0.00219	-0.00267				
				(-0.29)	(-0.58)				
log(Bidder Market Capitalization)				1.618***	1.775***				
				(6.26)	(4.68)				
Time Effects	No	No	No	No	No	No	No	No	No
N	7172	4152	5108	2048	1246	4152	4152	4152	4152
R^2	0.0913	0.143	0.117	0.101	0.179	0.145	0.143	0.144	0.143

Table 6. The Pricing of Mergers and Acquisitions: Subsamples. Piecewise linear regressions of the offer premium on the 52-week target high price, for subsamples. We divide the sample from Table 3 according to tender and non-tender offers, bidder attitude, and first and subsequent offers, successful and unsuccessful offers, form of payment, and first and second half of the sample period. All regressions control for 1/*P*, and all ratios are expressed in log terms. Robust t-statistics clustered by month are in parentheses.

	Tender		*Attitude*		*First Offer*	
	No	**Yes – No**	**Hostile**	**Friendly – Hostile**	**No**	**Yes – No**
52-Week Target High Price %:						
b_1	0.246***	0.329***	0.462***	-0.110	0.328***	-0.0650
	(4.97)	(6.51)	(3.56)	(-0.94)	(6.88)	(-0.92)
b_2	0.0751*	0.124*	-0.205	0.340**	0.103***	0.0109
	(1.83)	(1.77)	(-1.32)	(2.14)	(2.68)	(0.13)
b_3	0.0597	-0.0201	0.0280	0.0608	0.0485	0.112
	(1.59)	(-0.38)	(0.35)	(0.68)	(1.55)	(1.41)
Inverse Price	3.870***		4.644***		3.667***	
	(8.00)		(7.67)		(7.40)	
Time Effects	No		No		No	
N	7172		4152		7172	
R^2	0.105		0.126		0.0919	

	Successful		*Form of Payment*		*Second Half*	
	No	**Yes – No**	**Stock**	**Cash – Stock**	**No**	**Yes - No**
52-Week Target High Price %:						
b_1	0.179***	0.201***	0.450***	-0.147**	0.405***	-0.150***
	(2.69)	(3.65)	(6.64)	(-2.36)	(6.89)	(-2.93)
b_2	0.133**	0.00300	-0.0227	0.248***	0.0669	0.0759
	(1.98)	(0.04)	(-0.29)	(2.75)	(1.16)	(1.11)
b_3	0.0620	-0.00229	0.0478	0.104*	-0.00572	0.0767
	(1.31)	(-0.04)	(0.86)	(1.81)	(-0.08)	(1.04)
Inverse Price	4.021***		4.307***		3.678***	
	(7.51)		(6.46)		(7.34)	
Time Effects	No		No		No	
N	6635		3143		7172	
R^2	0.109		0.139		0.0929	

Table 7. Predicting Success in Mergers and Acquisitions. Regressions of the offer premium on the 52-week target high price. We run probit regressions:

$$pr(S) = a + bOffer_{it} + c(Offer_{it} > 52WkHi_{i,t-30}) + e_{it}$$

where *S* is equal to 1 if a deal is completed, *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price (*P*) 30 calendar days prior to the announcement date. All regressions control for 1/*P*, and all ratios are expressed in log terms. We limit the sample only to those deals that Thomson identifies as completed or withdrawn. The first two columns estimate a linear relationship between the probability of success and the offer premium. The second two columns use a flexible polynomial. Robust t-statistics with standard errors clustered by month are in parentheses.

	Probit	*Probit*	*Probit*	*Probit*
	1	**2**	**3**	**4**
Offer Premium:				
b	0.00109***	0.000103	0.00116	0.000783
	(3.28)	(0.64)	(1.03)	(1.50)
Offer Premium^2			0.00000179	-0.00000760
			(0.08)	(-0.73)
Offer Premium^3			0.000000232	0.000000105
			(0.51)	(-0.67)
Offer Premium^4			-3.86e-09	9.93e-10
			(-0.78)	(0.48)
Offer Premium>52-Week Target High Price:				
c	0.0431***	0.0319***	0.0425***	0.0297***
	(2.87)	(3.07)	(2.75)	(2.86)
Cash		-0.0133		-0.0141
		(-1.18)		(-1.24)
Stock		0.00935		0.0101
		(1.17)		(1.27)
Hostile		-0.454***		-0.453***
		(-6.23)		(-6.22)
Tender		0.0251***		0.0252***
		(3.59)		(3.67)
log(Target Market Capitalization)		-0.0107***		-0.0108***
		(-3.74)		(-3.70)
log(Bidder Market Capitalization)		0.00587***		0.00580***
		(3.28)		(3.26)
Inverse Price	-0.0110	-0.00978	-0.0101	-0.00908
	(-1.48)	(-1.64)	(-1.34)	(-1.52)
Target Return$_{t-1}$ %	0.000230	-0.000181	0.000219	-0.000194
Target Return$_{t-2}$ %	0.00155***	0.000114	0.00152***	0.0000859
Target Return$_{t-3}$ %	0.00118***	0.0000122	0.00117***	0.00000775
Target Return$_{t-4}$ %	0.000870***	-0.000151	0.000842**	-0.000145
Target Return$_{t-5}$ %	-0.000536	0.000384**	-0.000560	0.000370**
Target Return$_{t-6}$ %	0.000620	0.000301	0.000600	0.000277
Target Return$_{t-7}$ %	0.000591	-0.0000365	0.000579	-0.0000409
Target Return$_{t-8}$ %	-0.000209	-0.0000556	-0.000214	-0.0000691
Target Return$_{t-9}$ %	-0.000246	0.0000338	-0.000267	0.00000176
Target Return$_{t-10}$ %	-0.000480	0.000137	-0.000500	0.000129
Target Return$_{t-11}$ %	-0.000567	0.000253	-0.000566	0.000244
Target Return$_{t-12}$ %	0.0000920	0.000342	0.0000666	0.000336
Time Effects	No	No	No	No
N	6635	2355	6635	2355
R^2	0.0148	0.206	0.0151	0.209

Table 8. Mergers and Acquisitions: Market Reaction. Ordinary and two-stage least squares regressions of the 3-day CAR of the bidder on the offer premium:

$$r_{t-1\to t+1} = a + bOffer_{it} + e_{it} \qquad Offer_{it} = a + b_1 \min(52WkHi_{i,t-30},25) + b_2 \max(0,\min(52WkHi_{i,t-30} - 25,50)) + b_3 \max(0,52WkHi_{i,t-30} - 75) + e_{it}$$

where *r* is the market-adjusted return of the bidder for the three-day period centered on the announcement date, *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price 30 calendar days prior to the announcement date. The first and the third columns use ordinary least squares. The second and the fourth columns instrument for the offer premium using *52WkHi*. Robust t-statistics with standard errors clustered by month are in parentheses.

	OLS	*OLS*	*IV*	*OLS*	*IV*
	1	**2**	**3**	**4**	**5**
Offer Premium:					
b	-0.0186***	-0.0204***	-0.215***	-0.0443***	-0.253***
	(-2.64)	(-2.74)	(-3.48)	(-4.21)	(-4.39)
Cash				1.421***	1.749***
				(3.76)	(3.59)
Stock				-1.831***	-1.380***
				(-5.14)	(-3.37)
Hostile				-0.229	1.249
				(-0.25)	(1.07)
Tender				1.124***	2.560***
				(3.10)	(4.06)
Financial Buyer				3.185	0.704
				(1.56)	(0.20)
log(Target Market Capitalization)				-1.073***	-1.532***
				(-7.26)	(-6.85)
log(Bidder Market Capitalization)				0.386***	0.729***
				(4.06)	(4.97)
Inverse Price	0.320**	0.614***	1.412***	-0.651**	-0.0215
	(2.00)	(3.38)	(4.19)	(-2.43)	(-0.06)
Target Return$_{t-1}$ %		-0.00159	-0.00970	0.00413	-0.00922
Target Return$_{t-2}$ %		-0.00846	-0.0120	-0.00641	-0.00538
Target Return$_{t-3}$ %		-0.00261	-0.0225*	0.00799	-0.00121
Target Return$_{t-4}$ %		0.00875	-0.00298	-0.00436	-0.0161
Target Return$_{t-5}$ %		0.0201*	0.00549	-0.00247	-0.0211
Target Return$_{t-6}$ %		0.0166	0.0152	0.0113	0.0121
Target Return$_{t-7}$ %		0.0128	0.00454	0.00307	-0.00539
Target Return$_{t-8}$ %		0.00737	-0.00922	0.00277	-0.0142
Target Return$_{t-9}$ %		0.0231*	0.0187	0.0207	0.0114
Target Return$_{t-10}$ %		0.0268**	0.0211	0.0117	0.00794
Target Return$_{t-11}$ %		0.0174	0.0195	0.00294	0.00136
Target Return$_{t-12}$ %		0.0139	0.00686	0.0222	0.0133
Time Effects	3937	3750	3750	2400	2400
N	No	No	No	No	No
R^2	0.00301	0.0129	.	0.0873	.

Table 9. Merger Waves. Regressions of the number of mergers on the 52-week high of different indices. We run ordinary least squares regressions.

$$Mergers_t = a + b52WkHi_{t-30} + e_t$$

where *Mergers* is a normalized measure of merger activity, and *52WkHi* is the high stock price for the market over the 365 calendar days prior to the quarter for which the number of mergers is reported. Quarterly data on the raw number of mergers are from *Mergerstat Review* for the period 1973-2007. The quarterly levels of merger activity are calculated by dividing the raw number of mergers each quarter by the total number of firms on the NYSE, as reported by CRSP. Detrended quarterly levels of merger activity are calculated by subtracting the average level of quarterly merger activity over the trailing two and one-half year period before the 365 calendar days over which the high stock price is calculated from the current quarterly level of merger activity. The 52-week market index high price is calculated from CRSP (CRSP: TOTVAL). The 52-week high B/M and low B/M index high prices are calculated from proxies indices formed from the monthly returns in Ken French's "Portfolios Formed on Book-to-Market." High B/M is defined as the top 30% of French's B/M-ranked universe; low B/M is defined as the bottom 30%. Robust t-statistics with standard errors that correct for autocorrelation up to five lags are in parentheses.

	1	**2**	**3**	**4**	**5**	**6**	**7**
52-Week Market Index High Price %:							
b	-0.0181***						
	(-3.03)						
52-Week High B/M Index High Price %:							
b		-0.0229***	-0.0258***	-0.0216***	-0.0351**	-0.0349***	-0.0283**
		(-5.09)	(-6.34)	(-4.21)	(-2.19)	(-2.86)	(-2.08)
52-Week Low B/M Index High Price %:							
b				-0.00370			-0.00962
				(-0.57)			(-1.12)
B/M of High B/M Index:							
				-0.189			0.0478
				(-0.65)			(0.15)
B/M of Low B/M Index:							
			-2.101***	-1.670*		-2.128***	-2.244**
			(-3.80)	(-1.75)		(-3.76)	(-2.22)
Market Return$_{t-1}$ %					-0.0108	-0.00937	-0.0141
Market Return$_{t-2}$ %					-0.00900	-0.000946	-0.00227
Market Return$_{t-3}$ %					-0.0142	-0.0131	-0.0141
Market Return$_{t-4}$ %					0.00678	0.00897	0.00881
Market Return$_{t-5}$ %					0.00134	0.00863	0.00848
Market Return$_{t-6}$ %					-0.0170	-0.0134	-0.0147
Market Return$_{t-7}$ %					0.00687	0.00743	0.00841
Market Return$_{t-8}$ %					0.00910	0.0151	0.0157
Market Return$_{t-9}$ %					-0.0157	-0.0139*	-0.0156*
Market Return$_{t-10}$ %					0.0147	0.0183	0.0196
Market Return$_{t-11}$ %					-0.00528	-0.00346	-0.00299
Market Return$_{t-12}$ %					0.000162	-0.000119	0.000826
N	126	126	126	126	126	126	126
R^2	0.1005	0.0991	0.3239	0.3357	0.1640	0.3886	0.4045

Figure 1. Slide from Cablevision Presentation to Shareholders, October 24, 2007. The management of Cablevision recommended acceptance of a $36.26 per share cash bid from the Dolan family. The slide compares this bid price to various recent prices including 52-week highs.

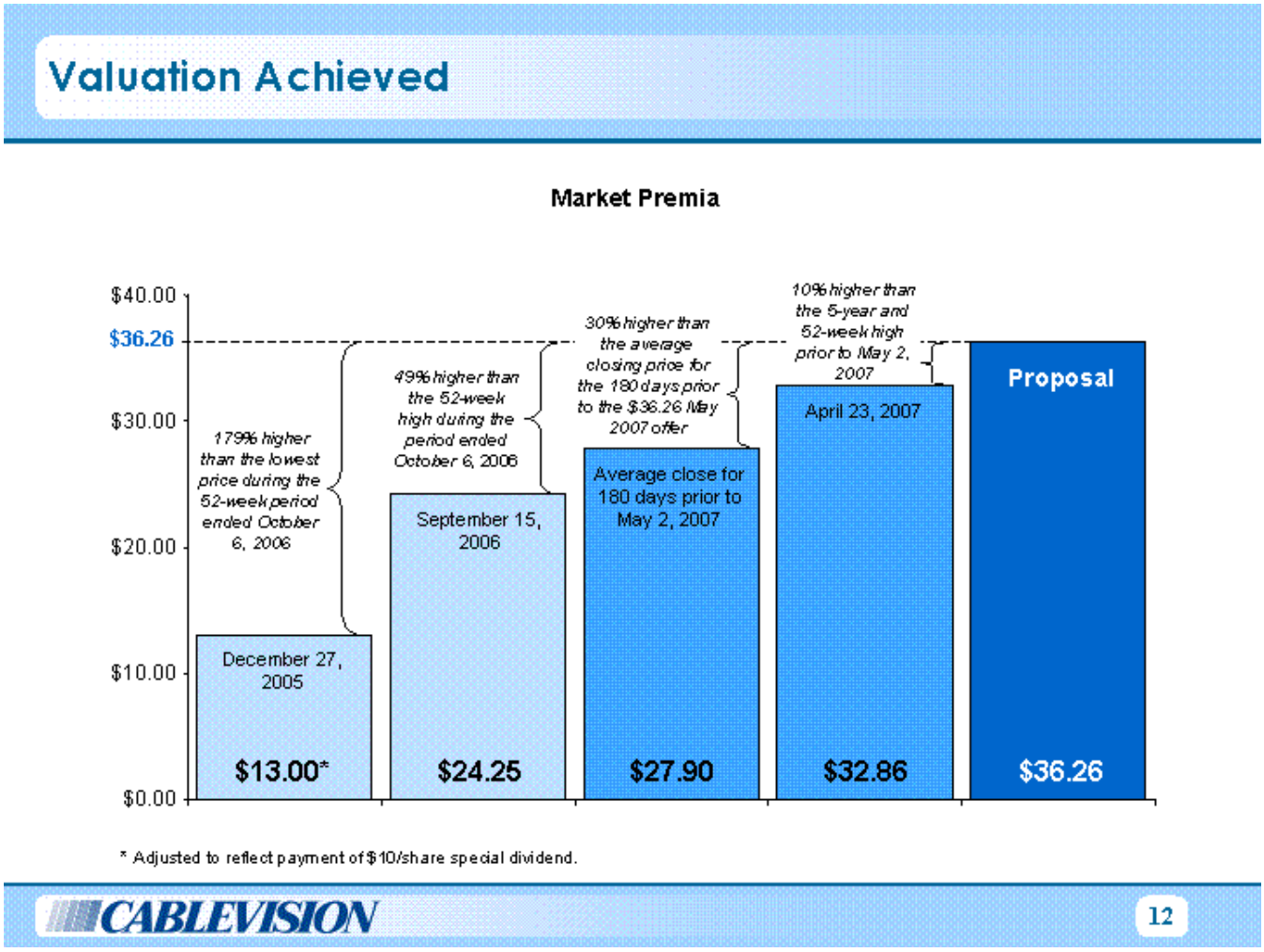
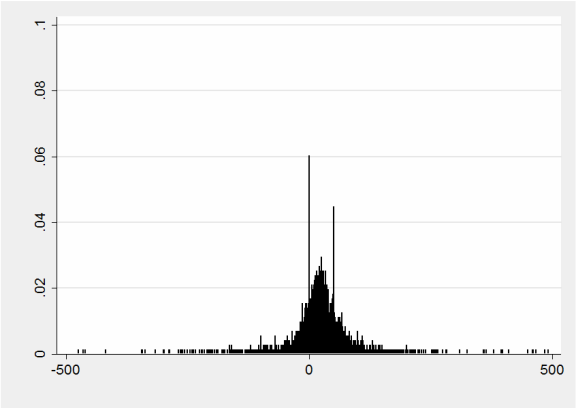
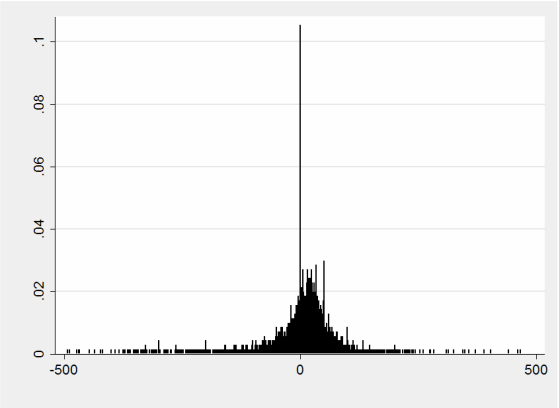


Figure 2. Offer Price Density. Histogram of the difference between the offer price and the target's 52-week high price, where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price 30 calendar days prior to the announcement date.

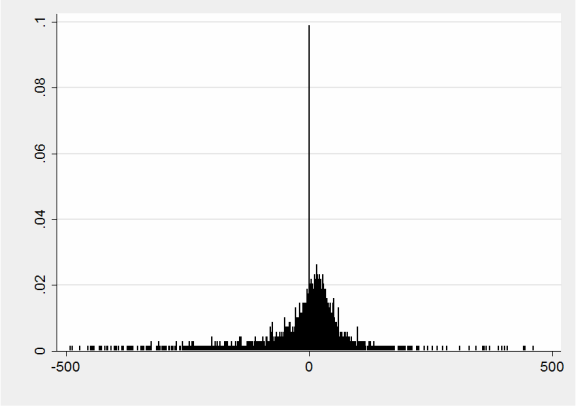
Panel A: 13-Week High



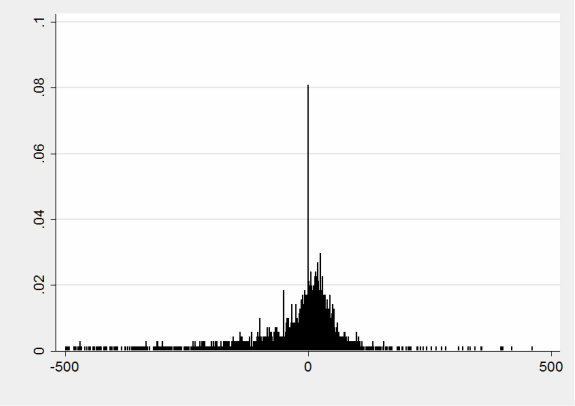
Panel B: 26-Week High



Panel C: 39-Week High



Panel D: 52-Week High



Panel E: 104-Week High

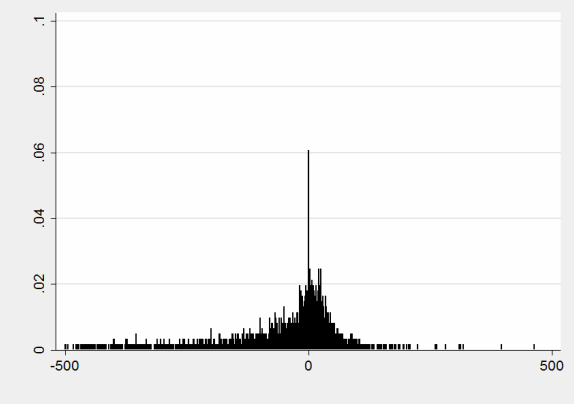
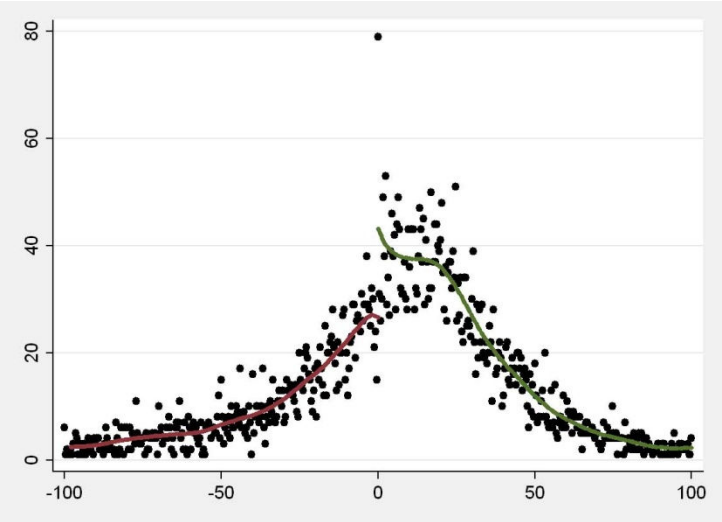


Figure 3. Offer Price Density: Discontinuity at the 52-week high. Histogram of the difference between the offer price and the target's 52-week high price, where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price 30 calendar days prior to the announcement date. Panel A uses 500 bins, while Panel B uses 200 bins. The discontinuities are statistically significant with bootstrap p-values of 0.01 and 0.00 respectively, using the approach described in Nicholas (2007).

Panel A: 500 bins of the offer price, centered at the 52-week high



Panel B: 200 bins of the offer price, centered at the 52-week high

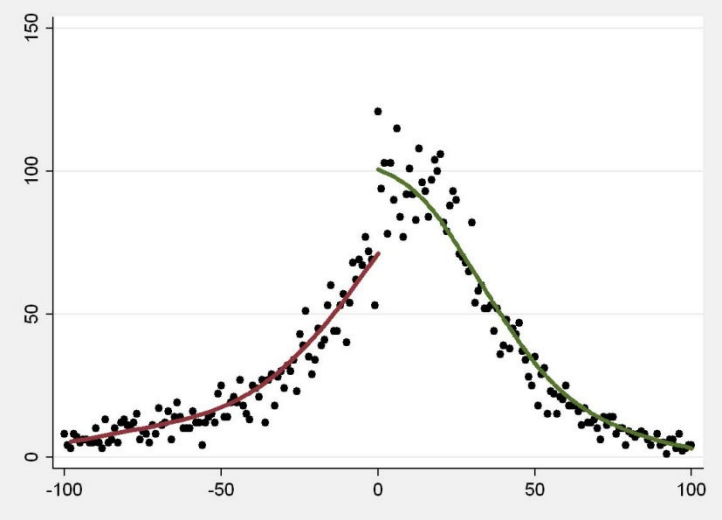
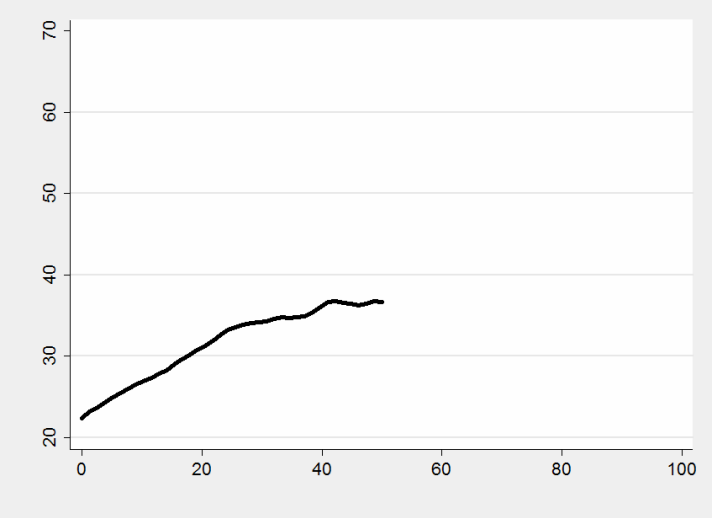


Figure 4. Non-linear effects. Gaussian kernel regressions of the offer premium on the 52-week target high price.

$$Offer_{it} = a + b52WkHi_{i,t-30} + e_{it}$$

where *Offer* is the offer price from Thomson and *52WkHi* is the high stock price over the 365 calendar days ending 30 days prior to the announcement date, with both expressed as a log percentage difference from the CRSP stock price 30 calendar days prior to the announcement date. The first kernel regression has a bandwidth of 20 and has 40 estimation points. The second has a bandwidth and 40 estimation points. Panel A limits the sample to situations where the 52-week high is less than 1.5 times the target price 30-days prior to the announcement date. Panel B limits the sample to situations where the 52-week high is less than two times the target price 30-days prior to the announcement date.

Panel A. Acquisition premium (y-axis) on the 52-week high premium (x-axis), 0 to 50



Panel B. Acquisition premium (y-axis) on the 52-week high premium (x-axis), 0 to 100

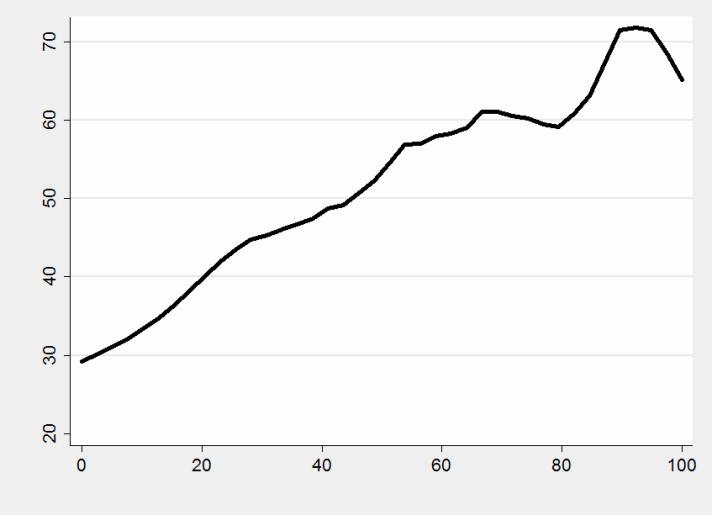
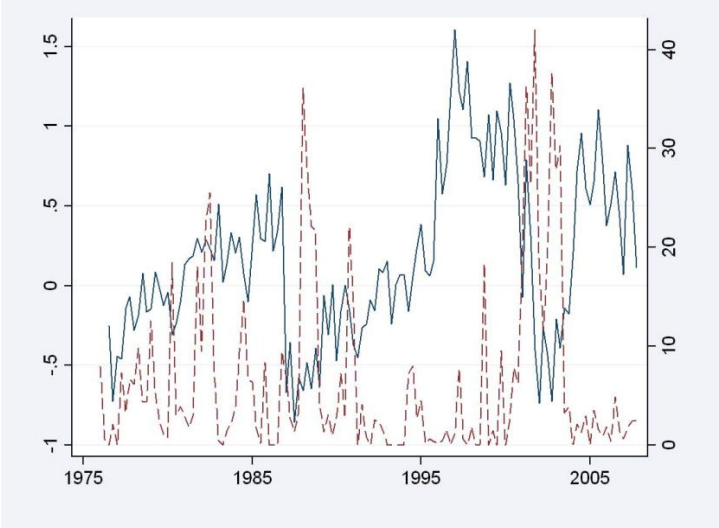


Figure 5. Merger Waves. Quarterly data on the raw number of mergers are from *Mergerstat Review* for the period 1973-2007. The quarterly levels of merger activity are calculated by dividing the raw number of mergers each quarter by the total number of firms on the NYSE, as reported by CRSP. Detrended quarterly levels of merger activity are calculated by subtracting the average level of quarterly merger activity over the trailing two and one-half year period before the 365 calendar days over which the high stock price is calculated from the current quarterly level of merger activity. The 52-week market index high price is calculated from CRSP (CRSP: TOTVAL). The 52-week high B/M and low B/M index high prices are calculated from proxies indices formed from the monthly returns in Ken French's "Portfolios Formed on Book-to-Market." High B/M is defined as the top 30% of French's B/M-ranked universe; low B/M is defined as the bottom 30%.

Panel A. Plot of detrended quarterly level of merger activity (solid, left y-axis) and the 52-week high of the market index (dashed, right y-axis)



Panel B. Plot of detrended quarterly level of merger activity (solid, left y-axis) and the 52-week high of the high B/M index (dashed, right y-axis)