


Earnings Growth and Acquisition Returns: Do Investors Gamble in the Takeover Market?

Tingting Liu 
Iowa State University Ivy College of Business
tliu@iastate.edu (corresponding author)

Danni Tu
Southern Illinois University Carbondale College of Business and Analytics

Abstract

We document a strong positive initial market reaction to merger announcements from bidders with either large earnings growth or significant earnings decline, relative to those with neutral earnings change, reflecting a U-shaped pattern between bidders' earnings growth and announcement returns. However, the higher initial returns for bidders with earnings decline subsequently reverse, whereas the higher returns for bidders with high growth do not. We further show that the return patterns are driven by a tendency for retail investors to gamble that merger and acquisition deals initiated by poorly performing bidders will generate high synergies.

I. Introduction

Given that firms' reported earnings numbers are the single most important measure of firm performance, a large body of literature investigates the impact of earnings growth on asset prices and stock returns.¹ The broad conclusion from this literature is that earnings growth (i.e., change in earnings) is positively associated with subsequent stock returns (e.g., Easton and Harris (1991), Kothari, Lewellen, and Warner (2006), and Chen and Zhang (2007)). In this article, we investigate how earnings growth affects returns to mergers and acquisitions (M&As), one of the most important events in the corporate world. Specifically, we examine how the earning performance of bidding firms affects investor reactions to acquisition announcements.

Pursuing fast business growth is one of the most common motives for companies transacting in the M&A market. Theoretical studies suggest that acquirers have

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¹See Nichols and Wahlen (2004) and Kothari and Wasley (2019) for a review of the role of earnings numbers in the capital markets.

high-growth opportunities prior to M&As. These high-growth acquirers seek investment opportunities from target firms in the M&A market (Jovanovic and Braguinsky (2004), Rhodes-Kropf and Robins (2008), and Levine (2017)). However, it is not uncommon for firms with substantial earnings declines to make acquisitions. Moreover, anecdotal evidence suggests that investors are often enthusiastic about these acquisitions announced by companies suffering significant earnings decline.

For example, after reporting about a 21% earnings decline in Mar. 2014, the construction company William Lyon Homes announced its plan to acquire Polygon Northwest-Residential for \$520 million later that year. [Figure A1](#) in the [Appendix](#) shows cumulative raw return and cumulative returns for the CRSP value-weighted index around the deal announcement. William Lyon Homes' share price increased by more than 14% in the 2 days following the announcement on June 23, 2014, but significantly reversed in the following month. The strong market reactions to the announcement and the substantial price reversal afterward clearly suggest that the initial positive reaction reflects investor overreaction to the acquisition announcement. In this article, we ask two questions. First, do investors systematically overreact to acquisitions announced by bidders suffering earnings declines? Second, if they do overreact, what behavior bias is most likely contributing to this irrationality?

We focus on the bidders' recent earnings growth (i.e., the change in net income during the most recent 2 years prior to the merger) because investors consider earnings the single most important item in the financial reports (Block (1999), DeGeorge, Patel, and Zeckhauser (1999)). As a result, bidders' recent earnings performance may significantly influence how investors perceive the M&A deal.² We begin by examining how a bidder's acquisition announcement returns are associated with the bidder's recent earnings growth. We consider two alternative hypotheses. The rational expectation hypothesis assumes that investors are unbiased and that the market, on average, is efficient in evaluating deal quality. Therefore, the price movement around the merger announcement reflects the change in the fundamental value of the acquirer and should not be followed by price drift or reversal in the post-announcement period. In contrast, the investor overreaction, or mispricing hypothesis, as illustrated by the William Lyon Homes acquisition example, suggests that investors may systematically overweight the probability of high synergies and underweight the riskiness associated with an acquisition, particularly for acquiring firms that had recently experienced earnings declines. Under these assumptions, this initial price overreaction should be followed by subsequent price reversals.

Using more than 37,000 M&A deals that involve public bidders from 1981 to 2017, we begin our analysis by plotting the cumulative abnormal returns (CARs) to bidding firms over a 5-day window surrounding the merger announcement for decile portfolios based on the earnings growth of the bidding firms. [Figure 1](#) shows a preview of our first main result, revealing a U-shaped relationship in which the initial returns around acquisition announcements are much higher for bidding firms with either significantly high earnings growth or substantial earnings decline.

²Block (1999) surveys financial analysts and reports that even analysts rank earnings as a more important valuation tool than cash flows. In [Section V.B.2](#), we conduct a battery of robustness tests and find that our results are robust using alternative earnings performance measures.

FIGURE 1

Bidder Acquisition Announcement Returns by Earnings Growth Deciles

Figure 1 shows bidder CAR(-2,2) against earnings growth deciles, 1 (lowest) to 10 (highest). CAR(-2,2) is the cumulative average abnormal returns in a 5-day window surrounding the merger announcement using market-adjusted returns from the CRSP value-weighted index. Day 0 is the acquisition announcement date. The sample includes deals announced between 1981 and 2017. Returns are in percentage.

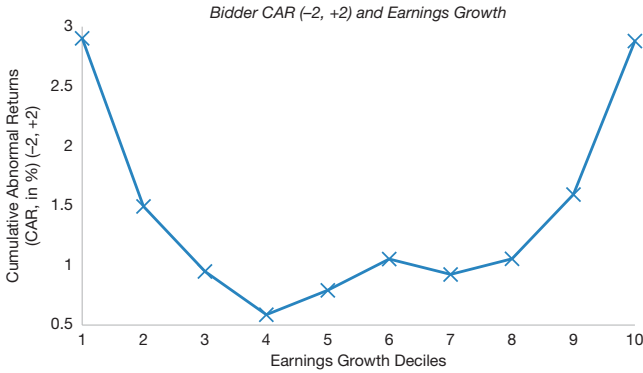


FIGURE 2

Bidder Cumulative Abnormal Returns by Earnings Growth Type

Figure 2 displays bidder cumulative abnormal returns, adjusted by the market-adjusted returns from the CRSP value-weighted index, from 5 trading days prior to the merger announcement to 42 trading days after the announcement. We place bidders into three groups: low, moderate, and high growth. We define bidders as low-growth bidders if their growth deciles are 3 or lower. We define bidders as high-growth bidders if their growth deciles are 8 or higher. We define the rest of the bidders as moderate-growth bidders. The sample includes deals announced between 1981 and 2017. Returns are in percentage.

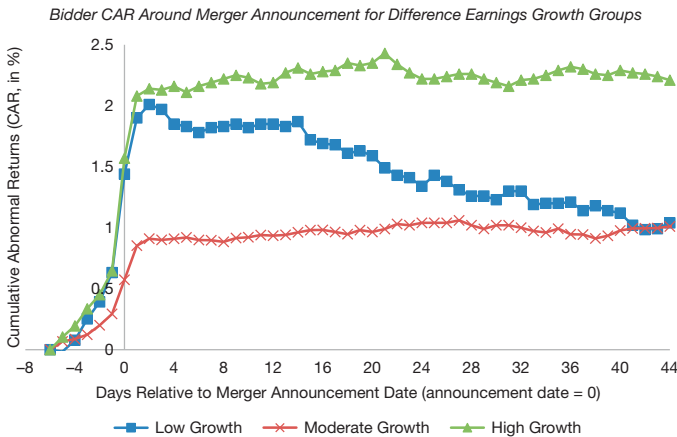


Figure 2 shows a preview of our second main result. This graph shows the daily CARs over the 2-month period from day -5 to day +42 around acquisition announcements for three groups of bidders with low, moderate, and high earnings growth. Among bidders with low earnings growth, the large positive initial market reaction is followed by a reversal over the subsequent months. In contrast, the large initial returns for bidding firms with high earnings growth remain high over the next

2 months. Further regression analysis indicates that these return patterns are robust after controlling for deal and firm characteristics, and year and industry fixed effects.

Next, we investigate which investor behavior is most likely contributing to the overreaction. We conjecture that investors' attitudes toward gambling likely result in the overvaluation of poor-performing bidders at the announcement time. This explanation is motivated by a growing literature showing that investors, particularly retail investors, concentrate their trading in stocks with lottery-like payoffs (i.e., Kumar (2009a), Bali, Cakici, and Whitelaw (2011), Green and Hwang (2012), and Byun and Kim (2016)). In the M&A context, acquisitions made by bidders with significant earnings declines provide attractive opportunities to investors with a taste for gambling. Acquisitions have risky payoffs, especially when they are made by acquirers that have already been experiencing deteriorating operating performance. An unsuccessful acquisition can have a more detrimental effect on these bidders. However, there is a small probability that the acquisition will create high synergistic gains, which may quickly turn around the sinking ship. This betting on poor-performing firms to make good acquisitions mentality is similar to the well-documented favorite–long-shot bias in racetrack gambling in which bettors consistently overbet long shots and underbet favorites (e.g., Thaler and Ziemba (1988), Snowberg and Wolfers (2010)).

To investigate whether investor gambling behavior can explain the initial overreaction and subsequent price reversal of bidders with earnings declines, we first examine whether our results are concentrated among bidders with high retail holdings because, as discussed earlier, retail investors are attracted to lottery-type stocks. Consistent with our expectations, we find that the mispricing results are concentrated in the subsample of bidders with high retail holdings.

We acknowledge that retail investors' behavioral biases are not limited to gambling. To provide further evidence on the gambling channel, we conduct cross-sectional analyses by comparing subsamples based on stock lottery-type characteristics. Since investors with a taste for gambling concentrate their trading in stocks with lottery-like payoffs, such as high volatility and extreme positive returns (e.g., Kumar (2009a), Bali et al. (2011)), we separate deals into subsamples based on the bidding firms' pre-merger volatility and maximum returns. We further construct a lottery index, following Bali, Hirshleifer, Peng, and Tang (2019). In each case, we find that the results are concentrated among bidders with lottery-like payoffs.

We next investigate how investors' propensity to gamble affects our findings. We follow Baker and Wurgler (2006) and use an investor sentiment index to capture investors' propensity to speculate. We find that the return patterns are concentrated among the subsample with high investor gambling propensity. Schneider and Spalt (2016), (2017) show that CEOs with a propensity to gamble prefer riskier target firms in M&As. We therefore follow Schneider and Spalt (2016) to measure the CEO's gambling preference and then conduct a subsample analysis. We find that our results are concentrated in the subsample with high managerial gambling propensity, suggesting that investors with a taste for gambling follow managers who are more likely to gamble.

We next investigate the distribution of ex-post returns to M&A announcements to identify whether there are a few winners among bidders with negative

earnings growth. Although we document that, on average, these bidders underperform in the post-M&A period, gambling may be rational if the payoffs are sufficiently large and not too improbable. Our results support this explanation. We find that bidders with negative earnings growth have a higher return volatility and a fatter right tail in the post-merger return distribution. The top 10% of returns (i.e., returns higher than 90% of the estimates, denoted as P90) are almost always larger for bidders with negative earnings growth compared to those with positive growth. This analysis provides further support that bidder stocks with negative growth indeed exhibit lottery-like features that attract individual investors with the propensity to gamble.

Our results hold up under several robustness checks including using alternative measures of earnings growth, using analysts' earnings forecasts (instead of the previous year's earnings) as an alternative benchmark, using alternative scalars, using cash flows or stock returns to measure recent firm performance, and using alternative econometric specifications. We also investigate whether our results are supported by other alternative explanations including investor attention and overconfidence. We fail to find support for these alternative explanations. Collectively, our empirical results strongly suggest that retail investors' gambling behavior is most likely to explain the overreaction to acquisition announcements made by bidders with earnings declines.

Our article makes several contributions. First, our article adds to the growing literature that investigates how investors' gambling behavior affects their investment decisions and asset returns (Kausar, Taffler, and Tan (2009), Kumar (2009a), Bali et al. (2011), Green and Hwang (2012), Kausar, Kumar, and Taffler (2013), Dorn, Dorn, and Sengmueller (2015), Byun and Kim (2016), and Kumar, Page, and Spalt (2016)). Our article is also broadly related to the literature documenting investors' inefficient response to new information. A major finding of this literature is that investors underreact to news such as earnings releases and analysts' forecast revisions (e.g., Ball and Brown (1968), Givoly and Lakonishok (1980), Bernard and Thomas (1989), Stickel (1991), Chan, Jegadeesh, and Lakonishok (1996), Gleason and Lee (2003), and Livnat and Mendenhall (2006)).³ We extend this literature by documenting evidence that, due to gambling incentives, investors *overreact* to M&A announcements made by bidders with earnings declines.

Second, our article contributes to the extensive literature investigating the performance of bidding firms around M&A announcements. Although a large number of studies examine factors such as deal and firm characteristics that may affect the bidder announcement returns, few studies consider whether and how potential investor behavioral biases may affect bidder returns around acquisition announcements.⁴ Notable exceptions include a few recent studies by Louis and Sun

³A large body of asset pricing research documents that security prices underreact to news over short horizons of 6–12 months (momentum), and overreact to news over long horizons of 3–5 years (return reversals). For example, see De Bondt and Thaler (1985), Jegadeesh and Titman (1993), (2001), and Rouwenhorst (1998).

⁴For example, prior studies show that target public status, bidder size, market-to-book ratio, form of the deal (i.e., merger vs. tender offer), and method of payment (i.e., cash vs. stock) are significantly related to bidder announcement returns (e.g., Lang, Stulz, and Walking (1989), Servaes (1991),

(2010), Baker, Pan, and Wurgler (2012), and Ma, Whidbee, and Zhang (2019).⁵ We extend this small but growing literature by showing that earnings change, whether positive or negative, is significantly related to bidder returns. The most likely explanation for this outcome is that investors bet on acquisitions announced by bidders with negative earnings growth, creating a U-shaped pattern between earnings growth and bidder announcement returns.

Finally, our findings have implications regarding the use of market reactions around M&A announcements to estimate shareholders' wealth effects. Ever since Fama, Fisher, Jensen, and Roll (1969) produced evidence on how stock prices respond to new information, event studies have become standard practice in corporate finance literature.⁶ A crucial assumption, however, is that the market efficiently incorporates new information into stock prices. Focusing on *target* firms' stock returns around both M&A announcements and takeover rumors, Bessembinder and Zhang (2015) find evidence of investor overreaction. In contrast, our article investigates how investor behavior bias affects *bidder* announcement returns. Moreover, we explore the types of behavioral biases that drive bidder mispricing around M&A announcements. Our article therefore adds to the small literature that casts doubt on the efficacy of using the short-horizon event study methodology to measure bidder gains (e.g., Mitchell, Pulvino, and Stafford (2004), Liu and Wu (2014)).⁷

II. Hypothesis Development

A. Hypothesis Under the Assumption of Investor Rationality

Acquisitions are external investments. The traditional Q-theory of investment focuses on the reallocation of physical capital from firms with low productivity to those with high productivity (e.g., Jovanovic and Rousseau (2002)). Levine (2017) shows that M&As create value by allowing investment opportunities to flow to firms that are most capable of exploiting their potential. In equilibrium, bidders with high productivity and low costs gain by acquiring targets with quality projects but also high costs. Although there are no clear theoretical predictions about the relationship between earnings growth and bidder returns, empirical studies (in the non-M&A setting) generally find a positive relationship between earnings change and subsequent stock returns (e.g., Easton and Harris (1991), Kothari et al. (2006), and Chen and Zhang (2007)).

The M&A literature shows that the sources of merger gains come from efficiency improvement, corporate governance transfers from bidders to target firms, management expertise, human capital transfer from bidders to target firms,

Chang (1998), Harford (1999), Moeller, Schlingemann, and Stulz (2004), Cooney, Moeller, and Stegemoller (2009), Officer, Poulsen, and Stegemoller (2009), and Offenbergl and Pirinsky (2015)).

⁵Baker et al. (2012) and Ma et al. (2019) find that the anchoring bias influences deal outcomes. Louis and Sun (2010) show that investors' inattention affects bidder announcement returns.

⁶Ben-David, Bhattacharya, and Jacobsen (2020) show that the bidder announcement return has become the most widely used measure for value creation in M&As.

⁷Mitchell et al. (2004) and Liu and Wu (2014) show that about half of the negative announcement returns for bidders paying stocks to buy public targets reflects downward price pressure.

and so forth.⁸ However, many deals also fail to achieve the anticipated merger synergies, particularly for acquiring firms with poor growth options (e.g., McGee, Thomas, and Thomson (2015), Hoberg and Phillips (2018)). Therefore, bidders with negative earnings growth are likely to experience particularly poor merger outcomes.

Under the assumption that bidders with strong earnings growth are in a better position to identify ideal target firms that allow them to transfer their superior management skills or productive opportunities, acquisitions announced by bidders with high earnings growth are potentially more value-creating when compared with acquisitions announced by bidders with low earnings growth. Furthermore, under rational expectations, the market incorporates new information rapidly and efficiently. Therefore, no price drift or reversal should follow the acquisition announcement. The above discussions lead to our first hypothesis:

Hypothesis 1. Deals announced by bidders with high (low) earnings growth are more (less) value-creating, and there is no price drift or reversal during the post-announcement period.

B. Hypotheses Under the Assumption of Investor Irrationality

In this section, we allow investors to behave irrationally and discuss predictions related to this assumption. If investors systematically overreact to acquisitions announced by bidders with earnings declines, as illustrated by the anecdotal example in the introduction, then stock prices are overvalued at the acquisition announcement for these bidders. If rational investors such as arbitrageurs are limited in their ability to compete and correct the mispricing, the price overreaction is expected to be followed by subsequent price reversals in the post-announcement period.

We further hypothesize that investors' attitudes toward gambling are likely to explain the overvaluation of poor-performing bidders at the announcement. Previous studies show that people's gambling preferences may affect investment decisions (e.g., Friedman and Savage (1948), Markowitz (1952), Shiller (1989), (2000), Shefrin and Statman (2000), Statman (2002), Barberis and Huang (2008), Kumar (2009a), Bali et al. (2011), and Green and Hwang (2012)). Moreover, the gambling hypothesis predicts that investors are more willing to bet on acquisitions made by bidders with deteriorating performance, compared to bidders with high growth.

Prior literature shows that in sports betting, such as racetrack gambling, bettors consistently overbet long shots and underbet favorites relative to their observed frequency of winning (e.g., Thaler and Ziemba (1988)). Snowberg and Wolfers (2010) further suggest that misperceptions of probability drive the favorite–long-shot bias. In the M&A setting, this favorite–long-shot bias implies that gambling M&As made by poor-performing firms are more attractive because a successful acquisition could be a game-changer for a firm experiencing declining operating

⁸For example, Devos, Kadapakkam, and Krishnamurthy (2009), Wang and Xie (2009), Hoberg and Phillips (2010), Erel (2011), and Li, Qiu, and Shen (2018b).

performance and limited internal growth opportunities. In addition, Thaler and Johnson (1990) show that when decision-makers have prior losses, as is likely in the case of low-growth bidders, an outcome that could offer the opportunity to “break even” is especially attractive. However, the likelihood of a poor-performing firm engaging in a high synergy acquisition is low, given its limited ability to compete for high-quality targets and its difficulty in integrating the target post-merger due to constrained resources. If investors overweight the probability of deal success and underweight the probability of deal failure for bidders with earnings decline, we expect price overreaction to acquisition announcements, which leads to temporary mispricing and subsequent post-announcement price reversals. The above discussions lead to our second hypothesis:

Hypothesis 2. Investors overreact to acquisitions announced by bidders with low earnings growth. This overreaction pushes the stock price to increase around the acquisition announcement and to decline during the post-merger announcement period.

The gambling hypothesis also has cross-sectional implications. For example, prior literature shows that retail investors tend to exhibit a stronger preference for gambling because they are less sophisticated and more behaviorally biased (Black (1986), Odean (1998), Barber and Odean (2000), Benartzi and Thaler (2001), Kumar (2009a), and Conrad, Kapadia, and Xing (2014)). Moreover, investors with a taste for gambling concentrate their trading on stocks with lottery-like payoffs, such as stocks with high volatility or high extreme positive returns (Kumar (2009a), Bali et al. (2011)). Byun and Kim (2016) further show that the overvaluation of lottery-like options is attributable to investor sentiment, which reflects investors’ propensity to speculate. We therefore state the following set of hypotheses:

Hypothesis 2a. Overreaction to acquisitions announced by bidders with low earnings growth is concentrated among stocks traded mainly by individual investors.

Hypothesis 2b. Overreaction to acquisitions announced by low earnings growth bidders is affected by investors’ propensity to gamble.

III. Sample

A. Sample Formation and Overview

We begin with all announced U.S. M&A transactions from Jan. 1, 1981 to Dec. 31, 2017 in the Thomson One Banker Securities Data Company (SDC) database. When calculating earnings growth, we require bidders to have at least 2 years of earnings data on Compustat prior to the acquisition announcement. Earnings growth is computed as the change in net income during the 2-year period immediately prior to the merger announcement, deflated by the book value of equity. We follow Cen, Wei, and Yang (2017) and use the book value of equity as a deflator to avoid concerns about using either share prices or a market value-based deflator

TABLE 1
Summary Statistics

Table 1 sample consists of 37,004 deals announced between 1981 and 2017. Panel A presents summary statistics for the full sample. Panel B compares bidder announcement returns among different earnings growth groups. We report statistics of bidder's earnings growth and bidder CAR(-2,2) by deciles, 1 (lowest) to 10 (highest). CAR(-2,2) is the cumulative average abnormal returns in a 5-day window surrounding the merger announcement using market-adjusted returns from the CRSP value-weighted index. Definitions of all variables are provided in the Appendix. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Summary Statistics

	N	Mean	Std. Dev.	Median	P5	P95
CAR(-2,2)	36,343	1.42%	11.70%	0.36%	-10.37%	15.46%
CAR(3,23)	36,342	-0.28%	11.64%	-0.49%	-19.15%	19.17%
CAR(3,44)	36,342	-0.50%	16.54%	-0.80%	-27.54%	26.84%
CAR(3,65)	36,342	-0.87%	20.30%	-1.32%	-33.80%	33.33%
EG	37,004	0.030	1.178	0.023	-0.315	0.356
B/M	36,974	0.573	0.407	0.491	0.092	1.359
BIDDER_SIZE	37,004	5,538.19	16,470.07	684.65	20.89	26,432.91
log(BIDDER_SIZE)	37,003	6.550	2.167	6.529	3.039	10.182
STOCK_PAYMENT	37,004	0.169	0.375	0.000	0.000	1.000
CASH_PAYMENT	37,004	0.253	0.435	0.000	0.000	1.000
PRIVATE_TARGET	37,004	0.791	0.407	1.000	0.000	1.000
RELATIVE_SIZE	36,440	0.376	3.029	0.088	0.004	1.303
LEVERAGE	37,003	0.204	0.200	0.155	0.000	0.597
SAME_INDUSTRY	37,004	0.444	0.497	0.000	0.000	1.000
TENDER_OFFER	37,004	0.034	0.182	0.000	0.000	0.000
TOEHOLD	37,004	0.019	0.135	0.000	0.000	0.000
HOSTILE	37,004	0.015	0.123	0.000	0.000	0.000
PRIOR_RETURN	36,993	13.109	54.625	2.919	-48.502	108.15
WITHDRAWN	37,004	0.054	0.225	0.000	0.000	1.000

Panel B. Bidders Merger Announcement Return and Earnings Growth

Decile	Earnings Growth (EG)			Bidder CAR(-2,+2)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
1	-0.907	-0.316	2.486	2.903%	0.557%	17.474%
2	-0.079	-0.068	0.047	1.494%	0.444%	13.581%
3	-0.021	-0.015	0.022	0.949%	0.213%	9.892%
4	0.003	0.007	0.013	0.587%	0.168%	7.284%
5	0.017	0.019	0.009	0.791%	0.186%	7.072%
6	0.028	0.030	0.009	1.053%	0.375%	7.997%
7	0.042	0.043	0.011	0.924%	0.356%	7.464%
8	0.065	0.064	0.017	1.055%	0.385%	7.815%
9	0.120	0.114	0.040	1.594%	0.614%	16.665%
10	1.032	0.356	2.417	2.880%	0.755%	14.690%

(Ball (2011), Cheong and Thomas (2011)).⁹ Panel A of Table 1 in the Supplementary Material lists the steps taken to form the final sample of 37,004 observations. Panel B presents the temporal distribution of our sample. Consistent with prior studies (e.g., Andrade, Mitchell, and Stafford (2001), Harford (2005)), we observe a large merger wave in the late 1990s and the early 2000s.

B. Full Sample Summary Statistics

Panel A of Table 1 reports summary statistics for the full sample.¹⁰ The mean (median) bidder earnings growth prior to the merger is 3% (2%). Seventeen percent of the deals are financed entirely with stock, and 25% are financed entirely with

⁹In Section V.B.2, we use the book value of total assets as an alternative deflator and find that our results are robust.

¹⁰All variables are defined in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles.

cash. Seventy-nine percent of the deals have nonpublic target firms, and less than 2% of bidders have a toehold prior to the merger. Approximately 3% of the deals are tender offers. Approximately 5% of the deals are withdrawn, and 44% of the targets and bidders are from the same industry. Overall, these summary statistics show that the intertemporal patterns and deal characteristics in our data mirror the samples used in prior research on publicly traded bidders. Table 2 in the Supplementary Material reports the correlation matrix for our sample. In general, none of the correlations warrant any concern for multicollinearity.

IV. Earnings Growth and Market Reactions to Merger Announcements

A. Bidder Cumulative Abnormal Returns and Earnings Growth

As an initial step to examine the relationship between bidders' earnings growth and merger announcement returns, we first sort our sample into deciles based on bidders' recent earnings growth and report the average CARs in a 5-day window surrounding the merger announcement ($CAR(-2,2)$). Panel B of Table 1 reports the summary statistics of bidders' recent earnings growth and $CAR(-2,2)$ for each decile group. The mean of bidders' earnings growth goes from -0.907 for decile 1 to 1.032 for decile 10. The sufficient variation in bidders' earnings growth allows us to make meaningful statistical inferences in later empirical tests.

Panel B of Table 1 reports strong positive market reactions to mergers announced by bidders with either very high or very low earnings growth. For example, bidders with the lowest earnings growth earn an average $CAR(-2,2)$ of 2.90% (unreported t -statistic = 9.9), and bidders with the highest earnings growth earn an average $CAR(-2,2)$ of 2.88% (unreported t -statistic = 11.8). Bidders among the other eight decile groups have average $CAR(-2,2)$ of around 1%.

We then plot bidder $CAR(-2,2)$ against earnings growth deciles in Figure 1. Visual inspection reveals a clear U-shaped pattern between earnings growth and acquisition announcement returns. Both Figure 1 and Panel B of Table 1 show that the relationship between a bidder's earnings growth and their acquisition announcement return is nonlinear. A bidder's announcement return appears to be positively related to the degree of that bidder's earnings deviation from that of the previous year (i.e., it does not matter whether earnings deviate in a positive or negative manner).

B. Cross-Sectional Regression Analysis of Announcement Abnormal Returns

In this section, we formally examine the relationship between earnings growth and acquisition returns by employing a multiple regression analysis. Our regression model is specified as

$$(1) \quad CAR(-2, 2) = \alpha + \beta_1 |EG|^- + \beta_2 |EG|^+ + \text{CONTROLS} + \varepsilon,$$

where the dependent variable is the bidder's $CAR(-2,2)$. We construct our main independent variables based on the observation in Figure 1 that visually shows a

nonlinear relationship between bidders' acquisition returns and their earnings growth. We therefore adopt a piecewise linear regression to allow the coefficients of earnings growth to vary across firms with positive versus negative growth. We use negative earnings growth ($|EG|^-$) and positive earnings growth ($|EG|^+$) as our main independent variables to capture the asymmetric market reactions to acquisitions made by bidders with negative versus positive earnings deviations, respectively.

Table 2 reports regression results. We first test the relationship between the *level* of a bidder's earnings growth and their acquisition return in column 1. We find that the coefficient on the level of a bidder's earnings growth (EG) is insignificant (t -value = 0.46). This is not surprising, given the evidence shown in Section IV.A that the relationship between bidders' earnings growth and acquisition returns is nonlinear. In contrast, column 2 shows that the coefficients on both $|EG|^-$ and $|EG|^+$ are positive and highly significant. This relationship remains robust after we control for deal/firm characteristics in column 3 and industry and year fixed effects in column 4.¹¹

Economically, for bidders with positive earnings growth, a 1-standard-deviation increase in EG is associated with an increase in bidder announcement returns of 2.274%, after controlling for a broad range of firm/deal characteristics and industry/year effects in column 4. For bidders with negative earnings growth, a 1-standard-deviation increase in EG is associated with an increase in bidder announcement returns of 3.063%.¹² Given that the average announcement return is 1.42%, the magnitudes of these coefficients are economically meaningful. Overall, the results reported in Table 2 provide strong evidence that earnings change, regardless of the direction, is significantly related to bidder announcement returns.¹³

C. Short-Term Post-Announcement Returns

To test whether the initial positive returns to acquisition announcements are due to investor overreaction, we examine bidders' short-term post-announcement returns. Specifically, if the strong positive market reaction to bidders with earnings decline reflects investors' updated rational beliefs based on the arrival of new information, we should not observe price reversal after the merger announcement. However, if the announcement returns reflect investor overreaction, we expect to

¹¹As a robustness check, we include industry \times year fixed effects in the regressions and find that our results remain robust (see Table 3 in the Supplementary Material).

¹²For bidders with positive earnings growth, we estimate the economical magnitude by using the coefficient of $|EG|^+$ reported in column 4 of Table 4 (1.930) multiplied by the standard deviation of EG. For bidders with negative earnings growth, we estimate the economical magnitude by using the coefficient of $|EG|^-$ multiplied by the standard deviation.

¹³Several control variables in Table 2 have significant effects on bidder returns and are largely consistent with prior studies. For example, bidders have higher returns when acquiring private target firms (e.g., Chang (1998), Officer et al. (2009), and Li, Liu, and Wu (2018a)). Moeller et al. (2004) and Boone and Mulherin (2008) report that large bidders have lower announcement returns. The method of payment and whether a deal is structured as a tender offer are also related to announcement returns (e.g., Travlos (1987), Lang et al. (1989), and Offenberg and Pirinsky (2015)).

TABLE 2
Cross-Sectional Regression Analysis of Announcement Abnormal Returns

Table 2 reports OLS regression results of bidder announcement returns. The dependent variable is bidder CAR(-2,2). The independent variable in column 1 is the level of earnings growth (EG). The independent variables in columns 2–4 are the absolute value of negative earnings growth ($|EG|^-$) and the absolute value of positive earnings growth ($|EG|^+$). Definitions of all variables are provided in the Appendix. Industry effects are based on the Fama and French (1997) industry classification. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

	Dependent Variable: CAR(-2,+2)			
	1	2	3	4
EG	0.155 (0.46)			
$ EG ^-$		3.753*** (6.77)	2.790*** (4.48)	2.600*** (4.09)
$ EG ^+$		2.812*** (6.23)	2.042*** (4.44)	1.930*** (4.15)
log(B/M)			0.584*** (4.28)	0.575*** (4.05)
STOCK_PAYMENT			0.841*** (3.63)	0.801*** (3.19)
CASH_PAYMENT			0.471*** (4.25)	0.387*** (3.35)
PRIVATE_TARGET			2.391*** (14.52)	2.396*** (14.23)
RELATIVE_SIZE			0.301 (1.49)	0.297 (1.48)
log(BIDDER_SIZE)			-0.531*** (-14.09)	-0.562*** (-13.61)
LEVERAGE			0.002 (0.01)	0.012 (0.03)
SAME_INDUSTRY			0.039 (0.33)	-0.163 (-1.18)
TENDER_OFFER			1.624*** (6.14)	1.674*** (6.34)
TOEHOLD			-0.050 (-0.15)	-0.035 (-0.11)
HOSTILE			-0.985*** (-2.65)	-0.850** (-2.28)
PRIOR_RETURN			-0.003** (-1.99)	-0.004** (-2.08)
Constant	1.417*** (22.74)	0.957*** (14.72)	2.701*** (6.53)	1.044 (0.94)
Year FE	No	No	No	Yes
Industry FE	No	No	No	Yes
No. of obs.	36,343	36,343	35,202	35,202
F^2	0.000	0.006	0.034	0.039

observe a return reversal following the announcement. For our post-announcement return analysis, we choose relatively short periods (i.e., 1–2 months or 21–42 trading days).¹⁴ The short windows have several advantages. First, firm fundamentals are unlikely to change dramatically during such short periods. Therefore, we can more credibly attribute price reversal (if it exists) to potential mispricing at the announcement. Second, compared to long-run returns over 3–5 years, returns over a few months are less likely to face the “bad-model problem,” as discussed in Fama

¹⁴We also extend the short-term post-announcement window into 3 months or 63 trading days after the merger announcement date in an untabulated analysis and find the results are similar.

(1998). However, one disadvantage of using short periods is that results cannot be identified if mispricing takes longer to be corrected.¹⁵

Figure 2 shows the bidders' cumulative average abnormal returns from 5 trading days before the merger announcement to 42 trading days after the announcement date for bidders with high, low, and moderate earnings growth, respectively. Figure 2 shows a clear reversal pattern for low-growth bidders right after the merger announcement. In contrast, for moderate- and high-growth bidders, we do not observe any obvious return drift or reversal from day 3 to day 42.

We further examine the relationship between bidders' short-term post-announcement returns and their earnings growth by replacing the dependent variable in equation (1) with post-announcement returns over two alternative windows: CAR(3,23) and CAR(3,44). Table 3 reports the regression results. Column 1 shows that $|EG|^+$ is not significantly related to CAR(3,23), suggesting that bidders with positive earnings growth do not have return reversal after the merger announcement. In contrast, the coefficient on $|EG|^-$ is significantly negative, suggesting that there is a return reversal after the merger announcement for bidders with negative earnings growth. Column 2 shows a similar pattern for CAR(3,44). In columns 3 and 4, we control for deal/firm characteristics and year/industry fixed effects. The results remain robust. The return reversals for bidders with negative earnings growth are also economically large. For example, column 4 shows that the coefficient of $|EG|^-$ is -2.332 , indicating that a 1-standard-deviation increase in EG reduces returns by 2.75% for the negative earnings growth bidders during the 2-month period after the announcement.

Taken together, the results reported in Tables 2 and 3 and Figures 1 and 2 are inconsistent with Hypothesis 1 and are strongly consistent with Hypothesis 2. That is, the strong positive market reaction to merger announcements combined with subsequent price reversals indicates that investors overreact to acquisitions announced by bidders experiencing significant earnings decline. In contrast, high announcement returns do not reverse for bidders with high earnings growth.

D. Investigating Investors' Gambling Preferences

To investigate investors' gambling preferences, we first compare firm characteristics among bidders with high, low, and moderate earnings growth reported in Table 4 in the Supplementary Material. We find that bidders with low earnings growth have a higher book-to-market ratio and lower past returns, compared with bidders with high earnings growth. Moreover, low-growth bidders have higher extreme past returns, higher return volatilities, higher lottery indexes, lower analyst coverage, and higher retail holdings, indicating that gambling incentives may play a role in explaining acquisition returns. We next conduct subsample analyses to further explore this explanation.

1. Retail Investors

Prior literature shows that retail investors are attracted to stocks with lottery-like payoffs (e.g., Kumar (2009a), Bali et al. (2011), (2019)). To investigate whether

¹⁵To address this potential concern, later in the article, we investigate post-merger intermediate-term return performance during 1–3 years.

TABLE 3
Cross-Sectional Regression Analysis of Short-Term Returns

Table 3 reports a cross-sectional regression analysis of bidder short-term returns. Columns 1 and 3 report post-merger announcement abnormal returns measured from day +3 (i.e., day +3 to day 23). Columns 2 and 4 report total announcement abnormal returns measured from day +3 to day 44. Day 0 is the acquisition announcement date. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

	Dependent Variable			
	CAR(3,23)	CAR(3,44)	CAR(3,23)	CAR(3,44)
	1	2	3	4
IEG ⁻	-1.620*** (-3.44)	-2.646*** (-3.93)	-1.240** (-2.38)	-2.332*** (-3.11)
IEG ⁺	-0.044 (-0.12)	0.351 (0.68)	0.424 (1.05)	0.965* (1.71)
log(B/M)			0.531*** (4.63)	1.005*** (6.19)
STOCK_PAYMENT			-0.343 (-1.53)	-0.966*** (-3.08)
CASH_PAYMENT			0.329** (2.25)	0.541*** (2.61)
PRIVATE_TARGET			0.487*** (2.88)	0.515** (2.14)
RELATIVE_SIZE			0.041 (0.94)	0.029 (0.37)
log(BIDDER_SIZE)			0.099*** (2.71)	0.179*** (3.46)
LEVERAGE			1.010** (2.42)	1.560*** (2.64)
SAME_INDUSTRY			0.027 (0.19)	0.488** (2.46)
TENDER_OFFER			0.533 (1.62)	0.403 (0.88)
TOEHOLD			-0.303 (-0.67)	-0.170 (-0.27)
HOSTILE			-1.159** (-2.42)	-1.314** (-2.03)
PRIOR_RETURN			0.006*** (3.25)	0.010*** (4.08)
Constant	-0.182*** (-2.78)	-0.376*** (-4.05)	0.285 (0.16)	0.660 (0.29)
Year FE	No	No	Yes	Yes
Industry FE	No	No	Yes	Yes
No. of obs.	36,342	36,342	35,201	35,201
R ²	0.001	0.001	0.011	0.015

investor gambling behavior can explain the initial overreaction and subsequent price reversal of bidders with earnings declines, we first examine whether our results are concentrated among bidders with high retail holdings.

In Table 4, we split our sample based on the bidder firm's retail holdings. Following Bali et al. (2019), we measure retail holding as 1 minus the quarterly fractional institutional ownership (IO) at the most recent quarter prior to the merger announcement.¹⁶ For each subsample, we report our main merger announcement return regression (similar to column 4 of Table 2) and short-term post-announcement

¹⁶In untabulated analysis, we use individual trading data from the U.S. discount broker sample introduced by Barber and Odean (2000) to directly measure retail buying around merger announcements. We also follow Boehmer, Jones, Zhang, and Zhang (2021) to construct alternative direct measure of retail trading. We find consistent results using each measure.

TABLE 4
Retail Holdings and Acquisition Returns

Table 4 reports OLS regression results on the relationship between the bidders' earnings growth and bidder CARs over different event windows in subsamples split based on retail holdings (RHLD). Columns 1 and 2 report results for bidder 5-day abnormal returns around the merger announcement for bidders with low and high retail holdings, respectively. Columns 3 and 4 report results for post-merger announcement abnormal returns measured from day +3 to day +23 for bidders with low and high retail holdings, respectively. Columns 5 and 6 report results for post-merger announcement abnormal returns measured from day +3 to day +44 for bidders with low and high retail holdings, respectively. All control variables reported in Tables 2 and 3 are included but not reported for brevity. We also test the differences in coefficients between the two subsamples and report p -values from the chi-square test. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

Sample	Dependent Variable					
	CAR(-2,+2)		CAR(3,23)		CAR(3,44)	
	Low RHLD	High	Low	High	Low	High
	1	2	3	4	5	6
EG ⁻	-0.266 (-0.51)	3.410*** (3.81)	0.506 (0.63)	-1.359** (-2.02)	0.201 (0.18)	-2.695*** (-2.80)
EG ⁺	0.125 (0.25)	2.471*** (3.85)	0.499 (0.77)	0.637 (1.23)	0.765 (0.86)	1.297* (1.81)
p -Values from chi-square test of differences in coefficients						
EG ⁻			0.07*		0.05**	
EG ⁺			0.87		0.64	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	17,862	17,340	17,862	17,339	17,862	17,339
R^2	0.035	0.046	0.010	0.021	0.013	0.029

return regressions (similar to columns 3 and 4 of Table 3). Consistent with our expectation, when considering bidders with earnings decline, we find the previously observed return patterns of overreaction followed by reversal are concentrated among bidders with high retail holdings. In contrast, we do not observe overreaction to acquisitions announced by bidders with earnings decline within the low retail holding subsample. Moreover, a chi-square test shows that the coefficients on |EG|⁻ are significantly different in both the announcement window and the post-announcement window between the two subsamples.

Overall, the results reported in Table 4 are consistent with Hypothesis 2a, namely that retail investor trading drives the overreaction to the acquisition announcement made by bidders with earnings decline. These results are also consistent with prior literature showing that retail investors tend to exhibit a stronger preference for gambling because they are less sophisticated and more behaviorally biased relative to institutional investors (Black (1986), Odean (1998), Barber and Odean (2000), Benartzi and Thaler (2001), Kumar (2009a), and Conrad et al. (2014)).

2. Stocks with Lottery-Like Payoffs

In this section, we investigate how stock characteristics affect our results. The gambling hypothesis predicts that investors with a taste for gambling concentrate their trading in stocks with lottery-like payoffs. We thus conduct subsample analyses by identifying situations in which investors' gambling incentives are likely to be stronger. This analysis can further shed light on the mechanism behind investor

behavior biases. If it is indeed the irrational beliefs in gambling behavior that drive the positive reaction around the announcement as well as the post-announcement reversal, these gambling-motivated trading activities should be concentrated among a subset of bidder stocks with lottery-like features.

Prior studies demonstrate that some investors like stocks have speculative features, which make them attractive gambles (e.g., Barberis and Huang (2008), Kumar (2009a), and Kumar, Page, and Spalt (2011)). Motivated by this literature, we investigate three sets of bidders that are potentially appealing gambling objects. Kumar (2009a) shows that investors with a taste for gambling concentrate their trading in stocks with high uncertainty. The argument is that when uncertainty is high, investors might believe that the extreme positive events observed in the past are more likely to occur again. We use the bidder's return volatility prior to merger announcements to capture bidder uncertainty. We expect investors to be more likely to bet on acquisitions announced by bidders that have recently experienced high return volatility. Given that return volatility is likely to significantly increase around the merger announcement, we estimate bidder return volatility over day -6 to day -257 to avoid potential confounding effects due to the merger announcement itself.

Consistent with our expectation, we find that the results are concentrated in the subsample of bidders with high recent return volatility. For example, in column 2 in Panel A of Table 5, the coefficient on $|EG|^-$ is 2.566 (significant at the 1% level) in the high volatility group, whereas the coefficient is an insignificant 0.334 in the low volatility group. The 2 coefficients are significantly different at the 1% level as shown by a chi-square test. We find similar patterns regarding the short-term post-announcement returns. Specifically, results in column 4 show that the 1-month reversal for negative earnings growth bidders is concentrated in the high volatility subsample. A chi-square test shows that the coefficients on $|EG|^-$ are significantly different between subsamples. We observe similar results using CAR(3,44).

In addition to return volatility, prior studies show that investors with a taste for gambling prefer stocks with extreme positive returns (Bali et al. (2011)). Intuitively, the extreme return events resemble lottery features. We therefore split the sample based on bidders' maximum daily return prior to merger announcements in Panel B of Table 5. Following Bali et al. (2011), we use the maximum daily return to measure the extent to which a stock exhibits a lottery-like payoff. We obtain the maximum daily return over day -6 to day -257 prior to the merger announcement and form two subsamples based on the bidders' pre-merger high/low maximum return. We again find that investor overreaction to acquisitions made by bidders with negative earnings growth is concentrated in the subsample with high maximum returns.

Our third set of sample splits based on the firm's index of lottery-likeness prior to the merger announcement date. Following Bali et al. (2019), we construct the lottery-likeness index (LTRY) to proxy for the stocks' lottery-like payoffs. Similar to return volatility and maximum return, investors should be more likely to bet on acquisitions announced by bidders with a high LTRY. Panel C of Table 5 reports the results. Consistent with our prediction, the return patterns of overreaction and reversal for bidders with negative earnings growth are present only in the subsample with high LTRY but are absent in the subsample with low LTRY. A chi-square test shows that the coefficients are significantly different between subsamples.

TABLE 5
 Lottery-Type Stocks and Acquisition Returns

Table 5 reports OLS regression results on the relationship between the bidders' earnings growth and bidder CARs over different event windows in subsamples split based on bidder firms' past return characteristics. Panel A reports results for bidder with high/low return volatility prior to the merger announcement. Panel B reports results for bidder with high/low max daily return prior to the merger announcement. Panel C reports results for bidder stocks with low/high lottery index. Tests of differences in coefficients between the two subsamples are performed, and p -values from the chi-square test are reported. All control variables reported in Tables 2 and 3 are included but not reported for brevity. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

	Dependent Variable					
	CAR(-2,+2)		CAR(3,23)		CAR(3,44)	
	1	2	3	4	5	6
<i>Panel A. Sorting on Bidders' Return Volatility</i>						
Sample	Low Ret. Vol.	High	Low	High	Low	High
EG ⁻	0.334 (0.68)	2.566*** (3.34)	1.457* (1.84)	-1.346** (-2.20)	2.801** (2.41)	-2.429*** (-2.79)
EG ⁺	0.324 (0.76)	1.984*** (3.59)	0.605 (1.03)	0.538 (1.13)	0.159 (0.19)	1.371** (2.10)
p -Values from chi-square test of differences in coefficients						
EG ⁻	0.01***		0.01***		<0.01***	
EG ⁺	0.02**		0.93		0.26	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	17,601	17,601	17,600	17,601	17,600	17,601
R ²	0.050	0.039	0.028	0.017	0.049	0.027
<i>Panel B. Sorting on Bidders' Max Return</i>						
Sample	Low Max	High	Low	High	Low	High
EG ⁻	0.141 (0.32)	2.694*** (3.45)	1.105 (1.55)	-1.181* (-1.90)	1.941* (1.96)	-2.322*** (-2.61)
EG ⁺	0.629 (0.82)	1.887*** (3.54)	1.418** (2.18)	0.504 (1.09)	1.672* (1.77)	1.180* (1.86)
p -Values from chi-square test of differences in coefficients						
EG ⁻	<0.01***		0.02**		<0.01***	
EG ⁺	0.18		0.25		0.66	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	17,606	17,596	17,605	17,596	17,605	17,596
R ²	0.043	0.039	0.021	0.015	0.036	0.025
<i>Panel C. Sorting on Bidders' Stock LTRY</i>						
Sample	Low LTRY	High	Low	High	Low	High
EG ⁻	-0.017 (-0.03)	2.463*** (3.22)	0.676 (0.73)	-1.327** (-2.15)	0.715 (0.53)	-2.334*** (-2.67)
EG ^{+d}	0.499 (1.04)	1.934*** (3.45)	0.401 (0.61)	0.672 (1.42)	2.396** (2.38)	1.067 (1.64)
p -Values from chi-square test of differences in coefficients						
EG ⁻	0.01***		0.07*		0.05**	
EG ⁺	0.05**		0.74		0.27	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	17,653	17,542	17,652	17,542	17,652	17,542
R ²	0.040	0.041	0.014	0.016	0.018	0.023

Overall, the subsample results reported in Table 5 provide compelling evidence consistent with Hypothesis 2b, which predicts that the overreaction to acquisitions announced by bidders with poor earnings performance is concentrated among stocks with lottery features.

3. Investors' Propensity to Gamble

Prior studies show that in addition to firm characteristics, investor sentiment can also affect investors' gambling preferences. Baker and Wurgler (2006) define "investor sentiment" as the propensity to speculate. The authors suggest that high investor sentiment reflects investors' optimistic outlook toward the future and increases the relative demand for speculative investments. Brunnermeier and Parker (2005) and Brunnermeier, Gollier, and Parker (2007) show that this optimism is a key driver of investors' preference for lottery-like assets. Byun and Kim (2016) find that the overvaluation of lottery-like options is attributable to investor sentiment.

Our measure of investor propensity to gamble, therefore, is the investor sentiment index constructed by Baker and Wurgler (2006). We identify high- and low-sentiment periods and then analyze the pricing impact on mergers announced by firms with low growth within both periods. Table 6 reports regression results in the subsamples for high/low sentiment. Consistent with Hypothesis 2b, we find that the price reversal caused by overpricing around the announcement of bidders with negative earnings growth is more pronounced during high-sentiment periods (columns 4 and 6). In contrast, we do not observe return reversals during low-sentiment periods (columns 3 and 5). The difference in coefficients test shows that the

TABLE 6
Investor Propensity to Gamble and Acquisition Returns

Table 6 reports OLS regression results on the relationship between the bidders' earnings growth and bidder CARs over different event windows in subperiods with high/low investor sentiment. Tests of differences in coefficients between the two subsamples are performed, and *p*-values from the chi-square test are reported. All control variables reported in Tables 2 and 3 are included but not reported for brevity. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

Sample	Dependent Variable					
	CAR(-2,+2)		CAR(3,23)		CAR(3,44)	
	Low Sentiment	High	Low	High	Low	High
	1	2	3	4	5	6
EG ⁻	1.770*	2.812***	-0.352	-2.089***	-0.206	-4.459***
	(1.66)	(3.12)	(-0.51)	(-2.58)	(-0.21)	(-3.82)
EG ⁺	1.538**	2.100***	0.026	0.718	0.788	0.685
	(2.40)	(2.92)	(0.05)	(1.10)	(1.13)	(0.74)
<i>p</i> -Values from chi-square test of differences in coefficients						
EG ⁻	0.45		0.10*		<0.01***	
EG ⁺	0.56		0.40		0.93	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	17,453	17,749	17,452	17,749	17,452	17,749
<i>F</i> ²	0.058	0.044	0.012	0.020	0.018	0.027

coefficients on $|EG|^{-}$ are significantly different between the high- versus low-sentiment periods for post-announcement return reversal regressions.

4. CEOs' Propensity to Gamble

In addition to investors gambling on acquisitions, the CEOs of bidder firms may also gamble on acquisitions. Schneider and Spalt (2017) show that risky firms are more likely to be taken over and suggest that the gambling preferences of bidding firm CEOs may play a role. Investors who enjoy gambling may follow managers who are more likely to gamble. Therefore, we split our sample based on the acquiring-firm CEOs' propensity to gamble.

Our first proxy for the CEOs' propensity to gamble is the target firm's expected skewness. Schneider and Spalt (2016), (2017) show that CEOs with a propensity to gamble prefer projects with positively skewed expected returns. Following Zhang (2006) and Green and Hwang (2012), we calculate the target firm's expected skewness using the industry-level skewness proxy because most of our target firms are private firms with no return data available. Specifically, for each target firm i , we construct

$$(2) \quad \text{SKEW}_{i,t} = \frac{(P_{99} - P_{50}) - (P_{50} - P_1)}{(P_{99} - P_1)},$$

where P_j is the j th percentile of the cumulative 3-month return distribution pooled across all stocks within the same Fama–French industrial classification (FF48) of the target firm i over 3 months preceding the month of the merger announcement. Panel A of Table 7 reports the regression results in subsamples of high versus low expected target skewness. We find that the return patterns are much stronger in the subsample of targets with high skewness, suggesting that investors are more likely to gamble when managers are also gambling.¹⁷

Our second proxy for the CEO's gambling preference is CPRATIO, the ratio of Catholics to Protestants as a percentage of the total population in a county. This measure is developed by Kumar et al. (2011) to capture the gambling propensity of decision-makers in a geographical area. CPRATIO is based on local religious beliefs and associated gambling norms, so it may bring an exogenous variation in the CEOs' propensity to gamble.¹⁸ Our subsample analysis based on the bidder CPRATIO in Panel B of Table 7 shows that the return reversal in the post-merger announcement period for low-growth bidders is concentrated in the subsample with a high CEO propensity to gamble, although the statistical difference between the two subsamples is insignificant. Overall, the results reported in Table 7 suggest that

¹⁷As a robustness check, we use the target industry-level return volatility as a proxy for the target firm's riskiness. We report the results in Table 5 in the Supplementary Material. We find that the results are concentrated in the subsample with high target industry return volatility, although the tests for differences in coefficients show no statistical significance at conventional levels.

¹⁸Following Kumar et al. (2011) and Schneider and Spalt (2016), we construct a CPRATIO variable and assign this measure to each acquisition deal based on the county where the bidding firm's headquarters are located and the year the acquisition is announced. The data for county religiosity are from 1980 to 2010, and the county information is based on Compustat. For acquisition deals with missing county information from Compustat (about 3,000 deals), we manually collect the county information.

TABLE 7
CEO Propensity to Gamble and Acquisition Returns

Table 7 reports OLS regression results on the relationship between the bidders' earnings growth and bidder CARs in subsamples split based on target firms' expected skewness and the religiosity of counties that bidder firms' headquarters locate at. Panel A reports results for targets with high/low expected return skewness prior to the merger announcement. Panel B reports results for bidder headquarters locating in counties with high/low ratio of Catholics to Protestants (CPRATIO). Tests of differences in coefficients between the two subsamples are performed, and *p*-values from the chi-square test are reported. All control variables reported in Tables 2 and 3 are included but not reported for brevity. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively. Returns are in percentage.

		Dependent Variable					
		CAR(-2,+2)		CAR(3,23)		CAR(3,44)	
		1	2	3	4	5	6
<i>Panel A. Sorting on Target Expected Skewness</i>							
Sample	Low Skewness	High	Low	High	Low	High	
IEG ⁻	2.506*** (3.06)	2.505*** (2.78)	-0.711 (-0.91)	-1.628** (-2.33)	-0.276 (-0.25)	-4.027*** (-4.04)	
IEG ⁺	1.367** (2.39)	2.467*** (3.46)	-0.379 (-0.68)	1.056* (1.80)	0.035 (0.04)	1.633** (2.02)	
<i>p</i> -Values from chi-square test of differences in coefficients							
IEG ⁻	0.99		0.38		0.01***		
IEG ⁺	0.23		0.07*		0.15		
Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	
No. of obs.	17,687	17,515	17,686	17,515	17,686	17,515	
R ²	0.051	0.039	0.012	0.017	0.017	0.024	
<i>Panel B. Sorting on the CPRATIO of Counties</i>							
Sample	Low CPRATIO	High	Low	High	Low	High	
IEG ⁻	2.242** (2.58)	2.154** (2.02)	-0.336 (-0.38)	-1.934** (-2.35)	-1.768 (-1.45)	-3.273*** (-2.74)	
IEG ⁺	2.132*** (3.18)	1.423* (1.95)	0.372 (0.53)	0.617 (0.98)	1.681* (1.66)	0.758 (0.88)	
<i>p</i> -Values from chi-square test of differences in coefficients							
IEG ⁻	0.95		0.19		0.38		
IEG ⁺	0.46		0.78		0.49		
Controls	Yes	Yes	Yes	Yes	Yes	Yes	
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	
No. of obs.	14,450	14,502	14,449	14,502	14,449	14,502	
R ²	0.047	0.051	0.016	0.018	0.024	0.021	

investors with a gambling preference follow CEOs who are also more likely to gamble.

E. Distribution of Buy-and-Hold Returns Among Bidders with Different Earnings Growth

Thus far, our evidence collectively suggests that investors gamble on acquisitions to change the fate of bidder firms with poor earnings performance and this causes temporary mispricing around the merger announcement. To further shed light on the gambling mechanism, we examine the distribution of buy-and-hold returns for bidders following M&A events. The motivation behind this analysis is to check whether returns to bidders with negative earnings growth following M&As do, in fact, exhibit lottery-like features (i.e., extreme positive returns and high volatility).

Table 8 reports the buy-and-hold return distributions over 1–12 months for bidders with positive and negative earnings growth, respectively. Consistent with the price reversal results documented in **Section IV.C**, we observe that bidders with positive earnings growth have higher mean and median returns for the entire 12 months following the acquisition announcements when compared with bidders with negative earnings growth. However, bidders with negative earnings growth have a higher return volatility (measured by standard deviation) and a higher skewness. They also have fatter tails in the return distribution. For example, in the 3 months following the announcement, the return standard deviation is 32% for bidders with negative earnings growth and 24.9% for bidders with positive earnings growth. The respective skewness between bidders with positive versus negative growth during this same period is 7.2 and 4.9. The maximum return during these 3 months for bidders with negative growth is 1073%, whereas the maximum return for bidders with positive growth is 794%. We observe similar return patterns for the top 1%, top 5%, or top 10% returns. The only exceptions are the maximum returns over the 1-month and 6-month time spans. Our interpretation of the return distribution reported in **Table 8** is that the stocks of bidder firms with negative earnings growth indeed exhibit lottery-like features that attract individual investors with the propensity to gamble.

F. Long-Term Post-Merger Announcement Return Analysis

In this section, we investigate how long the relationship between earnings growth and post-merger announcement return persists by examining longer horizon returns over the 1-, 2-, and 3-year periods following the M&A announcement.

Prior studies show that measuring long-horizon returns can be sensitive to both the methodology used and the choices of matched firms (Bessembinder and Zhang (2013)). Fama (1998) shows that bad-model problems are more serious in tests involving long-term returns. With these caveats in mind, we proceed to our long-term return analysis by adopting two approaches: one using CAR (CAR) and another using buy-and-hold abnormal return (BHAR) in the regression analyses. While neither of these approaches is perfect, the collective evidence on bidders' long-run returns complements the short-term return results.

In Panel A of **Table 9**, we present regression results for long-term post-merger announcement CARs. We find that the returns of bidders with low growth underperform for up to 3 years following the merger announcement. We repeat the regression analysis using BHARs and find similar results reported in Panel B. We interpret the long-term underperformance for bidders with negative earnings growth as consistent with their initial overreaction to merger announcements.

V. Additional Analyses

A. Short Interest Around M&As

In this section, we investigate short interests around merger announcements. Short sellers are widely viewed as sophisticated and informed traders (Christophe,

TABLE 8

Post-Merger Announcement Buy-and-Hold Return Distribution for Bidders with Different Earnings Growth

Table 8 reports statistics of post-merger buy-and-hold returns for bidders with positive and negative earnings growth. We only include completed deals in this analysis. We report the following statistics: mean, median, standard deviation, skewness, %positive, max, P99, P95, P90, P75, P25, P10, P5, P1, and min. Post-merger buy-and-hold returns are measured over 1–3, 6, and 12 months 2 trading days after the merger announcement.

Holding Period	1 Month		2 Months		3 Months		6 Months		12 Months	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Mean	1.27%	0.65%	2.34%	1.42%	3.38%	2.02%	6.01%	4.77%	11.72%	9.78%
Median	0.89%	0.32%	1.84%	0.64%	2.46%	0.94%	4.31%	2.42%	6.88%	4.16%
Std. dev.	13.94%	16.89%	19.11%	24.77%	24.85%	31.99%	36.57%	48.36%	58.84%	69.94%
Skewness	4.87	2.58	2.67	4.25	4.93	7.16	7.80	8.51	6.68	6.82
% Positive	54.31%	51.57%	56.04%	52.09%	56.72%	52.22%	57.83%	53.83%	58.52%	54.33%
Max	540.62%	333.33%	545.16%	713.64%	794.29%	1,072.73%	1,861.29%	1,834.29%	1,766.67%	1,895.23%
P99	39.90%	54.36%	59.58%	76.97%	76.93%	96.31%	114.05%	150.00%	196.58%	238.86%
P95	20.55%	24.25%	29.86%	34.85%	37.72%	42.86%	57.41%	65.52%	89.02%	100.78%
P90	14.29%	15.53%	20.75%	23.03%	26.22%	28.89%	39.62%	43.74%	61.95%	66.60%
P75	6.85%	7.10%	10.56%	10.56%	13.12%	13.27%	20.24%	20.27%	32.15%	31.90%
P25	-5.00%	-6.78%	-6.72%	-9.42%	-8.08%	-11.90%	-11.64%	-16.35%	-17.24%	-24.18%
P10	-12.09%	-15.79%	-17.16%	-22.74%	-21.03%	-27.75%	-30.48%	-40.60%	-43.95%	-55.29%
P5	-17.76%	-23.41%	-25.53%	-33.33%	-31.23%	-39.98%	-43.77%	-56.76%	-60.30%	-73.24%
P1	-32.89%	-40.89%	-44.94%	-56.25%	-52.37%	-65.23%	-67.77%	-80.56%	-84.00%	-94.05%
Min	-83.20%	-78.14%	-92.50%	-89.16%	-91.01%	-95.96%	-96.81%	-98.11%	-99.81%	-99.89%

TABLE 9
Long-Term Post-Merger Announcement Returns

Table 9 reports results on bidders' post-announcement long-term returns in the post-merger periods. We only include completed deals in this analysis. In Panel A, the dependent variables are long-term cumulative abnormal returns (CAR), adjusted by the market value-weighted return, measured over 1, 2, or 3 years after the merger announcement. In Panel B, the dependent variables are long-term buy-and-hold abnormal returns (BHAR), measured as the difference between bidder buy-and-hold return and that of a matched firm based on size and book-to-market ratio. All control variables reported in Tables 2 and 3 are included but not reported for brevity. Definitions of all variables are provided in the Appendix. Heteroskedasticity-consistent standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Long-Term CAR

	Dependent Variable		
	CAR_1Y	CAR_2Y	CAR_3Y
	1	2	3
EG ⁻	-0.062*** (-3.31)	-0.128*** (-5.48)	-0.178*** (-7.06)
EG ⁺	0.001 (0.05)	0.013 (0.67)	-0.005 (-0.23)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
No. of obs.	33,315	33,315	33,315
R ²	0.041	0.072	0.078

Panel B. Long-Term BHAR

	Dependent Variable		
	BHAR_1Y	BHAR_2Y	BHAR_3Y
	1	2	3
EG ⁻	-0.011 (-0.43)	-0.128*** (-3.19)	-0.129*** (-2.71)
EG ⁺	0.026 (1.13)	0.018 (0.52)	0.054 (1.31)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
No. of obs.	31,379	31,379	31,379
R ²	0.011	0.021	0.022

Ferri, and Hsieh (2010), Boehmer and Wu (2013)). However, our robust evidence of overreaction suggests that short sellers might not be actively shorting low-growth bidders' shares when the merger is announced.

Graph A of Figure 1 in the Supplementary Material shows average abnormal short interest in months surrounding the merger announcement for high-, low-, and moderate-growth bidders. Following Mitchell et al. (2004), we calculate abnormal short interest as a fraction of short interest measured 6 months prior to the merger announcement. In Panel A of Table 6 in the Supplementary Material, we further compare the change in short interest by computing the difference from month -1 to 0, where 0 is the month immediately *after* the merger announcement. We find that although short interest significantly increases around the merger announcement for all bidders, low-growth bidders experience the lowest level of increase (0.05% relative to total shares outstanding) and the high-growth bidders experience the highest level of increase (0.11% relative to total shares outstanding).

We repeat the above analysis excluding deals involving public targets with stock payment because short interest in those deals can potentially be driven by non-

informational short selling.¹⁹ Graph B of Figure 1 in the Supplementary Material shows that the average abnormal short interest for low-growth bidders barely increases around merger announcements. This result is confirmed in Panel B of Table 6 in the Supplementary Material, where the mean test shows an insignificant change in short interest for low-growth bidders around the merger announcement. However, Panel C shows that short interest increases significantly in later months. Our interpretation is that two factors can potentially explain the low short interest around the merger announcement and the delayed short-selling activity in subsequent months. First, as reported in Table 4 in the Supplementary Material, the median IO is 39.1% for low-growth bidders, compared with 43.4% for high-growth bidders. Given that a direct short-sale constraint is the supply of shares (e.g., Jones and Lamont (2002), Nagel (2005)), the cost of borrowing for low-growth bidders is likely to be higher due to low IO.

Second, prior studies show that arbitrageurs face the risk that irrational traders may push prices even further away from fundamentals. Therefore, arbitrageurs have an incentive to avoid this noise trader risk when they have limited capital, a margin requirement, or a short horizon (De Long, Shleifer, Summers, and Waldmann (1990), Shleifer and Vishny (1997), and Baker and Wurgler (2013)). In untabulated results, we follow Boehmer et al. (2021) and construct a measure of retail buying. We find a positive and significant increase in retail buying volume in the 5-day window surrounding the merger announcements only among the low-growth bidders. The noise trader risk combined with the high cost of borrowing can prevent short sellers from aggressively shorting shares of low-growth bidders around the merger announcement.

B. Robustness Checks

1. Analyses with Alternative Samples

In untabulated results, we find that low-growth bidders tend to have a slightly higher percentage of deals withdrawn compared with high-growth bidders. To ensure that our findings are not driven by withdrawn deals, we replicate our baseline regression results by including only successfully completed deals. The results in Table 7 in the Supplementary Material report that our findings remain very robust by excluding withdrawn deals.

We further form a subsample by removing merger announcements that occur within 1 month following an earnings announcement to alleviate the concern that the price reversal might reflect the post-earnings-announcement drift (PEAD). Table 8 in the Supplementary Material reports that our findings are largely unaffected (if not stronger), suggesting that the price reversal after the merger announcements made by low-growth bidders more likely reflects investor overreaction

¹⁹Mitchell et al. (2004) and Liu and Wu (2014) report significant short-selling activity by merger arbitrageurs who short sell a certain number of bidders' shares and simultaneously purchase a corresponding number of target firms' shares based on the exchange ratio. Merger arbitrageurs only short bidders' shares in stock deals with public target firms. This is because arbitrageurs are unable to buy equity in private targets and therefore have no interest in shorting the bidders' stocks. In cash deals, merger arbitrageurs simply buy shares of the target firm's stock and have no need to short the bidders' stocks.

around the merger announcements made by these bidders as opposed to reflecting the PEAD.

2. Using Alternative Measures of Bidder Performance Prior to M&As

To ensure that our results are not sensitive to the specific measurement of earnings growth used in our main tests, we conduct several robustness checks using alternative specifications to capture the bidder's performance prior to the merger announcement. First, instead of net income, we measure earnings growth as the change in income before extraordinary items and report results in Panel A of Table 9 in the Supplementary Material. Our results remain robust using this alternative earnings measure. Second, instead of using equity as the scalar, we scale the change in earnings by the book value of total assets. Our results (reported in Panel B) remain robust. Third, we use the consensus analyst earnings forecasts (instead of the previous year's earnings) as an alternative benchmark and compute the difference between the actual earnings and analysts' expectations. Panel C shows that our results are robust when using this alternative earnings benchmark. Fourth, instead of earnings, we use the change in operating cash flows to measure the bidder's operating performance before the M&A events. Results (reported in Panel D) remain robust. Finally, we use bidder stock returns instead of accounting performance in the 6 or 12 months before the merger announcement to measure bidder performance and report results in Panels E and F. Our findings again remain robust.

3. Alternative Model Specifications

Since we observe that the relationship between bidders' acquisition returns and earnings growth is U-shaped, we test the robustness of our findings with an alternative model specification using quadratic regressions. Our quadratic regression model is specified as

$$(3) \quad \text{CAR}(-2, 2) = \alpha + \beta_1 \text{EG} + \beta_2 \text{EG}^2 + \text{CONTROLS} + \varepsilon,$$

where the dependent variable is the bidder's 5-day CAR around the merger announcement date. The main independent variables are EG and EG^2 .

Table 10 in the Supplementary Material reports the results of the quadratic regression analysis. In column 3, the coefficient on the level of earnings growth (EG) is insignificant. However, the coefficient on the quadratic term ($(\text{EG})^2$) is significantly positive with a *t*-value of 4.84, confirming the U-shaped relationship between bidders' announcement returns and earnings growth.

As an additional robustness check, we analyze the effect for different decile earnings groups by estimating coefficients separately for high- and low-growth groups. We perform the following regression analysis and plot the coefficients on decile dummy variables in Figure 2 in the Supplementary Material:

$$(4) \quad \text{CAR}(-2, 2) = \alpha + \sum_{i=1}^3 \beta_i \text{DECILE}_i + \sum_{i=5}^{10} \beta_i \text{DECILE}_i + \text{CONTROLS} + \varepsilon,$$

where DECILE_i is the indicator variable for the earnings growth decile. The omitted group (i.e., decile 4) is the group with the most neutral earnings growth. The plot in

Figure 2 in the Supplementary Material confirms that after controlling for deal and firm characteristics as well as industry and year effects, the relationship between bidders' earnings growth and acquisition returns remains U-shaped.

C. Alternative Explanations

1. Investor Attention

The first alternative explanation we consider is investor attention. Barber and Odean (2008) argue that investor attention greatly influences the purchase decisions of individual investors. Assuming that investors face a significant search problem when choosing stocks to buy, many investors consider only stocks that catch their attention. In contrast, their sell decision has less of a search problem because normally individual investors own a small number of stocks and only sell the stocks that they own. As a result, attention-grabbing events lead to buying behavior by individual investors. This heavy buying activity can push up prices around the announcements of attention-grabbing events, with prices subsequently reversing (Seasholes and Wu (2007)).

The investor attention explanation appears to be appealing because it also predicts that individual investors drive the overreaction. However, we show that bidders with earnings decline have lower analyst coverage suggesting that, if anything, these bidders are less visible to investors. To further explore this alternative explanation, we construct three measures to capture stock visibility and investor attention. Our first measure is analyst coverage since prior studies suggest that analyst coverage appears to increase both investors' recognition and the visibility of covered stocks (e.g., Li and You (2015), O'Brien and Tan (2015)). One issue with raw analyst coverage is that this variable is highly correlated with firm size. To ensure that we are not purely capturing the firm size effect, we follow Hong, Lim, and Stein (2000) and estimate *residual analyst coverage*, where the residual comes from the regression of coverage on firm size.

Panel A of Table 11 in the Supplementary Material reports results in the subsamples of residual analyst coverage. We find that the previously observed return patterns exist only among subsamples with low residual coverage. However, a chi-square test shows that the coefficients on $|EG|^{-}$ are not significantly different between these two subsample groups for post-announcement periods. Nevertheless, the results contradict the alternative explanation that investor attention drives our results.

Our second measure of investor attention is based on the day of the deals' announcements. Prior studies suggest that investors pay more attention to events announced early in the week and pay limited attention to announcements made at the end of the week or on the weekend (e.g., Dellavigna and Pollet (2009), Louis and Sun (2010)). Therefore, we split the sample into deals announced on Monday and Tuesday versus deals announced on other days.²⁰ Under the attention hypothesis, we expect to find results concentrated among deals announced early in the week. Panel B of Table 11 in the Supplementary Material reports that investor overreaction to deals announced by bidders with negative earnings growth seems to appear in both subsamples, which is inconsistent with the investor attention explanation.

²⁰Our results are similar if we separate our sample based on Monday or non-Monday deals.

In the last set of investor attention hypothesis tests, we separate bidder firms based on whether their stocks belong to the S&P 500 index at the time they make the acquisition announcements. Since acquisitions involving S&P 500 firms tend to generate significantly more news coverage, and therefore higher visibility, the investor attention hypothesis predicts a stronger overreaction among S&P 500 bidders. Results in Panel C of Table 11 in the Supplementary Material report the opposite: Investor overreaction is much stronger among the non-S&P 500 bidders. This result, in fact, is more consistent with the gambling explanation because investors' gambling targets tend to be smaller firms (i.e., non-S&P 500 bidders). Taken together, we fail to find empirical support for the investor attention hypothesis.

2. Investor Overconfidence

The second alternative explanation we consider is investor overconfidence. Specifically, we investigate whether the overreaction to M&A announcements made by poor-performing bidders reflects investor overconfidence rather than gambling incentives. Prior studies show that higher levels of valuation uncertainty can lead to greater overconfidence (e.g., Daniel, Hirshleifer, and Subrahmanyam (1998), (2001), and Kumar (2009b)). Since we do find that our results are concentrated among bidders with high pre-merger return volatility, it is important for us to distinguish between the overconfidence-based and the gambling-based explanations.

To test the overconfidence hypothesis, we use two proxies: trading frequency and past returns. Barber and Odean (2002) show that overconfidence leads to excessive trading. We therefore construct abnormal turnover, adjusted for market-level trading activities, to proxy for shareholder overconfidence. Statman, Thorley, and Vorkink (2006) argue that with biased self-attribution, the level of investor overconfidence increases with past returns. The attribution bias documented in the psychology literature (e.g., Langer and Roth (1975)) predicts that investors tend to give themselves too much credit by attributing good return performance to their stock picking skills and this leads to overconfidence. Therefore, stocks with high past returns are more likely to have investors who suffer from attribution bias and thus exhibit overconfidence. If existing shareholders are overconfident about merger synergies, this may create price overreaction at the announcement. Table 12 in the Supplementary Material reports that results among bidders with low turnover or low returns are similar, if not stronger, compared with bidders with high turnover or high returns. These findings are inconsistent with the overconfidence hypothesis.

VI. Conclusion

In this article, we investigate whether investors gamble in the takeover market and how this behavior affects acquisition returns. Using a comprehensive sample of M&As, we find strong positive market reactions to mergers announced by bidders with either very high earnings growth or significant earnings declines when compared to those with neutral earnings change. The graph analyzing the relationship between earnings growth and acquisition announcement returns results in a U-shaped pattern. Moreover, low-growth bidders' stock prices exhibit noticeable reversals shortly after the merger announcement. These return patterns are concentrated among stocks with lottery-like features and those with more retail holdings.

In addition, we find significant return underperformance for the bidders with negative earnings growth persisting for up to 3 years.

Taken together, our results indicate that investor behavior biases significantly affect acquisition returns, particularly for bidders with negative earnings growth. The propensity of individual investors to gamble on poorly performing bidder's stock causes a price overreaction to acquisition announcements which is followed by significant post-merger underperformance. Our findings add to the growing literature documenting how investors' gambling behavior affects their investment decisions. Moreover, our results challenge the common practice that uses bidder returns over a short window surrounding the merger announcement to measure the wealth effect of a merger, especially when considering bidders with significant earnings decline.

Appendix. Variable Definitions

All Compustat firm characteristics are measured as of the fiscal year-end before the merger announcement, and all continuous variables are winsorized at the 1st and 99th percentiles.

B/M: Book value of equity divided by the market value of equity.

BHAR: Buy-and-hold abnormal returns, measured as the difference between the raw buy-and-hold return of a bidder and that of a matched firm based on size and book-to-market ratio. For the most recent month prior to the merger announcement, the matched firm is chosen as the one with the closest book-to-market ratio to the bidders out of all firms with a market capitalization between 70% and 130% of the bidder's market capitalization.

BIDDER_SIZE: The bidder's book value of assets.

CAR(*a,b*): Cumulative abnormal return, adjusted by the market value-weighted return, measured over the event window (*a,b*), where day 0 is the public merger announcement date.

CASH_PAYMENT: A dummy variable equal to 1 if the bidder uses cash as the only method of payment.

CPRATIO: Catholic-Protestant ratio in Kumar et al. (2011).

EG: Earnings growth, computed as the change in net income from the fiscal year-end before the merger announcement to that of the previous fiscal year-end, scaled by the book value of equity.

SKEW: Industry-level skewness in Zhang (2006) and Green and Hwang (2012), calculated as $Skew_{i,t} = \frac{(P_{99} - P_{50}) - (P_{50} - P_1)}{(P_{99} - P_1)}$, where P_j is the j th percentile of the cumulative 3-month return distribution pooled across all stocks within the FF48 industry of target firm i over 3 months preceding the month of the merger announcement.

HOSTILE: A dummy variable equal to 1 if the SDC classifies the deal attitude as hostile or unsolicited.

INVESTOR_SENTIMENT: Sentiment index in Baker and Wurgler (2006).

IOR: Institutional holding, calculated as the number of shares that are held by institutional investors divided by the number of shares outstanding.

LEVERAGE: Book value of debt divided by the book value of assets.

$|EG|^-$: The absolute value of negative earnings growth.

$|EG|^+$: The absolute value of positive earnings growth.

$\ln(\text{BIDDER_SIZE})$: Natural logarithm of bidder size.

$\ln(\text{B/M})$: Natural logarithm of the book-to-market ratio.

LTRY: Index of lottery-likeness in Bali et al. (2019). It defines lottery stocks as low-priced stocks with high idiosyncratic volatility and high idiosyncratic skewness.

MAX: Maximum of returns over the past 252 trading days relative to day $t - 6$, where day t is the merger announcement date.

NEG_EG: A dummy variable equal to 1 if the bidder has negative earnings growth prior to the merger announcement.

PRIOR_RETURN: Cumulative abnormal return, adjusted by the market value-weighted return, over the past 252 days relative to day $t - 6$, where day t is the merger announcement date.

PRIVATE_TARGET: A dummy variable equal to 1 if the SDC reports the target public status as a subsidiary or private firm.

RELATIVE_SIZE: Deal value divided by the acquirer's book value of assets.

RHLD: Retail holding, measured as 1 minus the quarterly fractional IO (i.e., 1-IOR).

SAME_INDUSTRY: A dummy variable equal to 1 if the acquirer and the target firm share the same 3-digit SIC.

STOCK_PAYMENT: A dummy variable equal to 1 if the bidder uses stock as the only method of payment.

TENDER_OFFER: A dummy variable equal to 1 if the deal is classified as a tender offer.

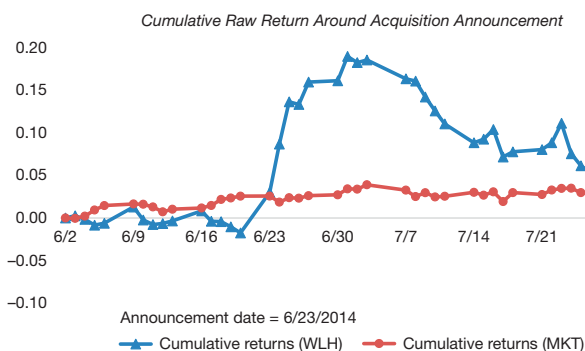
TOEHOLD: A dummy variable equal to 1 if the acquirer owns 5% or more of the target firm's stock before the merger announcement.

RETURN_VOLATILITY: Stock return volatility, calculated as the standard deviation of daily returns over the past 252 days relative to day $t - 6$, where day t is the merger announcement date.

FIGURE A1

William Lyon Homes Inc.'s Cumulative Raw Return Around Acquisition Announcement

Figure A1 displays William Lyon Homes Inc.'s cumulative raw return and cumulative returns for the CRSP value-weighted index around the merger announcement made on June 23, 2014.



Supplementary Material

To view supplementary material for this article, please visit <http://doi.org/10.1017/S0022109022000746>.

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