

# Assimilation Effects in Financial Markets

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## ABSTRACT

An assimilation bias occurs when people's evaluative judgement is positively influenced by a previously observed signal. We study this effect by examining investors' appraisal of M&A deals announced one day after other firms in the same 1-digit SIC as the merging parties release earnings surprises. Consistent with assimilation effects, acquirers' M&A announcement stock return initially correlates with the previous day's earnings surprises. This effect reverses after one week. Assimilation generates other distortions as more positive surprises are related to increases in bid competition, takeover premiums, and withdrawn M&As. Evidence from IPOs corroborates the presence of assimilation effects in financial markets.

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## I. Introduction

Individuals often base their judgements and decisions on assimilable or accessible information (Tversky and Kahneman, 1973, 1974). For example, people perceive the behavior of others as more hostile following exposure to narratives that remind them of hostility (Srull and Wyer, 1979). Participants heighten estimates of the likelihood of winning a lottery after viewing lucky numbers or words (Jiang, Cho, and Adaval, 2009). Assimilation—the cognitive bias that distorts individuals’ perception of an object (or event) when they compare it to something else by reducing the apparent differences between them—can lead to potentially costly evaluation errors because such a bias alters the true value of a perceived signal depending on the preceding observation.<sup>1</sup>

In this paper, we study assimilation effects in financial markets. Figure 1 illustrates our experimental setup. We identify earnings surprises released the day before an M&A announcement in which both the target and the acquirer companies operate in the same 1-digit Standard Industry Classification (SIC) as the earnings-releasing firms. We then assess whether the stock price reaction to the M&A announcement depends on the earnings surprise released the previous day.

Our empirical design provides a plausible environment to test for assimilation effects. Academic work indicates that investors and acquirers pay close attention to same-industry earnings around M&A announcements because earnings belong to a category of information that could be relevant for the assessment of a deal’s value. Additionally, the financial press frequently combines earnings and M&A news.<sup>2</sup> Consequently, due to the salience of both earnings and M&A news, investors’ perception of M&A deals might be affected by the earnings released shortly before the

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<sup>1</sup> See Janiszewski and Wyer (2014) for a review of assimilation effects in the psychology literature.

<sup>2</sup> See, for example, Shalev (2007), Garvey, Milbourn, and Xie (2013), Dasgupta, Harford and Ma (2020), and Gaspar, Lescourret, and Wang (2020). As an example of press article combining earnings and M&A news, a *Wall Street Journal* article reports that [M&A] “deal talks and earnings results sparked sharp moves in individual stocks” (<https://www.wsj.com/articles/stocks-steady-as-dollar-strengthens-1477035628>). Appendix A presents excerpts from the *Financial Times* and *Wall Street Journal* in which M&A and earnings news are reported together.

merger announcement. From a research perspective, the magnitude of earnings surprises can be precisely quantified (unlike other events such as bankruptcies), and the M&A data are generally available. Combined, these features enable us to study the presence and real effects of assimilation in financial markets.

The theory of assimilation effects predicts a *positive* relation between today's acquirer stock reaction to an M&A announcement and yesterday's earnings surprise. The intuition is that, by using assimilation-related heuristics, investors overstate the similarity between the merging firms and the earnings-announcing firms. Under this view, a better-than-expected earnings surprise by a firm in a given industry makes the prospects of an M&A in that industry more favorable, triggering a more positive reaction to the M&A deal than would have occurred if yesterday's earnings were disappointing.

It is important to distinguish between assimilation and contrast effects, which are regarded as the main types of context-based cognition bias that arise when comparisons with background information affect judgment. Unlike assimilation bias, contrast effects predict a *negative* association between the value of the first signal (e.g., yesterday's earnings surprise) and the subsequent judgement (e.g., value of an M&A deal). Bless and Burger (2016) and Förster, Liberman, and Kushel (2008) argue that assimilation effects are induced by a *global* (information) processing style whereby people form a relatively *abstract* representation. Those authors also argue that contrast effects are induced by a *local* processing style whereby people form a *concrete* representation. Notably, in a similar experimental setup, Hartzmark and Shue (2018) find a negative association between investors' reaction to today's earnings surprise and yesterday's earnings surprise. Their findings are consistent with contrast effects because yesterday's earnings provide a concrete benchmark to evaluate today's earnings surprise. In our context, assimilation

effects, rather than contrast effects, are more likely to arise because earnings announcements do not provide a concrete benchmark against which an M&A deal can be directly judged.<sup>3</sup>

Our baseline test shows that the bidders' two-day cumulative abnormal return (CAR) upon the M&A announcement is positively related to earnings surprises released during the previous day by 1-digit SIC linked firms. Regression analyses reveal that such association is statistically significant. On average, a one standard deviation increase in the earnings surprise is associated with a 32 basis-point increase in the bidder's CAR during the 2-day M&A announcement period. This effect is economically important since the bidders' median CAR upon the M&A announcement in our sample is 0.6%. In an analogous experimental setup that examines contrast effects, Hartzmark and Shue (2018) find that investors perceive earnings news today less impressively if yesterday's earnings surprise was good. According to their results, increasing yesterday's ( $t-1$ ) surprise by one standard deviation is associated with a 16 basis-point decrease in returns from  $t-1$  to  $t+1$ . Therefore, in terms of both magnitude and economic importance, our results compare favorably to those in Hartzmark and Shue (2018).

It is possible that investors rationally factor the earnings news in their appraisal of the acquirer firm because it transmits value-relevant new information. Under this conjecture, the earnings news should be permanently priced. It is also possible that, due to assimilation effects, investors' perception about the M&A deal is distorted by the salient, albeit irrelevant, earnings surprise.

To differentiate the *information transmission* hypothesis from the *assimilation effects* alternative, we study bidder returns during the week after the M&A announcement. During this

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<sup>3</sup> As another example, Bless and Schwartz (2010) discuss an experiment on the perceived trustworthiness of politicians that primes some subjects with information on scandal-ridden politicians (e.g., Richard Nixon). When subsequently evaluating politicians' trustworthiness *in general*, the primed subjects rated politicians as less trustworthy—an assimilation effect. However, when rating the trustworthiness of a *specific* politician (e.g., Newt Gingrich), the primed subjects' evaluation is more favorable—a contrast effect. In another example, Bless and Schwartz (2010) discuss the case of a professor whose academic department colleague has won a Nobel prize. In this case, the Nobel laureate will enhance the *overall* perception of his department (assimilation) but hurt the perception of his *specific* peers (contrast).

longer interval, we find a strong price reversal on the bidders that respond to the earnings surprise upon the M&A announcement. Specifically, during the week that follows the M&A announcement day, the price reversal cancels out the initial abnormal response to the earnings surprises. This happens although no additional price-sensitive news involving the bidder, its target, or the earnings firms is released. This evidence is in contrast with the idea that the surprise should be permanently priced because it is relevant news. Instead, the market correction provides support for assimilation bias during M&A announcements. Notably, our market correction results are congruent with the predictions by 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. Moreover, the horizon of the post-announcement reversal we find is like that in Tetlock (2007), showing that the effects of attention-induced biases on stock returns reverse within one week.

Ancillary analyses indicate that only the *most recent* 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. Consistent with Della Vigna and Pollet (2007), these findings show that temporal distance attenuates behavioral effects.<sup>4</sup> These results also mitigate concerns of slow information diffusion through time, information leakage, and market anticipation as alternative explanations for our main results. In addition, when we divide the earnings surprise in terciles (i.e., most positive in the top tercile and most negative in the bottom tercile), we find that the bidder response is not monotonic across these groups as it is driven by the top and bottom terciles. This evidence is consistent with the argument by Hartzmark (2015) that investors pay attention to

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<sup>4</sup> Similarly, Bhargava and Fisman (2014) and Hartzmark and Shue (2018) show that contrast effects matter only from the most recent observations.

extreme (more salient) events. Importantly, we also consider—and obtain no support for—*strategic timing* of merger announcements as an alternative hypothesis to account for our findings.

We subject our baseline findings to a battery of robustness tests, including diverse specifications of our main constructs (e.g., surprise measures and M&A performance) and different econometric techniques (e.g., placebo tests and checks for unobserved heterogeneity). These analyses continue to support assimilation effects when investors evaluate merger deals in the presence of a salient earnings release.

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 CAR upon the M&A announcement is inversely related to the probability that (a) the acquirer firm is sued (Gong, Louis, and Sun, 2008), (b) the bid is withdrawn (Luo, 2005), and (c) the acquirer's CEO is fired (Lehn and Zhao, 2006).

With this literature as a backdrop, we investigate the overall scope of the assimilation bias by examining other key facets of the M&A process within our experimental design. Using the division of M&A gains proposed by Ahern (2012), we find that a one standard deviation increase in the earnings surprise is associated with a 64 basis-point decline in the *perceived* gains of the target relative to the acquirer. A similar increase in the earnings surprise is associated with a 45 basis-point increase in the probability that the deal is subject to a competing bid over the price-correction period. Other tests show that a single standard deviation increase in the earnings surprise is associated with an upward revision of 19 basis points in the final offer price, a result congruent with the increased bid competition that we document.

Our last piece of evidence on the distortions to the M&A process arising from assimilation effects comes from analyses of withdrawn transactions. Our estimates indicate that a one standard deviation increase in the earnings surprise is associated with a 56 basis-point increase in the probability of deal termination. This effect is economically meaningful when benchmarked against the 8.6% incidence of deal termination in our sample. Notably, target shareholders / board are more likely to reject the initial bid following a higher earnings surprise. When this happens, targets are more likely to be subsequently acquired by another bidder at a higher premium.

Overall, our findings suggest that assimilation effects distort some takeovers. While some effects are temporary (biased M&A announcement CARs and ensuing price correction), others are permanent (increased competition among bidders, offer revisions, and merger cancellations). Yet, be they temporary or permanent, the distortions we uncover are likely to materially affect the wealth of both target and bidder investors.

While we investigate the effect of a cognitive bias during consecutive earnings releases and merger announcements from a corporate finance perspective, we follow behavioral work by Chen, Moskowitz, and Shue (2016) and validate our experiment in a different setting: consecutive earnings releases and IPO announcements. The results of this validation, which are consistent with those from our baseline M&A analyses, deliver further support for the presence of assimilation effects in financial markets.

We find no support for different alternative information transmission hypotheses (e.g., slow information diffusion, strategic timing, portfolio rebalancing). Although rejecting all conceivable information alternatives is infeasible, any remaining option must be rather unique and convoluted as it requires all of the following ingredients: (a) relevant information from an unobserved variable is positively correlated with both earnings-releasing firm A's news and acquirer B's M&A synergies, (b) the information from that unobserved variable only has

an effect for earnings surprises released on day  $t-1$ , but not for those released on days  $t-2$  or  $t-3$ , (c) investors do not react to this information until day  $t$  although it was released on  $t-1$ , and (d) while investors do not react until day  $t$ , their late reaction is biased as it leads to a stock price reversal. Although it is not feasible to rule out this convoluted variant of the information transmission alternative, the assimilation effects, rooted on well-documented cognitive biases, provides a simpler and more sensible explanation for our empirical evidence.

The central contribution of our paper is to highlight the real effects stemming from assimilation bias that occurs during some acquisitions. In this vein, our work adds to the strand of the M&A literature on the effects of behavioral phenomena such as overconfidence (Malmendier and Tate, 2008), hubris (Rau and Vermaelen, 1998), underreaction to the passage of time (Giglio and Shue, 2014), and reference point prices (Baker, Pan, and Wurgler, 2012; Ma, Whidbee, and Zhang, 2019). We advance this literature by documenting sizeable distortions to the M&A process related to assimilation effects. In this regard, our results also deliver guidance to researchers about the need for extending the measurement interval of the M&A wealth effect. Indeed, our price reversal results imply that both the bidder M&A CAR and the division of merger gains are biased when computed in short windows around the M&A announcement day. Moreover, our findings on offer revisions, bid competition, and withdrawn deals provide an alternative, albeit nonstandard, explanation to justify some of the variation in these important M&A characteristics.

As far as we know, our study is the first to empirically document assimilation effects in financial markets in general, and during M&As and IPOs in particular. Nevertheless, our work draws from, and expands upon, related evidence in behavioral finance. Empirical papers in that area find salience effects in financial markets associated with extreme portfolio positions (Hartzmark, 2015), recent asset prices (Cosemans and Frehen, 2021), mean tax rates (Graham, Hanlon, Shevlin, and Shroff, 2017), and information display in online trading platforms (Frydman



and Wang, 2019). Other behavioral studies document the effects of extrapolation on asset prices (e.g., Greenwood and Shleifer, 2014; Hirshleifer, Li, and Yu, 2015; Barberis, Greenwood, Jin, and Shleifer, 2018). Furthermore, while our experimental design partly resembles the setting in Hartzmark and Shue (2018), we study cross-event (from earnings to M&A deals) assimilation effects whereas they examine within-event (earnings) contrast effects.<sup>5</sup> Finally, our evidence that irrelevant comparisons can distort large corporate transactions connects our work to a large theoretical literature on reference points and context-dependent choice (e.g., Kahneman and Tversky, 1979; Bordalo, Gennaioli, and Shleifer, 2020).

## **II. Data and Summary Statistics**

### *A. 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 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.<sup>6</sup> For all deals, we ensure that (1) the acquirer and the target belong to the same 1-digit SIC, (2) the transaction value is greater than US\$10 million, (3) the acquirer owns at least 50% of the target's equity after the transaction is completed, (4) the target is not undergoing bankruptcy proceedings, (5) the parties to the M&A deal are non-financial firms (i.e. first digit SIC  $\neq$  6), and

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<sup>5</sup> Importantly, as Hartzmark and Shue (2018) note, both assimilation and contrasts effects are errors in perceptions (rather than errors in expectations). A perceptual (expectations) error is a biased assessment after (before) the event transpires. Because investors evaluate the M&A *after* they observe the deal announcement, we are able to capture an error in perceptions.

<sup>6</sup> We use a selection procedure like that in Barger, Schlingemann, Stulz, and Zutter (2010), Masulis, Wang, and Xie (2007), and Erel, Liao, and Weisbach (2012). These criteria produce an initial sample of 42,682 transactions.

(6) the M&A announcement is not confounded by other news, such as same-day earnings announcements, by the bidder or the target firm.<sup>7</sup> The latter condition, which is commonplace in the M&A literature, ensures that market reactions upon acquisition announcements are not distorted by other events. The final sample includes 7,882 observations in which the bidder firms have stock market and accounting data available from CRSP and Compustat, respectively. The M&A deals we study collectively account for over US\$4.9 trillion in terms of transaction value.<sup>8</sup>

Panel A of Table 1 reports the temporal distribution of our sample and the (1-digit SIC) industrial distribution of the 7,882 M&A transactions.<sup>9</sup> The number of deals is lower during times of economic contraction that occur at the beginning of the sample period and again in 2009.<sup>10</sup> 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, Appendix B provides the definition for all variables. Our 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 43% of our transactions involve a private target and just around 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

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<sup>7</sup> Steps (2) through (5) eliminate 14,075, 119, 427, and 8,368 observations, respectively.

<sup>8</sup> 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>

<sup>9</sup> During the sample period, the industrial distribution of our bidders mirrors the industrial distribution of all public acquirers in SDC. For most industries, the percentage of our sample is quite similar (in terms of order of magnitude) to that in SDC. For example, 0.36 vs. 0.41 in Agriculture, 7.60 vs. 6.30 in Mining, 0.99 vs. 1.44 in Construction, 44.04 vs. 37.07 in Manufacturing, 12.66 vs. 12.10 in Transportation and utilities, 2.33 vs. 4.75 in Wholesale, 4.48 vs. 6.18 in Retail, 27.54 vs. 31.69 in Services.

<sup>10</sup> On March 9, 2009, the Dow Jones Industrial Average finished at 6,547.05, its lowest close over the prior 12 years.

with the 1% incidence of transaction hostility reported by Cai and Sevilir (2012). At 91.45%, 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 two-day cumulative abnormal return (CAR) accruing from the acquisition announcement day until the next 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.<sup>11</sup> 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 1.09%. This estimate compares favorably to the 0.82% two-day average M&A announcement CAR for a sample of 3,121 bidders studied by Rau (2000).

### *B. 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.

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.<sup>12</sup> 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

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<sup>11</sup> This procedure requires 200 non-missing returns during the estimation window and uses the value-weighted CRSP index to proxy for the market portfolio.

<sup>12</sup> 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 like those tabulated.

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  $\tau$ ) 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  $\tau$  is given by equation (1).

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

where *Forecast consensus* <sub>$i\tau$</sub>  equals the median analyst forecast for firm  $i$  during  $[\tau - 15, \tau - 2]$  and (stock) *Price* <sub>$i,\tau-3$</sub>  is drawn from the CRSP database.

For each M&A deal announced at  $t$ , we estimate an earnings surprise released at time  $t-1$  by any firm  $i$  belonging to the same 1-digit SIC industry as both the acquirer and target firms. 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.

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  $\tau$ . Each firm's market value 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 conforms with the view that investors pay more attention to earnings releases by larger firms. Then, all else equal, surprises from larger firms should make the prospects of firms in related industries more salient than would similar surprises from smaller firms.

Throughout the paper, the value-weighted industry earnings surprise (estimated with equation (2)) is matched with the following day's M&A announcements. 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 7,882 M&A deals, 3,255 industry earnings occur in the day before the merger announcement. 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 -0.00002. This estimate is similar to that 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.<sup>13</sup>

### **III. Baseline Empirical Analyses**

Behavioral finance studies deliver compelling evidence showing that salience distorts investors' decisions. For example, salience bias alters the choices made by mutual fund investors (Bailey, Kumar, and Ng, 2011) and by investors that buy stocks with a recent history of high earnings announcement returns (Ertan, Karolyi, Kelly, and Stoumbos, 2021). These studies provide a background as we test whether assimilation effects cause distortions to the M&A process. Our experimental design, depicted in Figure 1, consists of earnings surprises disclosed

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<sup>13</sup> Our industry surprise measure is winsorized at the 1% and the 99% levels to reduce the impact of outliers.

one day before an M&A announcement in which both the target and the acquirer operate in the same 1-digit SIC as the earnings-releasing firms. In this setting, we test whether investors rationally appraise M&A events against the alternative that cognitive biases distort their appraisals.

#### *A. Investors' Reactions to M&A Deals Announced the Day after the Release of Earnings Surprises*

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

$$CAR_{i,[t,t+1]} = \alpha + \beta Surprise_{t-1} + \eta_y + \psi_j + \varepsilon_{i,t} \quad (3)$$

where  $\psi_j$  are four-digit SIC industry fixed effects and  $\eta_y$  are year fixed effects. 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 all tests is the bidder's 2-day M&A CAR running from the merger announcement day ( $t$ ) until the next day ( $t+1$ ).

Regressions (1) and (2) analyze our entire sample of 7,882 observations while (3) and (4) analyze the subsample of 3,255 observations with non-zero earnings surprises. Models (2) and (4) expand the specification in equation (3) with a vector of deal-specific control variables like 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 coefficient in model (4), increasing the value-weighted earnings surprise by one standard deviation is associated with a 32 basis-point surge in the bidder's M&A

CAR.<sup>14</sup> Because the median bidder CAR in our sample is 0.6%, these estimates indicate that the incorporation of the earnings information into the valuation of the bidder firm is both statistically significant and economically important.<sup>15</sup>

Next, we perform a preliminary test to study whether an earnings surprise released at  $t-1$  conveys material information affecting the bidder in an M&A announced the next day. Under this possibility, 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 merger is announced at  $t$ . To perform this test, we first exclude the 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 6,333 transactions and report the results in columns (5) and (6) of Table 2. The results show that the association between  $Surprise_{t-1}$  and the bidders' M&A announcement CAR remains positive and statistically significant. 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. This finding does not endorse the idea that the earnings surprise released at  $t-1$  transmits material information affecting the bidder in a merger announced the next day.

#### *A.1. Alternative Specifications and Target Firm Response*

To further assess the information transmission channel, we estimate an untabulated regression in which the dependent variable is the bidder's  $[0,+1]$  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 sign as

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<sup>14</sup> We obtain 32 bps by multiplying the 0.355 estimate for  $Surprise_{t-1}$  by 0.009 (standard deviation of  $Surprise_{t-1}$ ).

<sup>15</sup> Some of the control variables in Table 2 yield results that are in line with existing M&A studies. For instance, like Cai and Sevilir (2012) and Masulis et al. (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. Like the findings by Fuller, Netter, and Stegemoller (2002), bidders earn higher CARs in acquisitions of private or subsidiary targets. As in Masulis et al. (2007), the estimate for the bidder's Q is not statistically significant.

$Surprise_{t-1}$ . We also exclude all transactions involving private and subsidiary targets. In a regression of the remaining 1,087 observations, the estimate for  $Surprise_{t-1}$  is 0.589,  $p$ -value = 0.036. Our surprise variable and the bidder's M&A return exhibit a *positive correlation* during  $[0,+1]$ , even when the surprise and the bidder (and/or the target) firms' returns exhibit opposite signs at  $t-1$  (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. Yet, we acknowledge that it is not ex-ante clear whether investors pay attention to deal premiums or to synergies upon the M&A announcement. We argue that salience is unlikely to affect the target's M&A announcement return, especially in cash-financed deals, because it reflects the offer premium and the probability of deal completion (Betton, Eckbo, and Thorburn (2008, p. 411)). We confirm this in untabulated regressions like those in Table 2 in which we replace the bidder's CAR with the target's CAR for deals that are all cash-financed. In those tests, estimates for  $Surprise_{t-1}$  are not statistically significant.

#### *A.2. Same 4-Digit SIC Matching*

Foster (1981) shows that earnings announcements transmit information to the other firms in the same SIC-4 industry. In our setting, Foster's results suggest that the bidder's response to the earnings surprise should be stronger when the earnings surprise firms and the merger firms belong to the same 4-digit SIC. That is what we find when we perform the analyses with the 4,007 transactions in which the merging firms and the earnings surprise firms belong to the same 4-digit



SIC code. Specifically, the magnitude of the  $Surprise_{t-1}$  estimates in columns (7) and (8) of Table 2 is roughly double the corresponding estimates in the other columns in the table.<sup>16</sup>

### *B. Overreaction and Price Reversal*

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  $t$ . Notably, the results in models (5) and (6) of Table 2 are not congruent with the idea that an earnings surprise released at  $t-1$  transmits relevant information affecting an M&A announced the next day. Yet, despite the findings in those models, we cannot conclusively assert that investors' valuations of some M&A deals are biased. The analyses in this section are therefore anchored in the predictions of behavioral theories to ascertain whether, in the context of our experiment, investors' evaluations of some M&A deals are distorted by assimilation effects.

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. In our setting, De Bondt and Thaler's arguments imply that if the bidder's price reactions upon the M&A announcement are biased by the salient earnings surprise, we should observe a reversal. Alternatively, no price correction should occur if the earnings surprises released at  $t-1$  deliver information relevant to the M&A firms.

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 1-digit SIC  $Surprise_{t-1}$ . For reference, as in the baseline tests, the dependent variable in models (1) and (2) is the bidders' CAR

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<sup>16</sup> Chow (1960) tests indicate that the  $Surprise_{t-1}$  estimates in columns (7) – (8) are statistically larger than their respective counterparts in models (1), (3), (5) and (2), (4), (6).

[0,+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 [0,+7]. Panel A of Table 3 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 earnings surprise-affected bidders give up a sizable fraction of the gains earned upon the M&A announcement during [0,+1]. Notably, the horizon of the price reversal we document compares favorably to the findings in other work. Tetlock (2007), for example, shows that attention-related stock return biases dissipate 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) of Panel A in Table 3, tracking the abnormal return during [0,+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 assimilation effects during mergers and inconsistent with the information transmission alternative.<sup>17</sup>

### *B.1. Monotonicity and Symmetry*

Hartzmark (2005) finds that investors are more likely to sell both their best and worst portfolio positions, based on return from purchase price. He argues that this phenomenon arises because individuals tend to pay attention to extreme (more salient) events. If this is also true in our experiment, the bidders' response to the earnings surprise might not be monotonic. Moreover, 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

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<sup>17</sup> In untabulated tests we add the target premium as an additional control variable in tests similar to those reported in Panel A of Table 3. Our key results remain unaltered while the estimates for the premium variable are negative and significant (as in Baker et al., 2012).

these circumstances and in our context, we would expect larger reactions to negative earnings surprises. Yet, 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 symmetrical.

The tests in Panel B of Table 3 shed light on these issues by dividing salience effects of (non-zero) earnings surprises in terciles (i.e., most positive in the top tercile and most negative in the bottom tercile). Consistent with the arguments by Hartzmark (2005), the results indicate that the bidders' response to the earnings surprises is driven by the extreme terciles (most positive and most negative surprises). In addition, in each of the three CAR windows we analyze, the response to the bottom tercile (negative) earnings surprises and the response to the top tercile (positive) earnings surprises are not statistically different.<sup>18</sup> These findings, documenting no asymmetry in responses to the top and bottom tercile surprises, also cast doubt on the possibility that bidders deliberately time merger announcements during earnings announcement season.

## *B.2. Confounding Events*

A potential concern with the price reversal results in Panel A of Table 3 is that they might be driven by the stock market anomaly described by Thomas and Zhang (2008) in their study of the timing of earnings 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 439 M&A transactions with potentially confounding events during [+2,+7]. To identify these observations, we respectively search I/B/E/S, SDC, and Lexis/Nexis for other major

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<sup>18</sup> The Chow (1960) statistics for the difference in the  $Surprise_{t-1}$  coefficient for the top vs. bottom tercile regressions for CAR[0,1], CAR [2,7] and CAR [0,7] are 0.139 ( $p$ -value = 0.55), -0.412 ( $p$ -value = 0.15), and -0.312 ( $p$ -value = 0.34), respectively.

news (e.g., executive departures, lawsuits, bid price revisions) affecting our target, bidder, or earnings-surprise firms. The regressions in Panel C, analyzing the remaining 7,429 observations, continue to show a bidder's response to the earnings surprise when the M&A is announced and a share price reversal during the ensuing trading days.

A related concern is the tendency of M&A announcements and the bidder's own earnings releases to be bundled. As shown by Gaspar et al. (2020), a nonnegligible proportion of M&A deals are announced on the same day as the bidder's earnings announcement. We note that our sample excludes M&A announcements confounded by other target or bidder news (including, for example, earnings releases, executive resignations, lawsuits, and analysts upgrades or downgrades). Nevertheless, we are sensitive to the concern that the exclusion of the bundled announcements could introduce a sample selection bias. To mitigate this concern, we run tests with a sample that includes all observations that were discarded because the bidder's own earnings are bundled with the M&A announcement. Panel D of Table 3 reports the results. According to Chow (1960) tests, the estimates of these tests are statistically similar to those in Panel A of Table 3. These findings mitigate the concern that the exclusion of bundled cases introduces a sample selection bias in our analyses.

### *B.3. Zero Surprises and Withdrawn M&As*

Aside from removing confounding observations, we perform two additional analyses to probe the robustness of the price reversal finding. In Panel E of Table 3, 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 F, 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 Panels E and F continue to show a price reversal on the bidders that respond to the earnings surprise upon the M&A announcement.

#### *B.4. Press Coverage*

Panel G of Table 3 analyzes a subsample in which (at  $t-1$ ) there is a non-zero earnings surprise and (on next day) the announced M&A deal is covered by *The Wall Street Journal*. The justification for this test is the work by Barber and Odean (2008) showing that investors tend to focus on stocks that are on the news and to largely ignore those that are not. For us, their findings imply greater effects of assimilation bias. This inference is borne in the data. In Panel G, estimates for the initial response to  $Surprise_{t-1}$  and the subsequent price reversal are larger in magnitude than those from the baseline analyses.

#### *B.5. Pure Saliience*

Throughout the paper,  $Surprise_{t-1}$  takes a non-zero value when at least one firm in the same 1-digit SIC as the M&A firms releases earnings at  $t-1$ , the day before the M&A announcement. A potential caveat with this process is that our results might be driven by cases where the earnings firms and the M&A transaction parties can be matched beyond the 1-digit SIC. We address this in Panel H of Table 3 by setting  $Surprise_{t-1}$  to zero for cases in which at least one of the earnings-releasing firms operates in the same 2-digit (or higher) SIC as the M&A firms. As a result, in the tests in Panel H, the only way to link the earnings-surprise firms and the M&A firms is through a 1-digit SIC match.<sup>19</sup> In Panel H, we label our key explanatory variable as *Pure Saliience* $_{t-1}$ . The

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<sup>19</sup> We get similar results when we remove the observations with a SIC match of 2-digits or higher (instead of setting these observations to zero as we do in Panel H of Table 3).

results in the six regressions reported in Panel H continue to document an initial response to the earnings surprise and subsequent price correction.<sup>20</sup>

In general, the results in Panels A through H of Table 3 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).<sup>21</sup> Investors misvalue the bidder firm upon the M&A announcement due to assimilation effects following salient earnings surprises. The valuation distortions, however, are short-lived as the bidder's stock experiences a price reversal.

### *B.6. Information Transmission*

In Panel I of Table 3, we evaluate the 4,007 transactions in which the merging firms and the earnings-surprise firms belong to the same 4-digit SIC code. In this subsample, we do not observe a price reversal. This result supports the information transmission hypothesis and is consistent with the findings by Foster (1981) indicating that earnings announcements convey relevant information to other firms in the same SIC-4 industry. Notably, the lack of a price reversal related to earnings-surprise firms in the same 4-digit SIC code as the M&A firms, casts doubt on the idea that our baseline results on bidders' overreaction and subsequent price reversal are due to (a) portfolio rebalancing motives by investors, or (b) representativeness heuristics whereby investors expect reversals rather than trends (as in Rabin and Vayanos, 2010).

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<sup>20</sup> We note that the coefficients for  $Surprise_{t-1}$  in columns (1) and (2) of Panel H are slightly larger than the coefficients for the same variable in columns (1) and (2) in Panel A. However, Chow tests reveal that the estimates are not statistically different at conventional levels.

<sup>21</sup> Our empirical findings also deliver some validation for theoretical work of economic choice by Bordalo et al. (2012; 2013a; 2013b; 2020). 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.

#### IV. Distortions to the M&A Process

Our baseline results show that investors misvalue the acquirer's stock in M&A deals announced shortly after an earnings surprise is released. Although we show that the misvaluation is corrected during the week following the announcement, it is possible that such error could affect the M&A firms in other ways. Indeed, existing work shows that the bidder's M&A announcement CAR is inversely related to the probability that (a) the acquirer firm faces litigation (Gong et al., 2008), (b) the bid is rescinded (Luo, 2005), and (c) the acquirer's CEO is fired (Lehn and Zhao, 2006). In this section, we build upon these studies to evaluate other potential (and more permanent) distortions to other key facets in the M&A process.

##### *A. Perceived Division of Merger Gains*

To study whether the relative share of the merger surplus that is initially captured by the targets is influenced by the earnings surprise, we use the procedure in Ahern (2012). Specifically, in Table 4 we report four OLS regressions in which the dependent variable is the target's gain relative to the acquirer's gain. To construct this variable, we first estimate the target \$CAR and the acquirer \$CAR as the 2-day cumulative abnormal return (from  $t$  until  $t+1$ ) multiplied by the market value of the firm's equity two days before the M&A announcement. Next, we compute the target's \$CAR minus the acquirer's \$CAR. We then divide this difference by the sum of the acquirer and the target market values 50 trading days before the merger announcement to obtain our relative gain dependent variable. The control variables in the even-numbered tests in Table 4 are like those in Table 2. All models include year and industry fixed effects. To conserve space, Table 4 reports only the coefficient estimates for the  $Surprise_{t-1}$  variable.

In the M&A deals preceded by greater earnings surprises, the relative gain of the target versus the acquirer is significantly lower. We obtain similar results in columns (3) and (4) where we limit

the analyses to cases with non-zero earnings surprises. The  $Surprise_{t-1}$  coefficient in Model (4) indicates that raising the earnings surprise by one standard deviation is associated with a decline of 64 basis points in the perceived relative gain of the target vs. the acquirer.<sup>22</sup> Thus, the assimilation effects cause an economically important distortion. Of course, such distortion would be reversed together with the bidders' stock price in the days following the M&A announcement.

We also find strong effects in the transactions in which both merging firms and the earnings-releasing companies operate in the same 4-digit SIC. The estimate in model (6) indicates that a single standard deviation increase in the earnings surprise is related to a 52 basis-point decrease in the relative gain of the target vs. the acquirer.

### *B. Competing Bids*

The tests in Table 4 show that, in M&A deals preceded by a higher earnings surprise, the initial perceived gain of the target vs. the acquirer is substantially lower. This finding would give the impression that bidders in those deals get a bigger “piece of the acquisition pie” for their shareholders by extracting rents from their targets. Thus, it is possible that this issue prompts other “rival” acquirers to bid for the same target. Because we document a price correction within the 7-day trading window following the deal announcement, we study bid competition that transpires within the same time period.<sup>23</sup> For this purpose, we expand the specification in Officer (2003) with  $Surprise_{t-1}$  as the key independent variable in a set of six probit models of the determinants of bid competition that occurs within the 7-day trading window after the initial M&A announcement.<sup>24</sup> These regressions appear in Table 5.

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<sup>22</sup> The calculation is as follows. We multiply the coefficient of  $Surprise_{t-1}$  in (-0.711) by 0.009 (standard deviation of  $Surprise_{t-1}$ ).

<sup>23</sup> In about 25% of the deals where we observe a rival bidder, the competing offer arrives within 7 days of the initial M&A announcement.

<sup>24</sup> Our results also obtain when we estimate linear probability (OLS) regressions instead of probit models.



The dependent variable in all the tests in Table 5 is equal to one for targets that receive a competing public takeover offer during the 7 trading days after the M&A announcement. Otherwise, the dependent variable equals zero. In Models (1) and (2), we analyze the full sample. In Models (3) and (4), we exclude observations for which  $Surprise_{t-1}$  equals zero. Regressions (5) and (6) omit observations with potentially confounding news (e.g., executive departures, lawsuits) after the M&A announcement. Models (7) and (8) analyze the subsample in which the merging firms and the earnings-releasing firms operate in the same 4-digit SIC. All tests include year and industry fixed effects and the even-numbered regressions control for the same variables used in Table 2. For brevity, Table 5 reports only the estimates for the  $Surprise_{t-1}$  variable.

The results of all tests in Table 5 show that the earnings surprise is associated with an increase in the likelihood of attracting competing bids in takeovers. Based on the estimates in Model (4), a one standard deviation increase in the earnings surprise implies a 45 basis-point increase in the probability that the target receives an offer from more than one rival bidder immediately following the merger announcement. As a result, the assimilation effects upon the M&A announcement appear to generate substantial interest in acquiring the target firm.

The evidence that competition arises immediately after the M&A announcement suggests that the post-announcement price corrections to the bidder's stock are probably less salient than the initial deal announcement returns. Moreover, the quick emergence of rival bids is also consistent with recent work showing that stakeholders use a bidder's M&A announcement return to proxy for merger performance, without making adjustments for subsequent price fluctuations.<sup>25</sup> As a result, competition might be unwarranted if it is prompted by a behaviorally biased perception that bidders in these deals do better. Recognizing whether such a perception is indeed biased might be

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<sup>25</sup> See Dutordoir, Strong, and Sun (2021).

difficult as we also observe significant competing bids in models (7) and (8) analyzing cases in which the merging and the earnings-releasing firms belong to the same 4-digit SIC code. To shed light on this issue, we use *Pure Saliency*, as defined in Section III.B.5, as the main explanatory variable in additional bid competition regressions. The results of these additional tests reveal a significantly positive relation between bid competition and “pure saliency” (see Internet Appendix Table A1). This evidence (a) indicates that rational updating from the same 4-digit SIC earnings news cannot fully explain the higher bid competition we uncover, and (b) validates the premise underlying our tests that market participants pay attention to the “relative gain.” In line with this “attention to relative gain” conjecture, in unreported tests we find that competition effects are stronger in deals fully financed with cash because the relative gain is more salient in cash transactions (i.e., no co-movement of stock-price gains as in stock deals). Moreover, we find that our results on acquirer stock price reversals do not qualitatively change if we limit the analysis to transactions that do not exhibit competing bids (see Internet Appendix Table A2). This finding mitigates the concern that increased competition drives our price reversal findings.

### *C. Offer Revisions*

Given that assimilation bias promotes bid competition in some M&A transactions, we next study whether the initial bidders in these deals are more likely to revise their offers upwards. The eight probit regressions in Panel A of Table 6 use a (0,1) indicator for upward bid revision as the dependent variable and  $Surprise_{t-1}$  as the key explanatory variable. Similarly, Panel B reports OLS regressions that use the percentage difference between the initial and final bid premium offered for the target as the dependent variable. Otherwise, the tests in Table 6 are specified as those in Table 5.<sup>26</sup>

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<sup>26</sup> In columns 1 and 2 of Table 6 we analyze the 1,463 observations with complete offer price information in SDC.

The tests in Table 6 indicate that  $Surprise_{t-1}$  is associated with increases in *both* the probability and the percentage change of an upward bid revision. For example, based on Model (4) in Panel B, a one standard deviation increase in the earnings surprise raises the final premium offer by 19 basis points.<sup>27</sup> In terms of economic importance, this is quite a large effect because the unconditional mean for the revision of the final premium is 95 basis points. In Table A1 of the Internet Appendix, we show that these findings are robust when we use the “pure salience” measure of earnings surprise. In unreported tests, we also find that the percentage of premium revisions is larger in all-cash transactions (where the bidder’s relative gain is more salient).

#### *D. Deal Termination*

In Panel A of Table 7, we estimate six probit models in which the dependent variable is set to one if the acquisition is withdrawn and is set to zero if it is completed. In all tests, the key independent variable is  $Surprise_{t-1}$ . With regards to the samples and the control variables in these tests, Table 7 follows the template used in Tables 5 and 6.<sup>28</sup>

The estimates indicate an inverse association between  $Surprise_{t-1}$  and the probability that the M&A is completed. The marginal effects drawn from Model (4) imply that an increase of one standard deviation in the earnings surprise is related to an increase of 56 basis points in the probability of deal termination. The economic magnitude of this effect is substantial when benchmarked against the 8.55% incidence of withdrawn mergers in our sample.

Notably, the tests in columns (1) through (6) of Panel A indicate a strong and statistically significant probability of deal terminations in cases likely distorted by assimilation effects. In contrast, in columns (7) and (8) we do not observe similar terminations in the cohort of 4-digit-SIC-linked “rational” deals that do not exhibit a price reversal (Panel I of Table 3).

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<sup>27</sup> We get 19 bps by multiplying the estimate of  $Surprise_{t-1}$  in column 4 by the standard deviation of  $Surprise_{t-1}$ .

<sup>28</sup> We lose 42 observations with unknown transaction completion status.

We conjecture that higher deal terminations following more positive earnings surprises are, at least in part, attributable to the target's demand for a higher premium and the increasing number of competing bids. To test these possibilities, Panel B of Table 7 examines the reasons for deal withdrawals. Specifically, we search Lexis/Nexis and press releases for whether (a) the target shareholders or directors reject the bid following the deal announcement, and (b) the target firms are eventually sold to some other bidders at a higher premium. The four probit regressions reported in Panel B analyze the sample of withdrawn deals with (0,1) dependent variables indicating target shareholder/director M&A rejection (columns (1) and (2)) and acquisition by another firm at a higher premium (columns (3) and (4)), respectively. We find that rejections by target shareholders/directors are indeed higher following more positive earnings surprises, and that the same target firms are more likely to be acquired by another bidder at a higher premium. This evidence supports the view that demand for higher premiums and increased competition, in the presence of assimilation effects, contribute to a higher cancellation rate for M&A deals announced following good earnings surprises.

## **V. Robustness Tests**

Our baseline analyses indicate that certain behavioral biases distort the market's initial valuation of some M&A transactions. This section probes the robustness of these findings with three different types of analyses. The first set is guided by existing behavioral studies to ascertain if our results conform to many established findings in that literature. The second set of tests assess whether our results hold with different constructs of the main variables of interest and under alternative econometric specifications. The third group seeks to validate our experimental design and to rule out an alternative hypothesis.

### A. Temporal Distance of the Earnings Surprises

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 Panel A of Table 8.

In line with DellaVigna's temporal distance argument for the effect of salience, in models (1)-(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 bidder's return.

By definition,  $Surprise_{t-1}$  equals zero for M&A announcements occurring on Mondays. It is possible that the assimilation effects of earnings surprises released on Friday dissipate by the time an acquisition is announced the following Monday. To evaluate this issue, column (4) of Panel A in Table 8 adjusts our surprise classification by replacing all Monday surprises with the actual earnings surprises occurring on the previous trading day. According to the estimate for  $Surprise_{t-1}$  (0.291,  $p$ -value = 0.002), the assimilation effects remain.

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. Column (5) of Panel A in Table 8 deals 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 2-day bidder M&A announcement CAR.

### *A.1. Same-Day Responses*

We study cases in which both earning releases and merger announcements 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 earnings surprises as occurring before (or after) this event. We address this in untabulated analyses in which we split earnings surprises released on the M&A announcement day into *AM surprises* (those announced before the stock market opens at 9:30 am) and *PM surprises* (those announced after the market closes at 4:00 pm). We then regress the same-day (day  $t$ ) bidder's abnormal return on *AM surprises* and *PM surprises* in regressions similar to those in Panel A of Table 8. According to the regression estimates, the *AM surprise* variable earns a positive and statistically significant coefficient (0.265,  $p$ -value = 0.05). In contrast, the coefficient for the *PM surprise* variable is positive but not significant (0.130,  $p$ -value = 0.21). These results are not only congruent with our baseline findings but also with those in Hartzmark and Shue (2018). Those authors show that earnings surprises released before 9:30 am significantly bias return reactions to announcements made later in the afternoon.

### *B. Strength of the Assimilation Effects*

In Panel B of Table 8, we assess whether our results are consistent with the predictions in the behavioral finance literature related to the strength of behavioral biases. 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 cognitive biases are weaker (but still significant) in acquirer firms with high institutional ownership.<sup>29</sup> This result is consistent with the argument by Barber and Odean

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<sup>29</sup> In Panel B of Table 8, we calculate the mean (total) effect of  $Surprise_{t-1}$  by taking the partial derivative  $\partial f() / \partial Surprise_{t-1}$ , which equals  $\beta_2$  (standalone effect) and adding that to  $0.5 \times \beta_1$  (interaction effect times the mean value of the moderating factor, *above median*, 0.5).

(2008, 2013) that institutional investors act more rationally than individual investors and with contemporaneous work by Andonov and Rauh (2020) showing that institutional investors exhibit behavioral biases.<sup>30</sup>

Regressions (3) and (4) in Panel B 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 assimilation effects remain, albeit smaller, in deals with larger acquirers. This finding is in line with existing evidence showing that firm size mitigates investors' 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 shows that the market reaction to new information is more accurate for low-uncertainty stocks. With this evidence in mind, in Column (5) and (6) of Panel B 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 eliminate) the assimilation effects.

### *C. The Strategic Timing Hypothesis*

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. Johnson and So (2018), for example, show that firms schedule later-than-expected earnings dates when the earnings are likely to fall short of analyst forecasts. In the context of M&A deals, Louis and Sun (2010) argue that managers strategically announce “bad” (overvaluation driven) M&A deals on Fridays to exploit investor inattention leading into weekends.

In the situation we study, the strategic timing alternative predicts that bidders intentionally announce the acquisition just after peers' earnings surprises to potentially capitalize on the

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<sup>30</sup> 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.

market's sentiment. Strategic timing may be particularly likely when the bidder itself has a recent negative earnings surprise and the bidder managers know that peer firms are likely to release good earnings. In this scenario, bidder managers might rush to announce an ostensibly good M&A deal immediately after peer firms release positive earnings surprises. This strategy may avert a drop in the bidder firm's own stock price. 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.<sup>31</sup> If managers are able to circumvent these issues, they would have to accurately react to the surprises (i.e., understand assimilation effects) and quickly announce the M&A deal (within 24 hours of the surprise). These issues suggest that our results are unlikely to be driven by the bidders' strategic timing.

Notwithstanding the caveats which cast doubt on the premise that bidders strategically time the M&A announcement, we estimate four probit regressions to study this alternative hypothesis. Panel A of Table 9 presents these tests. The dependent variable is set to one if an M&A deal is announced on day  $t$  and there is an earnings surprise on day  $t-1$  involving firms in the same 1-digit SIC as the merging firms. Otherwise, the dependent variable is set to zero. Column 1 includes all earnings surprises whereas column 2 includes only positive surprises. We use  $Surprise_{t-1}$  as the main predictor variable. In columns 3 and 4, we respectively replace  $Surprise_{t-1}$  with two different indicator variables. The first flags positive surprises and the other flags top surprises (i.e., positive surprises that fall in the top surprise tercile). Using these indicator variables enables us to directly examine whether M&A announcements are more likely to be scheduled on the day after (large) positive earnings news.

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<sup>31</sup> U.S. securities laws require that the bidder and target publicly announce the transaction soon after a definitive merger agreement is signed.



The results in Panel A of Table 9 do not support the strategic timing alternative hypothesis. Parameter estimates for  $Surprise_{t-1}$  and for both positive surprise indicators 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.

To further probe the role of the bidders' own earnings surprises, we run four additional robustness tests in Panel A. These analyses resemble our baseline regressions in Table 2, but we (a) exclude bidder firms that release earnings over  $[-7,0]$  before the M&A announcement (columns 5 and 6), and (b) control for the bidder's own earnings surprise released within one week before the deal announcement (columns 7 and 8). The new results continue to document a positive and significant association between bidders' abnormal return and yesterday's earnings surprise,  $Surprise_{t-1}$ . Notably, this association proves robust to controlling for the bidder's own earnings surprise. This evidence mitigates the possibility that our results are driven by either strategically timed M&A announcements or by the bidders' own earnings news.

#### *D. Alternative M&A Performance Measures*

In Panel B of Table 9, we use different proxies to measure M&A performance. In regressions (1) and (2), we estimate bidder's returns with the Carhart (1997) four-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 two-day announcement window minus the expected return over the same period. In columns (7) and (8), we use the deal's CAR, calculated as the weighted average CAR of the target and bidder using their market capitalization two days before

the M&A announcement as the weight.<sup>32</sup> Coefficient estimates in these tests show that our baseline evidence indicating assimilation effects is robust to these alternative return measures.

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 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.<sup>33</sup> Estimates for  $Surprise_{t-1}$  in regressions (7) and (8) are not statistically significant at conventional levels. The lack of significance is not consistent with the conjecture that the earnings surprise transmits material information to the M&A firms. However, the absence of significant results (in the long-term performance tests) is in line with the overreaction and subsequent stock price reversal we document in Table 3.

#### *E. Experimental validation: Are Initial Public Offerings (IPOs) vulnerable to an assimilation bias?*

Our key premise is that assimilation effects lead agents to perceive a pattern in sequential—but otherwise random—events. The preceding tests (of successive earnings releases and M&A announcements) provide empirical results supporting this premise and provide evidence on the presence (and impact) of assimilation effects in financial markets. Although we analyze

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<sup>32</sup> Deal CAR is only available for deals involving a public bidder and a public target (1,428 transactions in our sample).

<sup>33</sup> We drop 1,377 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.

the impact of assimilation bias in the context of M&As, we follow behavioral work by Chen et al. (2016) and validate our experiment in a different setting (i.e., IPOs).

Panel C of Table 9 analyzes successively announced earnings and IPOs. Panel C reports OLS regressions of IPO returns based on a sample of 5,891 IPOs between 1989 and 2014 drawn from SDC. In columns (1) and (2), the dependent variable is the IPO's opening return, measured as the percent difference between the first trading day closing price and the offer price (as in Lowry and Shu, 2002 and Liu and Ritter, 2011). In columns (3) and (4), the dependent variable is the IPO's cumulative return from the 2<sup>nd</sup> until the 7<sup>th</sup> trading day. In columns (5) and (6), the dependent variable is the cumulative return running from the offer day until the 7<sup>th</sup> trading day. In all tests, the key independent variable,  $Surprise_{t-1}$ , measures the value-weighted average earnings surprise released one day before the offer date for firms in the same 1-digit SIC as the IPO firm.

The results in column (2) yield estimates similar to those in the extant IPO literature.<sup>34</sup> More importantly, as in our tests studying M&A announcements, we find that earnings surprises distort investors' perception of IPO announcements. According to the estimate in column (2), a one-standard deviation increase in the earnings surprise is associated with a 0.8% increase in the IPO firm's opening return. Consistent with assimilation effects, we find that investors' response to the earnings surprise upon the IPO announcement fully disappears during the next six trading days. This price reversal obtains even though no other material information involving the IPO company or the earnings-releasing firms is announced. Thus, aside from validating our experimental design,

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<sup>34</sup> The estimates are: Initial return =  $\alpha + 2.688 (Surprise_{t-1})^a + 0.033 \ln(\text{IPO proceeds}) - 0.174 (\text{NYSE-AMEX})^a - 0.097 (\text{NASDAQ})^a + 0.064 (\text{VC})^a - 0.019 (\text{High-tech}) - 0.0003 (\% \text{Insider shares}) + 0.020 (\text{retail investors}) + \varepsilon$ , where "a" denotes statistical significance at the 1% level. The negative estimate for the NYSE-AMEX variable and the positive estimate for VC are similar to those in Lowry and Shu (2002) and Liu and Ritter (2011), respectively.

the evidence from our IPO tests provides corroborating evidence of the presence of assimilation effects in financial markets and bolsters the hypothesis that these effects distort asset prices.

#### *F. Other Robustness Tests and Experimental Design Issues*

We report additional robustness tests in the Internet Appendix (see Table A3). Our results are robust to the use of alternative constructs of earnings surprises, other statistical specifications (i.e., multiplicative fixed effects such as industry  $\times$  year fixed effects), different industry definitions, and to analyses that consider the target firm's own earnings surprise.

We also tackle several issues related to our experimental design. First, we address whether merger announcements are necessary. This issue arises because if investors' perceptions about weakly-linked industry peers are distorted by earnings surprises, this error might occur for other firms that are not involved in an M&A deal. We do not find empirical support for this conjecture (see Panel A Table A4 of the Internet Appendix). The lack of response by non-M&A peers conforms to the idea that salience (i.e., stocks that are on the news) triggers investors' cognitive bias. Second, we ask whether we really need the 1-digit SIC link as depicted in Figure 1. To explore this question, we run the baseline regressions replacing the 1-digit-SIC  $Surprise_{t-1}$  with earnings surprises from firms in unrelated industries (i.e., without a 1-digit SIC link to the merging companies). We do not find a significant response from the bidder stock to the unrelated salient surprise. This finding reaffirms the view that, although apparently weak, the 1-digit link between the earnings-surprise firms and both merger firms is essential to trigger a response from the bidder. Finally, in our baseline regressions, we replace  $Surprise_{t-1}$  with *Market surprise* $_{t-1}$ , calculated as the value-weighted earnings surprise of *all* earnings-announcing firms. This variable does not attain statistical significance. The lack of significance suggests that our baseline findings are unlikely to be driven by the market sentiment.

## VI. Conclusions

A large literature in psychology documents that assimilation effects—people’s tendency to reduce the apparent differences between objects or events when they make evaluative judgments in sequence—lead to potentially costly mistakes. We study assimilation bias and its costs in financial markets. Our experiment consists of two sequentially announced salient events: earnings surprises released by firms that operate in the same 1-digit SIC as the merging firms in an M&A deal announced one day later. Consistent with the presence of assimilation effects in financial markets, we find a *positive* association between yesterday’s salient earnings surprises and today’s bidder firm M&A announcement stock return. We also find evidence of a stock price reversal: the bidder’s positive stock return response to the earnings surprises that occurs upon the M&A announcement disappears a week later. Our results indicate that the economic magnitude of these valuation errors is both statistically significant and economically important.

While the acquirers’ stock price misvaluation is temporary, other effects stemming from the assimilation bias are permanent. We find that larger earnings surprises are related to more competition by rival firms to acquire the target, to increases in the M&A premiums extended to target shareholders, and to more withdrawn acquisition offers. Collectively, these findings indicate that assimilation effects can create real and important distortions that affect some M&A deals.

Given our results on assimilation effects in mergers, it is also possible that these cognitive biases could be persistent and create mispricing and other non-trivial distortions in different settings with sequentially announced salient events. Consistent with this conjecture, we find additional evidence on the presence and impact of assimilation effects in financial markets when we validate our experiment in the context of IPOs. We hope that our evidence motivates further research on the degree to which similar behavioral phenomena distort other corporate activities and on the impact of such distortions on firms and investors.

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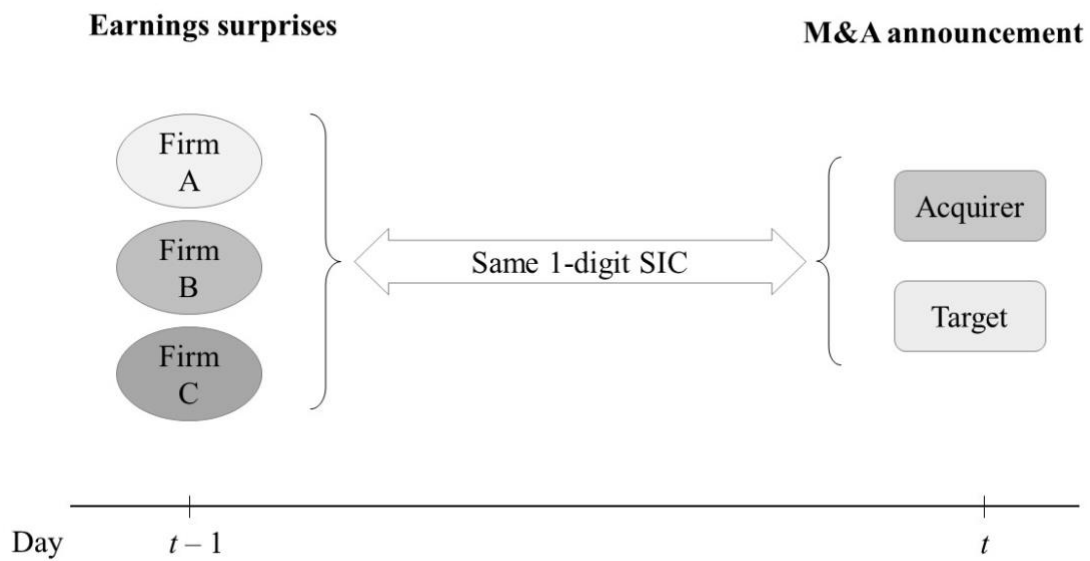
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**Figure 1. Experimental design**

This figure illustrates the empirical design.



**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.  $Surprise_{t-1}$ , our main measure of salience, is the value-weighted average earnings surprises of firms that announce earnings the day before the acquisition announcement in the M&A firms' 1-digit SIC.

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

	Agriculture	Mining	Construction	Manufacturing	Transportation, Utilities	Wholesale	Retailing	Services	Total	Pct
1989	1	7	0	54	19	2	1	13	97	1.23
1990	0	6	0	54	9	2	12	16	99	1.26
1991	0	15	0	47	16	4	4	26	112	1.42
1992	0	11	1	53	9	7	7	32	120	1.52
1993	1	16	2	83	28	4	14	46	194	2.46
1994	1	19	3	99	37	10	16	49	234	2.97
1995	0	17	3	145	51	12	21	81	330	4.19
1996	2	31	0	175	54	12	30	105	409	5.19
1997	1	43	4	191	54	24	21	129	467	5.92
1998	3	35	7	215	54	18	29	174	535	6.79
1999	0	16	3	222	85	11	35	139	511	6.48
2000	1	20	2	237	57	5	16	108	446	5.66
2001	1	14	8	160	52	2	12	95	344	4.36
2002	1	21	7	134	40	6	19	105	333	4.22
2003	1	27	2	147	39	3	16	90	325	4.12
2004	2	36	1	169	43	3	11	118	383	4.86
2005	3	31	2	157	48	11	9	117	378	4.80
2006	1	31	1	156	44	11	14	120	378	4.80
2007	1	26	2	149	33	5	17	121	354	4.49
2008	0	34	3	107	27	10	9	94	284	3.60
2009	0	19	6	93	20	1	3	44	186	2.36
2010	1	28	6	112	24	6	2	67	246	3.12
2011	0	19	5	130	29	3	4	59	249	3.16
2012	1	21	3	128	29	3	11	71	267	3.39
2013	2	27	4	116	45	6	8	71	279	3.54
2014	4	29	3	138	52	3	12	81	322	4.09
Total	28	599	78	3,471	998	184	353	2,171	7,882	100
Pct	0.36	7.60	0.99	44.04	12.66	2.33	4.48	27.54	100	

***Panel B: Deal and bidder characteristics***

	<b>N</b>	<b>Mean</b>	<b>S.D.</b>	<b>p25</b>	<b>p50</b>	<b>p75</b>
CAR[0,1]	7,882	0.01085	0.06336	-0.01822	0.00602	0.03467
Relative size	7,882	0.25487	0.72892	0.02783	0.08549	0.24575
Hostile	7,882	0.00837	0.09113	0	0	0
All cash deal	7,882	0.33037	0.47038	0	0	1
All stock deal	7,882	0.14692	0.35405	0	0	0
Cross-industry	7,882	0.31528	0.46465	0	0	1
Public target	7,882	0.20388	0.40291	0	0	0
Private target	7,882	0.43352	0.49559	0	0	1
Completed deal	7,840	0.91454	0.27958	1	1	1
Competing bid	7,882	0.00304	0.05510	0	0	0
Bidder size	7,882	6.68484	1.79869	5.42035	6.58200	7.82890
Bidder Q	7,882	2.45535	2.93797	1.32465	1.74794	2.58221

***Panel C: Earnings surprise***

Surprise <sub>t-1</sub> , non-zero	3,255	-0.00002	0.00927	-0.00013	0.00032	0.00127
Surprise <sub>t-1</sub>	7,882	-0.00001	0.00596	0	0	0.00010

**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. In columns 1 through 6,  $Surprise_{t-1}$  measures the value-weighted earnings surprise in the M&A firms' 1-digit SIC. In columns 7 and 8,  $Surprise_{t-1}$  is the value-weighted earnings surprise in the firms' 4-digit SIC. Columns 1 and 2 include observations where the bidder and target are in the same 1-digit SIC. Columns 3 and 4 further exclude observations where  $Surprise_{t-1}$  is equal to zero. Columns 5 and 6 exclude observations in which the bidder's  $t-1$  stock return has the same sign as  $Surprise_{t-1}$ . Columns 7 and 8 include observations where the bidder and target are in the same 4-digit SIC. Announcement year and industry dummies are included in all regressions. Standard errors are reported in parentheses and are double-clustered by deal year-month and by industry. \*\*\*, \*\*, and \* to indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	CAR[0,1]							
	Same SIC-1 industry		Same SIC-1 industry Non-zero $Surprise_{t-1}$		Exclude observations where $Surprise_{t-1}$ has the same sign as the Bidder's return at $t-1$		Same SIC-4 industry	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.352*** (0.111)	0.332*** (0.114)	0.377*** (0.115)	0.355*** (0.113)	0.387*** (0.139)	0.343** (0.153)	0.896*** (0.184)	0.780*** (0.201)
Relative size		0.007*** (0.002)		0.010*** (0.003)		0.007*** (0.002)		0.006*** (0.001)
Unsolicited		-0.006 (0.008)		-0.001 (0.009)		-0.000 (0.010)		-0.012 (0.013)
Hostile		-0.004 (0.007)		-0.009 (0.009)		-0.006 (0.009)		-0.015 (0.010)
Toehold		0.000 (0.000)		-0.001 (0.001)		0.000 (0.000)		0.000 (0.000)
All cash		0.004 (0.002)		0.005* (0.003)		0.002 (0.002)		0.004 (0.003)
All stock		-0.005*** (0.002)		-0.005 (0.004)		-0.005** (0.003)		-0.010*** (0.002)
Cross-industry		-0.004* (0.002)		-0.006* (0.003)		-0.004 (0.003)		- -
Private target		0.022*** (0.003)		0.022*** (0.004)		0.022*** (0.003)		0.025*** (0.003)
Subsidiary		0.024*** (0.003)		0.020*** (0.004)		0.025*** (0.003)		0.025*** (0.004)
Bidder runoff		0.002** (0.001)		0.003*** (0.001)		0.002 (0.001)		0.001 (0.001)
Bidder size		-0.003*** (0.000)		-0.003*** (0.001)		-0.003*** (0.001)		-0.005*** (0.001)
Bidder Q		0.000 (0.000)		-0.000 (0.001)		-0.000 (0.000)		0.000 (0.000)
Bidder leverage		0.011 (0.007)		0.000 (0.014)		0.013* (0.007)		0.025*** (0.009)
Profitability		-0.000 (0.000)		0.000 (0.000)		-0.001*** (0.000)		-0.000 (0.001)
Cash holding		-0.001 (0.005)		-0.011 (0.007)		0.004 (0.008)		0.004 (0.008)
Stock volatility		-0.064 (0.065)		-0.142 (0.095)		-0.066 (0.089)		-0.172** (0.080)
Constant	0.011*** (0.000)	0.013** (0.006)	0.010*** (0.000)	0.017* (0.009)	0.011*** (0.000)	0.012* (0.007)	0.012*** (0.000)	0.022*** (0.004)
Observations	7,882	7,882	3,255	3,255	6,333	6,333	4,007	4,007
R <sup>2</sup>	0.070	0.109	0.122	0.153	0.078	0.119	0.095	0.147
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

**Table 3. Overreaction to salience and subsequent price correction**

OLS regressions of bidders' cumulative abnormal returns (CAR). In Panel A, we use the sample of acquirers and targets that are in the same 1-digit SIC. Panel B separates surprises in terciles. In Panel C, we exclude observations in which the SDC reports a bid price revision following the deal announcement, or in which bidder, target, and/or earnings release firms have potentially confounding news over the [2,7] window. In Panel D, we include "bundled announcements," that is, M&A announcements bundled with bidders' earnings releases. In Panel E, we exclude observations for which  $Surprise_{t-1}$  equals zero. Panel F further excludes withdrawn transactions. In Panel G, we use a subsample of acquisitions covered by the Wall Street Journal with non-zero surprise on  $t-1$ . Panel H identifies  $Surprise_{t-1}$  with a subsample of earnings firms that can only be matched to the takeover target's 1-digit SIC but not to 2-digit or higher SIC codes. We flag this measure as "pure salience." In Panel I, we use the sample of acquirers and targets that are in the same 4-digit SIC.  $Surprise_{t-1}$  is the value-weighted earnings surprise in the M&A firms' 1-digit SIC, except in Panel I, where  $Surprise_{t-1}$  is the earnings surprise in the firms' 4-digit SIC. Announcement year 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: Same SIC-1 industry**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.352*** (0.111)	0.332*** (0.114)	-0.281** (0.115)	-0.280** (0.116)	0.069 (0.171)	0.047 (0.170)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	7,882	7,882	7,882	7,882
R <sup>2</sup>	0.070	0.109	0.056	0.059	0.059	0.079
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel B: Terciles of earnings surprises**

	CAR[0,1]			CAR[2,7]			CAR[0,7]		
	1	2	3	4	5	6	7	8	9
	Bottom	Middle	Top	Bottom	Middle	Top	Bottom	Middle	Top
$Surprise_{t-1}$	0.342** (0.166)	20.960 (14.901)	0.480* (0.283)	-0.268** (0.116)	-11.396 (9.868)	-0.728* (0.402)	0.113 (0.232)	9.286 (15.102)	-0.340 (0.478)
Controls as in T.2	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,081	1,087	1,087	1,081	1,087	1,087	1,081	1,087	1,087
R <sup>2</sup>	0.252	0.221	0.245	0.247	0.217	0.214	0.216	0.204	0.246
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

**Panel C: Same SIC-1 industry excluding observations with confounding news over [2,7]**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.369*** (0.116)	0.341*** (0.112)	-0.261** (0.107)	-0.257** (0.109)	0.110 (0.167)	0.083 (0.165)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	7,429	7,429	7,429	7,429	7,429	7,429
R <sup>2</sup>	0.072	0.110	0.059	0.062	0.061	0.080
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel D: Considering bundled announcements**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
$Surprise_{t-1}$	0.356*** (0.113)	0.336*** (0.115)	-0.255** (0.097)	-0.256** (0.099)	0.100 (0.160)	0.076 (0.157)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	8,163	8,163	8,163	8,163	8,163	8,163
R <sup>2</sup>	0.071	0.110	0.055	0.058	0.059	0.079
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel E: Further excluding observations with zero-surprise**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Surprise<sub>t-1</sub></i>	0.411*** (0.122)	0.381*** (0.118)	-0.273*** (0.098)	-0.252** (0.102)	0.134 (0.181)	0.129 (0.181)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	3,015	3,015	3,015	3,015	3,015	3,015
R <sup>2</sup>	0.124	0.155	0.115	0.119	0.113	0.127
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel F: Further excluding withdrawn transactions**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Surprise<sub>t-1</sub></i>	0.379*** (0.127)	0.345*** (0.120)	-0.276** (0.108)	-0.260** (0.104)	0.109 (0.184)	0.085 (0.182)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	2,751	2,751	2,751	2,751	2,751	2,751
R <sup>2</sup>	0.132	0.160	0.117	0.121	0.114	0.129
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel G: M&As covered by The Wall Street Journal with non-zero surprise**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Surprise<sub>t-1</sub></i>	0.948*** (0.270)	1.031** (0.391)	-0.731** (0.292)	-0.683* (0.361)	0.199 (0.395)	0.281 (0.259)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	323	323	323	323	323	323
R <sup>2</sup>	0.282	0.335	0.177	0.223	0.243	0.329
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel H: "Pure salience" surprise**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Pure-salience Surprise<sub>t-1</sub></i>	0.374*** (0.126)	0.345*** (0.129)	-0.293** (0.120)	-0.291** (0.120)	0.084 (0.173)	0.054 (0.172)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	7,882	7,882	7,882	7,882
R <sup>2</sup>	0.070	0.109	0.056	0.059	0.059	0.079
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Panel I: Same SIC-4 industry**

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Surprise<sub>t-1</sub></i>	0.896*** (0.184)	0.780*** (0.201)	0.204 (0.246)	0.208 (0.265)	0.931*** (0.223)	0.831*** (0.286)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	4,007	4,007	4,007	4,007	4,007	4,007
R <sup>2</sup>	0.095	0.147	0.067	0.072	0.076	0.104
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table 4. Salience and perceived division of merger gains**

This table tests the relation between perceived division of merger gains upon M&A announcement and  $Surprise_{t-1}$ . We calculate the perceived target's gain relative to the acquirer's gain following Ahern (2012). To construct this dependent variable, we first estimate the target \$CAR and the acquirer \$CAR as the firm's merger announcement CAR[0,1] multiplied by market equity of the firm two days before the merger announcement. We then compute the target's \$CAR minus the acquirer's \$CAR. Finally, we divide this difference by the sum of acquirer and target market values 50 trading days before the merger announcement. This measure captures the market perceived relative gain of the target versus the acquirer for each dollar of total market value, without the concern that total gains may be negative. In columns 1 and 2, we use the sample of acquirers and targets that are in the same 1-digit SIC. In columns 3 and 4, we further exclude observations for which  $Surprise_{t-1}$  equals zero. In columns 5 and 6, we use the sample of acquirers and targets that are in the same 4-digit SIC. In columns 1 through 4,  $Surprise_{t-1}$  measures the value-weighted earnings surprise in the M&A firms' 1-digit SIC. In columns 5 and 6,  $Surprise_{t-1}$  is the value-weighted earnings surprise in the firms' 4-digit SIC. The even-numbered regressions add control variables as in Table 2. All regressions include announcement year 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.

	<b>Division of merger gains</b>					
	Same SIC-1 industry		Same SIC-1 industry non-zero surprise		Same SIC-4 industry	
	1	2	3	4	5	6
$Surprise_{t-1}$	-0.664*** (0.155)	-0.560*** (0.130)	-0.629** (0.186)	-0.711*** (0.187)	-1.195*** (0.312)	-1.302*** (0.228)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	1,428	1,428	564	564	724	724
R <sup>2</sup>	0.073	0.174	0.152	0.269	0.084	0.199
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table 5. Salience and bid competition**

This table tests the relation between public bid competition and  $Surprise_{t-1}$ . We use probit regressions in which the dependent variable is a dummy indicator that takes a value of one if SDC reports a competitive bid for the target after the public deal announcement, and zero otherwise. In columns 1 and 2, we use the sample of acquirers and targets that are in the same 1-digit SIC. In columns 3 and 4, we further exclude observations for which  $Surprise_{t-1}$  equals zero. In columns 5 and 6, we exclude observations with potential confounding news (e.g., earnings broadcasts) after the M&A announcement. In columns 7 and 8, we use the sample of acquirers and targets that are in the same 4-digit SIC. In columns 1 through 6,  $Surprise_{t-1}$  measures the value-weighted earnings surprise in the M&A firms' 1-digit SIC. In columns 7 and 8,  $Surprise_{t-1}$  is the value-weighted earnings surprise in the firms' 4-digit SIC. We report marginal effects. The even-numbered regressions add control variables as in Table 2. All regressions include announcement year 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.

	Competing bids over [0,7]							
	Same SIC-1 industry		Same SIC-1 industry non-zero surprise		Subsample excluding obs. with confounding news		Same SIC-4 industry	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.233*** (0.065)	0.235*** (0.058)	0.311*** (0.102)	0.504* (0.270)	0.236*** (0.080)	0.229*** (0.066)	0.406*** (0.116)	0.446*** (0.151)
Controls as in T.2	NO	YES	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	3,255	3,255	7,650	7,650	4,007	4,007
R <sup>2</sup>	0.049	0.201	0.048	0.369	0.055	0.192	0.035	0.220
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES



**Table 6. Saliency and bid revision**

This table examines the relation between bid price revision and  $Surprise_{t-1}$ . Panel A examines the incidence of (upward) bid revisions. We use probit models in which the dependent variable is an indicator variable that equals one if the final bid price is higher than the initial bid price announced at the deal announcement, and zero otherwise. We report marginal (instead of regression coefficient estimates). In Panel B, we use OLS regressions in which the dependent variable is the change of final offer price relative to the initial offer price in the deal announcement. In columns 1 and 2, we use the sample of acquirers and targets that are in the same 1-digit SIC. In columns 3 and 4, we further exclude observations for which  $Surprise_{t-1}$  equals zero. In columns 5 and 6, we exclude observations with potential confounding news (e.g., earnings broadcasts) after the M&A announcement. In columns 7 and 8, we use the sample of acquirers and targets that are in the same 4-digit SIC. In columns 1 through 6,  $Surprise_{t-1}$  measures the value-weighted earnings surprise in the M&A firms' 1-digit SIC. In columns 7 and 8,  $Surprise_{t-1}$  is the value-weighted earnings surprise in the firms' 4-digit SIC. The even-numbered regressions add control variables as in Table 2. All regressions include announcement year 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. Incidence of bid revision**

	Same SIC-1 industry		Same SIC-1 industry non-zero surprise		Subsample excluding obs. with confounding news		Same SIC-4 industry	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	4.948** (2.190)	4.370* (2.441)	6.017*** (2.323)	5.260** (2.493)	4.836** (2.371)	4.277* (2.592)	3.876 (4.507)	4.514* (2.388)
Controls as in T.2	NO	YES	NO	YES	NO	YES	NO	YES
Observations	1,463	1,463	584	584	1,410	1,410	735	735
Pseudo R <sup>2</sup>	0.097	0.241	0.180	0.281	0.099	0.233	0.129	0.293
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

**Panel B. % Bid revision**

	Same SIC-1 industry		Same SIC-1 industry non-zero surprise		Subsample excluding obs. with confounding news		Same SIC-4 industry	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.399*** (0.082)	0.240** (0.090)	0.385*** (0.073)	0.209** (0.065)	0.413*** (0.077)	0.261** (0.086)	0.385 (0.333)	1.188** (0.394)
Controls as in T.2	NO	YES	NO	YES	NO	YES	NO	YES
Observations	1,463	1,463	584	584	1,410	1,410	735	735
R <sup>2</sup>	0.057	0.199	0.094	0.217	0.059	0.181	0.109	0.292
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

**Table 7. Saliency and deal withdrawal**

This table evaluates the relation between deal completion and  $Surprise_{t-1}$ . In Panel A, we use probit regressions in which the dependent variable is a dummy indicator that takes a value of one if the transaction is withdrawn, and zero otherwise. In columns 1 and 2, we use the sample of acquirers and targets that are in the same 1-digit SIC. In columns 3 and 4, we further exclude observations for which  $Surprise_{t-1}$  equals zero. In columns 5 and 6, we exclude observations with potential confounding news (e.g., earnings broadcasts) after the M&A announcement. In columns 7 and 8, we use the sample of acquirers and targets that are in the same 4-digit SIC. In columns 1 through 6,  $Surprise_{t-1}$  measures the value-weighted earnings surprise in the M&A firms' 1-digit SIC. In columns 7 and 8,  $Surprise_{t-1}$  is the value-weighted earnings surprise in the firms' 4-digit SIC. We report marginal effects. In Panel B, we examine whether withdrawn deals are more likely to be rejected by target shareholders/directors or acquired by another bidder at a higher premium following larger surprises. The dependent variables are indicators for rejection by the target shareholders/board (columns 1 and 2) and for being acquired by another bidder at a higher premium (columns 3 and 4), respectively. The even-numbered regressions add control variables as in Table 2. All regressions include announcement year 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. Saliency and deal withdrawal**

	Withdrawn M&A							
	Same SIC-1 industry		Same SIC-1 non-zero surprise		Subsample excluding obs. with confounding news		Same SIC-4 industry	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.880** (0.353)	0.698*** (0.271)	0.869** (0.353)	0.618** (0.258)	0.947*** (0.349)	0.754*** (0.268)	-0.973 (1.058)	-0.204 (0.567)
Controls as in T.2	NO	YES	NO	YES	NO	YES	NO	YES
Observations	7,840	7,840	3,224	3,224	7,608	7,608	3,983	3,983
R <sup>2</sup>	0.036	0.135	0.043	0.181	0.034	0.134	0.049	0.137
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

**Panel B. What drives deal withdrawals?**

	Rejected by target shareholders / directors		Sold to another bidder at a higher premium	
	1	2	3	4
$Surprise_{t-1}$	4.934*** (1.869)	4.208** (1.930)	3.063** (1.466)	4.174* (2.358)
Controls as in T.2	NO	YES	NO	YES
Observations	670	670	670	670
R <sup>2</sup>	0.139	0.337	0.088	0.345
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

**Table 8. Temporal distance and heterogeneous effects**

OLS regressions of bidders' cumulative abnormal returns (CAR). The sample is the M&A announcements where the acquirer and the target are in the same 1-digit SIC industry. Panel A tests the temporal distance of salience. Columns 1 through 3 examine the earnings surprise in the merging firms' industry announced from four days before until three days after the M&A 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. Panel B adds interactions between the previous day's earnings surprises and firm characteristics. These firm characteristics are bidder firm's institutional ownership (column 1 and 2), bidder's firm size (column 3 and 4), and number of equity analysts covering the acquirer (column 5 and 6). Announcement year and industry dummies are included in all regressions. Standard errors are reported in parentheses and 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.

**Panel A. Temporal distance**

	CAR[0,1]				
	Lead and lag surprises			Adjust for Monday M&A announcement	Subsample since 1995
	1	2	3	4	5
$Surprise_{t-4}$	0.020 (0.124)		0.020 (0.124)		
$Surprise_{t-3}$	0.024 (0.104)		0.025 (0.106)		
$Surprise_{t-2}$	-0.149 (0.109)		-0.153 (0.108)		
$Surprise_{t-1}$	0.333*** (0.115)	0.331*** (0.115)	0.332*** (0.116)	0.291*** (0.088)	0.307*** (0.107)
$Surprise_{t+1}$		0.030 (0.119)	0.028 (0.118)		
$Surprise_{t+2}$		0.133 (0.103)	0.137 (0.103)		
$Surprise_{t+3}$		0.008 (0.102)	0.009 (0.102)		
Observations	7,882	7,882	7,882	7,882	7,026
R <sup>2</sup>	0.109	0.109	0.110	0.109	0.108
Controls as in Table 2	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES

**Panel B. Interaction effects of bidder characteristics**

	Institutional ownership		Firm size		Analyst coverage	
	1	2	3	4	5	6
$\beta_1$ $Surprise_{t-1}$ *Above median indicator	-0.693*** (0.183)	-0.588*** (0.189)	-0.588** (0.260)	-0.501* (0.268)	-0.495** (0.214)	-0.458** (0.219)
$\beta_2$ $Surprise_{t-1}$	0.639*** (0.157)	0.572*** (0.148)	0.607*** (0.176)	0.551*** (0.169)	0.608*** (0.183)	0.570*** (0.176)
$\beta_3$ Above median indicator	-0.004** (0.001)	0.000 (0.002)	-0.013*** (0.001)	-0.003 (0.002)	-0.009*** (0.002)	-0.001 (0.002)
<b>Joint significance test:</b> $\partial f() / \partial Surprise_{t-1}: 0.5*\beta_1 + \beta_2$	0.292** (0.112)	0.278** (0.119)	0.312*** (0.101)	0.301*** (0.114)	0.360*** (0.112)	0.341*** (0.116)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	7,882	7,882	7,882	7,882
R <sup>2</sup>	0.072	0.110	0.077	0.110	0.074	0.110
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table 9. Robustness tests, alternative hypothesis, and experimental validation**

This table reports robustness tests and additional analyses for alternative hypotheses. Panel A tests strategic timing of M&A announcements. Columns 1 through 4 report probit regressions for which the dependent variable is set to one whenever an M&A deal announced at  $t$  involves a firm in the same 1-digit industry as the earnings firms at  $t-1$ . We report marginal effects of the probit models (rather than coefficient estimates). Columns 1 and 2 include all earnings surprises and positive earnings surprises, respectively. Columns 3 and 4 use indicators for positive surprises and for top surprises (i.e., surprises in the top tercile bin) as the main predictor variable, respectively. Columns 5 through 8 report OLS regressions that examine the impact of bidders' own earnings surprises. The regressions are similar to the baseline specification in equation (3). Columns 5 and 6 exclude bidders that have an earnings announcement in  $[-7,0]$ . Columns 7 and 8 control for the bidder's recent earnings surprise. 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 deal CAR as the weighted average CAR of the target and bidder using their market capitalization 2 days before the announcement as the weight. Columns 9 and 10 measure M&A performance using the mean three-year post-merger return-on-asset (ROA) adjusted by the industry value-weighted ROA. Panel C reports IPO stock reactions to  $Surprise_{t-1}$ . The sample is based on 5,892 IPOs between 1989 and 2014 from SDC. In columns 1 and 2, the dependent variable is the IPO opening return, measured as the percent difference between the first trading day close price and the offer price. In columns 3 and 4, the dependent variable is the cumulative return from the 2<sup>nd</sup> until the 7<sup>th</sup> trading day. In columns 5 and 6, the dependent variable is the overall cumulative return calculated using the offer price and the aftermarket prices from the offer day until the 7<sup>th</sup> trading day.  $Surprise_{t-1}$  is the 1-digit SIC value-weighted average earnings surprise released one day before the offer date. In even-numbered columns we control for  $\log(proceeds)$ , defined as the size of the offering; *High-Tech*, a dummy variable for technology firms; *VC*, an indicator for venture-capital backed firms; *NYSE-AMEX* and *Nasdaq*, dummies for firms listed on the NYSE-AMEX and Nasdaq stock exchanges; *insidershare*, defined as the percentage of shares held by insiders after the offering; and *retail*, an indicator for retail investors' participation in the offering. All regressions include announcement year and industry fixed effects. The standard errors, which are in parentheses, are double-clustered by year-month and by industry. We use \*\*\*, \*\*, and \* to denote statistical significance at the 1%, 5%, and 10% level, respectively.

**Panel A. Strategic timing of M&A announcements and bidders' earnings**

	M&A announcements following earnings surprises				Bidders' own earnings			
	All surprises	Positive surprises	Indicator for positive surprises	Indicator for top surprises	Excluding bidders that release earnings over $[-7,0]$		Control for bidders' own earnings surprises	
	1	2	3	4	5	6	7	8
$Surprise_{t-1}$	0.153 (0.239)	-0.144 (0.849)			0.370*** (0.118)	0.351*** (0.120)	0.355*** (0.111)	0.332*** (0.115)
Positive/Top $Surprise_{t-1}$			0.005 (0.004)	0.002 (0.011)				
Bidder's own surprise							-0.125 (0.314)	0.029 (0.327)
Observations	25,685	16,579	25,685	25,685	7,674	7,674	7,882	7,882
(Pseudo) R <sup>2</sup>	0.118	0.116	0.118	0.118	0.069	0.109	0.070	0.109
Controls as in Table 2	–	–	–	–	NO	YES	NO	YES
Weekday FE	YES	YES	YES	YES	–	–	–	–
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

**Panel B. Alternative measures of M&A performance**

	Four-factor adj. CAR		Industry adjusted CAR		Buy-and-Hold AR		Deal CAR		Industry adjusted ROA	
	1	2	3	4	5	6	7	8	9	10
<i>Surprise<sub>t-1</sub></i>	0.325*** (0.082)	0.306*** (0.086)	0.375*** (0.118)	0.349*** (0.117)	0.348*** (0.109)	0.327*** (0.111)	1.222*** (0.219)	1.088*** (0.260)	-0.076 (0.113)	-0.068 (0.129)
Observations	7,882	7,882	7,882	7,882	7,882	7,882	1,428	1,428	6,505	6,505
R <sup>2</sup>	0.070	0.107	0.069	0.109	0.070	0.110	0.232	0.290	0.202	0.371
Controls as in Table 2	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Year 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. Experimental validation: IPO returns and extrapolation**

	Opening return		Cum. return[2,7]		Cum. ret[Initial, 7]	
	1	2	3	4	5	6
<i>Surprise<sub>t-1</sub></i>	2.543*** (0.479)	2.688*** (0.521)	-1.103*** (0.401)	-1.104*** (0.405)	0.629 (0.500)	0.758 (0.510)
Observations	5,891	5,891	5,891	5,891	5,891	5,891
R <sup>2</sup>	0.224	0.234	0.061	0.065	0.210	0.219
Controls	NO	YES	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

## Appendix A: Business Press Excerpts Bundling the Reporting of Earnings and M&A News

Excerpts from the Financial Times' FASTFT section on April 7, 2017 (upper panel) and the Wall Street Journal's Business section on August 2, 2021 (lower panel). In both excerpts, M&A news coverage is presented right next to contemporaneous earnings news.

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**Samsonite picks up eBags for \$105m**  
Samsonite has agreed buy US online bag retailer eBags for \$105m as the luggage company seeks to expand its e-commerce presence.

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APRIL 6, 2017

**Victoria's Secret owner posts deeper than expected fall in March sales**



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### BUSINESS

#### **News Corp to Buy OPIS for \$1.15 Billion**

The parent of The Wall Street Journal and HarperCollins Publishers will purchase Oil Price Information Service, an energy and renewables information-services company.

*Dave Sebastian . August 2, 2021*



### EARNINGS

#### **Rio Tinto First-Half Profit Sets Record on Commodity Price Surge**

Rio Tinto reported a record first-half net profit and more than tripled its midyear payout to shareholders, benefiting from a bull run in commodity prices that has stoked inflation expectations around the world.

*Rhiannon Hoyle . July 28, 2021*

## Appendix B: Variable Definition

### Panel A. M&A related variables

CAR [0,+1]	Bidder's two-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 [0,+1], four-factor adjusted	Bidder's two-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 two-day announcement window and the expected return over the same window. The expected return is calculated using the one-factor market model. (Source: CRSP)
Division of merger gains	Target's \$CAR minus the acquirer's \$CAR scaled by the sum of acquirer and target market values 50 trading days before the merger announcement. Target \$CAR and acquirer \$CAR are estimated as the firm's announcement CAR[0,1] multiplied by market equity of the firm two days before the merger announcement. (Source: CRSP)
Competing bids	Dummy variable equals 1 if the target receives a competing bid after the merger announcement, 0 otherwise. (Source: SDC)
% Bid revision	The percentage change of final offer price relative to the initial offer price in the deal announcement. (Source: SDC)
Withdrawn	Dummy variable equals 1 if the deal is withdrawn, 0 otherwise. (Source: SDC)
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 <sub>t-1</sub>	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 $(actual - forecast)/price_{t-3}$ , where <i>forecast</i> is the median analyst forecast within the $[\tau - 15, \tau - 2]$ window of the earnings announcement, where $\tau$ is the earnings announcement date. (Source: I/B/E/S, CRSP)
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### Panel C. Firm-level variables

Bidder size	The logarithm of book value of total assets. (Source: Compustat)
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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)
Stock 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 25 <sup>th</sup> percentile of all NYSE firms in the same 4-digit SIC in a given month.

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**Panel D. IPO related variables**

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Opening return	The percent difference between the first trading day close price and the offer price in an IPO. (Source: CRSP, SDC)
Cum. return[2,7]	Cumulative return from the 2nd until the 7th trading day after an IPO. (Source: CRSP)
IPO proceeds	Proceeds raised in an IPO. (Source: SDC)
NYSE-AMEX	Dummy variable equals 1 if the firm is listed in NYSE or AMEX, 0 otherwise. (Source: CRSP)
NASDAQ	Dummy variable equals 1 if the firm is listed in NASDAQ, 0 otherwise. (Source: CRSP)
VC	Dummy variable equals 1 if the firm is backed by venture capital, 0 otherwise. (Source: SDC)
High-tech	Dummy variable equals 1 if the firm is operating in the high-tech industry, 0 otherwise. (Source: SDC)
%Insider shares	Percentage of shares held by insiders after the offer. (Source: SDC)
retail investors	Dummy variable equals 1 if retail investors are involved in the offering, 0 otherwise. (Source: SDC)

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## **Internet Appendix**

### **Assimilation Effects in Financial Markets**

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**Table A1. Pure salience, bid competition, and price revision**

This table reports the robustness tests of salience effects on bid competition and bid price revision. The main independent variable is *Pure Salience*<sub>*t*-1</sub> (value-weighted average earnings surprises from firms that can only be matched to the takeover firm's 1-digit SIC but not to 2-digit or higher SIC codes). The dependent variable in Columns 1 and 2 is a dummy variable that flags competing bids over [0,7]. The dependent variable in Columns 3 and 4 is a dummy variable that indicates upward bid revisions. We use probit regressions in these models and report marginal effects. The dependent variable in Columns 5 and 6 is the bid price revision percentage. We use OLS regressions. The even-numbered regressions add control variables as in Table 2. All regressions include announcement year and industry dummies. The 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.

	<b>Competing bids over [0,7]</b>		<b>Bid revision</b>		<b>% Bid revision</b>	
	1	2	3	4	5	6
<i>Pure Salience</i> <sub><i>t</i>-1</sub>	0.176** (0.077)	0.173*** (0.064)	4.804** (1.906)	4.064* (2.296)	0.370*** (0.086)	0.187** (0.073)
Controls as in T.2	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	1,463	1,463	1,463	1,463
R <sup>2</sup>	0.047	0.198	0.096	0.240	0.056	0.199
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table A2. Robustness test: Removing M&A deals with competing offers**

This table reports OLS regressions of bidders' cumulative abnormal returns (CAR). We use the subsample of M&A deals that do not receive a competing offer after the initial deal is announced. Otherwise, the tests resemble those reported in Table 3. Announcement year 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.

	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>Surprise</i> <sub>t-1</sub>	0.357*** (0.110)	0.335*** (0.112)	-0.282** (0.115)	-0.280** (0.116)	0.072 (0.171)	0.049 (0.170)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	7,858	7,858	7,858	7,858	7,858	7,858
R <sup>2</sup>	0.070	0.109	0.056	0.059	0.059	0.079
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table A3. Additional robustness tests**

Robustness tests of OLS regressions of bidders' reaction to the M&A announcement. The sample is the M&A announcements where the acquirer and the target are in the same 1-digit SIC industry. The dependent variable in the regressions is the bidder's CAR [0,1] unless otherwise stated. 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  $t-1$ . Columns 3 and 4 use value-weighted return surprise, defined as:

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

where  $Mkt\ cap$  is the market capitalization (weight) three days prior to the earnings announcement. Columns 5 and 6 use equally weighted return surprise. In columns 7 through 10, earnings surprises are calculated using analysts' forecast earnings for only those firms coded as industry leaders. Panel B controls for unobserved industry heterogeneity with various multiplicative industry fixed effects. Columns 1 and 2 include bidder-target pair (2-digit SIC) industry fixed effects and year fixed effects. Columns 3 and 4 include bidder industry-year fixed effects and target industry-year fixed effects. In Panel C, 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. In Panel D, we use an alternative industry classification of Fama-French five (FF5) industries. We require the acquirer and the target to belong to the same FF5 industry and that the earnings surprises (calculated based on FF5) are non-zero. The even-numbered regressions add control variables as in Table 2. Unless otherwise indicated, all regressions include announcement year and industry dummies. Our standard errors, which are in parentheses, are double-clustered by 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
$Surprise_{t-1}$	0.129** (0.061)	0.117* (0.065)	0.035* (0.018)	0.041** (0.017)	0.046* (0.027)	0.056** (0.026)	1.129** (0.472)	0.991* (0.510)	0.987* (0.565)	0.942* (0.556)
Controls as in Table 2	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	7,882	7,882	7,882	7,882	7,882	7,882	7,882	7,882	7,882	7,882
R <sup>2</sup>	0.069	0.109	0.069	0.109	0.069	0.109	0.069	0.109	0.069	0.109
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

<b>Panel B. Controls for unobserved heterogeneity</b>						
	1	2	3	4		
<i>Surprise<sub>t-1</sub></i>	0.326*** (0.099)	0.317*** (0.107)	0.285** (0.112)	0.289** (0.111)		
Controls as in Table 2	NO	YES	NO	YES		
Observations	7,882	7,882	7,882	7,882		
R <sup>2</sup>	0.041	0.085	0.031	0.078		
Bidder-Target industry FE	YES	YES	-	-		
Industry × Year FE	-	-	YES	YES		
Year FE	YES	YES	-	-		
<b>Panel C. Target earnings surprises and non-public targets</b>						
	All M&As in the same 1-digit SIC		Subsample of non-public targets			
	1	2	3	4		
<i>Surprise<sub>t-1</sub></i>	0.353*** (0.111)	0.332*** (0.114)	0.242*** (0.088)	0.212** (0.100)		
Target's own surprise	0.116 (0.110)	0.078 (0.106)	- -	- -		
Controls as in Table 2	NO	YES	NO	YES		
Observations	7,882	7,882	6,275	6,275		
R <sup>2</sup>	0.070	0.109	0.073	0.106		
Year FE	YES	YES	YES	YES		
Industry FE	YES	YES	YES	YES		
<b>Panel D. Alternative industry definition: Fama-French five industries</b>						
	CAR[0,1]		CAR[2,7]		CAR[0,7]	
	1	2	3	4	5	6
<i>FF5 Surprise<sub>t-1</sub></i>	0.305** (0.123)	0.305** (0.149)	-0.498*** (0.176)	-0.477** (0.182)	-0.223 (0.256)	-0.204 (0.261)
Controls as in Table 2	NO	YES	NO	YES	NO	YES
Observations	3,063	3,063	3,063	3,063	3,063	3,063
R <sup>2</sup>	0.114	0.149	0.104	0.107	0.104	0.123
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

**Table A4. Experimental design validation**

Panel A reports OLS regressions of bidder/target peer firms' stock response to earnings surprises by firms in the same 1-digit SIC. Industry peers are 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 bidders' stock reaction to earnings surprises by firms that do not operate in the bidder's 1-digit SIC. Panel C reports the actual bidders' CAR response to earnings surprises of all firms in the market. Fixed effects are indicated at the bottom of each panel. 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**

	Target Peer				Bidder Peer			
	CAR[0,1]	AR[-1]	AR[0]	AR[1]	CAR[0,1]	AR[-1]	AR[0]	AR[1]
	1	2	3	4	5	6	7	8
<i>Surprise<sub>t-1</sub></i>	0.010 (0.008)	0.029 (0.018)	0.018 (0.013)	-0.005 (0.006)	0.029 (0.025)	0.020 (0.014)	0.019 (0.019)	0.007 (0.011)
Observations	157,264	157,264	157,264	157,264	153,205	153,205	153,205	153,205
R <sup>2</sup>	0.004	0.004	0.003	0.004	0.003	0.004	0.004	0.003
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-month FE	YES	YES	YES	YES	YES	YES	YES	YES

**Panel B. Bidders' reactions to unrelated earnings surprises**

	CAR[0,1]		AR[-1]		AR[0]		AR[1]	
	1	2	3	4	5	6	7	8
	<i>Unrelated surprise<sub>t-1</sub></i>	-0.008 (0.087)	-0.004 (0.101)	-0.040 (0.036)	-0.039 (0.035)	0.036 (0.059)	0.038 (0.071)	-0.022 (0.071)
Observations	7,882	7,882	7,882	7,882	7,882	7,882	7,882	7,882
R <sup>2</sup>	0.069	0.108	0.053	0.058	0.066	0.105	0.057	0.069
Controls as in T.2	NO	YES	NO	YES	NO	YES	NO	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

**Panel C. Acquirers' reactions to overall market earnings surprises**

	Bidders' CAR[0,1]			
	All M&As in the same 1-digit SIC		Non-zero market surprises	
	1	2	3	4
<i>Market surprise<sub>t-1</sub></i>	0.055 (0.074)	0.056 (0.084)	0.047 (0.079)	0.052 (0.093)
Observations	7,882	7,882	5,023	5,023
Controls as in T.2	NO	YES	NO	YES
R <sup>2</sup>	0.069	0.108	0.089	0.126
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES