Are market reactions to M&As biased by over-extrapolation of salient news?*

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Abstract

We study earnings surprises involving firms in a takeover target's 1-digit SIC released hours before the M&A public announcement. We find that these surprises correlate with the acquirers' M&A announcement return, but not with the returns to 4-digit SIC matched bidder and target peer firms. A week after the M&A announcement, acquirers exhibit a stock price reversal and their response to the earnings surprises disappears. We cannot reconcile these findings with rational Bayesian updating, information transmission, or strategic timing theories. The evidence that salient events affect investors' M&A valuations, supports behavioral theories predicting asset pricing distortions due to cognitive biases.

JEL classification: D03; G02; G14; G34; M41

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1. Introduction

De Bondt and Thaler (1985) note that agents frequently fail to revise their expectations according to Bayes' rule. Indeed, according to Hirshleifer (2001), people make biased judgments as limited time and cognitive resources lead them to apply heuristics like representativeness. He also notes that using representativeness heuristics can cause trend seeking, because people are prone to perceive meaningful patterns in a random sequence of events. The use of these heuristics can also lead to over-extrapolation (Barberis, 2013). Over-extrapolation occurs when people put too much weight on recent events as they form beliefs about key characteristics of impending events.[1] This behavior is probably more pervasive whenever the events are salient because most individuals overreact to salient (or dramatic) news events (Kahneman and Tversky, 1982). For example, recent work shows that overreaction to recent salient weather events prompt managers to overestimate their firm's future liquidity needs (Dessaint and Matray, 2017).

Based on this literature, we study over-extrapolation in the context of earnings surprises and merger and acquisition (M&A) deals. In our experiment, we identify earnings surprises released hours before an M&A announcement in which the earning surprise firms operate in the takeover target's 1-digit Standard Industry Classification (SIC). This setting is based on the idea that due to limited attention, investors focus on stocks that grab their attention (Barber and Odean, 2008). Thus, given the salience of both earnings surprises and merger transactions, it is possible that investors perceive these events to be meaningfully related when they are sequentially announced.

To evaluate whether this happens, we study the bidder's response to the earnings surprise during the M&A announcement because the assessment of synergies accruing to the bidder might

[1] Several studies show that investors over-extrapolate recent firm performance metrics as they form beliefs about future performance. See, for example, Lakonishok, Shleifer and Vishny (1994), Barberis, Shleifer and Vishny (1998), Greenwood and Hanson (2010), Greenwood and Shleifer (2014), Ertan, Karolyi, Kelly and Stoumbos (2017), and Frydman and Wang (2018).

be biased by other contemporaneous salient events. In contrast, the target's M&A announcement return is primarily determined by the offer premium (Betton, Eckbo, and Thorburn, 2008, p. 411). The choice of earnings surprises is natural because their magnitude can be unambiguously quantified. Besides, unlike other salient events such as bankruptcy filings, the regularity of earnings releases provides meaningful variation to examine over-extrapolation effects. The last element in our experimental design is the 1-digit SIC link between the earnings surprise firms and the target firm. Assessing the materiality of this weak connection is necessary to determine whether investors evaluate acquisitions rationally or whether salient events bias their evaluations. We propose two hypotheses to study these possibilities.

Rooted on market efficiency, we postulate the information transmission hypothesis stating that random earnings surprises from firms not involved in the M&A deal should not predict any stock price movement of the bidding firm. However, surprises that convey material new information should be permanently priced. In contrast, the over-extrapolation hypothesis predicts a positive correlation between the earnings surprises and the investors' reaction to the bidding firm upon the M&A announcement even if the surprise conveys no relevant information. The rationale is that generally positive earnings surprises in the target's industry remind investors of the upside of future payoffs, leading investors to overweigh the upside state probability. In this circumstance, investors perceive the potential surplus arising from the business combination (the acquisition synergy) as greater (in expectation) than its objective value. Likewise, generally negative earnings surprises make the downside payoffs more salient, leading investors to evaluate the acquisition synergy more pessimistically.

Our main empirical finding is illustrated in Figure 1. The bidders' three-day cumulative abnormal return (CAR) upon M&A announcement is positively related to earnings surprises

released just one day prior to the acquisition announcement. In regression analyses, we find that such association is statistically significant and economically important. Increasing the earnings surprises from the 75th to the 80th percentile (by about 0.025%) is related to an US$87 million increase in the bidder's market capitalization during the 3-day M&A announcement period. Our main result, however, does not let us distinguish between our hypotheses. One the one hand, it is possible that investors rationally factor the earnings news in their appraisal of the acquirer firm because the news conveys material new information affecting its valuation. On the other hand, it is also possible that investors over-extrapolate salient earnings surprises released hours before the M&A announcement to assess the valuation of the acquirer firm. The latter possibility suggests that, due to the use of heuristics rather than rational methods (Schwarz and Vaughn, 2002), investors perceive a meaningful link between the earning surprises and M&A events.

To help differentiate our hypotheses, we analyze subsamples of bidder peers and target peers, defined as those in the same 4-digit SIC as the actual bidder and target firms. Multivariate tests show that neither peer group exhibits a statistically significant reaction to the earnings surprises. While these results cast doubt on the hypothesis that the earnings releases transmit relevant information they are not sufficient to unequivocally reject it. That is, it is conceivable that the earnings surprise transmits information that is relevant only for the M&A firms.

Next, we study bidder returns from one day before the M&A announcement until one week after. During this longer interval, we find a strong price reversal on the bidders that respond to the earnings surprise upon the M&A announcement. Specifically, from one day before until one week after the acquisition announcement, the association between the bidder's stock return and the surprise measure is insignificant. The price reversal, which cancels out the initial abnormal response to the earnings surprise, obtains although no additional price-sensitive news involving

the bidder, its target, or the earnings-surprise firms is released. This result is in contrast with the prediction of the information transmission hypothesis that the surprise should be permanently priced because it is relevant news. Instead, the market correction provides support for over-extrapolation effects during M&A announcements. Notably, our market correction results are consistent with the predictions in De Bondt and Thaler (1985) that when a cognitive bias causes assets to deviate from their fundamental values they will subsequently exhibit a price reversal. The horizon of the post-announcement reversal we find is similar to that in Tetlock (2007). He shows that the impact of attention-induced investor sentiment on stock returns reverses within one week.

Ancillary analyses show that only the *most recent* salient surprises affect investors' assessments of M&A transactions. While yesterday's earnings surprises predict today's acquisition returns to bidders, earnings surprises from two, three, or four days prior to the M&A announcement have no effect on investors' valuation of the deal. Similarly, placebo surprises in the future bear no relation to today's M&A return. Importantly, when we focus on the same-day salient surprises, we find that investors respond significantly to those released in the morning (before stock markets open) but not to those released after markets close. These findings are consistent with those by DellaVigna and Pollet (2007) who show that temporal distance attenuates salience effects.[2] Moreover, these results mitigate concerns of slow information diffusion through time, information leakage, and market anticipation as alternate explanations for our main findings.

Additional tests show that over-extrapolation effects are weaker (but still statistically significant) in bidders that are larger, in bidders with higher levels of institutional ownership, and in bidders covered by more equity analysts. The size result is in line with the evidence by Kumar (2009) documenting an inverse relation between firm size and different behavioral biases. The

[2] Similarly (but in a different setting), Bhargava and Fisman (2014) and Hartzmark and Shue (2018) show that another psychological bias, contrast effects, matters only from the most recent observations.

other two results are consonant with the view that high institutional ownership (Barber and Odean, 2008, 2013) or more analyst coverage (Zhang, 2006) attenuates the effect of behavioral biases on the market's reaction to new information. These results, however, are not consistent with the possibility that our findings are due to information cascades (Alevy, Haigh, and List, 2007) whereby some investors ignore their own personal information and make decisions based on the choices of others.

Another alternative hypothesis posits that bidders can strategically time the acquisition announcement (Lee and Yerramilli, 2018). Under this possibility, better bidders are better at timing the deal's announcement right after positive earnings surprises. As a result, our surprise measure captures some kind of (unobservable) bidder ability. The results from robustness tests, however, do not provide support for the market timing alternative.

We subject our main findings to a battery of robustness tests. These include diverse specifications of our main constructs (e.g. surprise measures and M&A returns) and different econometric techniques (placebo tests and checks for unobserved heterogeneity). These analyses continue to show that investors over-extrapolate salient earnings releases to evaluate subsequent merger deals, even if a material correlation between the firms in these events does not exist. As a result, investors incorrectly value the bidder upon the M&A announcement. The valuation mistake, nevertheless, disappears a week later as the bidder's stock experiences a price reversal.

Despite the eventual price correction, the biased reaction on the bidders' stock upon the M&A announcement is likely to have material consequences for shareholders of the merging firms. Aside from the wealth fluctuations affecting investors that trade the acquirer's stock during the merger announcement, the bidder's reaction to the M&A is known to affect other facets of the deal. For example, studies find that the acquirer's 3-day CAR centered on the M&A announcement day is

inversely related to the probability that (i) the acquirer firm is sued (Gong, Louis, and Sun, 2008), (ii) the bid is withdrawn (Luo, 2005), and (iii) the acquirer's CEO is fired (Lehn and Zhao, 2006).

The main contribution of our paper is to advance our understanding of the effect of psychological biases on the valuation of financial assets. Our findings suggest that over-extrapolation of salient information distorts such valuations even in the presence of sophisticated investors or during major financial events (such as M&As) that invariably elicit substantial attention. In this regard, our paper is linked to a theoretical literature on context-dependent actions (Kahneman and Tversky, 1991; Bordalo, Gennaioli, and Shleifer, 2013a) and to studies on the effects of over-extrapolation (Lakonishok, et al., 1994; Greenwood and Shleifer, 2014; Hirshleifer, Li, and Yu, 2015; Ertan, Karolyi, Kelly, and Stoumbos, 2017; Barberis, Greenwood, Jin, and Shleifer, 2017).

Our evidence on distorted investor reactions during M&As transactions connects to research on biased market reactions related to the performance of portfolios of stocks categorized as either winners or losers (De Bondt and Thaler, 1985), to Friday earnings releases (DellaVigna and Pollet, 2009), to distraction (Hirshleifer, Lim, and Teoh, 2009), to seasonality (Chang, Hartzmark, Solomon, and Soltes, 2014), and to contrast effects (Hartzmark and Shue, 2018). In addition, this paper delivers novel evidence of salience effects in financial markets that complements work considering terror attacks (Burch, Emery, and Fuerst, 2011), natural disasters (Dessaint and Matray, 2017), extreme portfolio positions (Hartzmark, 2015), recent asset prices (Cosemans and Frehen, 2017), mean tax rates (Graham, Hanlon, Shevlin, and Shroff, 2017), and information display in online trading platforms (Frydman and Wang, 2018).[3]

[3] Other studies on salience theory include Barber and Odean (2008), Chetty, Looney, and Kroft (2009), Da, Engelberg, and Gao (2011), Choi, Lou, and Mukherjee (2017), and Bordalo, Gennaioli, and Shleifer (2012, 2013b, 2015, 2017).

The findings herein add over-extrapolation as a new dimension to the strand of the M&A literature on the effects of psychological biases from traits such as overconfidence (Malmendier and Tate, 2008), hubris (Rau and Vermaelen, 1998), and reference point prices (Baker, Pan, and Wurgler, 2012; Ma, Whidbee, and Zhang, 2018). Unlike those papers, however, our work is related to a behavioral bias attributable to investors. Importantly, our results on stock price reversals for bidders during the days after the merger announcement deliver guidance to researchers in this literature about the need for extending the window in which the M&A wealth effect is measured.

Our findings also add important evidence to the literature studying market reactions to earnings announcements which generally documents an under-reaction (i.e., post-announcement drift).[4] Our results show that the bidder responses are very different from the typical under-reaction to their own earnings surprises. In this sense, even though the target peers' earnings surprises appear informative to bidder investors about the underlying earnings that they have a claim to, they react, on average, differently to this news when it comes from a different source.

The paper proceeds as follows. Section 2 presents the data. Section 3 describes our empirical strategy and main results. Sections 4 contains robustness and additional tests. Section 5 concludes.

2. Data and summary statistics

2.1. Mergers and acquisitions

Our analyses rely on both completed and withdrawn M&A transactions announced during 1989-2014 consisting of U.S. publicly traded bidders and U.S. (public or private) targets. The SDC Platinum M&A Database is the source for these data. Following the selection methods most often used in the M&A literature, the sample excludes recapitalizations, self-tender offers, exchange

[4] See, for example, Bernard and Thomas (1990), Chan, Jegadeesh and Lakonishok (1996), and Kothari, Lewellen and Warner (2006).

offers, repurchases, partial equity stake purchases, acquisitions of remaining interests, privatizations, financial buyouts, as well as deals in which the target or the acquirer is a government agency.[5] For all deals, we ensure that (1) the transaction value is greater than US$10 million, (2) the acquirer owns at least 50% of the target's equity after the transaction is completed, (3) the target is not undergoing bankruptcy proceedings, (4) the parties to the M&A deal are non-financial firms (i.e. first digit SIC classification $\neq 6$), and (5) the M&A announcement is not confounded by other news involving the bidder or the target.[6] The final sample includes 10,518 observations in which the bidder firms have stock market and accounting data available from the Center for Research in Security Prices (CRSP) and Compustat, respectively. The M&A deals we study collectively account for over US$6.1 trillion in terms of transaction value.[7]

Panel A of Table 1 reports the temporal distribution of our sample and the (1-digit SIC) industrial distribution of the 10,518 sample bidders. During the sample period, the industrial distribution of our bidders mirrors the industrial distribution of all public acquirers in SDC.[8] The number of deals is lower during times of economic contraction that occur at the beginning of the sample period and again in 2009.[9] This incidence is broadly in agreement with the argument by Shleifer and Vishny (2003) that stock market health promotes merger activity.

Descriptive statistics for key M&A deal characteristics appear in Panel B of Table 1. To conserve space and avoid repetition, the Appendix provides the definition for all variables. Our

[5] We use a selection procedure similar to that in Bargeron, Schlingemann, Stulz, and Zutter (2010), Masulis, Wang, and Xie (2007), and Erel, Liao, and Weisbach (2012).This criteria produces an initial sample of 42,682 transactions.
[6] Steps (1) through (4) eliminate 14,075; 119; 427; and 8,368 observations, respectively.
[7] Transaction value is expressed in 2014 US dollars. Values are adjusted with the Consumer Price Index provided by the US Department of Labor Bureau of Labor Statistics at: https://www.bls.gov/cpi/tables.htm
[8] For most industries, the percentage of our sample is quite similar (in terms of order of magnitude) to that in SDC. For example, 0.45 vs. 0.41 in Agriculture, 6.50 vs. 6.30 in Mining, 1.06 vs. 1.44 in Construction, 46.51 vs. 37.07 in Manufacturing, 12.15 vs. 12.10 in Transportation and utilities, 3.41 vs. 4.75 in Wholesale, 4.01 vs. 6.18 in Retail, 25.90 vs. 31.69 in Services, 0.01 vs. 0.07 in Public administration.
[9] On March 9, 2009, the Dow Jones Industrial Average finished at 6,547.05, its lowest close over the prior 12 years.

sample characteristics are similar in most important respects to the samples used elsewhere in the M&A literature. For example, as in Gorton, Kahl, and Rosen (2009), one-third of our M&A deals are all-cash financed. Nearly 45% of our transactions involve a private target and just under 20% involve a public target. These figures are comparable to the incidence of private (49%) and public (17.3%) targets in Uysal (2011). About 0.8% of our deals are classified as hostile which is in line with the 1% incidence of transaction hostility reported by Cai and Sevilir (2012). At 91%, the completion rate in our sample is comparable to that of 84.6% in Gaspar, Massa, and Matos (2005).

For every bidder, we estimate the three-day cumulative abnormal return (CAR) centered on the acquisition announcement day. This CAR is the residual from the market model, whose parameters are estimated over a 200-day window ending 31 days before the deal's announcement date.[10] The length of our estimation period addresses the concern identified by Schwert (1996) related to investors' anticipation (or information leakage) before the deal announcement. Table 1 shows that the average bidder CAR in our sample is 1.17%. This estimate compares favorably to the 1.10% three-day average M&A announcement CAR for a sample of 12,023 bidders reported by Moeller, Schlingemann, and Stulz (2004).

2.2. Earnings surprises

Since our goal is to evaluate the impact of earnings surprises on M&A deals, we turn to the Thomson's Institutional Brokers' Estimate System (I/B/E/S) database for information on analyst forecasts, reported earnings, and earnings announcement dates. We use quarterly earnings announcements because most public firms commonly release quarterly earnings and investors pay close attention to these earnings calls (Boulland and Dessaint, 2017).

[10] This procedure requires 200 non-missing returns during the estimation window and uses the value-weighted CRSP index to proxy for the market portfolio.

The earnings surprise calculation requires data on actual and expected earnings. We use the actual earnings per share (EPS) released by each firm on the announcement dates as recorded in I/B/E/S.[11] As in DellaVigna and Pollet (2009), analyst forecasts proxy for expected earnings. Specifically, for each quarterly announcement, we record each analyst's most recent forecast to estimate the median earnings forecast consensus. Following Hartzmark and Shue (2018), we restrict the number of analyst forecasts in our calculation to a window between fifteen days and two days prior to the actual earnings announcement date (day τ) to avoid stale information.

Earnings surprise (*Surprise*) is the difference between the actual EPS released by the firm and the analysts' forecast consensus, scaled by the firm's stock price three trading days before the earnings announcement (Hartzmark and Shue, 2018). The calculation of an earnings surprise for firm i during day τ is given by equation (1).

$$Surprise_{i\tau} = \frac{Actual\ earnings_{i\tau} - Forecast\ consensus_{i\tau}}{Price_{i,\tau-3}} \tag{1}$$

where $Forecast\ consensus_{i\tau}$ equals the median analyst forecast for firm i during $[\tau - 15, \tau - 2]$ and (stock) $Price_{i,\tau-3}$ is drawn from the CRSP database.

For equation (1), we use a 1-digit SIC code to estimate an industry earnings surprise affecting the target's industry. The 1-digit classification is useful because it is unclear how narrowly investors compare one firm to other firms in a related industry. For example, a positive earnings surprise in the hospitality industry (SIC code 70) could remind investors of better prospects in the personal services industry (SIC code 72). However, using a narrower industry classification would miss cases like this.

[11] While DellaVigna and Pollet (2009) note that I/B/E/S misreports some earnings announcement dates, these mistakes essentially disappear after December 1994. In robustness tests, we discard all observations occurring before January 1995 and obtain results similar to those tabulated.

Multiple firms in an industry frequently announce earnings during the same day. To account for this, we calculate a value-weighted earnings surprise for all firms that belong to industry *j* and release earnings on day τ. Each firm's market capitalization three days prior to the earnings announcement proxies for that firm's weight. This baseline industry surprise measure is given by equation (2).

$$Surprise_{j\tau} = \frac{\sum_{i \in j} (Mkt\ cap_{i,\tau-3} \times Surprise_{i\tau})}{\sum_{i \in j} Mkt\ cap_{i,\tau-3}} \quad (2)$$

Our weighting scheme is consonant with the view that investors pay more attention to an earnings release by a larger firm. Then, all else equal, a surprise from a larger firm should make the prospects of firms in related industries more salient than would a similar surprise from a smaller firm.

Throughout the paper, the value-weighted industry earnings surprise (estimated with equation (2)) is matched with the following day's M&A announcements as a proxy for salient states. We focus on one-day lagged rather than same-day surprises because surprises that remind investors of a salient state need to arrive prior to the M&A announcement. In our sample of 10,518 M&A deals, 4,330 industry earnings surprises occur in the day before the announcement of an acquisition involving a 1-digit industry-related target. In our baseline tests, we set the earnings surprise variable to zero in the absence of at least one matched industry earnings surprise (no salience event). However, we also analyze the subsample of non-zero earnings surprises in additional tests.

Panel C of Table 1 shows that for the subsample of deals subject to industry earnings surprises, the mean value-weighted (1-digit) industry surprise equals 0.00003. This estimate is similar to those in other studies (DellaVigna and Pollet, 2009; Hartzmark and Shue, 2018) showing that the

mean earnings surprise is approximately zero. The mean value-weighted surprise remains mostly unchanged in the whole sample when zero earning surprise transactions are included.[12]

3. Empirical analyses

In this section, we evaluate the over-extrapolation hypothesis against two alternatives: information transmission and strategic timing. According to the first hypothesis, investors over-extrapolate information from earnings surprises to appraise a subsequent merger deal which causes a misvaluation of the acquirer firm. Conversely, the information transmission hypothesis argues that the surprise conveys meaningful information that is correctly incorporated into the market's valuation of the bidder. Under the over-extrapolation hypothesis, therefore, the link between the earnings surprise firms and the M&A firms is irrelevant; however, under the information transmission alternative the link is relevant. Given this tension, we begin by investigating the importance of the earnings surprises.

3.1. The effect of salient earnings surprises during M&As

We use regression analyses to study whether earnings surprises occurring at *t*-1 affect the bidder's market valuation in a merger announced at *t*. The key independent variable in all tests, $Surprise_{t\text{-}1}$, is calculated with equation (2). $Surprise_{t\text{-}1}$ is the value-weighted earnings surprise at time *t*-1 involving companies in the same 1-digit SIC code as the acquisition target in an M&A deal announced at time *t*. Equation (3) provides the model we estimate.

$$CAR_{i,[t-1,t+1]} \text{ or } CAR_{i,[0,t+1]} = \alpha + \beta\, Surprise_{t-1} + \eta_{ym} + \psi_j + \varepsilon_{i,t} \quad (3)$$

[12] Our value-weighted industry surprise measure is winsorized at the1% and the 99% levels to reduce the impact of outliers.

where ψ_j are four-digit SIC industry fixed effects and η_{ym} are announcement year by month fixed effects that control for unobserved time trends such as market sentiment (Baker and Wurgler, 2006). Standard errors are double-clustered by year-month and by industry.

Table 2 reports eight ordinary least squares (OLS) regressions based on equation (3). The dependent variable in models (1)-(4) is the bidder's 3-day M&A CAR centered on the deal's announcement date whereas in (5)-(8) it is the bidder's M&A CAR accruing from the announcement day until the next day.

Regressions (1) and (2) analyze our entire sample of 10,518 observations while (3) and (4) analyze the subsample of 4,330 observations with non-zero earnings surprises. Models (2) and (4) expand the specification in equation (3) with a vector of deal-specific control variables similar to those used in the M&A literature.

Parameter estimates for $Surprise_{t-1}$ are positive and statistically significant in models (1), (2), (3), and (4). According to the coefficients in model (2), increasing the value-weighted earnings surprise from the 75th to the 80th percentile is associated with a 0.72% surge in the bidder's M&A CAR. For the average bidder firm in our sample, this estimate translates to a market capitalization increase of about US$87 million during the announcement period.[13] These estimates indicate that the incorporation of salient earnings information into the valuation of the bidder firm is both statistically significant and economically important.[14]

[13] The calculations are as follows. We multiply the 0.3369 estimate for $Surprise_{t-1}$ in model (2) of Table 2 by 0.025% (change of $Surprise_{t-1}$ from the 75th to the 80th percentile). This product is then divided by the mean CAR of 0.0117 to obtain 0.72%. We then multiply this 0.72% by the average bidder's market capitalization 4 days before the deal's announcement (US$12,113 million in 2014 constant dollars) to get the US$87 million increase in market capitalization.

[14] Some of the controls variables in Table 2 yield results that are in line with existing M&A studies. For instance, like Golubov, Petmezas, and Travlos (2012), Cai and Sevilir (2012), and Masulis, Wang, and Xie (2007), the bidder's size is inversely related to the market's reaction. As in Malmendier and Tate (2008), the cash payment indicator is positively related to the bidder's M&A announcement return. Similar to the findings by Fuller, Netter, and Stegemoller (2002), bidders earn higher CARs in acquisitions of private or subsidiary targets.

Models (5) and (6) use the bidder's M&A CAR during the [0,+1] window to separate the market's reaction to the acquisition from the earnings surprises released at *t*-1. Despite this separation, the estimates for $Surprise_{t-1}$ remain positive and statistically significant.

The information transmission hypothesis implies that a subsample of bidders whose stock return has an opposite sign as the earnings surprise at *t*-1, should exhibit a *negative* (or at least, zero) correlation between the bidder's M&A return and $Surprise_{t-1}$ when the deal is announced. To perform this supplemental test of the information transmission alternative, we first exclude the 2,088 transactions in which, at *t*-1, the bidder's return exhibits the same sign as the value-weighted earnings surprise. We then run two regressions using the remaining 8,430 transactions and report the results in columns (7) and (8) of Table 2. As noted earlier, the dependent variable in both tests is the bidder's M&A CAR over [0,+1]. The results show that $Surprise_{t-1}$ continues to exhibit a positive and significant association with the bidders' M&A announcement CAR. The effect of the value-weighted earnings surprise manifests *positively* when the M&A is announced, even when the bidders' stock return and the same surprise variable have opposite signs on the previous day.

To further assess the information transmission channel, we estimate an untabulated regression in which the dependent variable is the bidder's M&A [0,+1] CAR. For this test, we remove transactions for which, at *t*-1, the return of the actual bidder and/or the actual target exhibits the same as sign as $Surprise_{t-1}$. We also exclude all transactions involving private and subsidiary targets. In a regression of the remaining 1,528 observations, the estimate for $Surprise_{t-1}$ is 0.9928, *p*-value = 0.014. Our surprise variable and the bidder's M&A return exhibit a *positive correlation* during [0,+1], even when the same surprise and the bidder (and/or the target) firms' returns exhibit opposite signs the day before the merger is announced.

We evaluate the bidder's stock reaction during the merger announcement because the market's assessment of the synergies going to the bidder might be affected by a contemporaneous salient event. Conversely, since the target's M&A announcement return is essentially based on the offer premium (Betton, Eckbo, and Thorburn (2008, p. 411) it is unlikely to be affected by salience. We confirm this in untabulated regressions similar to those in Table 2 in which we replace the bidder's CAR with the target's CAR. In those tests, estimates for $Surprise_{t-1}$ are not statistically significant.

The evidence in Table 2 shows that investors respond to the earnings surprise released at time *t*-1 during their assessment of a merger announced at time *t*. Despite the results in models (7) and (8) which are not congruent with the information transmission hypothesis, the evidence from the other tests in Table 2 does not really help us distinguish our hypotheses. Consequently, our next test is whether the earnings surprise prompts a response from other firms operating in the industries of the actual target and the actual bidder companies.

3.2. Are the earnings industry events irrelevant surprises or do they transmit information?

Under the information transmission hypothesis, it is possible that peer firms of the targets or peer firms of the acquirers also respond the earnings surprises. To examine this conjecture, we assemble a set of 153,202 bidder's peer firm-event observations defined as those that operate in the same 4-digit SIC code as the acquirer firms in our sample. We use the same procedure to create a sample of 157,260 target's peer firm-event observations. Both subsamples exclude the actual acquirer and target firms as well as any peer with a major (potentially confounding) news broadcast during the three-day acquisition announcement window.

In Panel A of Table 3, we use equation (3) to run OLS regressions of the investors' reactions to bidder peers and to target peers upon the earnings surprise. The key independent variable in all

tests, $Surprise_{t-1}$, is calculated with equation (2). The estimates indicate that $Surprise_{t-1}$ exhibits no statistically significant association with the abnormal returns of the 4-digit SIC-matched bidder (columns 1 through 4) or target peers (columns 5 through 8). These results arise when we use 3-day as well as 1-day abnormal returns for different days around the M&A announcement.

At first glance, the results in Panel A of Table 3 appear surprising since research in Accounting shows that earnings releases transmit relevant information to firms in the same industry. In establishing this finding, Foster (1981), for example, codes industry peers as those firms with the same digit 4-digit SIC. Our results, however, do not contradict this evidence because in our setting the earnings releasing firms and the target industry peers are only linked by a 1-digit SIC.

Our findings showing that the salient earnings surprises correlate with the bidders' M&A CAR (Table 2), but not with the return to 4-digit SIC matched bidder and target peer firms (Panel A of Table 3), have two important implications. First, this evidence is in agreement with the theory and empirical findings by Barber and Odean (2008) showing that limited attention leads investors to concentrate on stocks that grab their attention.[15] Second, these results provide some support for the over-extrapolation hypothesis. Investors perceive the earnings and M&A events to be meaningfully related, which prompts them to include the salient earnings surprise in their appraisal of the acquisition. Nevertheless, despite this evidence, it is still plausible that the earnings surprise conveys material news affecting only the M&A firms. Consequently, we cannot conclusively reject the information transmission alternative.

In Panel B of Table 3, we study a different control group of actual bidders and targets to evaluate whether they respond to a plausibly irrelevant earnings surprise stimulus from firms in unrelated industries (i.e. without a 1-digit SIC match between the earning surprise firms and the

[15] Our findings of non-significant abnormal returns on the peer firms are also congruent with those by Cohen and Frazzini (2008) showing that investors often ignore information from economically-linked firms.

target company). The test here is otherwise similar to those from our baseline analyses with the earnings surprise occurring at *t*-1 and the M&A announced the following day. The results show that when the earnings surprise firms are unrelated to the target, neither the target nor the bidder respond to the salient surprise. This finding reaffirms the view that, although weak, the 1-digit link between the earnings surprise firms and the target is essential to trigger a response from the bidder.

3.3. Overreaction and price reversal

De Bondt and Thaler (1985) argue that investors experience bouts of optimism and pessimism that cause stock prices to deviate systematically from their fundamental values and later to exhibit mean reversion. They note that such overreaction is consistent with Tversky and Kahneman's (1973, 1974) behavioral theory, where investors' ability to forecast future stock prices is biased by a variety of psychological factors. In our context and under the over-extrapolation hypothesis, De Bondt and Thaler's arguments imply that bidder's price reactions upon the M&A announcement, confounded by the salient earnings surprise, should experience a reversal. However, apart from the results in Table 3 and in columns (7) and (8) of Table 2 suggesting that the earnings surprise is irrelevant, no price correction should occur under the information transmission alternative.

To determine whether a price correction occurs in our sample, we estimate six regressions based on equation (3) in which the independent variable of interest is $Surprise_{t\text{-}1}$. For reference, as in the baseline tests, the dependent variable in models (1) and (2) is the bidders' CAR [-1,+1]. In regressions (3) and (4), the dependent variable is the bidders' CAR [+2,+7] and in (5) and (6), it is the bidders' CAR [-1,+7]. Panel A of Table 4 presents the results.

Models (3) and (4) show that there is a significant stock price reversal over the [-2,+7] window. During this interval, the over-extrapolation-affected bidders give up a sizable fraction of the gains

earned upon the M&A announcement during [-1,+1]. This result concurs with Arrow's (1982) observation that investors frequently overreact to market information. Moreover, the horizon of the price reversal we document compares favorably to the findings in other work. For example, Tetlock (2007) shows that the attention effect on public sentiment dissipates within one week.

We acknowledge that even in the presence of an overreaction, the earnings event could still be relevant, just not as relevant to trigger the effects we measure on the M&A announcement. However, our estimates in models (5) and (6), tracking the abnormal return during [-1,+7], cast doubt on this conjecture. The results in those tests indicate that the earnings surprise is indeed irrelevant as it has no significant effect on the return to the acquirers. Combined with our earlier findings, the price reversal results provide evidence consistent with over-extrapolation effects during acquisitions and inconsistent with the information transmission alternative.

Another potential concern with the price reversal results in Panel A of Table 4 is that they might be due to the stock market anomaly described by Thomas and Zhang (2008) in their study of the timing of earning announcements by industry peers. They find that stock prices for firms classified as late announcers overreact to earnings releases by the early announcers and that the overreaction is corrected when the late announcer's earnings are revealed. To address this issue, we eliminate 305 observations with potentially confounding events during [+2,+7]. To identify these observations, we respectively search I/B/E/S, SDC, and Lexis/Nexis for earnings announcements, M&A-related events, or other major news affecting our target, bidder, or earnings surprise firms. The regressions in Panel B, analyzing the remaining 10,213 observations, continue to show an overreaction and share price reversal for the over-extrapolation-afflicted acquirer firms.

Aside from removing confounding observations, we perform two additional analyses to probe the robustness of the price reversal finding. In Panel C of Table 4, we further distill the sample by

removing cases in which $Surprise_{t-1}$ equals zero. The rationale for this is that these observations are potentially adding noise to the analyses. In Panel D, the sample is further refined by dropping cases in which the M&A transaction is not completed. The reasoning here is that, even though observations with major news are removed, the possibility still exists that the price reversal might be driven (at least in part) by investors' updated probability of deal failure. Despite the sample filters we use, the empirical analyses in Panel C and D continue to document a price reversal.[16]

Panel E of Table 4 analyzes a subsample in which (at *t*-1) there is a non-zero earnings surprise and (the next day) the announced M&A deal is covered by *The Wall Street Journal*. The rationale for this test is based on the work by Barber and Odean (2008) that investors tend to focus on stocks that are on the news and to largely ignore those that are not. In our setting, their findings imply greater extrapolation effects. This is what we find. Estimates for the initial response to $Surprise_{t-1}$ and the subsequent price reversal are larger in magnitude than those from the baseline analyses.

It is possible that the earnings releasing firms operate in different business segments and this issue somehow distorts our findings. In Panel F, we address this by estimating $Surprise_{t-1}$ for a subsample of "pure play" firms (those that operate in a single 1-digit SIC according to Compustat's Historical Segment files). Our results still hold when $Surprise_{t-1}$ comes from pure play firms.

Panel G excludes stock reactions at *t*-1 to separate the market's M&A reaction from the earnings surprises released at *t*-1. Hence, in Panel G, the dependent variable is the CAR over [0,1] in columns 1 and 2, over [2,7] in columns 3 and 4, and over [0,7] in columns 5 and 6. Despite this separation, the results continue to show an initial response to $Surprise_{t-1}$ and a subsequent reversal.

[16] At first glance, the $Surprise_{t-1}$ estimate in model (3) of Panel D (which excludes withdrawn deals) appears larger than the $Surprise_{t-1}$ estimate in model (3) of Panel C (which does not exclude withdrawn deals). A Chow (1960) test statistic of 0.05 (*p*-value = 0.82), however, indicates that the estimates are not statistically different from one another. The same is true for the $Surprise_{t-1}$ estimates in model (4) of both panels (Chow test statistic of 0.02, *p*-value = 0.89).

In general, the results in Panel A through G of Table 4 show that the initial abnormal return response to the salient surprises disappears a few trading days after the acquisition announcement. This finding is consistent with the overreaction and subsequent reversal in De Bondt and Thaler (1985). Investors misvalue the bidder firm upon the M&A announcement due to their over-extrapolation of salient surprises, but the salience effects are short-lived as the bidder's stock experiences a price reversal. Our empirical findings also deliver some validation for theoretical work of economic choice by Bordalo, Gennaioli, and Shleifer (2012; 2013a; 2013b; 2015, 2017). A key assumption in their models is that individuals' attention is drawn to salient environmental features and that in making subsequent decisions, individuals overweight those salient features.

3.3.1. Closest industry matches

Research in accounting shows that earnings announcements transmit relevant information to other companies if the firms are closely matched at the 4-digit SIC level (Foster, 1981). We evaluate this conjecture in our setting by analyzing a subsample of 550 M&As where these closer matches occur. Specifically, these transactions include cases in which the earnings surprise firms and the actual target companies operate in the same 4-digit SIC industry. Panel H of Table 4 presents the results. The estimates in models (1) and (2) indicate that bidder CARs are significantly associated to earnings surprises by firms in the same 4-digit SIC as their targets. Interestingly, the results in models (3) and (4) of Panel H in Table 4 show that the same bidders do not experience a price reversal. The coefficient of $Surprise_{t-1}$ in both CAR[2,7] regressions is not statistically significant. This evidence is consistent with the information transmission view and validates our research design which uses releases from weakly linked earnings surprise firms (those in the same 1-digit SIC as the targets) as a suitable setting to test behavioral biases.

3.4. Additional analyses: temporal distance of the earnings surprises

The results in Table 3 show that earnings surprises occurring at *t*-1 affect investors' valuation of a merger announced at *t*. DellaVigna (2009) notes that, holding the level of informativeness constant, information that is further into the past or future is less likely to be salient. In our context, DellaVigna's arguments imply that surprises, such as those happening at *t*-2 or *t*-3, are not likely to affect investors' appraisal of the M&A deal. To test this, we augment our bidder CAR regressions with lagged industry earnings surprises that occur from *t*-4 until *t*-2. We also examine the M&A return reaction to future earnings surprises by including those occurring from *t*+1 to *t*+3. The results of these tests appear in the first three columns of Table 5.

Consistent with DellaVigna's temporal distance argument for the effect of salience, in models (1) through (3), only the surprises occurring at *t*-1 (the day before the M&A announcement) earn positive and significant coefficients. In contrast, past or future surprises are not related to the acquirer's return. Moreover, the $Surprise_{t-1}$ estimates in Table 5 are similar in magnitude to those in the baseline results (Table 2).

By definition, $Surprise_{t-1}$ equals zero for M&A announcements occurring on Mondays. It is possible that the salience effect of earnings surprises released on Friday dissipates by the time an acquisition is announced the following Monday. To evaluate this issue, in column (4) of Table 5, we adjust our surprise classification by replacing all zero Friday surprises with the actual earnings surprises occurring on that day for acquisitions announced on Mondays. According to the estimate for $Surprise_{t-1}$ (0.2967, *p*-value = 0.00004), the over-extrapolation effect remains strong.

We also address the concern noted by DellaVigna and Pollet (2009) of earnings date inaccuracies in I/B/E/S that persist for coverage of releases until December 1994. In column (5) of

Table 5, we deal with this concern by analyzing a subsample of M&A deals announced after January 1995. The results of this test continue to document a positive association between $Surprise_{t-1}$ and the 3-day bidder M&A announcement CAR.

To examine the timing of the earnings surprises and M&A announcement further, we study cases in which both occur during the same day. The main challenge with this test is that we do not observe the exact timing of the M&A announcement, making it difficult to classify surprises occurring before (or after) this event. To circumvent this issue, we split earnings surprises arising on the M&A announcement day into AM surprises and PM surprises. We define AM earnings surprises as those announced *before* the market opens (earlier than 9:30AM), and PM surprises as those announced *after* the market closes (later than 4:00PM).[17] Consequently, we discard all earnings surprises that happen during regular stock market hours. Hartzmark and Shue (2018) note that most firms release earnings outside regular stock market hours. Consequently, the exclusion of earnings surprises during this time period should not bias our analysis.

In model (6) of Table 5, we regress the same-day (day *t*) bidder abnormal M&A returns on AM surprises and PM surprises (both calculated with equation (2)). We exclude the *t*-1 and *t*+1 abnormal returns accruing to the bidders to focus on their day *t* price reaction to the day *t* salient surprises. The results indicate that bidder returns are affected by AM earnings surprises, but not by PM surprises. This finding supports the argument in the over-extrapolation hypothesis that investors establish a causal link between sequential events although such link may not exist. Moreover, the lack of significance on the PM surprises is inconsistent with the potential of either market anticipation or information leakage of the earnings surprises.

[17] I/B/E/S provides the exact timing of earnings releases. However, some earnings are released between 0:00 and 6:00AM or after 9:00PM based on I/B/E/S actual filings. We exclude earnings announcements in these two time intervals because we deem them to be inaccurate. The results are similar if we include earnings in these time intervals.

3.5. A different alternative hypothesis: Strategic timing of M&A announcements

Existing studies show that managers strategically manipulate the timing of news releases to mitigate potentially adverse information or to magnify the effect of positive news. Boulland and Dessaint (2017), for example, show that firms shorten the advance notice period of earnings announcements when the quarterly earnings are likely to fall short of analyst forecasts. Johnson, and So (2017) report similar results.[18]

In the situation we study, the strategic timing alternative predicts that bidders intentionally announce the acquisition just after earnings surprises to potentially capitalize on the market's sentiment related to such surprises. For this to occur, bidder managers must have information about both the nature and timing of the earnings surprises. Moreover, bidder managers would have to coordinate those events with their own signing of the merger agreement.[19] If managers are able to circumvent these issues, they would have to accurately react to the surprises (i.e. understand the salience effect) and quickly announce the acquisition deal (within 24 hours of the earnings surprise). These issues suggest that our results are unlikely to be driven by the bidders' strategic timing.

Notwithstanding the caveats just described which cast doubt on the premise that managers of the acquiring firm time the M&A announcement, we estimate four probit regressions to study this alternative hypothesis. Panel A of Table 6 presents these tests. The dependent variable is set to one if at least one M&A deal is announced on day *t* and there is an earnings surprise on day *t*-1

[18] Manipulation of individual's psychological bias is also studied in other fields such as the consumer market (e.g. DellaVigna and Malmendier, 2004; Eliaz and Spiegler, 2006; Gabaix and Laibson, 2006), politics (e.g. Eisensee and Stromberg, 2007), and the labor market (e.g. Bewley, 1999).

[19] U.S. securities laws require that the bidder and target publicly announce the transaction soon after a definitive merger agreement is signed.

involving at least one company in the same 1-digit SIC as the target firm. Otherwise, the dependent variable is set to zero. Columns 1 and 2 include all earnings surprises whereas columns 3 and 4 include only positive earnings surprises. In addition to month by year and industry fixed effects, the probit models include weekday fixed effects. Standard errors are double-clustered by year-month and by industry. To facilitate the interpretation of the probit estimates, Table 6 reports marginal effects for $Surprise_{t-1}$, which we estimate with equation (2).[20]

The results in Panel A of Table 6 do not support the strategic timing alternative hypothesis. Parameter estimates for $Surprise_{t-1}$ fail to attain statistical significance in all probit models. As a result, these analyses provide no evidence suggesting that bidders intentionally schedule the M&A deal announcement after industry earnings surprises.

A different way to test the strategic timing alternative is by checking whether the distribution of the surprise variable varies with the sign of the return to the acquirers. Specifically, it could be that bidders who get higher CARs skillfully time the M&A announcement following positive earnings surprises. Figure 2, however, shows that the distribution of $Surprise_{t-1}$ for positive bidder CARs is similar to the $Surprise_{t-1}$ distribution for negative bidder CARs. Moreover, a *p*-value of 0.481 from a Kolmogorov-Smirnov test suggests that the right tail in each subsample contains a similar incidence of (large) surprises. Consequently, the evidence in Figure 2, together with the results in Panel A of Table 6, does not support the strategic timing alternative hypothesis.

3.5.1. Is the response to the salient event symmetrical?

We are interested in evaluating whether bidder investors respond symmetrically to positive and negative surprises. If, for example, they respond more acutely to positive surprises, then a

[20] The interpretation of the reported marginal effect is similar to the least squares coefficients in a linear probability model. See Greene (1993, p. 639).

different version of the strategic timing hypothesis is that managers might time the M&A announcement during earnings season. By doing so, they would get the asymmetric benefit of positive earnings surprises without being harmed so much by negative earnings news.

Earlier work (e.g., Taylor, 1991; McQueen, Pinegar, and Thorley, 1996) suggests that salient negative events generate more intense psychological biases than do salient positive ones. Under these circumstances and in our context, we would expect larger reactions to negative earnings surprises. However, if short-sale constraints are present, we might observe a bigger market response to positive earnings surprises (e.g., Chen, Hong, and Stein, 2002). Thus, it is not ex-ante evident whether one response is more dominant than the other or whether the responses are not statistically different.

The analyses in Panel B of Table 6 shed light on these issues by analyzing and contrasting salience effects between (non-zero) surprises in the top tercile of our sample (i.e., most positive earnings surprises) and those in the bottom tercile (i.e., most negative earnings surprises). Chow (1960) tests for differences in the coefficients do not reveal statistical differences between the response to negative earnings surprises and the response to positive earnings surprises. These findings, documenting no asymmetry in responses, also cast doubt on the possibility that bidders deliberately time merger announcements during earnings announcement season.

4. Robustness Tests

We use diverse constructs of our main variables (e.g., earnings surprises and M&A performance), different econometric methods, and subsample analyses to probe the robustness of our baseline findings.

4.1. Alternative surprise measures

In Panel A of Table 7, we run ten regressions of the 3-day bidder M&A CAR. These tests use different constructs of $Surprise_{t-1}$. The tests in Panel A are based on equation (3), with the even-numbered regressions expanding the baseline specification with a vector of control variables.

To complement the results we obtain with the value-weighted measure of salience, we replace it with an equally-weighted measure in models (1) and (2). To address the concern that analyst forecasts might be biased (e.g. Lim, 2001; Hong and Kubik, 2003; and Gu and Wu, 2003), we construct a "*return surprise*" measure that does not utilize analyst forecast information. Return surprise tracks salience with the value-weighted stock return response to earnings announcements on day τ accruing to the actual firms that release them as specified by equation (4).

$$Return\ surprise_{j\tau} = \frac{\sum_{i \in j} (Mkt\ cap_{i,\tau-3} \times Return_{i,[\tau-1,\tau+1]})}{\sum_{i \in j} Mkt\ cap_{i,\tau-3}} \quad (4)$$

where *j* indicates the industry in which earnings-releasing firm *i* operates. The key independent variable in models (3) and (4) is the value-weighted return surprise measure whereas in models (5) and (6) it is the equally-weighted measure. Looking at the market-based measures in models (3) through (6) alleviates the concern of whether the earnings surprise is a salient measure of earnings news for investors who are paying attention to M&As in related industries.

In models (7) through (10), our explanatory variables track earnings surprises involving only firms classified as industry leaders. Since industry leaders are widely covered by the business press, looking at them proxies for whether investors actually become aware of the earnings news. Using the logic in Hartzmark and Shue (2018), we define industry leaders as firms with a market capitalization in the top 25th percentile of all NYSE firms in the same 4-digit SIC in that month.

Overall, all of the alternative surprise measures in Panel A of Table 7 continue to exhibit a positive and statistically significant association with the bidder's 3-day M&A announcement CAR.

4.2. Alternative M&A performance measures

In Panel B of Table 7, we replace the bidder's 3-day announcement CAR dependent variable with different ways to measure the acquirer firms' M&A performance. In regressions (1) and (2), we estimate bidder's returns with the Carhart (1997) four factor-factor model. In models (3) and (4) we calculate CARs with the market model and adjust them with 1-digit SIC industry returns. The dependent variable in models (5) and (6) is the bidder's buy-and-hold abnormal return (BHAR) which is the realized return over the three-day announcement window minus the expected return over the same period. In columns (7) and (8), we use the bidder's (unadjusted) cumulative total return over the three-day window. Panel B shows that over-extrapolation effects are robust to these alternative return measures. The estimates in model (4), for example, imply that increasing the value-weighted earnings surprise from the 75^{th} to the 80^{th} percentile is associated with a 0.81% increase in the bidder's M&A CAR. This result matches the baseline findings in Table 2.

Models (9) and (10) in Panel B complement the analysis with a measure of postmerger accounting performance (Healy, Palepu, and Ruback, 1992; Harford, Humphery-Jenner, and Powell, 2012; and Fich, Rice, and Tran, 2016). The advantage of using accounting data is that it is unlikely to be biased by market sentiment or investors' perceptions. Therefore, the accounting information provides an alternative way to examine whether our baseline results stem from behavioral biases or from rational information transmission. The dependent variable in columns (9) and (10) is the postmerger return on assets (ROA) for the combined firm. This accounting return proxy is measured as the average industry-adjusted ROA during the 3 years after the deal is

completed.[21] Estimates for $Surprise_{t-1}$ in regressions (7) and (8) are not statistically significant at conventional levels. While this evidence does not support the information transmission alternative, it is in line with the overreaction and subsequent stock price reversal we document in Table 4.

4.3. Unobserved heterogeneity

Because most corporate policies depend on unobservable factors, accounting for unobserved heterogeneity (or common errors) is a major obstacle in empirical finance research (Gormley and Matsa, 2014). In our setting, it is possible that unobservable (time-varying or time-invariant) characteristics that affect targets and bidders (jointly or separately) might be correlated with the earnings surprises. Such a situation could potentially bias our findings. Gormley and Matsa (2014) endorse the use of high-order (multiplicative) fixed effects as an econometric tool for addressing unobserved heterogeneity. Following their advice, we expand the baseline estimation in models (1) and (2) of Panel C in Table 7 by including target industry × acquirer industry fixed effects. These effects account for time-invariant unobservable industry characteristics such as supply-chain dependencies. Models (3) and (4) include bidder industry × year fixed effects and target industry × year fixed effects to control for time-varying industry attributes (e.g., M&A waves).

In the presence of fixed effects, including additional controls may lead to biased estimates if the identifying construct ($Surprise_{t-1}$ in our case) concurrently affects the control variables (Angrist and Pischke, 2009; Gormley and Matsa, 2014). Given this issue, models (1) and (3) in Panel C of Table 7 suppress the control variables. Estimates for $Surprise_{t-1}$ remain positive and statistically significant in all four regressions. These results suggest that time-varying or time invariant unobservable industry attributes are not biasing our findings.

[21] We drop 2,511 observations for which the transaction is not consummated or Compustat does not contain operating income before depreciation for the acquirer firms during the three years after the merger is completed.

4.4. Target earnings and private targets

It is possible that the target's own earnings could moderate our baseline findings. To study this issue, columns 1 and 2 in Panel D of Table 7 control for the actual target's most recent earnings surprise. To be thorough, columns 3 and 4 examine the subsample of non-public targets, which have no earnings surprises. The results show that, while the estimates for the target's own surprise are not statistically significant, those for $Surprise_{t-1}$ stay positive and significant in all tests. Importantly, a Chow (1960) test reveals that the estimate for the subsample of non-public targets in column 4 is statistically smaller at 0.2959 than that for the whole sample (0.3369) in column 2. This evidence is opposite to what the information transmission hypothesis would predict: a larger response for non-public targets since there is less public information about non-public targets.

We note (in Panel A of Table 1) that many of our targets operate in the Manufacturing and Transportation sectors. In untabulated tests, we run two regressions of the bidder CARs in which we discard observations with targets in these industries. Estimates for $Surprise_{t-1}$ (0.3942, *p*-value = 0.006 and 0.4520, *p*-value = 0.004 with controls) remain statistical significant in both regressions.

4.5. Interaction effects

We perform additional analyses in Panel E of Table 7 to assess whether our results are consistent with the predictions in the extant literature related to the strength of behavioral biases. We believe that the extrapolative behavior we uncover is likely driven by individual investors. To investigate this conjecture, models (1) and (2) interact our salience measure with an indicator that is set to one for bidder firms with above-the median institutional ownership. Estimates for the

interaction term and for the stand-alone $Surprise_{t-1}$ variable indicate that the over-extrapolation effects are significantly curtailed in acquirer firms with high institutional ownership. This result is consistent with the arguments by Barber and Odean (2008, 2013) noting that institutional investors act more rationally than individual investors and also with contemporaneous work by Andonov and Rauh (2018) showing that institutional investors exhibit extrapolative behavior.[22]

Regressions (3) and (4) interact $Surprise_{t-1}$ with an indicator that is set to one for bidders for which firm size is above the median. These tests also show that the over-extrapolation effects are truncated in larger acquirers. This finding is in line with existing evidence showing that firm size mitigates investors' behavioral biases (see, for example, Kumar (2009)).

Hirshleifer (2001) posits that psychological biases increase when there is more uncertainty. Zhang (2006) finds evidence consistent with this conjecture. Using analyst coverage to proxy for information uncertainty, he finds that the market reaction to new information is more accurate for low-uncertainty stocks. Given this issue, in Column 5 and 6 of Panel E (Table 7) we interact $Surprise_{t-1}$ and the number of analysts covering the acquirer firm. Consistent with Zhang (2006), we find that analyst coverage reduces (but does not fully eliminate) the over-extrapolation effect.

4.6. Refined industry matching: Pure salience

Throughout the paper, $Surprise_{t-1}$ takes a non-zero value when at least one firm in the same 1-digit SIC as the target firm releases earnings at *t*-1, the day before the M&A announcement. A potential caveat with this process is that our salience results might be driven by cases where the earnings firms and the target company can be matched beyond the 1-digit SIC. We address this in Table 8 by setting $Surprise_{t-1}$ to zero for the 762 cases in which at least one of the earnings

[22] Specifically, they find that institutional investors rely on past performance in setting future return expectations, and that these extrapolative expectations affect their target asset allocations.

releasing firms operates in the same 2-digit (or higher) SIC as the target. As a result, in the tests in Table 8, the only way to join the earnings surprise firms and the targets is through a 1-digit SIC match.[23] In Table 8, we label our key explanatory variable as *Pure Salience*$_{t\text{-}1}$.

The six OLS regressions in Panel A evaluate the effect of *Pure Salience*$_{t-1}$ on the bidders' 3-day M&A announcement CAR. Models (1) and (2) analyze our entire sample, whereas (3) and (4) study the subsample of observation with non-zero surprises. Regressions (5) and (6) use different combinations of multiplicative fixed effects to control for unobserved heterogeneity. Estimates for *Pure Salience*$_{t\text{-}1}$ in all tests are positive and statistically significant. The results in model (2) imply that raising *Pure Salience*$_{t-1}$ from the 75th to the 80th percentile is related to an increase of 0.89% in the acquirers' 3-day M&A announcement abnormal return. This increase augments the market value of the average bidder by US$108 million over the M&A announcement period. Although the estimates in models (1) and (2) in Panel A are larger in magnitude than those from our baseline tests, the difference in coefficients is not statistically significant. For example, a Chow (1960) test for the difference between the *Pure Salience*$_{t-1}$ estimate in column (2) in Panel A of Table 8 and the *Salience*$_{t-1}$ estimate in column (1) of Table 2 has *p*-value of 0.143.

The analyses in Panel B of Table 8, which are similar to those in Table 3, evaluate peer firms defined as those in the same 4-digit SIC as the bidder and target firms. The results show that none of the bidder peers (columns 1 through 4) or target peers (columns 5 through 8) exhibit statistically significant abnormal returns around the release of earnings surprises. These findings reaffirm the idea that these earnings surprises convey no information for either the acquirer industry or the target industry. Therefore, as with the tests in Table 3, the results in Panel B of Table 8 offer no support for the information transmission alternative hypothesis.

[23] We get similar results when we remove the 762 observations with an SIC match of 2-digits or higher.

Panel C reports eight OLS regressions in which *Pure Salience*$_{t-1}$ is the key independent variable. Columns (1) through (4) analyze our entire sample while (5) through (8) remove the 305 cases with potentially confounding news. In models (1), (2), (5) and (6) the dependent variable is the bidders' CAR [+2,+7] and in (3), (4), (7) and (8) it is the bidders' CAR [-1,+7]. Regressions (1), (2), (5) and (6) show a significant stock price decline over the [+2, +7] window that essentially erases all the gains during [-1,+1] we estimate in Panel A. Consequently and according to models (3), (4), (7) and (8) of Panel C, the earnings surprise as captured by *Pure Salience*$_{t-1}$, has no material effect on the return to the acquirers during [-1,+7].

Together, the results in Panels A and C show an overreaction and subsequent price reversal. Investors over-extrapolate *Pure Salience*$_{t-1}$ to value the bidder upon the M&A announcement, but the misvaluation is corrected as the bidder's stock experiences a price reversal.

4.7. Single surprises

Our measure of salience is based on aggregate earnings surprises because, as noted by Choi, Kalay, and Sadka (2006), individual earnings surprises represent cash flows news of that individual (earnings announcing) firm, while aggregate/average surprises represent industry-wide expectations. At the same time, Kothari, Lewellen, and Warner (2006, p.538) note that "establishing whether the same behavioral biases affect firm-level and aggregate returns should help theorists refine models of price formation."

Motivated by these papers, we analyze the 1,371 cases in which only one firm in the same 1-digit SIC as the target company releases earnings the day before the M&A announcement. The untabulated results show that single firm earnings surprises are unrelated to the return accruing to bidder and target peer firms. Yet, as in the main analyses, in a bidder M&A announcement CAR[-

1,+1] regressions the coefficient for the (single firm) $Surprise_{t-1}$ variable (0.1334, standard error = 0.066) implies that investors respond to the salient earnings event. Importantly, we also find that such response disappears as the salience-affected bidders exhibit a stock price reversal: the CAR[2,7] is -0.1465 with a standard error = 0.053. In general, these results match our baseline findings.

4.8. Same industry v. cross-industry M&As

It is possible that the over-extrapolation effects we document are driven by M&A transactions in which both parties to the deal operate in the same industry. The rationale here is that the earnings surprise is linked to both the target and the acquirer firm in same-industry M&As. To address this issue we estimate and compare the response to the salience surprise for same- and cross-industry deals.

The unreported tests reveal that bidders in *both* same-industry and cross-industry M&As exhibit a significant association with $Surprise_{t-1}$ during the M&A announcement and also a significant reversal afterwards. The CAR[-1,+1] estimates for $Surprise_{t-1}$ are 0.2980 (standard error = 0.148) and 0.3770 (standard error = 0.226) for the same- and cross-industry groups, respectively. A Chow test (1960) indicates that these coefficients are not statistically different from one another. The reversal during [+2,+7] is -0.1375 (standard error = 0.083) for same-industry deals and -0.2855 (standard error = 0.172) for cross-industry transactions. As in our baseline tests, the overall response to $Surprise_{t-1}$ during [-1,+7] is not statistically significant for either group. This evidence suggests that over-extrapolation of the salient earnings surprise occurs regardless of whether the merging firms operate in the same industry.

5. Conclusions

This paper provides novel empirical evidence that investors exhibit cognitive biases when valuing M&A transactions. Our experiment consists of earnings surprises released by firms that operate in the same 1-digit SIC as a target firm in an M&A deal that is announced hours later. We begin by showing that investors systematically respond to the salient earnings releases by factoring them into their appraisal of the bidder firm when the M&A is announced. Conversely, we do not detect a statistically significant response to the same earnings releases when we analyze 4-digit SIC matched bidder- and target-industry peer firms. Importantly, we also find evidence of a stock price reversal: the bidder's price reaction to the salient surprises that occurs upon the M&A announcement disappears a week later.

Collectively, these results do not conform to standard asset-pricing models based on the assumption that, through a Bayesian process, investors quickly and rationally update their beliefs when new and relevant information arrives. Moreover, our analyses do not support information transmission or strategic timing of M&A announcements as alternative hypotheses that can explain our findings. Instead, our results are congruent with behavioral theories (De Bondt and Thaler, 1985; Barber and Odean, 2008; Bordalo, Gennaioli, and Shleifer, 2013a) that predict distortions to asset prices due to the overweighting of recent salient information and the use of valuation heuristics. In our setting and under these theories, investors direct their attention to salient earnings surprises and over-extrapolate information from these events to evaluate an ensuing M&A transaction. Our findings suggest that investors overestimate the strength of the link between the earnings surprises and the firms participating in a subsequent M&A deal. This situation leads investors to make non-trivial valuation mistakes. Our empirical evidence indicates that the economic magnitude of the mistakes is both statistically significant and economically important.

References

Andonov, A., Rauh, J. D., 2018. The return expectations of institutional investors. Stanford University Graduate School of Business Research Paper No. 18-5.

Angrist J. D., Pischke J., 2009. Mostly harmless econometrics: An empiricist's companion. Princeton University Press.

Arrow, K. J., 1982. Risk perception in psychology and economics. Economic Inquiry 20, 1-9.

Baker, M., Pan, X., Wurgler, J., 2012. The effect of reference point prices on mergers and acquisitions. Journal of Financial Economics 106, 49-71.

Baker, M., Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. Journal of Finance 61, 1645-1680.

Barber, B., Odean, T., 2008. All that glitters: the effect of attention and news on the buying behavior of individual and institutional investors. Review of Financial Studies 21, 785-818.

Barber, B., Odean, T., 2013. The behavior of individual investors. In Handbook of the Economics of Finance, 2013, vol. 2. North-Holland: Elsevier.

Barberis, N., 2013. Psychology and the Financial Crisis of 2007-2008, in Financial Innovation: Too Much or Too Little? Michael Haliassos ed., MIT Press, Cambridge.

Barberis, N., Greenwood, R., Jin, L., Shleifer, A., 2015. X-CAPM: An extrapolative capital asset pricing model. Journal of Financial Economics 115, 1-24.

Bargeron, L., Schlingermann, F. P., Stulz, R. M., Zutter, C. J., 2010. Are acquisition premiums lower because of target CEOs' conflicts of interest? Working paper.

Bernard, V., Thomas, J., 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. Journal of Accounting and Economics 13, 305–340.

Betton, S., Eckbo, B. E., Thorburn, K. S., 2008. Corporate takeovers. In B. Espen Eckbo (ed.), Handbook of Corporate Finance, Empirical Corporate Finance, vol. 2. North-Holland: Elsevier.

Bewley, T. F., 1999. Why wages don't fall during a recession. Harvard University Press.

Bhargava, S., Fisman, R., 2014. Contrast effects in sequential decisions: Evidence from speed dating. Review of Economics and Statistics 96, 444-457.

Bordalo, P., Gennaioli, N., Shleifer, A., 2012. Salience theory of choice under risk. Quarterly Journal of Economics 127, 1243-1285.

Bordalo, P., Gennaioli, N., Shleifer, A., 2013a. Salience and asset prices. American Economic Review 103, 623-628.

Bordalo, P., Gennaioli, N., Shleifer, A., 2013b. Salience and consumer choice. Journal of Political Economy 121, 803 - 843.

Bordalo, P., Gennaioli, N., Shleifer, A., 2015. Salience theory of judicial decisions. Journal of Legal Studies 44, S7-S33.

Bordalo, P., Gennaioli, N., Shleifer, A., 2017. Memory, attention and choice. NBER Working Paper No. 23256.

Boulland, R., Dessaint, O., 2017. Announcing the announcement. Journal of Banking and Finance 82, 59-79.

Burch, T. R., Emery, D. R., Fuerst, M. E., 2011. Do investors overreact to super-salient events? Evidence from "Nine-Eleven". Working paper, University of Miami, Coral Gables, FL.

Cai, Y., Sevilir, M., 2012. Board connections and M&A transactions. Journal of Financial Economics 103, 327-349.

Carhart, M.M., 1997. On persistence in mutual fund performance. Journal of Finance 52, 57-82.

Chan, L., Jegadeesh, N., Lakonishok, J., 1996. Momentum strategies. Journal of Finance 51, 1681–1713.

Chang, T. Y., Hartzmark, S. M., Solomon, D. H., Soltes, E. F., 2014. Being surprised by the unsurprising: Earnings seasonality and stock returns. Review of Financial Studies 30, 281-323.

Chen J, Hong H, Stein J. C., 2002. Breadth of ownership and stock returns. Journal of Financial Economics 66, 171-205.

Chetty, R., Looney, A., Kroft, K., 2009. Salience and taxation: Theory and evidence. American Economic Review 99, 1145-1177.

Choi, D., Lou, D. and Mukherjee, A., 2017. The effect of superstar firms on college major choice. Working paper, The London School of Economics and CEPR.

Choi, J., Kalay, A., Sadka, G., 2016. Earnings news, expected earnings, and aggregate stock returns. Journal of Financial Markets, 29, 110-143.

Chow, G., 1960. Tests of equality between sets of coefficients in two linear regressions. Econometrica 28, 591-605.

Cohen, L., Frazzini, A., 2008. Economic links and predictable returns. Journal of Finance 63, 1977-2011.

Cosemans, M., Frehen, R., 2017. Salience theory and stock prices: Empirical evidence. Available at SSRN: https://ssrn.com/abstract=2887956.

Da, Z., Engelberg, J., Gao, P., 2011. In search of attention. Journal of Finance 66, 1461-1499.

De Bondt, W. F. M., Thaler, R., 1985. Does the stock market overreact? Journal of Finance 40, 793-805.

DellaVigna, S., 2009. Psychology and economics: Evidence from the field. Journal of Economic Literature 47, 315-372.

DellaVigna, S., Malmendier, U., 2004. Contract design and self-control: Theory and evidence. Quarterly Journal of Economics 119, 353-402.

DellaVigna, S., Pollet, J. M., 2007. Demographics and industry returns. American Economic Review 97, 1667-1702.

DellaVigna, S., Pollet, J. M., 2009. Investor inattention and Friday earnings announcements. Journal of Finance 64, 709-749.

Dessaint, O., Matray, A., 2017. Do managers overreact to salient risks? Evidence from hurricane strikes. Journal of Financial Economics 126, 97-121.

Eisensee, T., Stromberg, D., 2007. News droughts, news floods, and U. S. disaster relief. Quarterly Journal of Economics 122, 693-728.

Eliaz, K., Spiegler, R., 2006. Contracting with diversely naive agents. Review of Economic Studies 73, 689-714.

Erel, I., Liao, R. C., Weisbach, M. S., 2012. Determinants of cross-border mergers and acquisitions. Journal of Finance 67, 1045-1082.

Ertan, A., Karolyi, S.A., Kelly, P., Stoumbos, R.C., 2017. Individual investor over-extrapolation. Available at SSRN: https://ssrn.com/abstract=2720573.

Fich, E. M., Rice, E. M., Tran, A. L., 2016. Contractual revisions in compensation: Evidence from merger bonuses to target CEOs. Journal of Accounting and Economics 61, 338-368.

Foster, G., 1981. Intra-industry information transfers associated with earnings releases. Journal of Accounting and Economics 3, 201-232.

Frydman, C., Wang, B., 2018. The impact of salience on investor behavior: Evidence from a natural experiment. Available at SSRN: https://ssrn.com/abstract=3017406.

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

Gabaix, X., Laibson, D., 2006. Shrouded attributes, consumer myopia, and information suppression in competitive markets. Quarterly Journal of Economics 121, 505-540.

Gaspar, J., Massa, M., Matos, P., 2005. Shareholder investment horizons and the market for corporate control. Journal of Financial Economics 76, 135-165.

Golubov, A., Petmezas, D., Travlos, N. G., 2012. When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As. Journal of Finance 67, 271-312.

Greene, W. H., 1993. Econometric Analysis. Macmillan, New York.

Gong, G., Louis, H. Sun, A.X., 2008. Earnings management, lawsuits, and stock-for-stock acquirers' market performance. Journal of Accounting and Economics 46, 62-77.

Gormley, T. A., Matsa, D. A., 2014. Common errors: How to (and not to) control for unobserved heterogeneity. Review of Financial Studies 27, 617-661.

Gorton, G., Kahl, M., Rosen, R. J., 2009. Eat or be eaten: A theory of mergers and firm size. Journal of Finance 64, 1291-1344.

Graham, J. R., Hanlon, M., Shevlin, T. J., Shroff, N., 2017. Tax rates and corporate decision making. Review of Financial Studies 30, 3128-3175.

Greenwood, R., Shleifer, A., 2014. Expectations of returns and expected returns. Review of Financial Studies 27, 714-746.

Gu, Z., Wu, J. S., 2003. Earnings skewness and analyst forecast bias. Journal of Accounting and Economics 35, 5-29.

Harford, J., Humphery-Jenner, M., Powell, R., 2012. The sources of value destruction in acquisitions by entrenched managers. Journal of Financial Economics 106, 247-261.

Hartzmark, S. M., 2015. The worst, the best, ignoring all the rest: The rank effect and trading behavior. Review of Financial Studies 28, 1024-1059.

Hartzmark, S. M., Shue, K., 2018. A tough act to follow: Contrast effects in financial markets. Journal of Finance 73, 1567-1613.

Healy, P. M., Palepu, K. G., Ruback, R. S., 1992. Does corporate performance improve after mergers? Journal of Financial Economics 31, 135-175.

Hirshleifer, D., 2001. Investor psychology and asset pricing. Journal of Finance 56, 1533-1597.

Hirshleifer, D., Li, J., Yu, J. 2015. Asset pricing with extrapolative expectations and production. Journal of Monetary Economics 76, 87-106.

Hirshleifer, D., Lim, S., Teoh, S. H., 2009. Driven to distraction: Extraneous events and underreaction to earnings news. Journal of Finance 64, 2289-2325.

Hong, H., Kubik, J. D., 2003. Analyzing the analysts: Career concerns and biased earnings forecasts. Journal of Finance 58, 313-351.

Johnson, T., So, E., 2017. Time will tell: Information in the timing of scheduled earnings news. Available at SSRN: https://ssrn.com/abstract=2480662.

Kahneman, D., Tversky, A., 1982. Intuitive prediction: Biases and corrective procedures. In D. Kahneman, P. Slovic, and A. Tversky, (eds.), Judgment under Uncertainty: Heuristics and Biases. London: Cambridge University Press.

Kahneman, D., Tversky, A., 1991. Loss aversion in riskless choice: A reference-dependent model. Quarterly Journal of Economics 106, 1039-1061.

Kothari, S.P., Lewellen, J., Warner, J.B., 2006. Stock returns, aggregate earnings surprises, and behavioral finance. Journal of Financial Economics 79, 537-568.

Kumar, A., 2009. Hard-to-value stocks, behavioral biases, and informed trading. Journal of Financial and Quantitative Analysis 44, 1375-1401.

Lakonishok, J., Shleifer, A., Vishny, R., 1994. Contrarian investment, extrapolation, and risk. Journal of Finance 49, 1541-1578.

Lee, S., Yerramilli, V., 2018. Relative values, announcement timing, and shareholder returns in mergers and acquisitions. Available at SSRN: https://ssrn.com/abstract=2714572.

Lehn, K.M., Zhao, M., 2006. CEO turnover after acquisitions: are bad bidders fired? Journal of Finance 6, 1759-1811.

Lim, T., 2001. Rationality and analysts' forecast bias. Journal of Finance 56, 369-385.

Luo, Y., 2005. Do insiders learn from outsiders? Evidence from mergers and acquisitions. Journal of Finance 60, 1951-1982.

Ma, Q., Whidbee, D., Zhang, W., 2018. Acquirer reference prices and acquisition performance. Journal of Financial Economics, forthcoming.

Malmendier, U., Tate, G., 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. Journal of Financial Economics 89, 20-43.

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

McQueen, G., Pinegar, M., Thorley, S., 1996. Delayed reaction to good news and the cross autocorrelation of portfolio returns. Journal of Finance 51, 889–919.

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

Rau, P. R., Vermaelen, T., 1998. Glamour, value and the post-acquisition performance of acquiring firms. Journal of Financial Economics 49, 223-253.

Schwarz, N., Vaughn, L., 2002. The availability heuristic revisited: ease of recall and content of recall as distinct sources of information. T. Gilovich, D. Griffin, D. Kahneman (Eds.), Heuristics and Biases: The Psychology of Intuitive Judgment, Cambridge University Press, New York.

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

Shleifer, A., Vishny, R. W., 2003. Stock market driven acquisitions. Journal of Financial Economics 70, 295-311.

Taylor, S. E., 1991. Asymmetrical effects of positive and negative events: the mobilization-minimization hypothesis. Psychological Bulletin 110, 67–85.

Tetlock, P. C., 2007. Giving content to investor sentiment: The role of media in the stock market. Journal of Finance 62, 1139-1168.

Thomas, J., Zhang, F., 2008. Overreaction to intra-industry information transfers? Journal of Accounting Research 46, 909-940.

Tversky, A., Kahneman, D., 1973. Availability: A heuristic for judging frequency and probability. Cognitive Psychology 5, 207-232.

Tversky, A., Kahneman, D., 1974. Judgment under uncertainty: heuristics and biases. Science 185, 1124-1131.

Uysal, V. B., 2011. Deviation from the target capital structure and acquisition choices. Journal of Financial Economics 102, 602-620.

Zhang, X.F., 2006. Information uncertainty and stock returns. Journal of Finance 61, 105-137.

Figure 1. Bidders' 3-day M&A CAR versus earnings surprises announced at *t*−1

This figure plots the bidder's 3-day cumulative abnormal return (CAR) around an acquisition announcement on day *t* against value-weighted earnings surprises announced in the target's 1-digit SIC industry on day *t*−1. We estimate CARs holding all other M&A deal characteristics constant.

Figure 2. Earnings surprise distributions for positive and negative bidder CARs subsamples

This graph shows the histograms of *Surprise*$_{t-1}$ for two M&A subsamples: M&As with positive bidder abnormal returns and M&As with negative bidder abnormal returns.

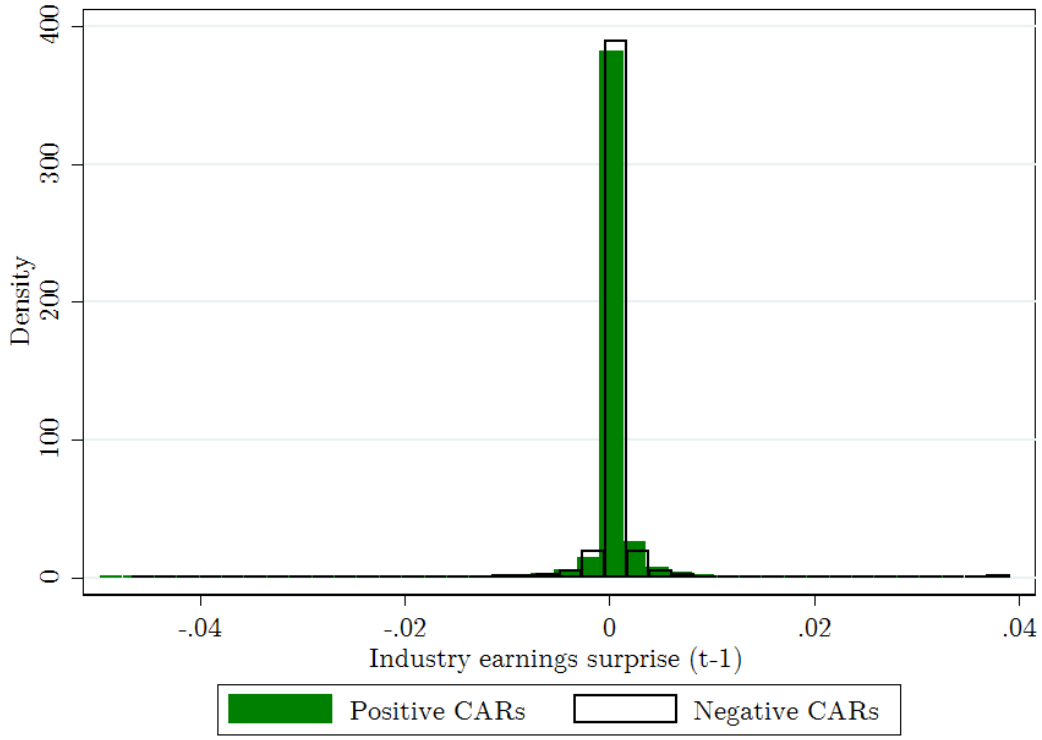

Table 1. Sample description

This table describes the sample and summary statistics for the main variables used in the empirical tests. Panel A report the industrial and temporal distribution of the sample bidders. Panel B reports deal characteristics. Panel C reports earnings surprise statistics. $Surprise_{t\text{-}1}$, our main measure of salience, is calculated as $(actual-forecast)/price_{\tau-3}$. In this estimation, *actual* is the value-weighted average earnings surprises of firms in the target's 1-digit SIC that announce earnings the day before the acquisition announcement and *forecast* is the median analyst forecast within the $[\tau-15, \tau-2]$ window of the earnings announcement, where τ is the earnings announcement date. Definitions of other variables are in the Appendix.

Panel A: Distribution of M&A by industry and by year

	Agricul-ture	Mining	Construc-tion	Manufac-turing	Transportation, Utilities	Wholesale	Retailing	Services	Public administration.	Total	Pct
1989	1	9	0	77	28	3	3	22	0	143	1.36
1990	1	7	0	67	11	4	12	26	0	128	1.22
1991	2	16	1	63	21	5	4	33	0	145	1.38
1992	2	14	2	75	9	8	8	45	0	163	1.55
1993	1	17	3	114	35	4	14	59	0	247	2.35
1994	1	26	5	141	44	17	16	69	0	319	3.03
1995	0	20	4	186	58	23	23	103	0	417	3.96
1996	3	35	2	247	64	26	32	140	0	549	5.22
1997	4	46	5	294	79	44	24	146	0	642	6.10
1998	6	41	10	300	75	36	38	214	0	720	6.85
1999	1	19	5	311	111	18	41	169	0	675	6.42
2000	2	24	4	338	75	8	19	134	0	604	5.74
2001	1	19	9	221	59	8	13	120	0	450	4.28
2002	1	23	9	189	46	11	26	136	0	441	4.19
2003	1	31	4	207	45	6	17	117	0	428	4.07
2004	2	37	1	249	50	10	12	144	0	505	4.80
2005	5	34	2	234	55	16	14	145	0	505	4.80
2006	1	34	3	245	53	17	19	149	0	521	4.95
2007	1	35	5	220	48	16	19	152	0	496	4.72
2008	0	38	3	148	41	15	13	116	0	374	3.56
2009	2	22	7	137	26	2	4	58	0	258	2.45
2010	1	32	6	152	35	13	3	86	0	328	3.12
2011	0	20	7	174	44	10	8	76	1	340	3.23
2012	1	22	4	175	40	10	15	85	0	352	3.35
2013	3	30	6	154	56	15	9	83	0	356	3.38
2014	4	33	4	174	70	14	16	97	0	412	3.92
Total	47	684	111	4,892	1,278	359	422	2,724	1	10,518	100
Pct	0.45	6.50	1.06	46.51	12.15	3.41	4.01	25.90	0.01	100	

Panel B: Deal and bidder characteristics

	N	Mean	S.D.	p25	p50	p75
CAR[-1,1]	10,518	0.01174	0.0885	-0.02132	0.00606	0.03953
Relative size	10,518	0.24528	0.7226	0.02466	0.07777	0.22602
Hostile	10,518	0.00751	0.0863	0	0	0
All cash deal	10,518	0.33267	0.4712	0	0	1
All stock deal	10,518	0.15164	0.3587	0	0	0
Cross-industry	10,518	0.48659	0.4998	0	0	1
Public target	10,518	0.19804	0.3985	0	0	0
Private target	10,518	0.44875	0.4974	0	0	1
Completed deal	10,518	0.91272	0.2823	1	1	1
Bidder size	10,518	6.75661	1.8710	5.42588	6.64555	7.94077
Bidder Q	10,518	2.47727	2.9093	1.33175	1.76782	2.61499
Panel C: Earnings surprise						
$Surprise_{t-1}$, non-zero	4,330	0.00003	0.0095	-0.00013	0.00031	0.00123
$Surprise_{t-1}$	10,518	0.00001	0.0061	0	0	0.00009

Table 2. Salience and acquisition return

OLS regressions of bidders' cumulative abnormal returns (CAR), using the sample of M&A deals described in Table 1. Steps for the calculation of our measure of salience, $Surprise_{t-1}$, appear in the legend to Table 1. Columns 1, 2, 5 and 6 include all sample firms. Columns 3 and 4 include observations $Surprise_{t-1}$ is not equal to zero. Columns 7 and 8 exclude observations in which the bidder's stock return has the same sign as $Surprise_{t-1}$ at t–1. Definitions for all variables are in the Appendix. Announcement year-month and industry dummies are included in all regressions. Standard errors, which are reported in parentheses, are double-clustered by deal year-month and by industry. We use ***, **, and * to indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR [-1,1]				**CAR[0,1]**			
	All sample		$Surprise_{t-1}$ is not equal to zero		All sample		Exclude observations where $Surprise_{t-1}$ has the same sign as the Bidder's return at t–1	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.3290***	0.3369***	0.3787***	0.3752***	0.2379***	0.2426**	0.2260**	0.2126**
	(0.114)	(0.118)	(0.125)	(0.114)	(0.089)	(0.095)	(0.105)	(0.106)
Relative size		0.0083***		0.0118***		0.0067***		0.0060***
		(0.002)		(0.003)		(0.001)		(0.001)
Unsolicited		-0.0127**		-0.0051		-0.0109		-0.0056
		(0.006)		(0.010)		(0.008)		(0.011)
Hostile		-0.0051		-0.0098		-0.0023		-0.0028
		(0.009)		(0.011)		(0.008)		(0.009)
Toehold		0.0001		-0.0003		0.0001		0.0001
		(0.000)		(0.000)		(0.000)		(0.000)
All cash		0.0061***		0.0077***		0.0046***		0.0040**
		(0.002)		(0.002)		(0.002)		(0.002)
All stock		-0.0042		-0.0035		-0.0058***		-0.0050**
		(0.003)		(0.005)		(0.002)		(0.002)
Cross-industry		-0.0022		-0.0032		-0.0027		-0.0030
		(0.002)		(0.003)		(0.002)		(0.003)
Private target		0.0204***		0.0199***		0.0200***		0.0205***
		(0.002)		(0.004)		(0.002)		(0.003)
Subsidiary		0.0229***		0.0187***		0.0223***		0.0236***
		(0.003)		(0.004)		(0.003)		(0.003)
Bidder runup		0.0026**		0.0013		0.0013***		0.0015*
		(0.001)		(0.002)		(0.000)		(0.001)
Bidder size		-0.0039***		-0.0038***		-0.0032***		-0.0031***
		(0.001)		(0.001)		(0.000)		(0.001)
Bidder Q		0.0001		0.0000		0.0000		-0.0001
		(0.000)		(0.001)		(0.000)		(0.000)
Bidder leverage		0.0147***		0.0096		0.0132**		0.0124**
		(0.006)		(0.015)		(0.006)		(0.005)
Profitability		-0.0005***		-0.0004***		-0.0004***		-0.0004***
		(0.000)		(0.000)		(0.000)		(0.000)
Cash holding		-0.0118***		-0.0198**		-0.0041		0.0005
		(0.004)		(0.010)		(0.004)		(0.007)
Stock volatility		-0.0357		-0.2121*		-0.0392		-0.0223
		(0.065)		(0.117)		(0.062)		(0.082)
Constant	0.0013	0.0041	0.1751***	0.1778***	0.0015	0.0032	0.0076	0.0089
	(0.010)	(0.014)	(0.010)	(0.024)	(0.009)	(0.013)	(0.010)	(0.015)
Observations	10,518	10,518	4,330	4,330	10,518	10,518	8,430	8,430
R^2	0.104	0.140	0.193	0.221	0.103	0.138	0.118	0.152
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 3. Do earnings surprises convey information to industry peers or to other M&A firms?

Panel A reports OLS regressions of bidder/target peer firms' stock response to earnings surprises by firms in the target's 1-digit SIC. Industry peers are identified using all CRSP firms in the same 4-digit SIC as the actual bidder (or target). The real bidder and target, as well as peer firms that announce earnings within the event window are excluded. Panel B reports actual bidder/target firms' stock reaction to earnings surprises by firms unrelated to either the bidder or the target's 1-digit SIC. Abnormal returns (AR) are calculated with the market model where the market returns are proxied by the value-weighted CRSP index. Market model parameters are estimated over a 200-day non-missing-value window ending 31 days before the acquisition announcement date. $Surprise_{t\text{-}1}$ measures the value-weighted average earnings surprise released one day before the acquisition announcement. The earnings surprise is measured as $(actual - forecast)/price_{\tau-3}$. The details for this calculation appear in the legend to Table 1. Announcement year-month and industry dummies are included in all regressions. Reported in parentheses are standard errors which are double-clustered by deal year-month and by industry. The symbols ***, *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Industry peers' reactions to earnings surprises

	Bidder Peer				**Target Peer**			
	CAR[-1,1]	AR[-1]	AR[0]	AR[1]	CAR[-1,1]	AR[-1]	AR[0]	AR[1]
	1	2	3	4	5	6	7	8
$Surprise_{t\text{-}1}$	0.0090	-0.0012	0.0110	-0.0008	0.0257	0.0131	0.0263	-0.0136
	(0.065)	(0.024)	(0.038)	(0.018)	(0.024)	(0.019)	(0.025)	(0.010)
Observations	153,202	153,202	153,202	153,202	157,260	157,260	157,260	157,260
R^2	0.014	0.009	0.009	0.009	0.014	0.009	0.009	0.009
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Unrelated M&A firms' reactions to earnings surprises

	Unrelated Bidders				**Unrelated Targets**			
	CAR[-1,1]	AR[-1]	AR[0]	AR[1]	CAR[-1,1]	AR[-1]	AR[0]	AR[1]
	1	2	3	4	5	6	7	8
$Surprise_{t\text{-}1}$	-0.0533	-0.0386	0.0593	-0.0535	0.0527	0.0270	-1.2488	1.0688
	(0.083)	(0.031)	(0.055)	(0.047)	(0.965)	(0.252)	(1.093)	(0.847)
Observations	10,518	10,518	10,518	10,518	1,879	1,879	1,879	1,879
R^2	0.042	0.029	0.041	0.032	0.231	0.185	0.219	0.190
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 4. Overreaction to salience and subsequent price correction

OLS regressions of bidders' cumulative abnormal returns (CAR). In Panel A, we use the full sample of acquisitions as reported in Table 1. In Panel B, we exclude 305 observations in which the bidder, target, and/or earnings release firms have potentially confounding news over the [2,7] window. In Panel C, we further exclude observations for which $Surprise_{t-1}$ equals zero. Panel D further excludes withdrawn transactions. In Panel E, we use a subsample of acquisitions covered by the Wall Street Journal with non-zero surprise on *t*-1. In Panel F, $Surprise_{t-1}$ is calculated for a subsample of earnings firms that operate in a single 1-digit SIC, identified with Compustat Historical Segment files. Panel G excludes stock reactions at *t*–1. Panel H tests M&A bidders' reactions to earnings surprises from firms in the same 4-digit SIC as their targets, using a subsample of 550 M&As where we can match $Surprise_{t-1}$ firms to the actual targets at the 4-digit SIC level. Except for Panel G, the dependent variable is the CAR over [-1,1] in columns 1 and 2, over [2,7] in columns 3 and 4, and over [-1,7] in columns 5 and 6. In Panel G, the dependent variable is the CAR over [0,1] in columns 1 and 2, over [2,7] in columns 3 and 4, and over [0,7] in columns 5 and 6. In The calculation for these abnormal returns appears in the legend to Table 2. Table 1 details the estimation of our measure of salience, $Surprise_{t-1}$. Definitions of all variables are in the Appendix. Announcement year (-month) and industry dummies are included in all regressions. We double-cluster the standard errors by deal year (-month) and by industry and report them in parentheses. The symbols ***, *, and * show statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Full sample						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.3290***	0.3369***	-0.1957**	-0.1996**	0.0808	0.0835
	(0.114)	(0.118)	(0.090)	(0.084)	(0.145)	(0.140)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,518	10,518
R^2	0.104	0.140	0.085	0.089	0.094	0.115
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Panel B: Excluding observations potentially confounding news over [2,7]						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.3282***	0.3351***	-0.1670*	-0.1694**	0.1089	0.1119
	(0.122)	(0.127)	(0.090)	(0.084)	(0.147)	(0.143)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	10,213	10,213	10,213	10,213	10,213	10,213
R^2	0.105	0.142	0.088	0.092	0.095	0.116
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Panel C: Excluding observations with zero-surprise and confounding news over [2,7]						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.3395***	0.3326***	-0.2427*	-0.2264*	0.0768	0.0927
	(0.118)	(0.115)	(0.133)	(0.126)	(0.205)	(0.200)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	4,145	4,145	4,145	4,145	4,145	4,145
R^2	0.201	0.227	0.194	0.202	0.195	0.206
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel D: Further excluding withdrawn transactions						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
Surprise$_{t-1}$	0.3455***	0.3338***	-0.2902*	-0.2809*	0.0424	0.0445
	(0.128)	(0.117)	(0.152)	(0.144)	(0.219)	(0.204)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	3,775	3,775	3,775	3,775	3,775	3,775
R^2	0.205	0.225	0.206	0.212	0.196	0.208
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Panel E: Subsample of M&As covered by *The Wall Street Journal* with non-zero surprise						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
Surprise$_{t-1}$	0.8785***	0.6271***	-0.7832*	-0.8621**	-0.0560	-0.3044
	(0.319)	(0.076)	(0.428)	(0.403)	(0.560)	(0.515)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	431	431	431	431	431	431
R^2	0.208	0.247	0.175	0.197	0.191	0.226
Year FE	YES	YES	YES	YES	YES	YES
Industry (SIC-2) FE	YES	YES	YES	YES	YES	YES
Panel F: Single-segment firms' earnings surprise						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
Surprise$_{t-1}$	0.4161***	0.3616**	-0.4955*	-0.4758*	-0.0954	-0.1343
	(0.152)	(0.164)	(0.294)	(0.285)	(0.285)	(0.296)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,518	10,518
R^2	0.103	0.140	0.085	0.089	0.094	0.115
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Panel G: Alternative announcement window						
	CAR[0,1]		**CAR[2,7]**		**CAR[0,7]**	
	1	2	3	4	5	6
Surprise$_{t-1}$	0.2379***	0.2426**	-0.1957**	-0.1996**	0.0014	0.0019
	(0.089)	(0.095)	(0.090)	(0.084)	(0.124)	(0.119)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,518	10,518
R^2	0.103	0.138	0.085	0.089	0.092	0.111
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Panel H: 4-digit SIC matched earnings surprise						
	CAR[-1,1]		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6
4-digit SIC *Surprise*$_{t-1}$	0.6983***	0.6139***	-0.0492	-0.1293	0.4948*	0.2985***
	(0.198)	(0.164)	(0.301)	(0.224)	(0.290)	(0.061)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	550	550	550	550	550	550
R^2	0.277	0.319	0.257	0.305	0.279	0.336
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Table 5. Salience and acquisition returns: Additional evidence

OLS regressions of bidders' (cumulative) abnormal returns (CAR or AR), using the sample of acquisitions described in Table 1. The dependent variable in columns 1 through 5 is CAR [-1,1] whereas in column 6 it is AR[0]. The calculation for these abnormal returns appears in the legend to Table 2. In columns 1 to 3, *Surprise* is the value-weighted average earnings surprise of firms in the target's industry that announce earnings from four days before until three days after the acquisition announcement. In column 4, the values for $Surprise_{t-1}$ for Monday M&A announcements are adjusted with the prior Friday's earnings surprise. In column 5, we exclude M&A deals occurring before January 1995. In column 6, AM *Surprise* is the value-weighted industry surprise for earnings announced before 9:30AM on the same day as the acquisition announcement, and PM *Surprise* is the industry surprise measure for earnings announced after 4:00PM. These earnings surprise variables are otherwise calculated with the steps outlined in Table 1. Definitions for all variables are in the Appendix. All regressions include announcement year-month and industry dummies. Standard errors, double-clustered by deal year-month and by industry, appear in parentheses. We use the symbols ***, **, and * to denote statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR[-1,1]					**AR[0]**
	Lead and Lag Surprises			Adjust for Monday M&A Anmt.	Subsample since 1995	Same-day Surprise
	1	2	3	4	5	6
$Surprise_{t-4}$	0.0461		0.0481			
	(0.092)		(0.091)			
$Surprise_{t-3}$	0.1820		0.1822			
	(0.134)		(0.134)			
$Surprise_{t-2}$	-0.0857		-0.0861			
	(0.115)		(0.115)			
$Surprise_{t-1}$	0.3374***	0.3341***	0.3345***	0.2967***	0.3223***	
	(0.118)	(0.120)	(0.119)	(0.072)	(0.118)	
$Surprise_{t+1}$		0.0572	0.0572			
		(0.136)	(0.135)			
$Surprise_{t+2}$		0.0190	0.0194			
		(0.099)	(0.098)			
$Surprise_{t+3}$		0.0844	0.0861			
		(0.066)	(0.067)			
Same-day AM *Surprise*						0.2653**
						(0.119)
Same-day PM *Surprise*						0.1293
						(0.113)
Controls as in Table 2	YES	YES	YES	YES	YES	YES
Observations	10,518	10,518	10,518	10,518	9,373	10,518
R^2	0.141	0.140	0.141	0.140	0.139	0.129
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Table 6. Alternative hypothesis: Strategic timing of M&A announcements

Panel A tests whether the positive relationship between today's M&A abnormal return and the previous day's measure of salience (*Surprise*$_{t-1}$) is driven by endogenous strategic timing of M&A announcements. The panel reports probit regressions for which the dependent variable is set to one whenever an M&A deal announced at *t*, involves a target in the same 1-digit industry as firms reporting earnings at *t*-1. To aid with the interpretation of our estimates, we report marginal effects. Columns 1 and 2 include all earnings surprises; columns 3 and 4 include only positive earnings surprises. All regressions includes weekday dummies, and regression (2) and (4) also adds year-month, and industry dummies. Panel B tests the bidder's stock reactions to non-zero earnings surprises by firms in the target's 1-digit SIC, separated by surprises in the top and bottom surprise terciles. *Chow* tests indicate the difference of coefficient estimates of *Surprise*$_{t-1}$ in the top and bottom tercile. Standard errors are double-clustered by year-month and by industry, and reported in parentheses. We use ***, **, and * to indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Are same-industry M&As announced following earnings surprise?

	All sample		Positive surprises	
	1	2	3	4
Surprise$_{t-1}$	0.4844	0.0665	-1.5117	0.2718
	(0.310)	(0.254)	(0.908)	(0.893)
Observations	25,685	25,668	16,579	16,462
Pseudo R^2	0.014	0.132	0.014	0.131
Weekday FE	YES	YES	YES	YES
Year-month FE	NO	YES	NO	YES
Industry FE	NO	YES	NO	YES

Panel B: Salience in the top and bottom terciles of earnings surprise

	CAR[-1,1]			**CAR[2,7]**			**CAR[-1,7]**		
	1	2	*Chow*	3	4	*Chow*	5	6	*Chow*
	Bottom	Top	*(p-val)*	Bottom	Top	*(p-val)*	Bottom	Top	*(p-val)*
Surprise$_{t-1}$	0.3040**	0.2783*	0.08	-0.2127**	-0.4063*	0.25	0.0261	-0.1886	0.28
	(0.154)	(0.151)	(0.77)	(0.107)	(0.210)	(0.62)	(0.119)	(0.280)	(0.60)
Controls as in Table 2	YES	YES		YES	YES		YES	YES	
Observations	1,443	1,445		1,443	1,445		1,443	1,445	
R^2	0.092	0.126		0.083	0.082		0.079	0.090	
Year FE	YES	YES		YES	YES		YES	YES	
Industry (SIC-2) FE	YES	YES		YES	YES		YES	YES	

Table 7. Robustness tests

OLS regressions of bidders' reaction to the M&A announcement. Except for Panel B, the dependent variable in the regressions reported in all the other panels is the bidder's CAR [-1,1]. In Panel A, we use alternative measures of $Surprise_{t-1}$. In columns 1 and 2, the average industry earnings surprise is calculated with equal weights, using analysts' forecast earnings. In columns 3 through 6, earnings surprises are calculated as the stock returns to the firms releasing earnings on $t-1$, value-weighted by their market capitalization four days prior to the earnings announcement (columns 3 and 4) or equally weighted (columns 5 and 6). In columns 7 through 10, earnings surprises are calculated using analysts' forecast earnings for only those firms coded as industry leaders. Panel B uses alternative measures of M&A performance for the bidder's firm. In columns 1 and 2 we calculate CARs with the Carhart (1997) four-factor model. In columns 3 and 4 we calculate CARs with the market model adjusted for 1-digit SIC industry returns. In columns 5 and 6 we measure the return response with buy-and-hold abnormal returns (BHARs). Columns 7 and 8 measure the return with the unadjusted cumulative total return. Columns 9 and 10 measure M&A performance using the mean three-year postmerger return-on-asset (ROA) adjusted by the industry value-weighted ROA. Panel C controls for unobserved industry heterogeneity with various multiplicative industry fixed effects. Columns 1 and 2 include bidder-target industry (2-digit SIC code) fixed effects and year-month fixed effects. Columns 3 and 4 include bidder industry-year fixed effects and target industry-year fixed effects. In Panel D, columns 1 and 2 control for the actual target's most recent earnings surprise calculated with equation (1). Columns 3 and 4 examine the subsample of non-public targets, which have no earnings surprises. Panel E adds interactions between the previous day's earnings surprises and firm characteristics. Column 1 and 2 show the interaction between $Surprise_{t-1}$ and the bidder firm's institutional ownership. Column 3 and 4 show the interaction between $Surprise_{t-1}$ and the bidder's firm size. Column 5 and 6 show the interaction between $Surprise_{t-1}$ and the number of equity analysts covering the acquirer. The even-numbered regressions add control variables as in Table 2. Detailed definitions of all variables are in the Appendix. Unless otherwise indicated, all regressions include announcement year-month and industry dummies. Our standard errors, which are in parentheses, are double-clustered by deal year-month and by industry. We use ***, **, and * to denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A. Alternative measures of surprise

	Equally-weighted $Surprise_{t-1}$		Value-weighted *Return Surprise*		Equally-weighted *Return Surprise*		Value-weighted leader $Surprise_{t-1}$		Equally-weighted leader $Surprise_{t-1}$	
	1	2	3	4	5	6	7	8	9	10
$Surprise_{t-1}$	0.1369**	0.1410**	0.0509**	0.0569**	0.0547*	0.0640**	0.9488**	0.8374**	0.9396*	0.9192**
	(0.064)	(0.065)	(0.025)	(0.023)	(0.029)	(0.028)	(0.409)	(0.372)	(0.486)	(0.434)
Controls as in Table 2	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,518	10,518	10,518	10,518	10,518	10,518
R^2	0.103	0.140	0.104	0.141	0.104	0.141	0.103	0.140	0.103	0.140
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B. Alternative measures of M&A performance

	Four-factor adj. CAR[-1,1]		Industry adjusted CAR[-1,1]		Buy-and-Hold AR		Cumulative Total Return		Industry adjusted ROA	
	1	2	3	4	5	6	7	8	9	10
$Surprise_{t-1}$	0.3458***	0.3462***	0.2988**	0.2972**	0.3245***	0.3316***	0.3573**	0.3634**	-0.1263	-0.1381
	(0.101)	(0.099)	(0.138)	(0.137)	(0.111)	(0.114)	(0.141)	(0.144)	(0.165)	(0.118)
Controls as in Table 2	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,518	10,518	10,518	10,518	8,007	8,007
R^2	0.100	0.135	0.104	0.140	0.105	0.141	0.115	0.148	0.190	0.363
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel C. Controls for unobserved heterogeneity

	1	2	3	4
$Surprise_{t-1}$	0.3024***	0.2958***	0.2576**	0.2559**
	(0.106)	(0.105)	(0.122)	(0.118)
Controls as in Table 2	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518
R^2	0.113	0.151	0.200	0.234
Bidder-Target Ind. FE	YES	YES	-	-
Bidder ind. × Year FE	-	-	YES	YES
Target ind. × Year FE	-	-	YES	YES
Year-month FE	YES	YES	NO	NO

Panel D. Target earnings surprises and non-public targets

	All sample		Subsample of non-public targets	
	1	2	3	4
$Surprise_{t-1}$	0.3291***	0.3369***	0.2987***	0.2959**
	(0.114)	(0.119)	(0.105)	(0.117)
Target surprise	0.0507	0.0276	-	-
	(0.178)	(0.184)	-	-
Controls as in Table 2	NO	YES	NO	YES
Observations	10,518	10,518	8,435	8,435
R^2	0.104	0.140	0.116	0.150
Year-month FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel E. Interaction effects of bidder characteristics

	Institutional ownership		Firm size		Analyst coverage	
	1	2	3	4	5	6
β_1 $Surprise_{t-1}$*Above median	-0.7982***	-0.7397***	-0.5311**	-0.4509*	-0.4511*	-0.4320*
indicator	(0.139)	(0.144)	(0.255)	(0.269)	(0.241)	(0.258)
β_2 $Surprise_{t-1}$	0.6565***	0.6373***	0.5739***	0.5490***	0.5698***	0.5696***
	(0.138)	(0.148)	(0.199)	(0.202)	(0.193)	(0.204)
β_3 Above median indicator	-0.0057***	-0.0013	-0.0134***	-0.0020	-0.0115***	-0.0021
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Joint significance test:	0.2574**	0.2674**	0.3083***	0.3235***	0.3442***	0.3536***
$\partial f()/\partial Surprise_{t-1}$: β_1*0.5 + β_2	(0.103)	(0.106)	(0.101)	(0.101)	(0.110)	(0.112)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	10,479	10,479	10,518	10,518	10,518	10,518
R^2	0.105	0.140	0.111	0.141	0.109	0.141
Year-month FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Table 8. Alternative surprise measure: Pure salience

In Panels A, B, and C of this table, we respectively evaluate the baseline results of over-extrapolation (Table 2), information transmission (Table 3), and price reversal (Table 4), with a *Pure Salience*$_{t-1}$ measure of earnings surprises. *Pure Salience*$_{t-1}$ flags cases where the earnings surprises can be matched to the target's 2-digit (or higher) SIC. In these cases, *Pure Salience*$_{t-1}$ is set to zero. Full definitions for all variables are in the Appendix. Standard errors, which we double-cluster by deal year-month and by industry, appear in parentheses. The symbols ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A. Salience effects and M&A announcements

	All sample		Non-missing *Surprise*$_{t-1}$ subsample		Control for industry heterogeneity	
	1	2	3	4	5	6
Pure Salience$_{t-1}$	0.4024***	0.3996***	0.4508***	0.4275***	0.3777***	0.3170**
	(0.135)	(0.138)	(0.130)	(0.122)	(0.130)	(0.145)
Controls as in Table 2	NO	YES	NO	YES	NO	NO
Observations	10,518	10,518	3,568	3,568	10,518	10,518
R^2	0.104	0.141	0.228	0.257	0.114	0.200
Year-month FE	YES	YES	YES	YES	YES	-
Industry FE	YES	YES	YES	YES	-	-
Bidder-Target Ind. FE	-	-	-	-	YES	-
Bidder ind. × Year FE	-	-	-	-	-	YES
Target ind. × Year FE	-	-	-	-	-	YES

Panel B. Tests for information transmission

	Bidder Peer				**Target Peer**			
	CAR[-1,1]	AR[-1]	AR[0]	AR[1]	CAR[-1,1]	AR[-1]	AR[0]	AR[1]
	1	2	3	4	5	6	7	8
Pure Salience$_{t-1}$	0.0156	0.0007	0.0113	0.0036	0.0341	0.0241	0.0089	0.0010
	(0.044)	(0.021)	(0.025)	(0.019)	(0.025)	(0.024)	(0.009)	(0.014)
Observations	115,966	115,966	115,966	115,966	114,644	114,644	114,644	114,644
R^2	0.017	0.011	0.011	0.011	0.016	0.012	0.013	0.011
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel C. Price correction and reversal

	Full sample				Exclude cases with confounding news over [2,7]			
	CAR[2,7]		**CAR[-1,7]**		**CAR[2,7]**		**CAR[-1,7]**	
	1	2	3	4	5	6	7	8
Pure Salience$_{t-1}$	-0.2259***	-0.2290***	0.1283	0.1200	-0.1949***	-0.1963***	0.1588	0.1516
	(0.071)	(0.065)	(0.149)	(0.145)	(0.070)	(0.063)	(0.151)	(0.146)
Controls as in Table 2	NO	YES	NO	YES	NO	YES	NO	YES
Observations	10,518	10,518	10,518	10,518	10,213	10,213	10,213	10,213
R^2	0.085	0.089	0.094	0.115	0.088	0.092	0.095	0.116
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES

Appendix.

Variable Definition

Panel A: M&A related variables	
CAR [-1,+1]	Bidder's three-day cumulative abnormal return around announcement date calculated using the one-factor market model. The market model parameters are estimated over the (-230, -31) trading days prior to the announcement date with value-weighted CRSP market index. (Source: CRSP)
CAR [-1,+1], four-factor adjusted	Bidder's three-day cumulative abnormal return around announcement date calculated using the Carhart (1997) 4-factor model. The market parameters are estimated over the (-230, -31) trading days prior to the announcement date with value-weighted CRSP market index. (Source: CRSP, Kenneth R. French Library)
Buy-and-hold abnormal return	The difference between the realized buy-and-hold returns over the three-day announcement window and the expected return over the same window. The expected return is calculated using the one-factor market model. (Source: CRSP)
Relative size	Deal value reported by SDC scaled by the bidder's market value of equity four days prior to the announcement. (Source: SDC, CRSP)
Unsolicited	Dummy variable equals 1 if the transaction is classified as unsolicited in the SDC, 0 otherwise. (Source: SDC)
Hostile	Dummy variable equals 1 if the transaction is classified as hostile in the SDC, 0 otherwise. (Source: SDC)
Toehold	Bidder's ownership in the target prior to the merger announcement. (Source: SDC)
All cash deal	Dummy variable equals 1 for purely cash-financed transactions, 0 otherwise. (Source: SDC)
All stock deal	Dummy variable equals 1 for purely equity-financed transactions, 0 otherwise. (Source: SDC)
Cross-industry deal	Dummy variable equals 1 if the acquirer and the target are not in the same 3-digit SIC industry, 0 otherwise. (Source: SDC)
Private target	Dummy variable equals 1 if the target is private, 0 otherwise. (Source: SDC)
Subsidiary target	Dummy variable equals 1 if the target is a subsidiary, 0 otherwise. (Source: SDC)
Bidder runup	Bidder's buy-and-hold return during the [-230,-30] window minus the CRSP value-weighted market buy-and-hold return over the same period. (Source: CRSP)
Panel B: earnings surprise variables	
$Surprise_{t-1}$	Industry earnings surprise one day prior to the M&A announcement, calculated as value-weighted (VW) or equally-weighted (EW) earnings surprises of firms in the target's industry that release quarterly earnings one day before the acquisition announcement. The earnings surprise is measured as $(actual - forecast)/price_{\tau-3}$, where *forecast* is the median analyst forecast within the $[\tau - 15, \tau - 2]$ window of the earnings announcement, where τ is the earnings announcement date. (Source: I/B/E/S, CRSP)

Return surprise$_{t-1}$	The value-weighted (VW) or equally-weighted (EW) stock return response to earnings releases by firms in the target industry one day prior to the M&A announcement. (Source: CRSP)
	Panel C: firm-level variables
Bidder size	The logarithm of book value of total assets. (Source: Compustat)
Bidder Q	Market value of assets (book value of assets minus book value of equity plus market value of equity) over book value of assets. (Source: CRSP, Compustat)
Bidder leverage	Book value of debts over market value of total assets. (Source: CRSP, Compustat)
Bidder profitability	Operating profits before depreciation, interests and tax scaled by total sales. (Source: Compustat)
Cash holding	Cash or cash equivalent scaled by the book value of total assets. (Source: Compustat)
Return volatility	Stock price volatility calculated over (-230, -30) trading days before the M&A announcement. (Source: CRSP)
Institutional ownership	Percent of shares owned by institutional investors. (Source: Thomson-Reuters Institutional Holdings Database)
Analyst coverage	Number of analysts in the quarter of the M&A announcement. (Source: I/B/E/S)
Industry adjusted ROA	The operating gain to mergers, calculated as the mean industry-adjusted return-on-asset over the three-year postmerger period as in Harford et al. (2012) (Source: Compustat)
Industry leader	Companies with a market capitalization in the top 25th percentile of all NYSE firms in the same 4-digit SIC in a given month.