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Investor Attention, Managerial Incentives, and M&As

Abstract

This thesis studies mergers and acquisitions (M&As) through three essays. Specifically, the first essay examines the effects of investor attention on capital market reactions to early announcements in M&A. The key finding is that an early announcement that can attract greater investor attention is associated with higher short-term abnormal returns. However, this relation is reversed after merger integration, and early-announced deals that attract greater investor attention are associated with a lower long-term firm value. For early-announced deals with low investor attention, neither the boosting effect of the short-term value effect nor the price reversal in the long run exists. My findings support the price pressure hypothesis for the market reaction to early announcements.

The second essay explores how chief executive officers (CEOs)' incentive horizon would influence firms' early-announced deals. In particular, I examine the effect of CEOs' incentive horizon on the likelihood of early announcements, CEOs' equity sales following early announcements, and the performance of early-announced merging firms. I find that compared to long-horizon CEOs, CEOs with short incentive horizons are more likely to announce a deal early (before signing definitive agreements) and sell more shares following early announcements. Early-announced deals initiated by short-horizon CEOs experience worse post-merger abnormal operating performance. Furthermore, these short-horizon CEOs are more likely to be replaced after early-announced deals. Overall, my findings highlight the importance of executive compensation horizon in M&As.

In the third essay, I investigate how target firm CEOs' industry tournament incentives (ITIs) would affect the probability of target-initiated M&A deals, and the chances of their subsequent labor market retention in the combined firms. I find that the probability of selling firms via deal initiation increases with target firm CEOs' ITIs, and this positive relation is more pronounced when target firm CEOs are younger or more talented, and have longer tenures. Furthermore, target firm CEOs with stronger ITIs are more likely to retain positions in the combined firms. My findings suggest that ITIs drive CEOs to sell their firms by initiating M&A deals and reap private benefits in the managerial labor market.

Declaration

I, Huai Qin, declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institutes of learning.

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Contents

Chapter 1

1.1. Introduction

This thesis aims to understand how managerial incentives and investor attention affect corporate strategies of M&A announcements and deal initiation. To explore the strategies of M&A announcement, I focus on early announcements in M&A, which are bidder firms voluntarily announcing the deal before signing a definitive agreement ((hereafter referred to as "early announcement", the deal with the early announcement is referred to as "early-announced deal"). I study the early announcements from two perspectives: investor attention captured by Google search volume index (SVI) and CEO incentives induced by short incentive horizons. To study the determinants of deal initiation, I emphasize the effect of CEOs' industry tournament incentives (ITIs) on deal initiation. A brief summary of thesis motivation, research background, and main findings of three individual papers are provided as follows.

The existing literature on M&A mostly focuses on the announcement of the definitive agreement with targets (hereafter referred to as "late announcement", the deal with the late announcement is referred to as "late-announced deal") and views M&A announcements as a purely legal response. However, some bidder firms voluntarily make early announcements from time to time in the real world. Aktas *et al.*(2018) recently provides a signalling-based interpretation for early-announced deals, suggesting that early announcements are used to smooth the negotiation process by signalling potential deal synergies to shareholders. Previous studies have found that investors pay significant attention to various significant corporate event announcements, such as announcements of corporate takeovers (Louis and Sun, 2010); initial public offerings (Da *et al*. 2011), earnings announcements (DellaVigna and Pollet, 2009), and payout policies (Bodnaruk and Östberg, 2013). As an unexpected and rich-information on deal synergies event of a firm, a natural question to ask is what determines the decision to make early announcements and how investors pay attention to early announcements. To

comprehensively study early announcements, I collect early-announced deals by manually checking the announcement date and definitive agreement signature date for each sample transaction from SEC filings.

In Chapter 2, I find that early-announced deals increase more abnormal attention from retail investors, compared to late-announced deals. Moreover, early-announced deals that have attracted high investor attention realize higher short-term announcement returns but lower long-term performance, compared to those deals with low investor attention. These results are consistent with the explanation of investor attention based on the pressure hypothesis of Barber and Odean (2008).

Although the decision to announce early is influenced by deal frictions (Aktas *et al.* 2018), the role of CEO incentive horizons on early announcements is not yet well studied. A large strand of the literature shows that CEOs' short-term incentives affect the timing of voluntary disclosures and news releases (e.g., Goplan *et al.* 2014; Edmans *et al.* 2018). The link between early announcements and CEOs' short incentive horizons may exist because early announcements are discretionary disclosures and potentially signal deal synergies. CEOs with short incentive horizons could be motivated to strategically use early announcements to reach their benefits.

In Chapter 3, I present evidence that CEOs with short incentive horizons are more likely to announce a deal early. Furthermore, short-horizon CEOs are more likely to sell shares following early announcements. Consistent with the negative performance of short-termism in the long run, early-announced deals initiated by short-horizon CEOs underperform in long-term operating performance, compared with those deals initiated by long-horizon CEOs. Short-horizon CEOs are more likely to be replaced after early-announced acquisitions. These results support an equity diversifying-based explanation for early-announced deals and are in line with motives of short incentive horizons (e.g., Edmans *et al.* 2018; Chi *et al*. 2019).

The extant M&A literature has shown that major economic driving factors of target initiation are the target firm's financial weakness (Masulis and Simsir, 2018), target CEO ownership (Fidrmuc and Xia, 2019), and narcissism (Aktas *et al*.2016). A recent strand of empirical studies demonstrates that external tournament incentives for CEOs influence firm performance and investment policy (Coles *et al*. 2018), corporate cash holding (Huang *et al*. 2019), firm innovation (Nguyen and Zhao, 2021), and stock price crash risk (Kubick and Lockhart, 2021). Given the important role played by CEOs in shaping corporate strategies and investments where deal initiation is the core stage of the M&A process, it is important to understand whether industry tournament incentives for target CEOs affect the deal initiation.

In Chapter 4, I find that target firm CEOs' industry tournament incentives increase the likelihood of target firms initiating M&A deals, and this positive relation is more pronounced when target firm CEOs are younger or more talented, and have longer tenures. Moreover, target CEOs with stronger industry tournament incentives are more likely to retain positions in the combined firm after deal completion. These findings suggest that industry tournament incentives incentivize CEOs to sell their firms by initiating M&A deals and reap private benefits in the managerial labor market.

The remainder of this thesis proceeds as follows: Chapter 2 shows full details of the first paper, titled "*Investor Attention and Early Announcements in Mergers and Acquisitions*". Chapter 3 presents the second paper, titled "*Short-horizon CEOs and Early Announcements in M&As* ". Chapter 4 details the third paper, titled "*Industry Tournament Incentives and M&A Deal Initiation*". Chapter 5 concludes. In chapters 2 and 4, I use the third person (we, our) rather than the first person (I,my), as these chapters are in the form of working, or submitted, papers co-authored with my supervisors.

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Chapter 2

Investor Attention and Early Announcements in Mergers and Acquisitions

2.1. Introduction

Previous literature has recognized that disclosing a bidding attempt before reaching a definitive agreement with the target (hereafter referred to as "early announcement", the deal with the early announcement is referred to as "early-announced deal") is costly for acquiring firms due to revealing private information to competitors and the potential price run-up of the target (Schwert,1996). However, as a form of voluntary disclosure by managers,[1] early announcements happen from time to time in real business. For instance, King Pharmaceuticals announced its bidding attempt for Alpharma on 22 August 2008 and signed a definitive agreement on 11 November 2008.[2] Tyson Foods disclosed its interest in acquiring Hillshire Brands on 29 May 2014 and reached a definitive agreement with the company on 2 July 2014.[3] Limited attention has thus far been paid to early announcements except by Aktas *et al.* (2018), who provided a signalling-based explanation for such corporate decisions, claiming that early announcement serves as a timely signal of the strategic importance of the given deal to the target firm's shareholders when the acquiring firm encounters frictions in its negotiations with the target.

However, the existing literature has done little to develop an understanding of the impact of acquiring firms' early announcements on investor attention and how this attention influences

[1] In this paper, our focus of early announcement is voluntary disclosure and differs from the forced disclosure required by the US Securities Exchange Act (Rule 10b-5, Exchange Act), which requires the bidder to disclose merger negotiations before an agreement is signed if it previously leaks the details of negotiations into the market.
[2] See Reuters news on 22 August 2008, "King sees an Alpharma deal accretive in 2nd year", available at https://www.reuters.com/article/king-alpharma-call-idUSN2243454620080822.
[3] See CNN news on 29 May 2014, "Tyson starts a bidding war for Hillshire", available at https://money.cnn.com/2014/05/29/news/companies/tyson-hillshire/index.html.

capital market perceptions with respect to early announcements of takeovers. Our paper fills this gap by investigating how investor attention is associated with takeover early announcements and how the effect of investor attention to early-announced deals would impact upon the temporal stock market reaction and firm value in the long run. We propose an investor-attention-based interpretation for firms' early announcements. Acquiring firms may be motivated to make early announcements to signal the synergistic potential to target shareholders, hoping to smooth the negotiation process, as found by Aktas *et al.* (2018). Meanwhile, compared to publicly releasing bidding attempt after reaching a definitive agreement with the target (hereafter referred to as "late announcement", the deal with the late announcement is referred to as "late-announced deal"), the early announcement contains information of greater unexpectancy to market investors and greater uncertainty (in terms of the possibility of achieving definitive agreement of the deal). As a result, early announcements are likely to boost investor attention, elicit an overly optimistic reaction from investors with limited attention and processing capacity, and lead to a contemporaneous rise in stock purchase. This investor overreaction in the short term is followed by lower future returns and lower long-run firm value. Note that Aktas *et al.*'s (2018) signalling-based interpretation and our investor-attention-based interpretation of early announcement are not mutually exclusive; on the contrary, they may coexist and complement each other. Investor-attention-based interpretation dominantly manifests itself and is more pronounced for early-announced deals that attract high investor attention. It does not prevent the signalling-based interpretation from maintaining across early-announced deals and being more observable for those deals with low investor attention.

Previous studies have found that investors pay significant attention to various significant corporate events, such as initial public offerings (Da *et al*. 2011; Bajo *et al.* 2016), earnings announcements (DellaVigna and Pollet, 2009), payout policies (Bodnaruk and Östberg, 2013), and corporate takeovers (Louis and Sun, 2010). As a non-recurring, rich-information on

synergistic potential, and attention-grabbing event of a firm, early announcement makes the firm's bidding attention public early and is expected to substantially increase the propensity of investors to pay more attention. Therefore, we predict that early-announced deals will be associated with greater investor attention than late-announced deals.

We empirically test the hypotheses using a sample of 1,302 merger and acquisition (M&A) transactions announced by U.S. public companies between 1 January 2005 and 31 December 2018. We manually check the announcement date and definitive agreement signature date for each sample transaction and identify 64 deals announced by acquiring firms before they reached a definitive agreement with the targets (i.e., early-announced deals), and 1,238 late-announced deals. Following Drake *et al.* (2012), we use an abnormal Google search volume index (*AbSVI)* and abnormal dollar trading volume (*AbVOL*) to depict investor attention. *AbSVI* is constructed based on manually-collected daily Google search volume data. The results based on both measures of investor attention confirm our conjecture. We find that when an acquiring firm announces a deal before reaching a definitive agreement with the target, investors substantially increase their attention toward the firm in terms of the abnormal Google search volume (abnormal dollar trading volume) by 22% (55%) on the early-announced deals relative to late-announced deals during the sample period across all sample deals.

Next, we ask how increased investor attention toward early-announced mergers would influence capital market response. Previous studies on investor attention have established that stock market investor attention could escalate the price effect of corporate event disclosure (Barber and Odean, 2008; Da *et al*.2011). There are two competing mechanisms that could explain the way in which investor attention influences capital market reaction to firms' early announcements: the price pressure argument (Barber and Odean, 2008) and the price discovery argument (DellaVigna and Pollet, 2009; Drake *et al.* 2012). The price pressure argument claims that, as a scarce cognitive resource (Kahneman, 1973), attention

affects the buying behavior of investors. As posited by Barber and Odean (2008), with limited time and resources, investors are more likely to buy rather than sell the stocks that grab their attention with bounded rationality. This results in positive price pressure on stock prices and short-term mispricing of these stocks. According to this *price pressure argument*, when an acquiring firm announces its bidding attempt before reaching a definitive agreement, it sends unexpected material information to the market, which is more likely to catch investors' attention and thus influence investors' buying decisions, especially in the case of retail investors with limited attention and processing power. Note that the short-term price increase could imply temporal mispricing of assets (i.e. the contemporaneous larger overvaluation of stocks in the M&A context, indicating at least in part the presence of market inefficiency). Investors' overreaction will be corrected in the long term after the integration of the early-announced deal has been completed. Therefore, we predict that bidder early announcements with greater investor attention are related to higher announcement abnormal returns in the short term, and greater return reversals in the long term. We label this the *price pressure hypothesis for early announcement*.

On the contrary, the price discovery argument posits that investor attention improves market efficiency by helping investors to demand and acquire more precise information (Drake *et al.* 2012) and thus promoting information discovery (DellaVigna and Pollet, 2009). According to the *price discovery argument*, takeover early announcements attract investor attention by sending valid signals about the firm and deal quality to the market. Therefore, investors will be able to make more informed and rational responses to deal information disclosure by paying attention to such announcements. With the lower probability of investor misevaluation or overreaction to the early-announced deal, market efficiency improves. As a result, we expect no price reversal for the merging firms in the long run. Brought together, we predict that bidder early announcements with high investor attention bring about higher short-

term and long-term returns in the capital market. We label this the *price discovery hypothesis for early announcement*.

We empirically test the effect of investor attention on early-announced deals with an identification framework of short-term and long-term capital market reactions to deal announcements. For a sample deal, we construct a dummy variable of high investor attention (*HighAtt*) if investor attention it has attracted on the first disclosure day is in the top quartile of the abnormal Google search volume of the whole sample. We test the effect of investor attention on early-announced deals in baseline regressions with extensive controls for various deal, bidder, and target characteristics. We find that early-announced deals that have attracted high investor attention realize 3.6%-4.1% higher cumulative abnormal returns (CARs) for bidders and merged firms across the three-day window surrounding the early announcement compared to those with low investor attention. On the contrary, the early-announced deals with low investor attention do not experience any significant CARs at early announcement. To account for different information disclosure content as well as different arbitrage activities surrounding early and late announcements, we follow Aktas *et al.* (2018) to further compute adjusted CARs to bidders and combined firms, both of which reflect the market reactions to both the early announcement and definitive agreement of an early-announced deal and our results hold. This set of evidence on short-term capital market reaction is consistent with both the *price pressure hypothesis for early announcement* and the *price discovery hypothesis for early announcement*.

One might be concerned that endogeneity issues and selection bias may drive our baseline findings on the effect of investor attention toward early-announced deals on short-term CARs to bidders and combined firms. We explicitly address this potential problem using various techniques. First, to control more directly for observable differences in the deal characteristics between early- and late-announced deals, we employ propensity score

matching (PSM) analysis to estimate the causal treatment effect and accommodate the possible selection problems. Second, to further address the potential endogenous relation between an early-announced deal and deal returns, we use a system of simultaneous equations to estimate the effect of investor attention on early-announced deals. Our reported findings based on short-term CAR analysis remain intact after addressing these endogeneity and selection bias concerns.

To distinguish between these two competing hypotheses of the investor attention effect on early announcement, we further investigate the effect on the long-term performance of acquiring firms. We employ the buy-and-hold abnormal returns (BHARs) as the long-term performance proxy. Although early-announced deals do not systematically outperform or underperform late-announced deals in the long run, we find that the early-announced deals with high investor attention are more likely to experience a price reversal during the 12-month period and the 24-month period after the early announcement. This price reversal effect translates to a 25.5% (35.7%) reduction in long-term performance during the 12 months (24 months) after the early announcement of an early-announced deal with high investor attention, compared to the one for an early-announced deal with low attention on average. This result is in line with Barber and Odean (2008) in terms of the price pressure explanation for investor attention.

Together, our findings provide support for the *price pressure hypothesis for early announcement*, and against the *price discovery hypothesis for early announcement.* Since the early announcement decision is largely made by top managers, this price reversal effect suggests a potential agency problem. Indeed, top managers might not have made the most favourable decision on behalf of the shareholders. The early-announced deals with substantial investor attention might make investors overact to the deal, pushing up the stock price in the short term but followed by a price reversal in the long run. Our evidence confirms that the

impact of early announcements on firm value effect and long-term price reversal is moderated by investor attention. Furthermore, investor attention may explain at least part of the announcement effect pattern for merging firms.

We test the robustness of our results by performing a battery of additional tests. First, since our investor attention measure in the short-term market reaction analysis is constructed based on an abnormal Google search, it is more likely to reflect the attracted attention of retail investors. We expect that the reported effect of investor attention on the early-announced deals would be more pronounced in domains with a less favourable information disclosure environment for investors, and hence attention- and resource-restricted retail investors would have to rely on Google search to a greater extent. Here, we find that the positive effect of investor attention to early-announced deals on short-term market reaction is indeed more substantial for deals attempted by bidders followed by low analyst coverage, and with greater opaqueness in information disclosure. This additional test result provides us with greater confidence as to the robustness of our findings.

Second, we define an alternative high investor attention dummy variable based on the abnormal trading volume, and repeat our baseline analysis on short-term and long-term CARs with this alternative dummy. Third, we apply cleaner definitions of "early announcement" by excluding deals jointly announced by both acquirers and targets, and hostile deals as well. Fourth, we apply a set of exclusion criteria, one at a time, to form a cleaner overall sample (i.e. excluding turbulent times for attention such as financial crisis; excluding deals with acquiring firms from the financial and utility industries to address regulatory concerns). Our results are robust to all these additional checks.

Our study makes several contributions to the literature. First, we complement the understanding of early announcements. As one of the pioneers in studying the early M&A announcement, we not only document the value impact of the early announcement but also

propose an investor-attention-based interpretation of early announcement. Apart from sending synergistic information to shareholders, early-announced deals could attract greater attention from investors, especially those less-sophisticated retail investors. We point out that apart from synergistic signalling, increased abnormal attention could be another driver of market reactions to early-announced deals. Our investor-attention-based interpretation is consistent with managers' opportunistic adjusting firm M&A announcement strategy to exploit investors' imperfect rationality and to pump up the stock price and the temporary returns for their own benefit. Managers of an acquiring firm might choose to announce a deal early, in part, to attract investor attention and influence short-term returns.

Our theory on the motives of early announcement complements Aktas *et al.'s* (2018) signalling explanation, which proposes that an early announcement represents the sending of a credible signal of the strategic importance of the transaction to the target firm's shareholders, when there are severe negotiation frictions between the merging parties. According to Aktas *et al.* (2018), early announcement serves as a tool to communicate with the uninformed target shareholders and make them perceive the bid as highly synergistic and associate it with a higher premium, hence supporting the deal. According to our investor-attention-based explanation, early announcements serve as a tool to attract investor attention. Announcing a deal early might imply a transaction which initially benefits the bidder's management but hurts shareholders in the long term. We reveal that the sources for this short-term value creation for early-announced deals at least in part come through attracting greater attention from investors, especially less-sophisticated retail investors. In other words, the higher market reactions to those early-announced deals are not entirely due to investors' perception of deal synergy. Our paper echoes Aktas *et al.* (2018) whereby early-announced deals realize greater short-term adjusted deal CARs, but differs from their paper in that we document a significant negative association between early-announced deals with high investor attention and post-merger long-

term stock returns. Furthermore, our investor-attention-based explanation is also different from other theories such as "announce-to-learn" (Luo, 2001, 2005) and CEO overconfidence (Malmendier and Tate, 2008). The "announce-to-learn" argument cannot explain higher short-term abnormal returns upon early announcement and the following price reversal in the long run. Under the CEO's overconfidence explanation, it is not given that deals with high investor attention will yield a higher short-term CAR.

Second, previous literature on investor attention has largely ignored the investors' attention toward early-announced takeovers and their impact on the value effect in the capital market. Our findings suggest that the early-announced deals attracting extremely high investor attention might temporally push up stock prices but then be detrimental to the acquiring firm's shareholders in the long term. Our paper documents this attention effect of the early announcement and complements the literature on the relationship between corporate events and investor attention (e.g., DellaVigna and Pollet, 2009; Louis and Sun, 2010), and the literature on the relationship between investor attention and stock price (e.g., Gervais *et al*. 2001; Barber and Odean, 2008; DellaVigna and Pollet, 2009; Hirshleifer *et al.* 2009; Hou *et al*. 2009; Da *et al*. 2011; Lou, 2014). This is the first study to our knowledge that attempts to offer new light to existing investor attention literature by investigating the relation between investor attention and early-announced deals: we reveal that abnormal investor attention affects the capital market reactions to early-announced deals.

Third, our study relates to the stream of literature on the role of internet search in business and economy. Previous literature has used internet search to explain the price run-up for target firms (Siganos, 2013), price movement of the cryptocurrency market (Smales, 2022) as well as stock market movement and volatility (e.g., Da *et al.*2011; Drake *et al.* 2012; Dimpfl and

Jank, 2016; Huang *et al.* 2019).[4] In the spirit of Reyes (2018), our paper uses Google search volume to construct our main measure of investor attention toward an M&A transaction, and we are the first to our knowledge to employ it in the context of an early announcement study. Our study also echoes Reyes (2018) by highlighting the importance of identifying the application scope of internet search as an attention proxy.

Fourth, the findings of this paper are closely tied to recent studies on managerial incentives to manipulate market perceptions and short-term stock prices. We echo the statement in Lou (2014) that "many important firm decisions are at least partially motivated by short-term share price considerations." Our paper adds to this stream of literature by providing evidence that managers also make announcement timing decisions for M&As to influence short-term firm value.

The remainder of this paper proceeds as follows: Section 2.2 reviews the relevant literature and develops the hypotheses; Section 2.3 describes the sample, data, and methodology; Section 2.4 presents the main results; Section 2.5 reports the results of robustness analysis, and Section 2.6 concludes.

2.2. Literature review and hypotheses development

2.2.1. Early announcement and investor attention

The US security laws regulate the public disclosure of material information (e.g., the public announcement of M&A deals) for the purpose of protecting investors' interests and improving market transparency.[5] Therefore, acquiring and target firms ordinarily issue a press release to announce the takeover and include the transaction's material terms after signing the definitive merger agreement. However, there is room for discretion in terms of the timing of

[4] Da et al. (2011) show that higher weekly individual investor attention proxied by the Google SVI can predict higher stock returns in the short run and a reversal in the long run. Drake et al. (2012) find that the abnormal Google search volume sharply increases at the earnings announcement date and is associated with higher announcement returns.

[5] For detailed mandate on M&A deal disclosure, see U.S. Securities Exchange Act (Rule 10b-5, Exchange Act) about M&A press release.

the public announcement of the deal. Previous literature has documented that managers do strategically plan the timing of corporate news releases. Lou (2014) finds that managers opportunistically increase advertising spending in the contemporaneous year when announcing 100% stock-financed acquisitions to pump up the bidder stock prices. In the M&A context, the timing of disclosing a deal to the public could also be opportunistically manipulated by managers. Acquirers' managers can choose to voluntarily disclose negotiation information at an earlier stage, ahead of signing the definitive agreement and before the formal due diligence process has been completed. In this case, the deal would to a large extent not be anticipated by the market at the time of announcement.

Previous studies have pointed out that investors pay substantial attention to material corporate events such as initial public offerings (Da *et al*. 2011; Bajo *et al.* 2016), earnings announcements (Dellavigna and Pollet, 2009), payout policies (Bodnaruk and Östberg, 2013), and corporate takeovers (Louis and Sun, 2010). As a non-recurring, high-information, and attention-grabbing event staged by a firm, an early announcement could be perceived as an unusual signal of the potential takeover to the market, which would be captured by investors. It could also provoke investors into demanding more information about the deal and merging firms. Therefore, early announcements would substantially increase investor attention propensity. With its nature of high unexpectancy and high uncertainty in terms of achieving a definitive agreement and final deal outcome, early-announced deals are likely to attract more abnormal attention from investors relative to late-announced deals. Therefore, our first hypothesis is as follows:

H_1: Early-announced deals are associated with greater investor attention compared to the attention level gleaned on late-announced deals.

2.2.2. Investor attention and stock market performance

Previous literature has documented that investor attention in the stock markets can escalate the price effect of disclosure of corporate events such as earnings announcements (Drake *et al.* 2012) and initial public offerings (Da *et al*.2011). Exploring the underlying mechanism of how investor attention escalates the price effect, previous studies have generally documented two competing explanations: the price-pressure-based argument and the price-discovery-based argument.

According to the price-pressure-based argument, increased attention from retail investors tends to temporally boost the stock price. Barber and Odean (2008) noted that attention plays an important role in retail investors' buying decisions when investors are short of time and resources to find a good listed stock to target. Since attention is a limited cognitive resource (Kahneman, 1973), investors typically consider investing in stocks that grab their attention when making buying decisions, whereas they consider stocks that they already hold when making selling decisions. This asymmetric effect of attention makes investors more likely to become net buyers of attention-grabbing stocks, which results in a positive price pressure being exerted on these stocks, which are then subject to short-term mispricing.

A stream of literature has found supportive evidence for the price-pressure-based argument by adopting various proxies for investor attention. Gervais *et al.* (2001) find that abnormal trading volume increases stock visibility and investor attention, resulting in a subsequent price increase. Meanwhile, Lou (2014) shows that managers increase firms' advertising costs to grab investors' attention, leading to a contemporaneous increase in retail buying orders and abnormal stock performance, though the price effect is eventually reversed in the long term. Da *et al*. (2011) use the Google search volume (SVI) as a proxy for investor attention and find that an increase in the SVI is associated with higher stock returns in the next two weeks, followed by a price reversal. In the M&A context, Louis and Sun (2010) show that M&A announcements

made on Fridays (where less investor attention is given) realize a lower abnormal trading volume and less pronounced negative returns for stock swap acquisitions. Reyes (2018) investigates the role of investor attention in M&A announcements and documents that price pressure would generate larger overvaluation of stocks and higher announcement returns in the short term. Elsewhere, Barbopoulos *et al.* (2020) state that takeovers (particularly small ones) announced on the day of releasing key macroeconomic news attract relatively high market attention and thus have higher abnormal announcement returns and experience a small price drift in the long run.

In the spirit of these previous studies, we posit that increased investor attention around the acquirer's early announcement date would also positively affect the market reaction to the early-announced deals due to short-term market mispricing. Such unexpected material news would catch investors' attention and influence their buying decisions, especially in the case of retail investors with limited attention and processing power. In the short run, these investors might not be able to arrive at a fair evaluation of the quality of the deal and may take an early announcement as a credible signal of a highly synergistic deal and then respond overly optimistically. Therefore, an early announcement could imply a temporal mispricing of the asset(s), and a contemporaneous larger stock overvaluation. In the long run, this temporary price overshooting for early-announced deals is corrected and then reversed. Therefore, we put forward the price pressure hypothesis for the early announcement:

H_{2a}: Compared to early announcements with low investor attention, acquirers' early announcements with high investor attention are associated with higher abnormal returns in the short term, which are then followed by lower abnormal returns in the long run.

Alternatively, the price-discovery-based argument claims that investor attention improves market efficiency by helping investors to acquire more precise information, hence promoting information discovery. Hirshleifer and Teoh (2003) show that limited investor attention reduces

price discovery and market efficiency. Meanwhile, DellaVigna and Pollet (2009) consistently argue that lower attention causes investors to take more time to react to market information. They find that compared to other weekdays, the limited investor attention paid to earnings announcements made on Fridays results in underreaction around the announcements and stronger post-announcement drifts. Indeed, Hou *et al.* (2009) find that lower attention leads to more post-earnings announcement drifts.

In an M&A setting, higher investor attention could speed up the synergy discovery process, leading the market price to more accurately reflect the value of the M&A transaction. Since the market generally overvalues M&A transactions, more investor attention should be associated with less overvaluation and, therefore, lower announcement returns (Reyes, 2018). This indicates that the positive short-term market reactions to increased investor attention would not disappear in the long run. In line with this, Drake *et al.* (2012) show that increased investor attention is more likely to exhibit a higher trading volume and faster information acquisition around the public M&A announcement date, reflecting the quality of the deal more accurately.

In the context of early-announced deals, as a material disclosure, early announcements of takeovers attract investor attention by sending valid signals about the firm and deal quality to the market. As a result, investors are able to search for deal information and provide more informed and rational responses to the deal information disclosure. Since the probability of investor misvaluation or overreaction to the early-announced deal is lower, we expect a less likely price reversal for the merging firms in the long run. Altogether, we propose our *price discovery hypothesis for early announcement*:

H_{2b}: Compared to early announcements with low investor attention, acquirers' early announcements with high investor attention are associated with higher abnormal returns in the short term, which are then followed by higher abnormal returns in the long run.

2.3. Data and sample

2.3.1. Sample construction

We extract all proposed M&A deals between 2005 and 2018 from the Thomson Reuters SDC Mergers and Acquisitions database (SDC hereafter),[6] and apply the following screening criteria: (1) both the acquirers and targets are publicly-listed US firms on the NYSE, AMEX, or NASDAQ; (2) we exclude transactions of spinoffs, repurchases, self-tenders, recapitalizations, going privatizations, liquidations, exchange offers, and acquisitions of remaining interest, partial interest, or assets; (3) the transaction value reported in the SDC is equal to or more than US$10 million; (4) acquirers control at least 50% of the target firm's shares after the transaction; and (5) acquirers' stock price and accounting information are available on CRSP and COMPUSTAT. We obtain a sample of 1,302 proposed deals.

We manually collect the definitive agreement date from the SEC filings and compare the date with the announcement date reported by the SDC. If the SDC announcement date is before the signing of the definitive agreement, the takeover is defined as "early-announced". 73 deals are identified based on this criterion. Next, by checking Factiva news about merging companies in the one month before the early announcement date and identifying whether there are other significant corporate events surrounding the early announcement date, we exclude four cases of negotiation information leakage. To avoid misclassifying cases where the deal announcement was made at weekends or on public holidays while the definitive agreement was then signed on the next working day as "early-announced", two cases with the gap between the SDC's early announcement date and the definitive agreement date being shorter than three calendar days are dropped. In addition, three cases where the reported SDC announcement date differs from that of the SEC filing are further dropped. Following this procedure, we identify 64 deals as "early-announced" and 1,238 deals as "late-announced".

[6] Our sample period starts from 2005 since Google search data is available from 2004 provided by Google Trends.

Table 1 presents the sample distribution across years (Panel A) and the acquiring firms' Fama-French 48 industries (Panel B). Overall, the early-announced deals account for 4.92% of the entire deal sample during the sample period 2005-2018, which is comparable to 6.67% of early-announced takeovers on average during the sample period 1990−2013 reported in Aktas *et al.* (2018). On average, it takes 74 days (with a median of 53 days) to reach the signing of definitive agreement since the early announcement date for our sample deals. As shown in Panel A, the year of 2009 witnesses the highest percentage (12.16%) of early-announced deals, while the year of 2012 has the lowest percentage (2.41%) of early-announced deals during our sample period. Panel B demonstrates that the early-announced sample deals are spread across various industries, with the top five industries: trading, communication, pharmaceutical product, computers, and electronic equipment, together accounting for 46.9% of early-announced deals in the sample.

*****insert Table 1 about here*****

2.3.2. Abnormal investor attention

We follow the previous literature to measure investor attention using two proxies: Google search volume index (SVI) and trading volume. Recent studies (e.g., Da *et al*. 2011; Drake *et al.* 2012; DeHaan *et al.* 2015) have widely used SVI as a proxy for investor attention. Da *et al.* (2011) argue that SVI can directly capture the magnitude of investor attention, particularly retail investors' attention. With the development of internet technologies, investors are more likely to use an internet search engine to gather information, especially from market-leading internet search platforms. Since Google is one of the most popular and prominent search platforms,[7] the search volume on Google is more likely to reflect investors'' general searching behaviours and their preference with regard to stocks (Da *et al*. 2011). Searching for a stock via Google

[7] Source: http://www.ebizmba.com/articles/search-engines.

indicates investors' attention toward the stock. Therefore, SVI could be perceived as a revealed attention measure.

Following this line of previous studies, we construct our main measure of abnormal investor attention based on SVI, calculated from the raw data on search frequency from Google Trends. We focus on the Google search volume for stock tickers rather than the various company business names as the former is more accurate in capturing investors' investment search purposes, whereas the latter might be noisier and also reflect people's non-investing purposes.

Consistent with Drake *et al.* (2012), we measure daily abnormal investor attention as:

$$AbSVI_{i,t} = \frac{SVI_{i,t} - ASVI_{i,t}}{ASVI_{i,t}}, \quad (1)$$

where $SVI_{i,t}$ is the daily search volume index for firm *i* on day *t*; $ASVI_{i,t}$is the average same-day search volume index of the week for the firm *i* over the past ten weeks to avoid any weekday and seasonal effects. $AbSVI_{i,t}$ is the difference between a firm's daily *SVI* and its average same-day *SVI* of the week during the past ten weeks, scaled by the average value. We construct the search volume-based investor attention measure, *Attention_AbSVI*, as the natural logarithm of (1+*AbSVI*) to normalize the distribution.

Due to data unavailability of direct measurement via internet search engines in some cases, a stream of literature has used trading volume as an alternative proxy for investor attention. Hou *et al.* (2009) show that investors pay attention to stocks which have a higher trading volume. Meanwhile, Lo and Wang (2000) provide empirical evidence to show that the trading volume is higher for stocks which tend to attract investor attention. Chordia and Swaminathan (2000) document that trading volume can be a better measure of attention than firm size. Barber and Odean (2008) use the abnormal daily trading volume of stocks as a proxy for investor attention.

In the spirit of this line of literature, we construct an alternative proxy for abnormal investor attention based on abnormal trading volume. The abnormal trading volume is calculated using Equation (2):

$$AbVOL_{i,t} = \frac{VOL_{i,t} - AVOL_{i,t}}{AVOL_{i,t}}, \quad (2)$$

where $VOL_{i,t}$ is the dollar trading volume for a firm *i* on day *t*; and $AVOL_{i,t}$ is the average same-day dollar trading volume for firm i over the past 10 weeks. We construct the trading volume-based investor attention measure, *Attention_AbVOL*, as the natural logarithm of (1+$AbVOL_{i,t}$) to normalize the distribution.

We use the *Attention_AbSVI (first disclosure day)* (*Attention_AbVOL (first disclosure day)*) to measure the investor's abnormal attention on the day when the proposed deal information is disclosed to the public for the first time. We use *Attention_AbSVI (total)* (*Attention_AbVOL (total)*) to measure the overall abnormal attention on the early-announced and late-announced deals. Specifically, for early-announced deals, *Attention_AbSVI (total)* (*Attention_AbVOL (total)*) is the sum of *Attention_AbSVI (first disclosure day)* (*Attention_AbVOL (first disclosure day)*) and the search volume-based (trading volume-based) investor attention measure of the definitive agreement signing date. For late-announced deals, *Attention_AbSVI (total)* (*Attention_AbVOL (total)*) equals *Attention_AbSVI (first disclosure day)* (*Attention_AbVOL (first disclosure day)*.

2.3.3. Short-term stock performance

To capture the market investors' short-term reaction to an acquirer's public announcement, we calculate the market model adjusted abnormal returns over the three-day window centred around the announcement date, i.e., *Bidder CAR [−1, +1]*, which measures the bidder's CAR *[−1, +1]* centred around the early announcement date (the announcement date) of the early-announced deals (late-announced deals). We estimate the market model parameters over the period starting 205 days and ending 6 days prior to the event date using CRSP value-weighted

index returns. Following Bradley *et al.* (1988), we depict the wealth effect on the combined firm (*Combined CAR [−1, +1])* using the value-weighted cumulative abnormal return of the acquirer and target firm over the (−1, +1) window surrounding the announcement. The weights are the acquirer's and the target's pre-merger market values of equity, excluding any holdings held by the bidder in the target prior to the merger (i.e., toeholds).

In the context of early-announced deals, the first disclosure (early announcement) and following the disclosure about the deal (definitive agreement announcement) might convey different sets of information to the market−the former being an unexpected shock with uncertainty as to whether a definitive agreement will be reached, and the latter being a confirmation of a definitive agreement being reached. To capture the market reaction to the full course of the deal information disclosure process of early-announced deals, we follow Aktas *et al.* (2018) to estimate the adjusted announcement returns, *Bidder adj CAR [−1, +1]* (*Combined adj CAR [−1, +1]*), by aggregating *Bidder CAR [−1, +1]* (*Combined CAR [−1, +1]*) around the early announcement date and the three-day announcement abnormal returns surrounding the definitive agreement date, *Bidder agreement CAR [−1, +1] (Combined agreement CAR [−1, +1]).* Following Aktas *et al.* (2018), when calculating agreement CARs, we require the gap between the early announcement date and the late announcement date to be at least 11 days. These additional criteria are to avoid two events that are too closed, which could lead to confounding information affecting our abnormal returns.

2.3.4. Long-term stock performance

We follow Hirshleifer *et al.* (2009) to measure the long-term stock performance of an acquiring firm with the buy-and-hold abnormal returns (BHAR) defined in Equation (3):

$$BHAR_{i,t} = \prod_t^T (1 + R_{it}) - \prod_t^T \left(1 + R_{pt}\right) \quad (3)$$

where R_{it} is the return of the acquiring firm and R_{pt} is the return of the benchmark portfolio on the month *t*; *T* is the holding period. We compute R_{pt} using a 25 size-and book-to-market

matched portfolio. The book-to-market ratio is calculated as the book value of equity for the last fiscal year-end in the prior calendar year divided by the market value of equity at the end of last December. We calculate $BHAR_{1,12}$ with a holding period of 12 months after the early announcement date (the announcement date) for early-announced deals (late-announced deals). For robustness, we also construct an alternative long-term stock performance measure ($BHAR_{1,24}$) with a holding period of 24 months.

Table 2 presents a comparison of the abnormal SVI, abnormal trading volume, and deal-related characteristics, as well as the bidder and target characteristics between the early- and late-announced deals in the sample. We winsorize all continuous variables at the 1st and 99th percentiles to avoid any bias caused by outliers. We note that for early-announced deals, although the magnitude of both abnormal investor attention measures on the first disclosure day, *Attention_AbSVI (first disclosure day)* and *Attention_AbVOL (first disclosure day)*, is significantly smaller than the investor attention attracted on the announcement date of late-announced deals, early-announced deals attract greater investor attention than late-announced deals in terms of the total abnormal investor attention at the deal level. This is consistent with early announced deals as eye-catching events attracting more investor attention due to their high unexpectancy and uncertainty, and boosting their demand for deal information. We note that our mean difference for *Attention_AbVOL (Total)* is insignificant at the conventional level. Compared to abnormal google search volume, the abnormal trading volume could reflect abnormal attention from both institutional and retail investors, which could lead to smaller effects on early-announced deals. Ben-Rephael *et al.* (2017) argue that retail attention shocks are less likely to lead to institutional shocks. Therefore, to capture the effect of abnormal attention from retail investors, we focus on the Google-search-based attention measure.

The univariate analysis in Table 2 also suggests that early-announced deals have a larger relative size to acquiring firms, and are more likely to be tend offers relative to late-announced takeovers. In early-announced deals, acquiring firms have higher volatility in their stock prices, and higher leverage, but smaller analyst coverage. Meanwhile, target firms of early-announced deals exhibit higher stock price volatility on average.

*****insert Table 2 about here*****

2.4. Results

2.4.1. Investor attention towards early announcement

We first analyse how investor attention is affected by early announcements. We investigate the effect of early announcement in multivariate regressions of the total abnormal investor attention measures, controlling for bidder characteristics, and time- and industry-fixed effects that might also affect investor attention. We estimate Equation (4) below and present the results in Table 3:

$$Attention\_AbSVI(total) \ or \ Attention\_AbVOL(total) = \beta_1 Early + \beta_k Controls + \varepsilon \quad (4)$$

where *Attention_AbSVI (total)* and *Attention_AbVOL (total)*) are the proxies for abnormal investor attention at the deal level. Following Aktas *et al.* (2018), we compute abnormal attention at the total deal level to incorporate different information content and arbitrager's activities on the early announcement and late announcement date, *Attention_AbSVI (total)* and *Attention_AbVOL (total).* As the information content is different between the early announcement and late announcement, investors and arbitrageurs would like to pay different attention and make the different intensity of arbitrage activities on these two dates. We expect that abnormal investor attention at the deal level could capture the overall reaction to deals from investors. Our key explanatory variable is *Early*, which equals one if the deal is identified as an early-announced deal, and zero otherwise. We control for a wide set of factors suggested by

prior studies on investor attention and Google search volume (e.g., Drak *et al.* 2012; Da *et al.* 2011): firm size (*Size*), analyst coverage (*Analyst*), the percentage of institutional ownership (*InstOwn*), the leverage ratio (*Leverage*), the book-to-market ratio (*BTM*), the standard deviation of the stock (*Sigma*), as well as the firm's stock raw returns (*Raw return*).

Table 3 presents the estimation results for regressions of abnormal investor attention on early-announced deals. In both column (1) and column (2), the coefficient of *Early* is positive and significant at the 5% level or above, which consistently indicates that investors pay substantial attention to the unexpected early announcement. The economic significance is also large: an early-announced deal is associated with a 22% higher abnormal Google search volume and 55% higher abnormal trading on average. The coefficients of control variables are qualitatively consistent with prior literature. For instance, echoing Drake *et al.* (2012) and Reyes (2018), larger firms attract significantly lower investor attention in M&As. In summary, the results in Table 3 provide supporting evidence of H_1 that early-announced deals are associated with greater investor attention than late-announced deals. Due to the high unexpectancy and uncertainty of early-announced deals, investors pay more attention to early-announced deals and demand more information for the deal and merging firms.

*****insert table 3 about here*****

2.4.2. Early announcement, investor attention, and acquirer's short-term performance

Next, we test how investor attention affects the short-term market reaction to early announcements. Table 4 presents the univariate analysis results of the short-term announcement abnormal returns. Panel A reports the short-term market reaction to bidders and combined firms for all (both early-announced and late-announced) sample deals. For the overall sample, the market reaction is negative (−0.88% for *Bidder CAR*, and −0.85% for *Bidder adj CAR*) to bidders and positive to the combined firms (2.14% for *Combined CAR*, and 2.22% for *Combined adj CAR*), all significant at the 1% level. This is in line with previous literature that

the acquisition of public targets is value-destroying for bidder firms (Travlos, 1987; Fuller *et al.* 2002), and that combined firms, on average, realize gains upon the M&A announcement (Fee and Thomas, 2004; Moeller et al. 2004; Harford *et al.* 2012). Comparing subsamples of early- and late-announced deals, we note that in early-announced deals, bidders experience positive and insignificant 3-day announcement abnormal returns, and that combined firms experience significantly positive abnormal returns (3.74% for *Combined CAR*, and 5.42% for *Combined adj CAR*, both significant at the 1% level). In late-announced takeovers, bidders experience significantly negative abnormal returns of −0.96% (significant at the 1% level), while combined firms realize positive abnormal returns of 2.05% (significant at the 1% level). Across all four measures of wealth effects, early-announced deals realize significantly higher abnormal returns to bidders and combined firms on average, which is consistent with Aktas *et al.* (2018).

However, this preliminary finding is based on average short-term market reactions. When we further check the abnormal returns to early-announced deals according to the level of investor attention attracted, a different picture is revealed. We classify a sample deal as a high investor attention deal (*HighAtt*) if its attracted investor attention (measured by the abnormal Google search volume) on the first deal disclosure day is in the top quartile of sample deals. As reported in Panel B, we find that the early-announced deals in the domain of high investor attention realize much higher abnormal announcement returns for bidders and combined firms than early-announced deals in the domain of low investor attention, with the mean differences being statistically significant at the 10% level or above. Collectively, this set of univariate analyses suggests that investor attention might moderate, or relate to, the short-term wealth effect of early announcement.

*****insert Table 4 about here*****

Our subsequent analysis explores how investor attention affects the impact of early announcements on short-term market reaction to a deal in a multivariate regression setting. We estimate Equation (5) using OLS regression:

$$CAR\,[-1,+1] = \beta_1 Early + \beta_2(Early \times HighAtt) + \beta_3\, HighAtt + \beta_k Controls + \varepsilon, \quad (5)$$

where *HighAtt* is the indicator variable which equals one if the abnormal Google search volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbSVI (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise.[8] We include a set of control variables to account for the firm fundamentals and deal characteristics that might influence a deal's wealth effect. Prior studies have reported that the wealth effect of a deal is related to the size (Moeller *et al*. 2004), leverage ratio (Maloney *et al*. 1993), BTM ratio (Dong *et al*. 2006), sigma (Moller *et al*. 2007), price runup (Rosen, 2006), relative size (Fuller *et al*. 2002), and the full stock payment (e.g., Travlos, 1987; Lang *et al*. 1989; Chang, 1998; Fuller *et al*. 2002). In addition, some of the previous literature has also documented that the market reaction to a deal is affected by whether the deal is being attempted through tender offers (*Tender*), to pursue diversification into other sectors (*Diversify*), and in high-tech industries (*HighTech*) or not (Jensen and Ruback, 1983; Maquieira *et al.* 1998; Masulis *et al*. 2007). Both year fixed effect and Fama-French 48-industry fixed effects are included in the baseline model, and standard errors are two-way clustered by the firm and industry levels.

[8] Tables 2 and 3 show that early announcement increases the total investor attention compared with the attention on the definitive agreement signing date for the late-announced deals. To clearly distinguish the attracted attention on first disclosure day for early-announced deals with that on the definitive agreement signing date for late-announced deals, we will focus on the attracted attention and define high attention based on first disclosure day for early-announced deals for further analysis. For robustness, we alternatively define high attention dummy (*HighAtt*) based on *Attention_AbSVI (Total)* (i.e., the total attention on the first disclosure day and definitive agreement signing date for early-announced deals, and the attention on the definitive agreement signing date for late-announced deals), and repeat Equation (5) regression. Our findings remain intact.

The results are presented in Table 5. We first examine the average effect of early-announced deals on short-term market reactions to bidders in columns (1) and (2). The dependent variables in columns (1) and (2) are *Bidder CAR [−1, +1]* and *Bidder adj CAR [−1, +1]*, respectively. The coefficients for the early-announced deal dummy (*Early*) are positive (0.017 in column (1) and 0.026 in column (2)), and significant at the 5% level in both models. Replacing the wealth effect of bidders with one of the merging firms in columns (3) and (4) gives us largely similar results. This set of results is consistent with the effect of early-announced deals on short-term market reactions reported in Table 6 of Aktas *et al.* (2018), demonstrating that, on average, early-announced deals gain more favourable market announcement reactions to bidders and combined firms than late-announced deals.

When we further examine how this effect of early-announced deals identified in columns (1) to (4) is affected by different investor attention domains with the interaction term (*Early*×*HighAtt*), the difference between impacts of early-announced deals is revealed. As reported in columns (5) to (8), we find a strong positive market reaction to the early-announced deals with high investor attention, but not to those deals with low investor attention: the coefficients on the interaction term are positive and significant at the 5% level across all four columns. The result is economically significant, with a higher magnitude than the average effect in columns (1) to (4) (0.036 in column (5), 0.053 in column (6), 0.041 in column (7), and 0.055 in column (8)), indicating that early-announced deals with high investor attention are associated with 3.6% (4.1%) higher short-term returns to bidders (merging firms) at first disclosure relative to those deals with low attention. If considering the market reaction to the full course of deal information disclosure of sample deals, this impact becomes even more pronounced: 5.3% (5.5%) higher short-term returns for bidders (merging firms) engaged in early-announced deals relative to those with low attention. The coefficient on *Early* turns insignificant in columns (5) to (8), suggesting that those early-announced deals without high investor attention do not realize

statistically significant abnormal returns, despite the early announcement event itself possibly sending the synergistic signal to market investors. This coefficient pair pattern is consistent with the preliminary findings from Panels B of Table 4. We note that the coefficient on *HighAtt* remains insignificant across all columns, indicating that abnormal investor attention does not necessarily generate net positive or negative wealth effect for late-announced deals. For late-announced deals, since an agreement is signed, there is less unexpectancy and uncertainty related to the deal, hence less likelihood to generate investor behavioural bias in the investment decision. Consequently, the wealth effect mainly depends on investors' judgement towards the quality of the late-announced deal through information searching, and their formed judgement is not necessarily always positive or negative.

Brought together, our evidence suggests that the average positive effect of early-announced deals on short-term market reaction is mainly driven by those early-announced deals that also attract high investor attention. This positive moderating role of investor attention is masked by the average abnormal returns to early announcement. The market reacts positively to early-announced deals only when the deal has attracted a high level of attention from investors.

*****insert Table 5 about here*****

2.4.3. Addressing the endogeneity and selection bias of the baseline test

One might be concerned that endogeneity issues and selection problems may bias our findings on the moderating effect of investor attention toward early-announced deals' short-term abnormal returns. We explicitly address these potential problems using various techniques.

First, to control more directly for observable differences in the deal characteristics between early- and late-announced deals, we employ propensity score matching (PSM) analysis to estimate the causal treatment effect and accommodate possible selection problems. Specifically, we use the logit model to estimate the propensity scores by including the control

variables in Equation (5).[9] The treatment group contains early-announced deals, while the control group comprises late-announced deals. To construct the matching sample, we match each treated firm with the closest propensity score of control firms using a one-to-one nearest neighbour matching method without replacements, which ensures that unmatched bidding firms are dropped from the sample.

Figure 1 (a) and Figure 1 (b) show the kernel density functions of the treatment firm and the control firm, based on the before- and after-matching of two groups, respectively. As shown in Figure 1 (a), the kernel density functions of two groups are clearly different before matching. After using the matching method, we can find that the kernel density functions of two groups are significantly closer as shown in Figure 1 (b), indicating that the observable characteristics of variables for early-announced and late-announced bidder firms are similar and comparable after matching.

*****insert Figure 1 about here*****

Panel A of Table 6 shows the treatment and control groups before and after matching. After matching, the propensity scores and key covariates are successfully balanced in our tests. All paired differences are insignificantly different from zero, suggesting that observable characteristics are similar between treated and control bidding firms. We repeat our short-term CAR baseline models (columns (5) to (8) in Table 5) by using the PSM-matched firms. As shown in Panel B of Table 6, early-announced deals with high investor attention are associated with stronger short-term market reactions: the coefficients of the interaction term are positive (0.054 in column (1), 0.088 in column (2), 0.073 in column (3), and 0.093 in column (4)) and

[9] The control variables are bidder size, bidder leverage , bidder book to market ratio, bidder run-up, bidder sigma, target size, target leverage, target book to market ratio, target run-up, target sigma, full stock payment, diversify, hightech, tender, and relative size.

significant across all four specifications[10]. This suggests that our baseline findings are robust with PSM setting addressing potential selection bias problems.

*****insert Table 6 about here*****

Furthermore, there might be concerns on endogeneity caused by simultaneity bias in our baseline setting. As Aktas *et al.* (2018) point out, deal returns are both the outcome and the determinant of early announcements. Therefore, we employ the simultaneous equations analysis (Pindyck and Rubinfeld, 1981, Chapter 7) of two-stage simultaneous equation system to address this issue. Specifically, we estimate a two-stage simultaneous equation system for subsamples of deals with high and low investor attention separately. In the first stage, two endogenous variables (*Early* and *Combined adj CAR*) are first regressed on a set of exogenous variables. We estimate the predicted value of *Early* and *Combined adj CAR* using the bidder's firm size (*Bidder Size*) and tender offer (*Tender*) as the instrument of the deal return (*Combined adj CAR*) and the decision of an early announcement (*Early*), respectively. In the second stage, the fitted values of deal returns (denoted by "*Predicted Combined adj CAR*") and early announcement decisions (denoted by "*Predicted Early*") are used to explain the other endogenous variable (i.e., "*Predicted Combined adj CAR*" as an explanatory variable for "*Early*", and "*Predicted Early*" as an explanatory variable for "*Combined adj CAR*").

As reported in Table 7, for the subsample of deals that attract high investor attention, the second-stage results of deal returns suggest that early announcements do predict higher adjusted deal CARs: the coefficient in column (2) is 0.033 and significant at the 5% level. However, this positive impact of early announcement on adjusted deal CARs does not exist for the subsample of deals with low investor attention. Collectively, these results again indicate that the positive market reaction on early-announced deals, at least not entirely, is driven by

[10] In an alternative model, we match the early-announced deals by using the kernel matching technique, and find qualitatively the same results. We provide these results in Appendix of Table A.1.

the deal synergy itself. Our results suggest that these early-announced deals are associated with higher returns only when they have attracted greater abnormal attention from investors. Therefore, our reported baseline findings based on short-term CAR analysis maintain intact after addressing potential endogeneity problems using various empirical settings and estimation techniques.

*****insert Table 7 about here*****

2.4.4. Early announcement, investor attention, and acquirer's long-term performance

Although both the *price pressure hypothesis for early announcement* and the *price discovery hypothesis for early announcement* predict a positive relationship between short-term abnormal returns and early announcements with high investor attention, they differ in their predictions on long-term performance. If price pressure drives the short-term positive market reaction, we expect that the temporal effect will be corrected in the market and thus eventually reversed in the long term (**H_{2a}**). Alternatively, if the abnormally high investor attention increases the market efficiency and price discovery, we would observe consistent abnormal return patterns in the long run **(H_{2b}).**

In this section, we examine the relationship between long-term stock performance and early announcements with high investor attention using univariate and multivariate analysis. We report the main results based on analysis of completed sample deals, and demonstrate robustness with analysis of all sample deals (completed or not). The univariate analysis results are presented in Table 8. Panel A of Table 8 reports the mean of the BHARs of all completed deals, early-announced deals, and late-announced deals. The mean difference in the 12-month (24-month) BHAR of early-announced deals and late-announced deals is 12.51% (10.69%), and is significant at the 1% (10%) level. This suggests that bidders engaged in early-announced deals on average generate greater performance in the long run compared to those of late-announced deals. To some extent, this evidence is consistent with early announcements

conveying signal about synergistic gain and manifesting it in the long term on average. Panel B of Table 8 compares the long-term performance of early-announced deals with high attention and low attention. In particular, the 12-month BHAR performance is 23.58% (significant at the 10% level) lower for bidders engaged in early-announced deals with high investor attention relative to bidders engaged in early-announced deals with low investor attention. These univariate results consistently suggest a price reversal pattern only for early-announced deals with high investor attention, supporting the *price pressure hypothesis* that a temporal positive effect on early-announced deals with high attention will eventually be corrected in the market.

*****insert Table 8 about here*****

We then test the impact of early announcement and investor attention on acquirer's long-term performance in a multivariate setting, controlling for the same set of bidder characteristics and time- and firm-fixed effects that might also affect long-term abnormal returns. The results are reported in Table 9. In columns (1) and (2), we regress BHAR for acquiring firms over 12- and 24-month periods after the deal announcement, respectively, on the early announced deal indicator (*Early*). The coefficient on *Early* is only significant at the 10% levels in column (1) but not significant at the conventional level in column (2), suggesting that early-announced deals do not systematically outperform or underperform late-announced deals in our sample. As shown in columns (3) and (4), the coefficient of the interaction term *Early* × *HighAtt* is negative and significant at the 5% level, indicating that the early-announced deals with high investor attention are more likely to experience a price reversal in the long term. This price reversal effect is economically significant, translating to a 25.5% (35.7%) reduction in long-term wealth effect in the following one year (two years) after the early announcement of an early-announced deal with high investor attention compared to one with low investor attention. This result is in line with Barber and Odean's (2008) price pressure explanation of investor attention.

Conversely, the coefficient of *Early* is positive in columns (3) and (4), significant at the 1% level (for a 12-month period) and 10% (for a 24-month period) level, respectively, indicating that the acquiring firms experience 18.7% (20.1%) higher long-term abnormal returns in the following one year (two years) for early-announced deals with low investor attention. This evidence suggests that the average synergistic signalling manifests it in a more observable way in the context of early announcements with relatively low investor attention, where the effect is less likely to be masked by heightened behavioural bias caused by abnormal investor attention. Repeating the multivariate analysis of long-term performance with all sample deals generates similar results and does not change our conclusions.

Overall, we find that early-announced deals which draw high investor attention are associated with a long-term price reversal, after experiencing the initial positive short-term market reaction. This is consistent with $\mathbf{H_{2a}}$ and supports the *price pressure hypothesis for early announcement* that the short-term inflated stock price attributable to attention-grabbing events tend to experience a price reversal due to the correction of the investor's behavioural biases (Lou, 2014; Barbopoulos *et al.* 2020). In addition, our results are in line with Malmendier *et al.* (2018) and Reyes (2018), both of which point out that short-term announcement effects fail to capture the long-run return implications of M&As. Furthermore, since early announcement decisions are usually made by top executives, our findings also imply the existence of agency problem of bidding firms – top managers might strategically announce a deal before reaching a definitive agreement, to temporarily push up stock returns and ignore shareholder interest in the long term.

*****insert Table 9 about here*****

2.5. Additional robustness

For robustness, we perform a battery of additional tests. First, we test our baseline findings on short-term abnormal returns by domains of investor information environment. Our investor

attention measure used in the reported results is constructed based on abnormal Google search volume, which is more likely to pick up the attention of retail investors with limited attention capacity and processing power. Compared to retail investors, institutional investors have a better information disclosure environment and hence rely much less on Google searches for information (Lou, 2014). Therefore, if our attention-based explanation holds, we would expect investor attention to have a more pronounced effect on the market reactions to the early announcement when individual investors face a weak information environment.

Following previous literature, we measure a firm's information environment according to its analyst coverage and disclosure opaqueness. A firm's information environment for individual investors is more favourable when it is followed by a greater number of analysts (Brennan *et al*. 1993) and when it allows more transparent information disclosure (Drake *et al.* 2012; Luypaert and Caneghem, 2017). Drake *et al.* (2012) document that larger institutional organizations are associated with less opaqueness and greater transparency when it comes to information disclosure. Therefore, we follow Luypaert and Caneghem (2017) to use firm size as a proxy for information disclosure environment. We split our sample into subsamples with high and low analyst coverage based on the sample median of the number of analysts following the bidder firm, and into subsamples with large and small bidders based on the sample median of bidder size. We repeat the baseline tests of Table 5 for subsamples of high and low analyst coverage (large and small firm size) and report the results in Table 10 Panel A (Panel B). We find that the positive effect of *Bidder CAR* (*Bidder adj CAR*) in early-announced deals with high investor attention is 7.1% (8.4%) higher for bidders with low analyst coverage, and is 6.5% (9.3%) higher for deals with greater opaqueness in the information disclosure. Replacing *Bidder CAR* (*Bidder adj CAR*) with *Combined CAR* (*Combined adj CAR*) produces similar results. These additional tests by domains of investor information environment further provide confidence to the robustness of our findings on short-term abnormal returns.

*****insert Table 10 about here*****

Second, we replace *HighAtt* with an alternative definition of high investor attention and present the results in Panel A of Table 11. We recognize that the Google search-based measure is more likely to reflect the information demand of retail investors rather than institutional investors. As posited by Madsen and Niessner (2019), Google search-based investor attention could be absorbed by the attention effect of institutional traders. Although our focus is to examine the impact of abnormal investor attention from retail investors on early-announced deals, we define an alternative high investor attention indicator (*HighAbvol*) based on the abnormal trading volume rather than Google search data, and repeat our baseline analysis on short-term and long-term CARs with this alternative dummy. Since stock trading volume reflects the attention and activities of both retail and institutional investors, the results of this test alleviate any concern that our previously reported findings are only driven by retail investors, not institutional investors.

Third, in the spirit of Aktas *et al.* (2018), we apply cleaner definitions of "early announcement" by excluding deals jointly announced by both bidders and targets, and hostile deals respectively. By not counting jointly-announced deals as early-announced deals, we form a cleaner dummy (*Early_exjoint*) for early-announced deals which represents a cleaner shock to the target and market alike. By excluding hostile deals from early-announced deals, we construct *Early_exhostile*, which ensures that our focused early announcement is different from those deals motivated by removing inefficient management. Results of robustness checks with cleaner definitions of "early announcement" are reported in Panels B and C respectively.

Fourth, to address the concern that our findings are driven by the potential regulatory impact on particular periods or industries, we repeat our analysis with a cleaner sample by excluding deals proposed in attention-turbulent times (i.e. the subprime lending and financial crisis in 2008) or periods of extremely negative market shock and excluding deals with acquiring firms

from the financial industry (SIC codes 6000- 6999) or utility industry (SIC codes 4900-4999), one at a time. We present the results in Panels D and E respectively. Our reported findings are robust against all of these additional checks.

*****insert Table 11 about here*****

2.6. Conclusions

Since it is costly for firms to disclose confidential information such as merger negotiations before reaching a definitive agreement, why do managers choose to release materially non-public facts voluntarily via early announcement? This paper explores the impact of investor attention on early-announced takeovers. We propose an investor-attention-based interpretation for firms' early announcements: with their greater unexpectancy and uncertainty, early announcements increase abnormal investor attention, and elicit an overly optimistic reaction from investors, especially retail investors with limited attention capacity and processing capacity, leading to a contemporaneous rise in stock buying.

We empirically test this investor-attention-based interpretation using an abnormal Google search volume index and abnormal trading volume as the proxies for investor attention. We find a positive relationship between early-announced deals and their attracted investor attention. We also show that early-announced deals with high investor attention exhibit higher short-term market reactions relative to early-announced deals with low investor attention, and these higher market reactions are eventually reversed in the long term. Overall, our findings support the *price pressure hypothesis* that investor attention plays a role in temporally boosting the acquirer's stock price.

To our knowledge, this is the first paper with the research setting of investor attention toward early announcements in takeovers. Our investor-attention-based interpretation of early announcement complements the signalling-based interpretation of Aktas *et al.* (2018). Our findings have important implications for corporate managers and boards. Corporate decision-

makers who decide to strategically time the announcement of M&As, should carefully consider the role of investor attention when it comes to corporate events and shareholder value.

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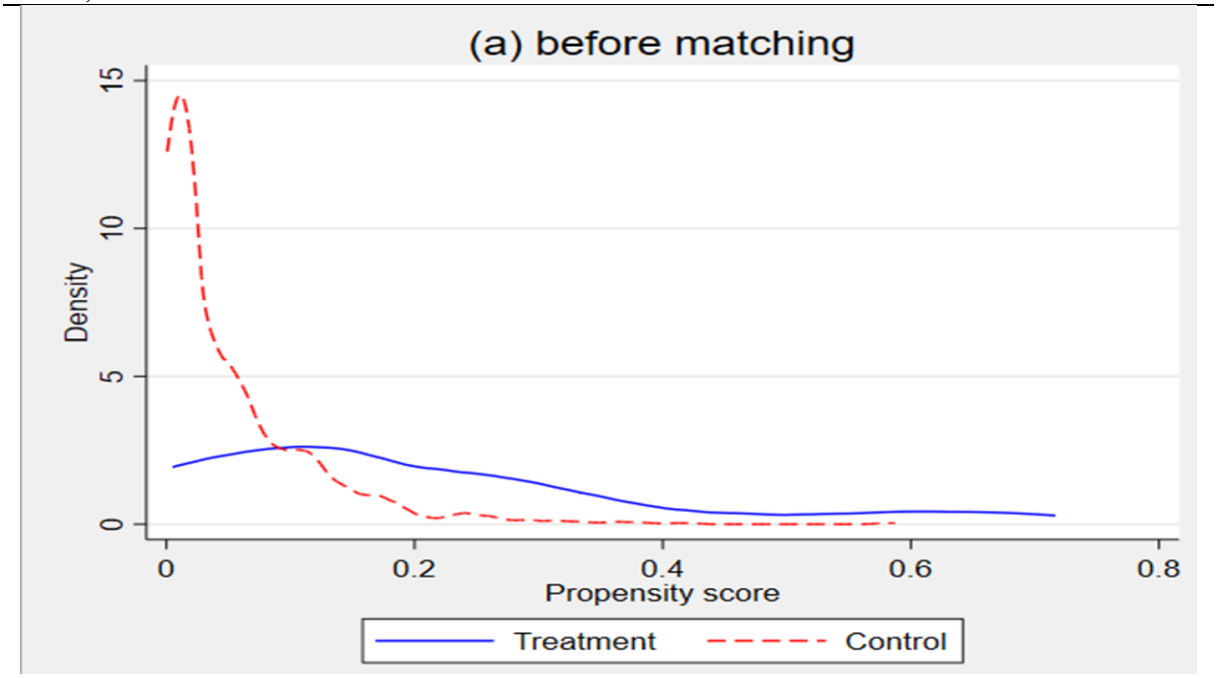
Figure 1: Kernel density of the early-announced deal and late-announced deal

This figure plots the kernel density of propensity matching scores for early-announced deals (treatment) and late-announced deals (control) before and after matching. We match firms using one-to-one nearest neighbor propensity score matching without replacement. The matching matrix includes *Bidder Size*, *Bidder Leverage*, *Bidder BTM*, *Bidder Run up*, *Bidder Sigma*, *Target Size*, *Target Leverage*, *Target BTM*, *Target Run up*, *Target Sigma*, *Full Stock Payment*, *Diversify*, *HighTech*, *Tender*, and *Relative Size*.



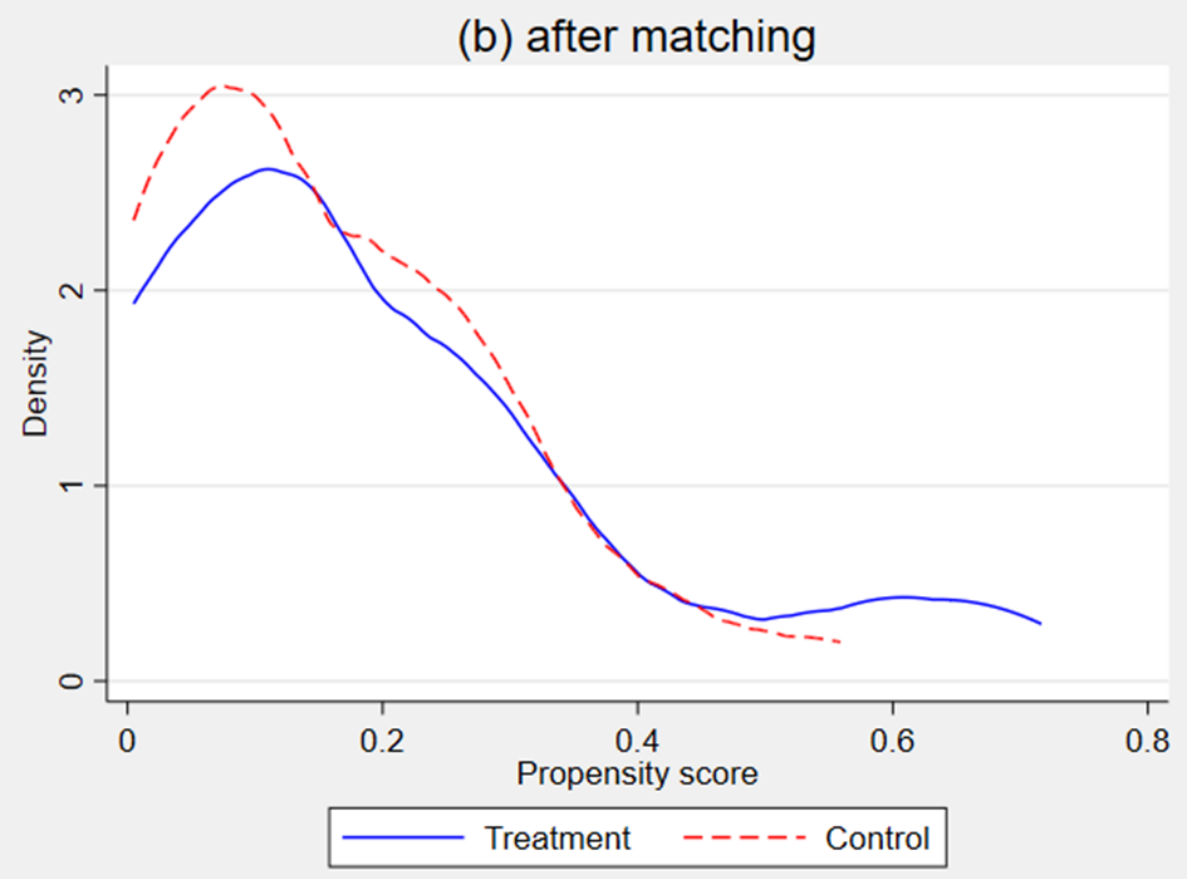


Table 1: Sample distribution

This table reports the sample distribution across the sample year (Panel A) and Fama-French 48 industries (Panel B). The sample includes 1,302 proposed takeovers from 2005 to 2018, 64 of which are early-announced deals. Percent (%) reports the ratio of the number of early announced deals over the number of total deals. Day difference (mean) (Day difference (median)) is the mean (median) days between the early announcement date and the definitive announcement date.

Panel A: Frequency of deals by year

Year	Total deals	Number of early announcements	Percent (%)	Day difference (mean)	Day difference (median)
	(1)	(2)	(3)	(4)	(5)
2005	128	8	6.25%	80	44
2006	132	4	3.03%	58	59
2007	127	4	3.15%	62	69
2008	75	5	6.67%	160	60
2009	74	9	12.16%	53	48
2010	90	3	3.33%	23	11
2011	53	4	7.55%	59	69
2012	83	2	2.41%	90	90
2013	74	4	5.41%	97	55
2014	100	6	6.00%	75	58
2015	101	6	5.94%	97	55
2016	102	4	3.92%	65	60
2017	69	2	2.90%	14	16
2018	94	3	3.19%	128	153
Total	1,302	64	4.92%	74	53

Panel B: Frequency by Fama-French 48 industries

Industry	Total deals	Number of early announcements	Percent (%)	Day difference (mean)	Day difference (median)
	(1)	(2)	(3)	(4)	(5)
Trading	64	8	12.50%	92	92
Communication	42	6	14.29%	40	40
Pharmaceutical Product	92	6	6.52%	32	41
Computers	57	5	8.77%	29	27
Electronic Equipment	82	5	6.10%	53	153
Other	965	34	4.46%	33	34
Total	1,302	64	4.92%	74	53

Table 2: Summary statistics

The table reports the summary statistics of variables. The sample includes 1,302 proposed takeovers from 2005 to 2018, 64 of which are early-announced deals. *Attention_AbSVI (first disclosure day)* is the *AbSVI* on the day that the proposed deal information is first released to the market. *Attention_AbVOL (first disclosure day)* is the *AbVOL* on the day that the proposed deal information is first released to the market. *Attention_AbSVI (Total)* is the sum of *Attention_AbSVI (first disclosure day)* and the search volume-based measure of definitive agreement signing date for early-announced deals, and *Attention_AbSVI (total)* equals *Attention_AbSVI (first disclosure day)* for late-announced deals. *Attention_AbVOL (Total)*) is the sum of *Attention_AbVOl (first disclosure day)* and the trading volume-based measure of definitive agreement signing date for early-announced deals, and *Attention_AbVOL (total)* equals *Attention_AbVOL (first disclosure day)* for late-announced deals. All variables are defined in Appendix, and all continuous variables are winsorized at 1st and 99th percentiles. We test for difference in means using the *t*-test allowing for unequal variance. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Early-announced deals			Late-announced deals			Mean Difference
	N	Mean	St.Dev.	N	Mean	St.Dev.	
	(1)	(2)	(3)	(4)	(5)	(6)	(2) – (5)
Abnormal Investor Attention							
Attention_AbSVI (first disclosure day)	56	0.253	0.053	1,112	0.376	0.022	−0.123*
Attention_AbVOL (first disclosure day)	64	0.553	0.094	1,238	0.782	1.023	−0.229**
Attention_AbSVI (Total)	56	0.510	0.653	1,112	0.376	0.022	0.134
Attention_AbVOL (Total)	64	1.268	1.428	1,238	0.782	1.023	0.486***
Deal Characteristics							
Deal size	64	3.455	5.207	1,238	2.937	6.973	0.518
Relative size	64	0.531	0.599	1,238	0.391	0.520	0.139**
Full Stock Payment	64	0.172	0.380	1,238	0.231	0.422	−0.059
Diversify	64	0.328	0.473	1,238	0.292	0.455	0.036
HighTech	64	0.156	0.366	1,238	0.090	0.287	0.066*
Tender	64	0.406	0.495	1,238	0.136	0.343	0.271***
Bidder Characteristics							
Size	64	26.747	70.671	1,235	26.793	64.734	−0.045
Leverage	64	0.186	0.149	1,233	0.146	0.127	0.040**
BTM	64	0.468	0.374	1,233	0.503	0.316	−0.035
Run up	64	0.054	0.298	1,238	0.053	0.264	0.001
Sigma	64	0.020	0.012	1,238	0.016	0.009	0.004***
Analyst	56	8.982	8.326	1,112	11.858	9.772	−2.875**
InstOwn	42	0.720	0.216	944	0.708	0.227	0.011
Raw Return	56	0.011	0.044	1,112	-0.007	0.053	0.018**
Target Characteristics							
Size	62	2.270	2.889	1,137	3.336	7.995	−1.065
Leverage	62	0.173	0.165	1,133	0.143	0.154	0.029
BTM	62	0.475	0.432	1,133	0.597	0.552	−0.121*
Run up	64	0.018	0.523	1,184	0.037	0.419	−0.019
Sigma	64	0.031	0.020	1,163	0.025	0.016	0.006***

Table 3: Early-announced deals and investor attention

The table reports the results of regressions of investor attention on early-announced deals. The overall sample includes 64 early- and 1238 late-announced deals from 2005 to 2018. The main dependent variable is *Attention_AbSVI (Total)* and *Attention_AbVOL (Total)* in columns (1) and (2), respectively. The main independent variable, *Early*, equals one in case the deal is announced before a definitive agreement is signed, and zero otherwise. We control for bidder firm characteristics, year-, and Fama-French 48- industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Attention_AbSVI (Total)	*Attention_AbVOL (Total)*
	(1)	(2)
Early	0.223**	0.553***
	(1.966)	(2.618)
Bidder Size	–0.078***	–0.070**
	(–2.896)	(–2.206)
Bidder Leverage	0.293	0.821**
	(1.191)	(2.379)
Bidder BTM	–0.026	0.002
	(–0.233)	(0.011)
Bidder Raw Return	–1.162*	–3.292***
	(–1.873)	(–3.389)
Bidder Sigma	2.161	1.707
	(0.465)	(0.285)
Bidder InstOwn	0.015	0.437***
	(0.119)	(2.646)
Bidder Analyst	0.125**	0.099
	(2.389)	(1.404)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Adjusted-R^2	0.025	0.128
N	983	1,090

Table 4: Univariate analysis of short-term abnormal returns

The table reports the univariate analysis of the bidder's three-day cumulative abnormal returns *CAR [−1, +1]* across groups of early versus late-announced deals and high versus low investor attention takeovers. We cover 64 early and 1238 late-announced deals in 2005 to 2018. *Bidder CAR [-1, +1]* is measured by using the market model adjusted abnormal returns to the bidder over (-1, +1) window surrounding the first disclosure day of the deal, i.e., early announcement date for early-announced deal and announcement date for late-announced deal. The CRSP value-weighted index returns are used as the benchmark over the period starting 205 days and ending 6 days prior to the event date. *Bidder agreement CAR* is the *CAR [−1, +1]* on the date of signing definitive agreement for early-announced deals only. *Bidder adj CAR* is the CAR and bidder agreement CAR for early announcement deals, and the bidder CAR for late-announced deals. *Combined CAR* is the value-weighted average of *CARs* of the bidder and target. The weights are based on the market value of equity of the bidder and target four days prior to the event announcement day. *Combined agreement CAR [−1, +1] is Combined CAR* on the date of signing definitive agreement for early-announced deals only. *Combined adj CAR* is the *Combined CAR* and Combined agreement CAR for early-announced deals, and *Combined CAR* for late-announced deals. Panel A reports *CARs* for all, early-announced and late-announced deals, respectively. Panel B reports *CARs* of early-announced deals with high and low investor attention. The difference in *CARs* is shown in the last column for both two Panels. Deals have high investor attention when the abnormal google search volume (*AbSVI*) on the first announcement day of the deal is in the top quartile of sample firms, and low investor attention if the *AbSVI* is in the bottom three quartiles. Detailed definitions of variables can be found in Appendix. We test for difference in means using the *t*−test allowing for unequal variance. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: CARs between early- and late-announced deals (%)

	All	Early announced deal	Late announced deal	Difference (Mean)
	(1)	(2)	(3)	(2) − (3)
Bidder CAR [−1, +1]	−0.88***	0.53	−0.96***	1.49*
	(−4.652)	(0.818)	(−4.834)	(1.689)
Bidder agreement CAR [−1, +1]		0.59	n.a.	n.a.
		(1.061)		
Bidder adj CAR [−1, +1]	−0.85***	1.13	−0.96***	2.09**
	(−4.402)	(1.198)	(−4.834)	(2.324)
N	1,302	64	1,238	
Combined CAR [−1, +1]	2.14***	3.74***	2.05***	1.69**
	(11.544)	(4.302)	(10.840)	(2.015)
Combined agreement CAR [−1, +1]		1.68***	n.a.	n.a.
		(4.257)		
Combined adj CAR [−1, +1]	2.22***	5.42***	2.05***	3.37***
	(11.760)	(4.962)	(10.840)	(3.955)
N	1,227	63	1,164	

Panel B: CARs for early-announced deals with high attention versus low attention (%)

	High attention (Top quartile)	Low attention (Bottom three quartiles)	Difference (Mean)
	(1)	(2)	(1) − (2)
Bidder CAR [−1, +1]	2.71*	−0.39	3.10**
	(1.950)	(−0.562)	(2.139)
Bidder adj CAR [−1, +1]	4.25**	−0.02	4.27*
	(2.084)	(−0.019)	(1.860)
N	14	42	
Combined CAR [−1, +1]	6.56***	2.62***	3.94**
	(3.580)	(2.921)	(2.113)
Combined adj CAR [−1, +1]	8.51***	3.94***	4.57*
	(3.389)	(3.232)	(1.789)
N	14	41	

Table 5: Market reaction to early announcements and investor attention

The table reports cross-sectional OLS regression results of *CAR [−1, +1]* on the takeover early announcement and investor attention. We cover 64 early- and 1238 late-announced deals from 2005 to 2018. The dependent variables are the *bidder CAR*, *bidder adj CAR*, *combined CAR*, and *combined adj CAR*, respectively. *Bidder CAR [-1, +1]* is measured by using the market model adjusted abnormal returns to the bidder over (-1, +1) window surrounding the first disclosure day of the deal, i.e., early announcement date for early-announced deal and announcement date for late-announced deal. The CRSP value-weighted index returns are used as the benchmark over the period starting 205 days and ending 6 days prior to the event date. *Bidder adj CAR* is the CAR and bidder agreement CAR for early announcement deals, and the bidder CAR for late-announced deals. *Combined CAR* is the value-weighted average of *CARs* of the bidder and target. *Combined adj CAR* is the value-weighted average of the adjusted CARs of the bidder and target. The weights are based on the market value of equity of the bidder and target four days prior to the event announcement day. *Early* equals one in case the deal is announced before a definitive agreement is signed, and zero otherwise. *HighAtt* equals one if the abnormal Google search volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbSVI (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early	0.017**	0.026**	0.012	0.030***	0.007	0.012	0.002	0.016
	(2.067)	(2.573)	(1.488)	(2.807)	(0.757)	(1.044)	(0.173)	(1.295)
Early × HighAtt					0.036**	0.053**	0.041**	0.055**
					(2.245)	(2.545)	(2.231)	(2.401)
HighAtt					−0.006	−0.005	−0.004	−0.004
					(−0.970)	(−0.902)	(−0.768)	(−0.740)
Bidder Size	−0.001	−0.002	−0.008***	−0.008***	−0.001	−0.002	−0.008***	−0.008***
	(−0.397)	(−0.746)	(−3.687)	(−3.918)	(−0.486)	(−0.805)	(−3.696)	(−3.902)
Bidder Leverage	0.051**	0.056**	0.065**	0.069**	0.049*	0.054**	0.063**	0.067**
	(1.964)	(2.159)	(2.406)	(2.531)	(1.877)	(2.051)	(2.321)	(2.426)
Bidder BTM	−0.014	−0.013	−0.006	−0.003	−0.015	−0.015	−0.007	−0.004
	(−1.178)	(−1.028)	(−0.427)	(−0.200)	(−1.271)	(−1.159)	(−0.511)	(−0.307)
Bidder Run up	−0.010	−0.008	−0.012	−0.010	−0.011	−0.010	−0.013	−0.012
	(−0.872)	(−0.665)	(−1.089)	(−0.931)	(−0.977)	(−0.828)	(−1.224)	(−1.120)
Bidder Sigma	−0.347	−0.450	0.278	0.283	−0.332	−0.430	0.293	0.301
	(−0.648)	(−0.808)	(0.625)	(0.606)	(−0.620)	(−0.773)	(0.656)	(0.646)
Target Size	−0.001	−0.001	0.005**	0.005**	−0.001	−0.001	0.005**	0.005**
	(−0.584)	(−0.513)	(2.440)	(2.477)	(−0.481)	(−0.460)	(2.475)	(2.473)
Target Leverage	0.016	0.021	−0.022	−0.017	0.015	0.020	−0.023	−0.017
	(0.851)	(1.058)	(−1.186)	(−0.878)	(0.795)	(1.010)	(−1.216)	(−0.906)
Target BTM	0.010	0.011*	0.006	0.006	0.010	0.011*	0.006	0.006
	(1.576)	(1.649)	(0.909)	(0.870)	(1.610)	(1.717)	(0.960)	(0.948)

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Table 5 (continued)

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Target Run up	0.006	0.005	−0.003	−0.003	0.006	0.006	−0.003	−0.003
	(1.143)	(1.057)	(−0.544)	(−0.676)	(1.170)	(1.087)	(−0.526)	(−0.665)
Target Sigma	0.016	−0.043	−0.072	−0.118	0.021	−0.036	−0.066	−0.110
	(0.079)	(−0.212)	(−0.353)	(−0.569)	(0.106)	(−0.177)	(−0.323)	(−0.535)
Full Stock Payment	0.007	0.007	−0.006	−0.007	0.007	0.007	−0.006	−0.007
	(1.134)	(1.102)	(−0.996)	(−1.169)	(1.178)	(1.178)	(−0.932)	(−1.080)
Diversify	−0.008	−0.007	−0.009	−0.009	−0.007	−0.006	−0.008	−0.008
	(−1.260)	(−1.218)	(−1.559)	(−1.530)	(−1.137)	(−1.041)	(−1.410)	(−1.335)
HighTech	−0.004	−0.004	0.003	0.003	−0.003	−0.003	0.004	0.004
	(−0.410)	(−0.455)	(0.374)	(0.276)	(−0.351)	(−0.356)	(0.449)	(0.386)
Tender	−0.000	−0.001	0.004	0.002	−0.000	−0.001	0.004	0.002
	(−0.010)	(−0.115)	(0.613)	(0.339)	(−0.018)	(−0.107)	(0.626)	(0.365)
Relative Size	−0.012	−0.014*	0.009	0.007	−0.012	−0.014*	0.010	0.008
	(−1.539)	(−1.810)	(1.181)	(0.912)	(−1.484)	(−1.728)	(1.225)	(0.979)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.075	0.080	0.139	0.147	0.077	0.084	0.141	0.152
N	1,051	1,051	1,034	1,034	1,051	1,051	1,034	1,034

Table 6: Propensity score matching analysis

The table reports results by using a propensity score matching analysis. We cover 64 early-announced deals and 64 matched late-announced deals from 2005 to 2018. The treatment group includes early-announced deals, and the control group includes late-announced deals. We match firms using one-to-one nearest neighbor propensity score matching without replacement. The matching matrix includes *Bidder Size*, *Bidder Leverage*, *Bidder BTM*, *Bidder Run up*, *Bidder Sigma*, *Target Size*, *Target Leverage*, *Target BTM*, *Target Run up*, *Target Sigma*, *Full Stock Payment*, *Diversify*, *HighTech*, *Tender*, and *Relative Size*. Panel A reports the univariate comparison of firm characteristics between the treatment and control groups and the corresponding p−values. Panel B reports the OLS regression results of early announcement and investor attention on *bidder CAR [−1, +1]*, *bidder adj CAR [−1, +1]*, *combined CAR [−1, +1]*, and *combined adj CAR [−1, +1]* in columns (1) to (4), respectively. *Early* equals one in case the deal is announced before a definitive agreement is signed, and zero otherwise. *HighAtt* equals one if the abnormal Google search volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbSVI (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Covariates balancing

	Before matching				After matching			
	Treatment	Control	Difference	P-value	Treatment	Control	Difference	P-value
Propensity score	0.198	0.050	0.148	0.000	0.159	0.159	0.000	0.998
Bidder Size	8.606	8.889	−0.283	0.248	8.563	8.223	0.340	0.381
Bidder Leverage	0.169	0.149	0.020	0.263	0.173	0.154	0.019	0.532
Bidder BTM	0.432	0.476	−0.044	0.252	0.416	0.367	0.049	0.370
Bidder Run up	0.060	0.062	−0.002	0.958	0.065	0.102	−0.037	0.607
Bidder Sigma	0.019	0.016	0.003	0.004	0.019	0.019	0.000	0.832
Target Size	6.845	6.712	0.133	0.586	6.726	6.451	0.275	0.451
Target Leverage	0.175	0.144	0.031	0.157	0.166	0.129	0.037	0.309
Target BTM	0.484	0.573	−0.089	0.160	0.496	0.504	−0.008	0.924
Target Run up	0.049	0.047	0.002	0.978	0.065	−0.002	0.067	0.544
Target Sigma	0.030	0.025	0.005	0.049	0.029	0.029	0.000	0.878
Full Stock Payment	0.182	0.215	−0.033	0.561	0.212	0.276	−0.064	0.477

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Table 6 (continued)

	Before Matching				After matching			
	Treatment	Control	Difference	P-value	Treatment	Control	Difference	P-value
Diversify	0.273	0.240	0.033	0.581	0.276	0.276	0.000	1.000
HighTech	0.164	0.102	0.062	0.151	0.170	0.191	−0.021	0.791
Tender	0.400	0.142	0.258	0.000	0.382	0.425	−0.043	0.678
Relative Size	0.557	0.390	0.167	0.024	0.538	0.469	0.069	0.553

Panel B: Regression diagnostics

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*
	(1)	(2)	(3)	(4)
Early	−0.003	0.006	−0.012	0.006
	(−0.132)	(0.230)	(−0.576)	(0.239)
Early × HighAtt	0.054*	0.088**	0.073**	0.093**
	(1.812)	(2.314)	(2.017)	(2.078)
HighAtt	−0.012	−0.011	−0.005	0.003
	(−0.542)	(−0.430)	(−0.192)	(0.116)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted-R^2	0.093	0.106	0.254	0.211
N	94	94	94	94

Table 7: Systems of simultaneous equation analysis

The table reports the two-stage results of combined adjusted CARs and the decision to early-announced deals in a simultaneous equation framework. We divide the deal sample into two subgroups based on the attention on the deal announcements. The dependent variables are *combined adj CAR [−1, +1]* and *Early*. We use *Tender* and *Bidder Size* as instruments for *Early* and *Combined adj CAR*, respectively. In the first stage, we regress dependent variables on all variables. In the second stage, we use the predicted value of dependent variable in the first stage as the explanatory variable for another dependent variable. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Subsample: deals with high investor attention				Subsample: deals with low investor attention			
	Combined adj CAR		Early		Combined adj CAR		Early	
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Predicted Early		0.033**				0.005		
		(2.156)				(0.770)		
Predicted Combined adj CAR				42.729**				11.086
				(2.564)				(1.214)
Bidder Size	–0.553**	0.013	–0.013**		–0.093	–0.008***	–0.008***	
	(–2.564)	(1.170)	(–2.372)		(–1.214)	(–3.414)	(–3.714)	
Bidder Leverage	7.393***	–0.214*	0.125**	2.033	–0.068	0.029	0.027	–0.366
	(3.491)	(–1.671)	(2.374)	(1.036)	(–0.090)	(1.078)	(0.977)	(–0.514)
Bidder BTM	0.141	0.014	–0.008	0.465	–0.544	0.006	0.009	–0.649*
	(0.168)	(0.354)	(–0.304)	(0.519)	(–1.479)	(0.493)	(0.717)	(–1.713)
Bidder Run up	1.491**	–0.067*	0.004	1.319**	–0.813***	–0.012	–0.012	–0.675**
	(2.242)	(–1.962)	(0.192)	(2.014)	(–2.618)	(–0.932)	(–1.093)	(–2.061)
Bidder Sigma	13.251	–0.267	–0.234	23.260	18.634	0.287	0.337	14.895
	(0.478)	(–0.231)	(–0.218)	(0.871)	(1.493)	(0.600)	(0.700)	(1.055)
Target Size	0.887***	–0.020	0.008	0.540***	0.149*	0.005**	0.006**	0.087
	(3.054)	(–1.251)	(1.421)	(2.665)	(1.824)	(2.029)	(2.216)	(1.348)
Target Leverage	–2.188	0.094	–0.038	–0.585	0.283	–0.014	–0.008	0.368
	(–1.238)	(1.480)	(–0.823)	(–0.336)	(0.501)	(–0.749)	(–0.422)	(0.652)
Target BTM	–2.432***	0.062	–0.002	–2.350***	–0.051	0.004	0.003	–0.087
	(–2.665)	(1.286)	(–0.105)	(–2.595)	(–0.227)	(0.663)	(0.499)	(–0.380)
Target Run up	–0.102	–0.003	0.007	–0.386	–0.146	–0.003	–0.005	–0.087
	(–0.221)	(–0.123)	(0.436)	(–0.823)	(–0.757)	(–0.742)	(–1.107)	(–0.446)
Target Sigma	–14.315	–0.225	–0.387	2.213	10.626*	0.033	–0.013	10.770*
	(–0.681)	(–0.270)	(–0.669)	(0.101)	(1.766)	(0.132)	(–0.057)	(1.785)
Full Stock Payment	–1.386**	0.024	–0.011	–0.924	0.221	–0.004	–0.005	0.277
	(–2.217)	(0.752)	(–0.789)	(–1.462)	(0.969)	(–0.608)	(–0.781)	(1.223)
Diversify	–1.111**	0.021	–0.017	–0.376	0.545***	–0.006	–0.005	0.601***
	(–2.093)	(0.874)	(–1.329)	(–0.573)	(2.578)	(–0.922)	(–0.908)	(2.785)

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Table 7 (continued)

	Subsample: deals with high investor attention				Subsample: deals with low investor attention			
	Combined adj CAR		Early		Combined adj CAR		Early	
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighTech	–0.744	0.027	–0.018	0.024	0.753**	0.005	0.008	0.661**
	(–0.994)	(1.106)	(–0.928)	(0.027)	(2.507)	(0.560)	(0.902)	(2.074)
Tender	1.119**		0.024*	0.076	0.969***		0.005	0.919***
	(2.372)		(1.864)	(0.164)	(3.985)		(0.731)	(3.795)
Relative Size	–1.571**	0.056	–0.008	–1.234**	0.271	0.007	0.008	0.180
	(–2.456)	(1.525)	(–0.560)	(–2.201)	(1.313)	(0.835)	(0.936)	(0.727)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted(Pseudo)R^2	0.353	0.052	0.079	0.353	0.226	0.139	0.140	0.226
N	154	152	261	154	768	754	773	768

Table 8: Univariate analysis of long-term abnormal return

The table reports the univariate analysis of post-M&A buy-and-hold abnormal returns (BHARs) of bidder firms in the early- versus late-announced deals and high versus low investor attention subgroups. The groups are sorted based on the *AbSVI* on the early announcement date. The BHARs are measured over a period of 12 months and 24 months after the early announcement date or definitive agreement singing date for early- and late-announced deals, respectively. Panel A reports BHARs for completed, early-announced, and late-announced deals, respectively. Panel B compares the BHARs of early-announced deals between high and low investor attention. The difference in BHARs is shown in the last column for both Panels. All variables are defined in Appendix. We test for difference in means using the *t*−test allowing for unequal variance. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: BHARs between early- and late-announced deals (%)

	ALL	Early announced deal	Late announced deal	Difference (Mean)
	(1)	(2)	(3)	(2) − (3)
$BHAR_{1,12}$	−2.57***	9.34	−3.17***	12.51***
	(−2.811)	(1.491)	(−3.499)	(2.920)
N	1,007	48	959	
$BHAR_{1,24}$	−3.71***	6.45	−4.24***	10.69*
	(−2.661)	(0.741)	(−3.029)	(1.650)
N	943	46	897	

Panel B: BHARs between early-announced deals with high attention and low attention (%)

	High attention (Top quartile)	Low attention (Bottom three quartiles)	Difference (Mean)
	(1)	(2)	(1) − (2)
$BHAR_{1,12}$	−7.36	16.22**	−23.58*
	(−0.786)	(2.097)	(−1.750)
N	14	34	
$BHAR_{1,24}$	−14.27	14.61	−28.88
	(−1.082)	(1.362)	(−1.517)
N	13	33	

Table 9: Long-term abnormal return analysis

The table reports results of post-M&A buy-and-hold abnormal returns (BHARs) of bidder firms in all completed deals. The BHARs are measured over a period of 12 months and 24 months after the early announcement date or definitive agreement signing date for early- and late-announced deals, respectively. Columns (1) and (3) report OLS regression results for 12-month BHAR, while Columns (2) and (4) report results for 24-month BHAR. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	$BHAR_{1,12}$	$BHAR_{1,24}$	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)
Early	0.109*	0.096	0.187***	0.201*
	(1.892)	(1.032)	(2.696)	(1.709)
Early × HighAtt			−0.255**	−0.357**
			(−2.385)	(−2.211)
HighAtt			−0.021	−0.030
			(−0.874)	(−0.817)
Bidder Size	−0.003	−0.014	−0.004	−0.016
	(−0.231)	(−0.807)	(−0.372)	(−0.933)
Bidder Leverage	−0.192*	−0.161	−0.185	−0.150
	(−1.675)	(−0.952)	(−1.647)	(−0.898)
Bidder BTM	−0.036	−0.021	−0.029	−0.011
	(−0.689)	(−0.257)	(−0.562)	(−0.138)
Bidder Run up	−0.034	−0.041	−0.025	−0.028
	(−0.642)	(−0.557)	(−0.458)	(−0.384)
Bidder Sigma	−4.595**	−8.535**	−4.722**	−8.752**
	(−2.006)	(−2.151)	(−2.109)	(−2.266)
Target Size	0.003	0.011	0.005	0.015
	(0.254)	(0.588)	(0.465)	(0.780)
Target Leverage	−0.205**	−0.400***	−0.209**	−0.407***
	(−2.409)	(−3.071)	(−2.530)	(−3.158)
Target BTM	0.003	−0.027	0.002	−0.029
	(0.112)	(−0.451)	(0.052)	(−0.483)
Target Run up	−0.013	−0.014	−0.012	−0.013
	(−0.513)	(−0.327)	(−0.484)	(−0.302)
Target Sigma	0.827	1.624	0.823	1.649
	(0.739)	(0.786)	(0.737)	(0.801)
Full Stock Payment	−0.021	−0.003	−0.023	−0.004
	(−0.682)	(−0.059)	(−0.759)	(−0.098)
Diversify	−0.002	0.005	−0.006	−0.001
	(−0.070)	(0.128)	(−0.242)	(−0.029)
HighTech	0.053	0.088	0.046	0.078
	(1.258)	(1.644)	(1.091)	(1.445)
Tender	−0.009	−0.016	−0.012	−0.021
	(−0.286)	(−0.357)	(−0.404)	(−0.452)
Relative Size	0.063*	0.059	0.061*	0.054
	(1.831)	(1.283)	(1.747)	(1.187)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted-R^2	0.033	0.058	0.041	0.065
N	914	864	914	864

Table 10: Information environment quality and investor attention

The table reports the results of the subsample analysis of announcement CARs based on the information environment quality. In Panel A, bidder firms are divided into groups with high and low number of analysts following based on its sample median. In Panel B, bidder firms are divided into small and big firms based on the sample median of firm size. We re-estimate OLS regression models in Table 5 for each subsample. Dependent variable is *Bidder CAR [−1, +1], Bidder adj CAR [−1, +1], Combined CAR [−1, +1],* and *Combined adj CAR [−1, +1],* respectively. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: subsamples by analyst coverage (*Analyst*)

	Bidder *CAR [-1, +1]*		Bidder adj *CAR [-1, +1]*		Combined *CAR [−1, +1]*		Combined adj *CAR [−1, +1]*	
	Subsample: Low Analyst Coverage	Subsample: High Analyst Coverage	Subsample: Low Analyst Coverage	Subsample: High Analyst Coverage	Subsample: Low Analyst Coverage	Subsample: High Analyst Coverage	Subsample: Low Analyst Coverage	Subsample: High Analyst Coverage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early	0.002	0.002	0.010	0.007	−0.008	0.003	0.011	0.011
	(0.169)	(0.160)	(0.588)	(0.480)	(−0.555)	(0.220)	(0.580)	(0.719)
Early × HighAtt	0.071***	0.014	0.084***	0.034	0.077***	0.010	0.084**	0.037
	(2.976)	(0.573)	(2.761)	(1.067)	(2.638)	(0.298)	(2.385)	(0.888)
HighAtt	−0.020**	0.010	−0.018*	0.010	−0.020**	0.013**	−0.020**	0.013**
	(−2.132)	(1.487)	(−1.964)	(1.511)	(−2.305)	(2.035)	(−2.251)	(2.049)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.055	0.203	0.069	0.205	0.154	0.212	0.157	0.218
N	533	518	533	518	524	510	524	510

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Table 10 (continued)

Panel B: Subsamples by firm size

	Bidder *CAR [-1, +1]*		Bidder adj *CAR [-1, +1]*		Combined *CAR [−1, +1]*		Combined adj *CAR [−1, +1]*	
	Subsample: Deals with Small bidders	Subsample: Deals with Large bidders	Subsample: Deals with Small bidders	Subsample: Deals with Large bidders	Subsample: Deals with Small bidders	Subsample: Deals with Large bidders	Subsample: Deals with Small bidders	Subsample: Deals with Large bidders
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early	−0.007	0.017	−0.004	0.025*	−0.015	0.020**	0.003	0.029**
	(−0.463)	(1.522)	(−0.213)	(1.788)	(−1.123)	(2.015)	(0.164)	(2.042)
Early × HighAtt	0.065***	−0.014	0.093***	−0.014	0.077***	−0.029	0.097***	−0.027
	(3.041)	(−0.553)	(3.290)	(−0.572)	(3.285)	(−1.370)	(3.344)	(−1.184)
HighAtt	−0.012	0.006	−0.011	0.006	−0.009	0.006	−0.008	0.006
	(−1.168)	(1.106)	(−1.095)	(1.107)	(−0.945)	(1.181)	(−0.895)	(1.186)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.040	0.241	0.041	0.250	0.113	0.222	0.120	0.230
N	521	530	521	530	510	524	510	524

Table 11: Additional robustness analysis

The table reports the robustness tests for Tables 5 and 9 by using an alternative definition of high attention in Panel A, an alternative definition of early announcements without joint announcements in Panel B, an alternative definition of early announcements without hostile deals in Panel C, excluding observations in the financial crisis year of 2008 in Panel D, and excluding bidder firms in financial and utility industries in Panel E. The alternative definition of high attention (*HighAbvol*) is a dummy variable that equals one if the abnormal trading volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbVOL* (first disclosure day), is in the top quartile of sample firms, and zero otherwise. *Early_exjoint* equals one in case the deal is announced before a definitive agreement is signed and not confirmed by the target on the same day, and zero otherwise. *Early_exhostile* equals one in case the deal is announced before a definitive agreement is signed and not hostile deals, and zero otherwise. The dependent variables from columns (1) to (6) are the *bidder CAR [−1, +1], bidder adj CAR [−1, +1], combined CAR [−1, +1], combined adj CAR [−1, +1], $BHAR_{1,12}$*, and *$BHAR_{1,24}$*, respectively. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Alternative definition of high attention

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)	(5)	(6)
Early	0.012	0.018*	0.009	0.023**	0.144**	0.159
	(1.335)	(1.658)	(1.030)	(2.070)	(2.333)	(1.540)
Early* × *HighAbvol	0.038**	0.062**	0.036	0.064**	−0.282**	−0.484***
	(2.023)	(2.512)	(1.639)	(2.257)	(−2.156)	(−3.024)
HighAbvol	0.002	0.003	0.012*	0.012*	−0.024	−0.043
	(0.342)	(0.469)	(1.769)	(1.874)	(−0.823)	(−0.974)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.076	0.084	0.145	0.158	0.038	0.066
N	1,051	1,051	1,034	1,034	914	864

Panel B: Alternative definition of early announcements (excluding joint announcements)

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)	(5)	(6)
Early_exjoint	−0.017	−0.001	−0.005	−0.008	0.196	0.171
	(−0.935)	(−0.056)	(−0.377)	(−0.510)	(1.535)	(1.225)
Early_exjoint* × *HighAtt	0.106***	0.087***	0.075***	0.089***	−0.312*	−0.380*
	(3.596)	(4.115)	(3.567)	(2.962)	(−1.725)	(−1.664)
HighAtt	−0.007	−0.007	−0.006	−0.006	−0.019	−0.027
	(−1.156)	(−1.214)	(−1.042)	(−1.034)	(−0.795)	(−0.728)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.087	0.084	0.133	0.134	0.033	0.067
N	1,015	1,015	998	998	884	835

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Table 11 (continued)

Panel C: Alternative definition of early announcements (excluding hostile deals)						
	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)	(5)	(6)
Early_exhostile	0.009	0.006	0.002	0.015	0.197***	0.192
	(0.811)	(0.598)	(0.197)	(1.313)	(2.813)	(1.597)
Early_exhostile* × *HighAtt	0.058**	0.042**	0.044**	0.058**	−0.294***	−0.324*
	(2.427)	(2.508)	(2.208)	(2.124)	(−2.699)	(−1.847)
HighAtt	−0.007	−0.007	−0.006	−0.006	−0.021	−0.031
	(−1.137)	(−1.226)	(−1.044)	(−1.000)	(−0.883)	(−0.829)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.091	0.084	0.138	0.148	0.043	0.063
N	1,049	1,049	1,032	1,032	912	862
Panel D: Subsample (excluding deals proposed in the 2008 financial crisis period)						
	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)	(5)	(6)
Early	0.007	0.013	0.000	0.015	0.169**	0.220*
	(0.683)	(1.017)	(0.045)	(1.118)	(2.252)	(1.748)
Early*× *HighAtt	0.040**	0.055**	0.042**	0.058**	−0.202*	−0.339*
	(2.311)	(2.531)	(2.303)	(2.469)	(−1.746)	(−1.880)
HighAtt	−0.007	−0.006	−0.005	−0.005	−0.025	−0.039
	(−1.118)	(−1.038)	(−0.915)	(−0.870)	(−0.993)	(−1.018)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.083	0.089	0.154	0.160	0.032	0.066
N	990	990	974	974	854	804
Panel E: Subsample (excluding deals with acquirers in financial and utility industries)						
	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*	$BHAR_{1,12}$	$BHAR_{1,24}$
	(1)	(2)	(3)	(4)	(5)	(6)
Early	0.005	0.013	−0.000	0.019	0.247***	0.232*
	(0.421)	(0.953)	(−0.044)	(1.454)	(3.135)	(1.715)
Early* × *HighAtt	0.047**	0.065***	0.048**	0.061**	−0.345***	−0.425**
	(2.528)	(2.801)	(2.272)	(2.376)	(−3.018)	(−2.241)
	(2.528)	(2.801)	(2.272)	(2.376)	(−3.018)	(−2.241)
HighAtt	−0.007	−0.006	−0.003	−0.003	0.010	−0.030
	(−0.854)	(−0.764)	(−0.422)	(−0.358)	(0.309)	(−0.624)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.070	0.079	0.141	0.155	0.060	0.066
N	720	720	708	708	638	611

Chapter 3

Short-horizon CEOs and Early Announcements in M&As

3.1. Introduction

Recent merger and acquisition (M&A) literature shows that some acquiring firms voluntarily disclose their deal information to the public before the signature of a definitive merger agreement (hereafter referred to as "early announcement", the deal with the early announcement is referred to as "early-announced deal"). Prior studies document that CEOs' short-term incentives influence the timing of voluntary disclosures and have real impacts on corporate investments and decisions (e.g., Goplan *et al.* 2014; Edmans *et al.* 2017; Chi *et al.* 2019). As a voluntary announcement of a deal at an early stage, Aktas *et al.* (2018) provide a signalling-based explanation for early-announced deals, suggesting that early announcements are strategically used to reduce negotiation frictions with target firms. However, the existing literature has little evidence on whether managerial incentive horizons have impacts on early-announced deals.

In this paper, we attempt to fill this gap by investigating the relation between CEOs' short incentive horizons and the decision to make early announcements in mergers. We focus on one type of discretionary and voluntary news release in M&A transactions: early announcements issued by bidder firms. There are several reasons for a link between early announcements and CEO incentive horizons. First, given that early announcements are one of the important strategies to deal with targets, CEOs from acquirers could be one of key decision-makers to determine whether firms should undertake this strategy. As Graham *et al*. (2015) argue that CEOs hold more decision-making authority in M&A deals relative to other corporate policies, CEO incentives do play an important role in shaping the decision of corporate acquisitions. Thus, the decision to early announcements should not only be influenced by deal frictions (Aktas *et al*. 2018) but also dependent on CEOs' incentives. Second, managerial short-termism

literature suggests that CEOs with short-term inventive horizons are more likely to manipulate the timing of corporate announcements (e.g., earnings announcements in Gopalan *et al*.2014; news releases in Edmans *et al*. 2018). Lastly, unlike the definitive M&A agreement announcement, the voluntary early announcements issued by acquiring firms for potential targets are more discretionary without rigorous disclosure requirements by regulations. These important characteristics of early announcements provide both more flexibilities and opportunities for CEOs with short incentive horizons to engage in events. For these reasons, we believe that CEO incentives horizons could have important impacts on early announcements.

Using U.S. public firms with detailed compensation data covered by ExecuComp starting from 1992, we develop a comprehensive measure of the CEO incentive horizon as in Chi *et al.* (2019). This measure not only considers existing overall CEOs' compensations including restricted stock, unvested options, unrestricted stock, and vested options but also captures vesting schedules and exercising decisions on previous grants. Thus, for a given year, this proxy can measure the incentive horizon for any CEO in the ExecuComp database, which allows us to study a broad sample of U.S. public firms.

We identify 51 significant early-announced deals with the available measure of CEO incentive horizons from 1,323 U.S. domestic M&A events announced between 1993 and 2017. Within our sample analysis, we document the following results. First, we find that CEOs with short incentive horizons are more likely to announce a deal early before the signature of definitive agreements. The effect of short incentive horizons is economically meaningful: short-horizon CEOs increase the probability of being early-announced deals by 18%, relative to a control sample of hypothetical merger pairs that firms did not involve early announcements. The magnitude of this effect is robust after controlling for CEO, acquirer, and target characteristics. Second, we investigate whether short-horizon CEOs are incentivized to engage in early announcements because they want to quickly sell their shares before the long-term costs

of strategic disclosures are realized. Our results confirm this hypothesis. We find that CEOs with short incentive horizons are more likely to sell shares following early announcements. Using a difference-in-difference approach, we find that short-horizon CEOs sell more shares by 0.14 basis points following early announcements, compared to the long-horizon CEOs in early-announced deals.

We then study the post-merger outcomes of early-announced deals initiated by short-horizon CEOs. We find that early-announced mergers with short-horizon CEOs have significantly underperformed operating performance in the long run (approximately a 2.1% reduction in abnormal operating performance), relative to early-announced mergers with long-horizon CEOs. This result further supports that short-horizon CEOs in early-announced deals create lower long-term values for shareholders.

Finally, we ask whether there is a potential cost to those short-horizon CEOs engaging in early-announced deals. Thus, we examine the effect of short incentive horizons on the likelihood of post-merger CEO turnover. We find that CEOs with short incentive horizons are more likely to leave the firm after mergers. This result is consistent with prior findings that CEOs who make value-destroying acquisitions are associated with a higher probability of being replaced due to internal governance (Lehn and Zhao, 2006).

This paper makes several contributions to the literature. First, to our best of knowledge, this is the first paper that directly studies the relation between CEO incentive horizon and the timing of M&A events. The work of Aktas *et al*. (2018) is close to our study, which investigates the relation between early announcements and deal negotiation frictions. However, they focus on the effect of negotiation frictions on determining early announcements. In this paper, we employ the CEO-level variation in incentive horizons to investigate early announcements in M&A transactions. A growing strand of the literature shows that executive incentive horizons play a vital role in corporate M&A activities (e.g., Edmans *et al*. 2020; Li and Peng, 2019). We

contribute to this literature by providing new evidence that CEOs' incentive horizons are the important driver of the timing of deal announcements.

Second, this paper contributes to the literature on managerial short-term incentives and horizons. These include papers suggesting that CEOs with short-termism time the discretionary news release (Edmans *et al*. 2018); CEOs' pay duration is positively related to corporate investments, long-term assets, and R&D intensity (Gopalan *et al*. 2014); equity vesting leads to higher CEO turnover (Jochem *et al*. 2018). Chi *et al.* (2019) show that short-horizon CEOs are more likely to engage in earnings management and make personal trading benefits. Our study complements this literature, showing that short-horizon CEOs are incentivized to time the M&A event and sell more shares following the event.

Lastly, this paper sheds new light on a broad literature on the role of CEO incentives in M&A transactions. This strand of literature demonstrates that the equity-based compensation structure encourages executives to make value-enhanced acquisitions (Datta, Datta, and Raman, 2001). However, this evidence is not universal, as some studies find that CEOs' wealth and pay are not sensitive to poor post-merger performance (Harford and Li, 2007). CEO risk-taking incentives induced by compensations could affect M&A decisions and the deal value (Croci and Petmezas, 2015). Our empirical results provide new evidence that CEO incentive horizons are negatively related to M&A quality.

The remainder of this paper is organized as follows. Section 3.2 reviews the literature and develops hypotheses. Section 3.3 discusses the sample, data, and methodology. We present empirical results in Section 3.4. Finally, section 3.5 concludes.

3.2. Related literature and hypothesis development

Does the short-horizon manager matter for the timing of corporate M&A announcements? Building on the theory of Stein (1988,1989), managerial myopia predicts that short-term incentives will affect managers' corporate decisions. Prior literature has recognized that short-

horizon managers are subject to myopic behaviors (Dechow and Sloan, 1991). Recently, Chi *et al.* (2019) find that CEOs with short-horizon incentives attempt to use corporate disclosures to inflate the stock price and generate personal gains. Similarly, Edmans *et al*. (2018) show that CEOs who have more vesting stocks have incentives to release more good news. As one of important corporate news events, manager myopia could play an important role in acquisition announcements. A contemporaneous paper by Edmans *et al*. (2020) directly investigates the effect of CEO short-term incentives on the stock repurchase and M&A announcements. Their empirical evidence finds that CEO equity vesting incentives are positively related to share repurchase and M&A activities, which induces CEOs to sell their stocks shortly after events. Thus, prior evidence suggests that both CEO incentives and horizons could be important factors to influence M&A activities.

Considering early announcements that are strategically used to deal with targets, CEOs from acquiring firms could be important decision-makers to decide whether firms should adopt this strategy. Thus, the decision to early announcements should not only be influenced by deal frictions (Aktas *et al*. 2018) but also dependent on CEOs' incentive horizons. As discussed early, managerial myopia is one of the important factors to shape corporate acquisitions. A plausible link between CEO short-horizon incentives and early announcements might exist because early announcements could be thought of as an ideal event to manipulate and address short-term stock price concerns. There are a couple of reasons why early announcements might be utilized by CEOs with short-horizon incentives. First, unlike M&A agreement announcements studied by Edmans *et al*. (2020), early announcements are more discretionary and less regulated by regulations. Traditional agreement announcements have strict disclosure requirements by the SEC to improve market transparency[11]. Thus, early announcements without mandated regulations can give CEOs more flexibilities and opportunities to manipulate when

[11] Please refer to U.S. Securities Exchange Act (Rule 10b-5, Exchange Act) for more details of M&A disclosures.

CEOs know the private information of forthcoming deals in advance. Second, CEOs with short incentive horizons are more likely to utilize the early announcements to diversify their stock holdings. Aktas *et al*. (2018) show that early announcements can perform as a good signal to the market. Thus, early announcements may be thought as unexpected good news to acquiring firms. Based on these two features of early announcements, CEOs with short incentive horizons are motivated to strategically time the M&A announcements and diversify equity holdings. To empirically test the effect of short-horizon CEOs on early announcements, we formulate the first hypothesis as follows:

H_1: CEOs who have short incentive horizons increase the likelihood of early announcements.

In the setting of early announcements, short-horizon CEOs are motivated to engage in early announcements of mergers because they have incentives to sell their equity holdings by disclosing unexpected good news to investors and the market. Prior studies have shown that managers can strategically choose disclosure policy and the timing of their trades (Noe,1999; Cheng and Kin,2006). Ladika and Sautner (2020) argue that when incentive horizons are shorter, managers should have stronger myopia behaviours and are more likely to quickly sell their shares in case long-term costs of their decisions are realized. Aktas *et al.(*2018) show that early announcements can perform as a potential positive signal to the market. As a result, it is reasonable to test whether the short-horizon CEOs will sell more stock holdings shortly after early announcements. Thus, we further study the trading behaviors of CEOs following early announcements. If short incentive horizons encourage CEOs to undertake early announcements, it is expected to observe that the CEOs would take advantage of this unexpected and potentially good signal and quickly sell more equity holdings. We summarize this hypothesis as follows:

H_2: CEOs who have short incentive horizons sell more equities after early announcements.

Next, we study whether early-announced deals initiated by short-horizon CEOs could create long-term value for shareholders. Due to the information asymmetry and deal complexity in M&As, CEOs could take the opportunity to make personal benefits rather than maximize the shareholder's value (Hartford and Li, 2007). CEOs with short incentive horizons could be motivated to use early-announced deals as opportunities for their personal benefits at the expense of shareholder value. For these reasons, we expect that CEOs with short incentive horizons reduce the deal quality of early-announced acquisitions. To test this prediction, the following hypothesis is stated:

H_3: Early-announced deals initiated by short-horizon CEOs decrease deal quality relative to early-announced deals initiated by long-horizon CEOs.

Prior literature provides evidence about the potential cost of CEO making value-destroying deals. Lehn and Zhao (2006) find that CEOs who make bad acquisitions are associated with higher CEO turnover following the merger. This indicates if CEOs with short incentive horizons engage in early-announced deals at the expense of shareholder value, these CEOs are more likely to be fired after mergers. As a result, we formulate the following hypothesis:

H_4: CEOs who have short incentive horizons increase the likelihood of CEO turnover after early-announced acquisitions.

3.3. Data and methods

3.3.1. Sample selection

To construct the data, we draw the initial sample of all NYSE, Amex, and Nasdaq firms over the period from 1992 to 2019 to compute the 1992-2016 CEO incentive horizons from the ExecuComp database. Then, we merge this CEO-level dataset with the sample for acquisitions, insider trading, and stock returns.

We start retrieving all announced U.S. domestic M&A deals between 1993 and 2017 from the Thomson Financial SDC Mergers and Acquisitions Database. The sample ends in 2017 due

to the available estimation of CEO incentive horizons. We require the deal type is not classified as spinoff, repurchase, self-tenders, recapitalizations, going privatizations, liquidations, exchange offers, and acquisitions of partial interests or assets. To be included in the sample, the deal value must exceed $10 million, and acquiring firms must control at least 50% of the target shares after transactions. To obtain detailed accounting data and stock returns, we further require both acquirers and targets are publicly traded firms. After satisfying the above requirements, we have 3,758 deals from 1993 to 2017. Furthermore, we require that each acquiring firm has the data required to construct measures of CEO incentives on the ExecuComp database. Both acquirer and target have required control variables. Finally, this procedure yields 1,323 acquisitions.

It is important to properly identify early announcements by acquirer firms in this study. Therefore, we mainly depend on hand-collected definitive announcement dates from the SEC filings and recorded dates from the SDC. We identify an early announcement as the SDC reported deal announcement date is before the definitive agreement date reported in SEC filings. Based on this method, we identify 92 deals that are announced before the date of definitive announcements from the SEC filings in a total of 1,323 deals. As we focus on voluntary early announcements by CEOs rather than disclosures by market rumors or regulations, we follow the method of Aktas *et al*. (2018) to further filter deals with early announcements. First, we require the gap between the early announcement date and the definitive agreement announcement date to be over three days. This criterion aims to avoid any early announcement which is announced at the weekend or public holidays while the definitive agreement is signed on the next working day. We exclude 12 cases that are not satisfied with the required intervals. Second, we exclude 22 cases that are reported as rumor cases from the SDC and news search on Factiva. We further exclude 6 cases as early announcements are used by targets for seeking buyers. Lastly, we exclude 1 case due to misreports that the initial public announcement has

reached the definitive merger agreement between acquirers and targets. After these procedures, we identify 51 early-announced deals in our deal sample.

Table 1 presents the deal distribution across years (Panel A) and acquiring firm's Fama-French 48 industries (Panel B). Panel A shows that our deal sample has 51 early-announced deals which account for 3.9% of total deals over the period from 1993 to 2017. As the required CEO information in Excucomp, the percentage of early-announced deals is lower than 6.7% in Aktas *et al.(*2018). The year 1998 is the most active year with respect to corporate acquisitions with 105 cases, while the years 1994 and 1995 have the largest number of early-announced deals with 5 cases. Panel B reports that early-announced deals are distributed in different industries based on Fama-French 48 industry classifications, with the top five industries: electronic and equipment, computers, business services, utilities, and retail industries, together accounting for 37.3% of total early-announced deals.

*****insert table 1 here*****

To build our analytical sample for the likelihood of early announcements, we generate a control sample of hypothetical early-announced merger pairs (pseudo early-announced acquirers and pseudo targets). As in Bena and Li (2014), we create two different control samples: industry-size matched sample and industry-size-market-to-book (*M/B*) ratio matched sample. To build the first control sample, for each actual early-announced merger pair firms in every year, we find up to five matching acquiring firms (target firms) by the same 2-digit SIC industry and by the firm size from Compustat in year t-1. Candidates for hypothetical merger pairs are neither an acquirer nor a target in the three years before the deal.

To construct the second control sample, for each actual early-announced merger pair firms in every year, we find up to five matching acquiring firms (target firms) by the same 2-digit SIC industry, then by estimated propensity scores using the firm size and market-to-book ratio from Compustat in year t-1. Candidates for hypothetical merger pairs are neither an acquirer

nor a target in the three years before the deal. The matching criteria for constructing the control sample are used to control for time, industry, firm size, growth opportunities, and overvaluation, which are important drivers for corporate M&A decisions shown in prior literature (e.g., Andrade *et al.* 2001; Hartford, 2005; Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004).

3.3.2. Measuring CEO incentive horizons

Early studies on managerial myopia or short-termism employ horizons of CEO age (Dechow and Sloan, 1991) and holdings of restricted stocks (Johnson *et al*. 2009). Recently, Chi *et al.* (2019) develop a comprehensive measure of CEO incentive horizon to capture horizons of overall CEO's holdings including restricted stock, unvested options, unrestricted stock, and vested options. The authors argue manager's incentive horizon should not only be determined by both new grants and existing grants but also vesting schedules and exercising decisions on previous grants. Thus, this comprehensive measure of CEOs incentive horizons considers information about new and existing grants, as well as previous sale decisions. Another advantage of this measure is easily accessible for a broad sample of U.S. firms since it is derived from the ExecuComp database which covers the top five executives for firms in the S&P 500, S&P Midcap 400, and S&P Smallcap 600, starting from 1992. Following the method of Chi *et al.* (2019), we use the CEO incentive horizon as the measure of CEO short-termism and describe more details of the construction next.

First, we derive the vesting period for restricted stocks. We use the annual data of each CEO from the ExecuComp to calculate the number of restricted shares that vest in the next three years. The number of restricted shares which vest in year t ($Vrstk$) is calculated as follows:

$$Vrstk_t = Rstk_{t-1} + GrantRstk_t - Rstk_t \quad (1)$$

where $Rstk_t$ indicates the number of restricted shares at the end of year t, $Rstk_{t-1}$ is the number of restricted shares at the end of year t-1, and $GrantRstk_y$ is the number of newly granted restricted shares in the year t.

Then, we calculate the vesting horizon of restricted shares by using a time-weighted average across three years. Specifically, the proportion of shares vested in year one is multiplied by one; the proportion of shares vested in year two is multiplied by two; and the proportion of shares vested in year three is multiplied by three. Following Chi *et al.* (2019), we assume that the rest shares not vested in year three will vest in year four. If there are no shares vested within three years, we assume its vesting horizon is four years. Stock dividends and stock splits are adjusted in the calculation. Thus, the vesting horizon of restricted shares ($Hrstk$) is computed as follows:

$$Hrstk = Vesting\ proportion * 1 + Vesting\ proportion * 2 + Vesting\ proportion * 3 \quad (2)$$

We provide a numerical example to show the measure capturing the difference in managers' incentive horizons. In year 0, both CEO A and CEO B have 300 restricted shares. CEO A will vest each 100 shares at the end of the next three years, while CEO B will vest all 300 shares at once at the end of year three. Thus, the estimated horizon for CEO A is 2 years ($=1*\frac{100}{300}+2*\frac{100}{300}+3*\frac{100}{300}$), and for CEO B is 3 years ($=1*\frac{0}{300}+2*\frac{0}{300}+3*\frac{300}{300}$). Although both CEO A and CEO B will vest all shares in 3 years, the effective incentive horizon for CEO A is shorter. Likewise, we use the same procedures to compute the vesting horizon of unvested stock options ($Hunvopt$).

For unrestricted shares and vested options, they technically have zero incentive horizon. However, Chi *et al.* (2019) suggest that CEOs may not be allowed to sell all vested shares or options at the CEO's discretion as board directors will have some restrictions. Thus, we use observed minimum incentives over a CEO sample period as an estimate of a minimum level of

CEO required holdings during the tenure, which are assumed to have a horizon of 4 years. The rest of vested shares and options above this minimum level are assumed to have a horizon of 0 year, which means CEOs can freely sell these holdings.

Lastly, we derive a weighted incentive horizon for each CEO by taking into account the CEO delta, which is calculated as follows:

$$Weighted\ Incentive\ Horizon\ (WIH) = \frac{Hrstk * Delta_{rstk} + Hunvopt * Delta_{unvopt} + 4 * Delta_{min} + 0 * Delta_{free}}{Total\ Delta} \quad (3)$$

where *Total Delta* is defined as the change in dollar value of CEO stock and stock option for a 1% change in the stock price, which is calculated as procedures of Chi *et al.* (2019)[12]. $Delta_{rstk}$ is the delta derived from restricted stocks. $Delta_{unvopt}$ represents the delta from unvested stock options. $Delta_{min}$ is the delta from the minimum required holdings for CEOs. $Delta_{free}$ indicates the delta from vested stock and options above the minimum level. WIH is a summary measure of the annual incentive horizon for CEOs, which captures the overall vesting horizon length for the CEO in a given year. Finally, we define the incentive horizon as the short horizon based on the sample median value of *WIH*. We create a dummy variable (*Short Horizon*) which equals one if the CEO's weighted incentive horizon is lower than the sample median values of *WIH*, and zero otherwise.

3.3.3. Dependent variables

Our empirical tests are mainly from two parts: the likelihood of early announcements and CEOs' trading behaviors following early announcements. For tests on the likelihood of early announcements, we construct our key outcome variable (*Early*) as a dummy variable which takes the value of one for the actual early-announced merger deals and zero for the matched

[12] See Chi et al. (2019) for a detailed description of the calculation of delta.

control deals. For the analysis of deal samples, we define *Early Deal* as a dummy variable that takes the value of one for the early-announced deals and zero for late-announced deals.

For tests on CEOs' trading activities surrounding early announcements, we obtain data on equity sales from the Thomson Reuters Insider Filing (TFN) database. Following Agrawal and Nasser (2012), we focus on open market purchases and sales (with transaction code of "P" and "S", respectively) made by CEOs. We further identify transactions with Thomson cleanse code marked as "S" and "A" to exclude inaccurate records in the database[13]. We compute the aggregate number of equity sales by CEOs on the same trading day. Thus, our measure of CEO' equity sales (*EquitySold*) following early announcements is calculated as the number of shares sold by CEOs scaled by the number of shares outstanding at the end of the fiscal quarter before early announcements, reported in basis points. To capture the CEO's trading behaviors, we calculate the *EquitySold* over the window [0, def day] where 0 indicates the early announcement date and def day is the definitive agreement announcement date. We perform a parallel computation for matched acquirer CEOs to estimate CEO's equity sales in the control group. We also define a dummy variable for the CEO sale (*Sell*) that takes the value of one if CEOs sell any share from the early announcement date to the definitive agreement announcement date, and zero otherwise.

3.3.4. Empirical methods

We examine the first two hypotheses by using the matched control sample. To conduct this part analysis, we estimate the following logit model:

$$Early = \beta_1 Short\ Horizon + \beta_2 CEO\ characteristics_{t-1} + \beta_3 Acquirer\ charateristics_{t-1} + \beta_4\ Target\ characteristics_{t-1} + \varepsilon_t \quad (4)$$

where *Early* is the binary variable which equals one for the actual early-announced merger deals and zero for the matched control deals. *Short Horizon* is our main variable of interest that

[13] Thomson cleanse code "A " represents numerous missing or invalid data elements, while code "S" indicates security did not meet collection requirements.

captures the effect of CEOs with short incentive horizons on early announcements. For control variables, we include a set of CEO characteristics, acquirer firm characteristics, and target firm characteristics. Specifically, we control for CEO-level characteristics including CEO age (*Age*) and tenure (*Tenure*) to capture CEOs' career concerns, risk-taking incentives (Vega), and two other compensation components: *Salary* and *Bonus* as in Edmans *et al.(*2017). Prior literature suggests that CEO age and tenures affect corporate acquisitions and investments (e.g., Yim, 2013; Pan *et al.* 2016), and CEO vega incentives are positively related to M&A activities (Croci and Petmezas, 2015). For both acquirer and target firm characteristics, we include a set of variables influencing acquisitions suggested by prior literature (e.g., Aktas *et al.* 2018; Hartford,1999): acquirer news coverage (*News*), firm assets (*Assets*), leverage level (*Leverage*), the market-to-book ratio (*M/B*), the return-on-assets ratio *(ROA*), the cash ratio (*Cash Ratio*), the sales growth ratio (*Sale Growth*), the buy-and-hold abnormal returns for firms' stock over the past 12 months (*PastRet*), and firm's stock volatility (*Vol*). Year fixed effects are included to account for time-invariant industry characteristics. Robust standard errors are clustered at the deal level. All variables' definitions can be found in Appendix.

3.4. Empirical results

3.4.1. Preliminary results

Table 2 shows summary statistics for the deal sample. Acquiring CEOs have an average *WIH* of 1.84 years in our deal sample, which is comparable to the figures of 1.83 years reported by Chi *et al. (*2019). It is notable that CEOs from early-announced deals have significantly shorter incentive horizons relative to CEOs from late-announced deals, suggesting that CEOs with short incentive horizons are more likely to engage in early announcements. Consistent with Aktas *et al.* (2018), we find that acquiring firms in early-announced deals are significantly smaller than those firms in late-announced deals. Overall, Table 2 suggests that short-horizon CEOs are encouraged to initiate early-announced deals.

*****insert table 2 here*****

Table 3 presents the comparison of actual early-announced deals versus the industry-size matched sample, and industry-size-M/B matched sample. Consistent with the findings in Table 2, we note that for actual early-announced deals, acquirer CEOs have significantly shorter incentive horizons relative to CEOs in the matched sample. In particular, the average incentive horizon of CEOs is 1.58 years in early-announced deals and 2.03 years in the two matched samples. The mean difference in *WIH* of –0.45 is statistically significant at the 1% level. The univariate tests indicate that CEOs with short incentive horizons are more likely to engage in early announcements. This is consistent with early-announced deals as the discretionary event enabling short-horizon CEOs to initiate. The univariate analysis in Table 3 also shows that, in general, CEOs from actual early-announced deals have significantly larger vega, bonus, and salary compensation, longer tenure periods, and higher age than the CEOs from the matched samples. Overall, our preliminary analysis based on both the deal sample and matched sample indicates that short-horizon CEOs are motivated to initiate early-announced deals.

*****insert table 3 here*****

3.4.2. Incentive horizon and the likelihood of early announcements

We first examine the effect of incentive horizon for CEOs on the likelihood of early-announced deals (H_1). To conduct this test, we estimate Equation (4) using our sample of actual early-announced merger pairs and the matched control samples.

Table 4 presents the results of logit regression of Equation (4). Columns 1 to 4 report results where the matched control sample is based on matching by industry and size. First, in a bivariate estimation of Equation (4) in column 1, we find the coefficient of *WIH* is negative and statistically significant at the 1% level. Recall that *WIH* is the raw measure of incentive horizon, which indicates the higher value of *WIH* is the longer incentive horizon for CEOs. Column 1 suggests that CEOs who have longer incentive horizons are negatively associated with the

likelihood of engaging in early announcements of mergers, relative to a control sample of CEOs who did not issue early announcements. Column 2 shows that the negative relation between incentive horizons and the likelihood of early announcements is robust to controlling for acquirer CEOs' characteristics and firm characteristics for both acquirers and targets. To better gauge the effect of incentive horizon on the probability of early announcements, we use a dummy variable: *Short Horizon*, which equals one if *WIH* is lower than the sample median, and zero otherwise. Columns 3 and 4 show that the coefficients of *Short Horizon* are both positive and significant at the 1% level. This result provides supporting evidence that short-horizon CEOs are more likely to engage in early-announced deals, which is consistent with our hypothesis H_1. The economic significance is also meaningful: short-horizon CEOs increase the probability of initiating early-announced deals by 18%, compared to long-horizon CEOs. For other variables, we find that CEO tenures are positively related to the early-announced deal, consistent with its interpretation as the proxy of CEO entrenchment (Hermalin and Weisbach, 1998). If early-announced deals are risky and difficult, entrenched CEOs are more likely to undertake them by building personal influence over the board.

We also test whether results are sensitive to the matched control sample by reestimating the analysis in a control sample based on matching by industry, size, and M/B ratio. These results are present in columns 5 to 8 of Table 4. As expected, the estimation results of *Short Horizon* are consistent with prior results in columns 1 to 4. The relation between the short incentive horizon and the probability of issuing early announcements stays positive and economically meaningful. Thus, the effect of *Short Horizon* on the likelihood of engaging in the early-announced deal is robust to alternative matching techniques and methods. Taken together, results from Table 4 indicate that CEOs with short incentive horizons are more likely to make early-announced deals. Our results support that CEO incentives are an important driver of timing deal announcements in M&A transactions.

*****insert table 4 here*****

3.4.3. Incentive horizon, CEO sales, and early announcements

Next, we test the hypothesis for CEOs' equity sales. Our second set of empirical tests investigates whether CEOs with short incentive horizons sell more stocks shortly after the voluntary early announcements. Firstly, we examine whether CEOs with short incentive horizons are more likely to sell stocks after early announcements. To conduct this test, we estimate Equation (5) using logit regression:

$$Sell = \beta_1 Early \ + \beta_2 Short\ Horizon + \beta_3 Early * Short\ Horizon + \beta_4\ CEO\ characteristics_{t-1} + \beta_5 Acquirer\ charateristics_{t-1} + \beta_6\ Target\ characteristics_{t-1} + \varepsilon_t \quad (5)$$

where the dependent variable is the dummy variable *Sell*, which equals one if acquiring CEOs sell any share from the early announcement date to the definitive agreement announcement date, and zero otherwise. Our interest of the variable is the interaction term (*Early*$*$ $Short\ Horizon$), which is expected to be significantly positive. All other variables are defined analogously to Equation (4).

Results are reported in Table 5.[14] In column 1, we find that the coefficient on *Early* is significantly negative at the 1% level, suggesting that CEOs who engage in early-announced deals are less likely to sell shares on average. However, the coefficient on interaction term (*Early***Short Horizon*) is positive and significant at the 1% level, revealing that short-horizon CEOs mitigate the negative effect of *Early* on the likelihood of CEO sales following announcements. This result is consistent with hypothesis H_2 that short-horizon CEOs are more likely to sell shares following early announcements relative to long-horizon CEOs in early-announced deals. A similar story emerges in columns 2 to 4: the likelihood of equity sales and

[14] As we include year dummies, the logit model requires within-year variations of dependent variable (*Sell*), otherwise deals and matched deals in that year are dropped. This results in lower observations than the whole sample. Therefore, we report both results of controlling and not controlling for year dummies.

early-announced deals is increasing with short incentive horizons. Overall, this evidence supports an equity diversification-based explanation for early-announced deals and is consistent with the motives of short incentive horizons (e.g., Edmans *et al.* 2018; Chi *et al.* 2019).

*****insert table 5 here*****

We then examine the magnitude of CEOs' equity sales following early announcements by conducting the difference-in-difference (DiD) analysis. Following the method of Agrawal and Nasser (2012), we use a DiD approach. We compare the level of CEO equity sales in actual early announced deals (treatment firms) and their matched control deals (matched firms) during the after-early period to the levels during the control period. Specifically, the after-early period is trading days from the early announcement date to the late agreement announcement date, while the control period has exactly the same days as the after-early period but in the one year before that. By comparing the CEO equity sales in treatment firms and matched firms during two periods (the after-early period and control period), our main interest of CEO equity sales equals the abnormal sales of CEOs in treatment firms minus the abnormal sales of CEOs in matched firms. This DiD approach controls both firm characteristics and time effect, which gives us a clean treatment effect.

To examine the effect of CEOs with short horizons on equity sales, we expand the sample for the fiscal year end prior to the early announcement date and the control period. As a result, we require two observations to be available for all explanatory variables for both treatment firms and matched firms. This step reduces 15 early announced deals due to the data availability. Then we estimate the following DiD regression model:

$$EquitySold_{i,t} = \beta_1 Early_{i,t} + \beta_2\, Post_t + \beta_3 Early_{i,t} * Post_t + \beta_4\, CEO\ characteristics_{i,t-1} + \beta_5 Acquirer\ charateristics_{i,t-1} + \beta_6\, Target\ characteristics_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

where the dependent variable is the measure of the CEOs' equity sales ($EquitySold$), which is calculated as the number of shares sold by CEOs scaled by the number of shares outstanding before early announcements. *Post* equals one (zero) if the CEO equity sales occur during the event period (control period). Our interest of variable is the interaction term ($Early * Post$) that captures the magnitude of CEOs' equity sales following the early announcements. All other variables are defined analogously to Equation (4).

Before discussing DiD regressions, we check whether the parallel assumption holds in our sample of early-announced deals (treatment firms) and matched control deals (matched firms). The parallel assumption requires in the absence of treatment (early announcements), the coefficient on the DiD estimator should be zero, which can keep a similar pre-event trend for both treatment and matched groups. Therefore, we first study a univariate DiD test for the difference in CEOs' equity sales between treatment firms and matched firms during the event period and one year prior to the early announcement shock (control period). Panel A of Table 6 reports the univariate analysis of DiD estimator. We find no statistically significant differences in CEO's equity sales between treatment and matched firms in one year before the early announcement date. This suggests that the parallel trend assumption is likely to hold. After the early announcement, we find a difference of 0.05 basis points of CEOs' equity sales between treatment firms and industry-size matched firms, significantly at the 1% level. We also examine the DiD estimator. For example, on average, a CEO in treatment firms sells more stocks by 0.06 basis points relative to a CEO in the matched firm. The difference is statistically significant at the 5% level. Similar results are found in the industry-size-M-B matched sample. Overall, these results provide further support for the H_2 that CEOs who strategically issue early announcements sell more equities shortly after early announcements.

Panel B of Table 6 reports regression results for Equation (6). Columns 1 and 4 show results based on the full sample, and the coefficient on interaction term (*Early*Post*) are positive and

statistically significant at the conventional level. This evidence confirms the previous univariate results that CEOs sell more shares following early announcements. Further, we estimate the same model but split the sample based on the median value of CEO incentive horizon (short horizon versus long horizon). Columns 2 and 3 show that the coefficient of the interaction term (*Early*Post*) is only positive and statistically significant for the subsample of short-horizon CEOs, whereas there is no similar trend of equity sales for the subsample of long-horizon CEOs. Turning to the economic significance, equity sales are 0.14 basis points higher for short-horizon CEOs in early-announced deals. The difference in the coefficient on *Early*Post* of two columns is significantly different from 0 (p-value<0.06). We find similar results in columns 5 and 6 when using our industry-size-M-B matched sample. These findings are not sensitive to the matching sample.

To summarize, our results show that short-horizon CEOs are more likely to sell equities following early announcements. This finding is robust to DiD analysis. Our results so far provide supporting evidence of H_2 that short-horizon CEOs are motivated to diversify their equity holding by utilizing early announcements. This is consistent with managerial short incentive horizons-based explanation for early-announced deals.

*****insert table 6 here*****

3.4.4. Post-merger operating performance

In this section, we examine whether early-announced deals initiated by short-horizon CEOs create long-term value for shareholders and its influence on CEO turnover. We conduct this set of analyses using a sample of 1,323 U.S. mergers announced between 1993 and 2017.

To test hypothesis H_3, we examine whether short-horizon CEOs influence post-merger operating performance. If short-horizon CEOs manipulate the timing of acquisition announcements for personal benefits at the expense of shareholders, we should expect a significant reduction in post-merger operating performance for these combined firms.

Following the method of Healy, Palepu, and Ruback (1992), we measure the operating performance as the operating income before depreciation divided by the market value of assets at the beginning of the fiscal year (*ROA*). We compute operating performance for the combined firm over 3 fiscal years (t+1 to t+3) surrounding the merger completion year (year t). For the pre-merger years, the operating performance is the value-weighted average of acquirer's and target's operating performance, using the market value of assets at the beginning of the fiscal year as weights. We then calculate the abnormal operating performance as the difference between the operating performance for merged firms and each year's median operating performance in the corresponding Fama-French 48 industry categories. For the pre-merger years, the industry median operating performance is the value-weighted average of acquirer's and target's industry median operating performance, using the market value of assets at the beginning of the fiscal year as weights.

Panel A of Table 7 reports cross-sectional results of abnormal changes in operating performance. The setup of regressions in those columns is as in Healy, Palepu, and Ruback (1992). The constant variable measures the average change in industry-adjusted abnormal operating performance due to the merger, which is our main variable of interest. Column 1 shows that early-announced deals are associated with −1.1% abnormal reduction in post-merger industry-adjusted operating performance. The last two columns further address the issue of whether short-horizon CEOs in early-announced deals drive the abnormal reduction in post-merger operating performance. As expected, results show that early-announced mergers initiated by short-horizon CEOs decrease by −2.1% in post-merger industry-adjusted operating performance (column 2), whereas there is not a similar change in performance for early-announced mergers by long-horizon CEOs. Again, this evidence supports hypothesis H_3 that short-horizon CEOs in early-announced deals create the lower value for shareholders.

We then examine results using the sample of all mergers and including the main interest of interaction term (*Early Deal*Short Horizon*) and a set of control variables. This method is similar to Harford, Humphery-Jenner, and Powell (2012). The dependent variable is the industry-adjusted abnormal operating performance for combined firms. *Early Deal* is a dummy variable that equals one if the deal is classified as the early-announced deal, and zero for the late-announced deal. We control for a set of acquirer CEO characteristics and deal characteristics including whether the deal is the tender offer (*Tender*), diversified (*Diversify*), the stock deal (*Stock Deal*), and deal relative size (*Relative Size*).

Panel B of Table 7 reports results for all merger deals. In columns 1 and 2, we find that the coefficients of *Early Deal* are negative but insignificant. However, column 3 shows that the coefficient of *Early Deal*Short Horizon* is negative (−0.03) and significant at the 5% level, confirming that short-horizon CEOs in early-announced mergers are associated with lower abnormal post-merger operating performance. When controlling for CEO characteristics and deal characteristics, column 4 presents a similar coefficient of *Early Deal*Short Horizon* (−0.04), significant at the 1% level. Overall, results reported in Table 9 suggest that early-announced deals initiated by short-horizon CEOs have significantly underperformed long-term operating performance, compared with those deals initiated by long-horizon CEOs. This finding is consistent with our hypothesis H_3 and suggests that short-horizon CEOs are not able to increase deal quality, which supports prior literature that CEO short-termism makes poor investment decisions (Edmans *et al.* 2018).

*****insert table 7 here*****

3.4.5. Post-merger CEO turnover

In this subsection, we examine the effect of short-horizon CEOs on the potential costs due to the underperformance of mergers. Prior literature finds that CEO turnover is negatively related to the amount of value created in mergers (Lehn and Zhao, 2006). Thus, CEOs who

make value-reducing acquisitions are more likely to be replaced following mergers. Amel-Zadeh and Meeks (2019) argue the potential serious cost is severe for acquiring CEOs issuing low credibility forecasts, suggesting that the likelihood of acquiring CEO's departure is significantly higher when they disclose news with weak credibility. If short-horizon CEOs who conduct early-announced deals create lower value for combined firms after mergers, it expects that these CEOs are more likely to leave the firm after acquisitions. To examine this prediction, we identify CEO turnover for each year as reported in ExecuComp databases. Following Amel-Zadeh and Meeks (2019), we define a dummy variable for the CEO turnover (*Turnover*) that equals one if the acquirer CEO leaves the firm within 3 years following the merger completion, and zero otherwise.

Table 8 reports the results of logit regression on the likelihood of CEO turnover after mergers. In column 1, we find that the coefficient of *Early Deal* is negative (coefficient= −0.62) and significant at the 1% level. When looking at the coefficient of the interaction term (*Early Deal*Short Horizon*), it becomes 0.63 and significant at the 1% level. This evidence suggests that the negative influence of *Early Deal* on the probability of CEO turnover is completely wiped out when CEOs have short incentive horizons. Columns 2 and 3 show results are robust after controlling for CEO and deal characteristics, year, and industry fixed effects. These results are consistent with the prediction of hypothesis H_4, suggesting that short-horizon CEOs are more likely to leave the firm after early-announced acquisitions. Our results continue to hold after using the raw measure of incentive horizon (*WIH*) and the interaction term between *Early Deal*WIH*. Column 4 to 6 show that coefficients on *Early Deal*WIH* are all statistically significant and negative, indicating that CEOs with shorter incentive horizons increase the likelihood of leaving firms after early-announced acquisitions. Consequently, results in Table 8 provide further evidence that the cost to short-horizon CEOs in early-announced deals exists

due to creating lower long-term values for shareholders[15]. This supports the findings of Lehn and Zhao (2006) that CEOs who make bad acquisitions are more likely to be replaced.

*****insert table 8 here*****

3.4.6. Additional robustness checks

In this section, we conduct several robustness tests. First, we use an alternative control sample by matching the industry, size, M/B, and acquirer CEO equity incentives. Following Coles *et al.* (2006), we use delta to measure CEO equity incentives, calculated as the change in dollar value of CEO stock option for a 1% change in the stock price. Our matching criteria additionally includes the CEO delta to exclude the effects of the magnitude of managerial incentives on early-announced deals. We repeat our main analysis by using an industry-size-M/B-delta matched sample. Our main findings are not changed[16].

*****insert table 9 here*****

Second, we conduct a placebo test to address the concern that there could be omitted factors or other timing of shocks also affecting the CEO's equity sales in our difference-in-differences results. We perform tests where we falsely assume that a treatment firm and the early announcement occur randomly. Specifically, we run simulations by artificially assigning the early-announced deal and matched deal and randomly selecting a false date for the early announcement. We conduct difference-in-differences regressions using the simulated sample and repeat this process 1000 times. Panel A of Table 10 reports the distribution of the coefficient on *Early*Post* and corresponding t-statistics. Compared to the results in Table 6, these simulated coefficients on *Early*Post* are smaller and statistically indistinguishable from zero. Results from placebo tests confirm our prior findings.

[15] Results obtained with this table should be interpreted with cautions. Although CEOs of acquiring firms would like to be the CEO of combined firms, we cannot determine whether CEOs departure is forced or part of plan during deal negotiations.

[16] In untabulated analysis, our findings of a positive relation between short incentive horizons and early-announced deals continue to hold when using the sample of 1,323 deals.

Third, we address the view that corporate governance issues may confound our empirical findings. Prior literature shows that corporate governance factors influence corporate acquisitiveness and deal quality (Masulis *et al*. 2007). To alleviate this concern, we use two additional controls for governance including acquiring firm's institutional ownership defined as the total fraction of common shares outstanding owned by institutional investors (*InstiOwn*) and the number of blockholders with at least 5% ownership in the firm (*Blockholders*). We continue to find our main results hold after accounting for governance factors.

Finally, in another robustness test, we include an additional CEO characteristic: CEO overconfidence. Prior evidence on CEO attributes and M&A studies show that CEO overconfidence increases corporate acquisitions and reduces shareholder values (Malmendier and Tate, 2008). Following Hirshleifer *et al*. (2012), we define CEO overconfidence as one for all the year after the CEO's option exceeds 67% moneyness, and zero otherwise. Our robustness tests show that main findings remain intact, either by itself or together with other governance factors mentioned in the preceding robustness test.

*****insert table 10 here*****

3.5. Conclusion

In this paper, we study whether the incentive horizon for CEOs affects the timing of merger announcements and acquisition performance. Using a comprehensive measure of CEO compensation horizons, we find that CEOs with short incentive horizons are more likely to announce a deal early before signing the definitive agreements. CEOs with short incentive horizons are incentivized to sell more equities shortly following early announcements.

However, these early-announced deals initiated by short-horizon CEOs have significantly underperformed operating performance in the long term. We further find that the costs to short-horizon CEOs are considerable that CEOs with short incentive horizons in early-announced deals are more likely to leave the firm due to poor merger decisions. Overall, our findings

broadly highlight that executive compensation horizons are important in M&A transactions and suggest that corporate boards need to carefully consider the length of compensation structure before making acquisitions.

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Table 1: The industry and year distribution of deal sample

This table reports the deal distribution of year (Panel A) and Fama-French 48 industries (Panel B). The sample consists of 1,323 U.S. mergers announced between 1993 and 2017, 51 of which are early-announced deals.

Panel A: Distributions across years

Year	Early-announced deals	Late-announced deals	Total deals
	(1)	(2)	(3)
1993	3	12	15
1994	5	53	58
1995	5	83	88
1996	3	74	77
1997	4	91	95
1998	1	104	105
1999	3	94	97
2000	3	80	83
2001	1	74	75
2002	1	45	46
2003	3	44	47
2004	3	53	56
2005	0	50	50
2006	2	48	50
2007	2	51	53
2008	2	39	41
2009	4	34	38
2010	1	37	38
2011	1	20	21
2012	1	32	33
2013	0	29	29
2014	0	33	33
2015	2	41	43
2016	0	31	31
2017	1	20	21
Total	51	1,272	1,323

Panel B: Distributions across Fama-French 48 industries

Industry	Early-announced deals	Late-announced deals	Total deals
	(1)	(2)	(3)
Electronic Equipment	5	73	78
Computers	4	51	55
Business Services	4	123	127
Utilities	3	43	46
Retail	3	35	38
Other	32	947	979
Total	51	1,272	1,323

Table 2: Summary statistics of the deal sample

The table reports the summary statistics of variables for deal sample. The sample consists of 1,323 US mergers announced between 1993 and 2017, 51 of which are early-announced deals. *WIH* is the weighted incentive horizon for CEOs calculated as in Section 3.2. *Short Horizon* is the indicator variable that equals one if *WIH* is lower than the sample median, and zero otherwise. All variables are defined in Appendix , and all continuous variables are winsorized at 1st and 99th percentiles. We test for difference in means using the *t*-test allowing for unequal variance. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	All		Early		Late		Early-Late
	N	Mean	N	Mean	N	Mean	Mean difference
CEO Characteristics							
WIH	1,323	1.844	51	1.614	1,272	1.853	−0.239*
Short Horizon	1,323	0.500	51	0.627	1,272	0.495	0.132*
Vega ($ millions)	1,323	0.240	51	0.420	1,272	0.233	0.187***
Age	1,323	54.540	51	57.20	1,272	54.43	2.763***
Tenure	1,323	7.475	51	9.549	1,272	7.392	2.158**
Salary ($ millions)	1,323	0.782	51	0.842	1,272	0.779	0.063
Bonus ($ millions)	1,323	0.856	51	1.014	1,272	0.849	0.164
Acquirer Characteristics							
Assets ($ millions)	1,323	22,757	51	8,651	1,272	23,322	−1,4671**
Leverage	1,323	0.218	51	0.228	1,272	0.217	0.011
M/B	1,323	2.102	51	1.955	1,272	2.001	−0.047
ROA	1,323	0.124	51	0.150	1,272	0.124	0.025**
Cash Ratio	1,323	0.119	51	0.127	1,272	0.118	0.010
Sales Growth	1,323	0.225	51	0.152	1,272	0.207	−0.055
PastRet	1,323	0.122	51	0.119	1,272	0.102	0.016
Vol	1,323	0.022	51	0.024	1,272	0.022	0.002
News	1,323	398.813	51	224.5	1,272	405.8	−181.333*
Target Characteristics							
Assets ($ millions)	1,323	2,942	51	1,583	1,272	2,996	−1,413
Leverage	1,323	0.201	51	0.277	1,272	0.194	0.082***
M/B	1,323	1.899	51	1.481	1,272	1.845	−0.364*
ROA	1,323	0.062	51	0.107	1,272	0.066	0.042*
Cash Ratio	1,323	0.174	51	0.153	1,272	0.174	−0.021
Sales Growth	1,323	0.257	51	0.134	1,272	0.186	−0.052
PastRet	1,323	0.051	51	0.049	1,272	0.016	0.033
Vol	1,323	0.032	51	0.033	1,272	0.032	0.001
Deal Characteristics							
Stock Deal	1,323	0.350	51	0.275	1,272	0.353	−0.078
Diversify	1,323	0.751	51	0.804	1,272	0.749	0.055
High Tech	1,323	0.094	51	0.137	1,272	0.092	0.204***
Tender	1,323	0.177	51	0.373	1,272	0.169	0.045
Relative Size	1,323	0.371	51	0.379	1,272	0.370	0.009

Table 3: Summary statistics of the matched sample

This table provides summary statistics for both the actual early-announced deals and hypothetical deals. We use two different control samples as the hypothetical deals. Specifically, we first construct the industry-size matched control sample. For each actual early announced merger pair firms in every year, we find up to five matching acquiring firms (target firms) by the same 2-digit SIC industry and by the firm size from Compustat in year t-1. Candidates for hypothetical merger pairs are neither an acquirer nor a target in the three years before the deal. Second, we construct the industry-size-M/B matched control sample. For each actual early announced merger pair firms in every year, we find up to five matching acquiring firms (target firms) first by the same 2-digit SIC industry, then by propensity scores using firm size, and market-to-book ratio from Compustat in year t-1. Candidates for hypothetical merger pairs are neither an acquirer nor a target in the three years before the deal. All continuous variables are winsorized at 1st and 99th percentiles. The detailed variable definition can be found in Appendix . The table reports results of difference in means using t-test. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Actual Early-Announced Deal (A)		Industry-Size Matched (B)		Industry-Size-M/B Matched (C)		Difference (A-B)	Difference (A-C)
	N	Mean	N	Mean	N	Mean	Mean	Mean
CEO Characteristics								
WIH	50	1.578***	231	2.028	228	2.032	−0.450***	−0.454***
Short Horizon	50	0.700***	231	0.459	228	0.456	0.241***	0.244***
Vega ($ millions)	50	0.400***	231	0.135	228	0.133	0.265***	0.275***
Age	50	57.300***	231	54.896	228	54.539	2.404**	2.761***
Tenure	50	9.980***	231	6.576	228	6.417	3.404***	3.563***
Salary ($ millions)	50	0.880***	231	0.671	228	0.662	0.209***	0.218***
Bonus ($ millions)	50	1.448***	231	0.491	228	0.479	0.957***	0.970***
Overconfidence	39	0.231	200	0.165	199	0.141	0.066	0.090
Acquirer Characteristics								
Assets ($ millions)	50	8,570	231	6,483	228	5,512	2,087	3,058**
Leverage	50	0.229	231	0.242	228	0.238	−0.013	−0.009
M/B	50	1.944	231	1.823	228	1.853	0.121	0.091
ROA	50	0.151	231	0.136	228	0.140	0.015	0.011
Cash Ratio	50	0.130	231	0.110	228	0.109	0.020	0.020
Sales Growth	50	0.153	231	0.140	228	0.116	0.013	0.037
PastRet	50	0.129	231	0.007	228	0.014	0.122*	0.115*
Vol	50	0.024	231	0.024	228	0.023	0.000	0.001
News	50	228.580	231	175.087	228	158.5	53.493	70.08
InstiOwn	49	0.634	227	0.669	222	0.679	−0.036	−0.045
Blockholders	49	1.449	227	2.009	222	2.005	−0.560**	−0.556**

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Table 3 (continued)

	Actual Early-Announced Deals(A)		Industry-Size Matched (B)		Industry-Size-M/B Matched (C)		Difference (A-B)	Difference (A-C)
	N	Mean	N	Mean	N	Mean	Mean	Mean
Target Characteristics								
Assets ($ millions)	50	1,612	231	1,441	228	1,873	171	−261
Leverage	50	0.281	231	0.243	228	0.246	0.038	0.035
M/B	50	1.484	231	1.650	228	1.385	−0.166	0.099
ROA	50	0.107	231	0.105	228	0.076	0.002	0.030*
Cash Ratio	50	0.156	231	0.166	228	0.147	−0.010	0.009
Sales Growth	50	0.137	231	0.225	228	0.155	−0.088	−0.018
PastRet	50	0.055	231	0.062	228	−0.015	−0.007	0.070
Vol	50	0.034	231	0.034	228	0.038	0.000	−0.004

Table 4: CEO Incentive horizon and the likelihood of early announcements

This table reports estimation results for a logit model. The sample includes actual early-announced merger firm pairs (acquirer and target) announced between 1993 and 2017 and matched control firm pairs. The matched sample contains, for each actual early announced merger pair firms, formed by matching up to 5 acquiring firms (target firms) based on the same 2-digit SIC industry and firm size from Compustat in year t-1, and by matching up to 5 acquiring firms (target firms) based on the same 2-digit SIC industry and propensity scores using firm size, and market-to-book ratio from Compustat in year t-1. The dependent variable in all columns is, *Early*, a dummy variable that takes the value of one for the actual early-announced merger deals, and zero otherwise. *WIH* is the weighted incentive horizon for CEOs calculated as in Section 3.2. *Short Horizon* is the indicator variable that equals one if *WIH* is lower than the sample median, and zero otherwise. Columns 1 ,2 ,5, and 6 report results when the key explanatory is the WIH, and columns 3,4,7, and 8 report corresponding results when the main explanatory variable is *Short Horizon*. Other variable definitions can be found in Appendix . All continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year fixed effects. Coefficients of marginal effects are reported. The t statistics from robust standard errors clustered at the deal group level are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Industry-Size match				Industry-Size-M/B- match			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WIH	−0.097***	−0.099***			−0.105***	−0.080***		
	(−3.621)	(−3.201)			(−3.852)	(−3.064)		
Short Horizon			0.183***	0.177***			0.192***	0.163***
			(3.386)	(3.080)			(3.669)	(3.054)
CEO Characteristics								
Ln (Age)		0.261		0.277		0.261		0.286
		(1.439)		(1.611)		(1.342)		(1.459)
Ln (Tenure)		0.057**		0.059**		0.057**		0.060**
		(2.161)		(2.324)		(2.115)		(2.261)
Ln (Salary)		0.120*		0.093		0.079		0.053
		(1.931)		(1.534)		(1.194)		(0.867)
Ln (Bonus)		0.011*		0.012*		0.016**		0.016**
		(1.692)		(1.772)		(2.020)		(2.059)
Ln (Vega)		0.025		0.025		0.022		0.023
		(1.342)		(1.420)		(1.242)		(1.418)
Acquirer Characteristics								
Ln (News)		0.049**		0.049**		0.033*		0.035**
		(2.394)		(2.513)		(1.934)		(2.226)
Ln (Assets)		−0.020		−0.012		−0.010		−0.008
		(−0.815)		(−0.496)		(−0.328)		(−0.290)
Leverage		−0.195		−0.157		−0.134		−0.136
		(−1.314)		(−1.047)		(−0.908)		(−0.890)
M/B		0.008		0.008		−0.009		−0.013
		(0.241)		(0.227)		(−0.195)		(−0.300)
ROA		0.333		0.388		0.104		0.131
		(0.896)		(1.081)		(0.244)		(0.335)
Cash Ratio		−0.037		−0.043		0.066		0.072
		(−0.204)		(−0.230)		(0.357)		(0.385)

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Table 4 (continued)

	Industry-Size match				Industry-Size-M/B- match			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales Growth		−0.009		0.009		0.106		0.129
		(−0.099)		(0.095)		(0.872)		(1.102)
PastRet		0.105*		0.119*		0.086		0.094
		(1.716)		(1.921)		(1.441)		(1.590)
Vol		4.736		3.722		2.948		2.052
		(1.592)		(1.342)		(0.950)		(0.752)
Target Characteristics								
Ln (Assets)		−0.021		−0.026*		0.008		0.004
		(−1.426)		(−1.814)		(0.459)		(0.262)
Leverage		0.175*		0.139		0.109		0.099
		(1.741)		(1.372)		(1.115)		(1.028)
M/B		−0.098***		−0.102***		0.017		0.028
		(−2.729)		(−2.729)		(0.447)		(0.685)
ROA		0.076		0.113		0.285		0.290
		(0.304)		(0.471)		(1.187)		(1.195)
Cash Ratio		0.098		0.116		0.239		0.214
		(0.773)		(0.946)		(1.638)		(1.478)
Sales Growth		−0.118**		−0.099*		−0.083		−0.089
		(−2.178)		(−1.890)		(−1.488)		(−1.544)
PastRet		0.011		0.005		−0.010		−0.015
		(0.264)		(0.136)		(−0.166)		(−0.259)
Vol		−0.076		−0.428		−0.468		−0.505
		(−0.053)		(−0.316)		(−0.217)		(−0.264)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.056	0.244	0.055	0.243	0.062	0.222	0.059	0.229
N	281	281	281	281	278	278	278	278

Table 5: CEO incentive horizon and the likelihood of equity sales

This table reports estimation results for a logit model. The sample includes actual early-announced merger firm pairs (acquirer and target) announced between 1993 and 2017 and matched control firm pairs. The dependent variable is *Sell* which takes the value of one if CEOs sell any share from the early announcement date to the definitive agreement announcement date, and zero otherwise. *Early* takes the value of one for the actual early-announced merger deals, and zero otherwise. *Short Horizon* is the indicator variable that equals one if *WIH* is lower than the sample median, and zero otherwise. The key explanatory variable is the interaction term *Early*Short Horizon*. Other variable definitions can be found in Appendix. Coefficients of marginal effects are reported. The t statistics from robust standard errors clustered at the deal group level are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Industry-Size match		Industry-Size-M/B match	
	(1)	(2)	(3)	(4)
Early	−0.562***	−0.620*	−0.712***	−0.710***
	(−3.578)	(−1.895)	(−4.299)	(−3.045)
Short Horizon	0.059	0.117	0.054	0.070
	(1.223)	(1.059)	(1.301)	(1.036)
*Early*Short Horizon*	0.568***	0.516*	0.694***	0.685***
	(3.848)	(1.798)	(4.184)	(3.174)
CEO Characteristics				
Ln (Age)	−0.322***	−0.330	−0.303**	−0.393
	(−3.246)	(−0.734)	(−2.550)	(−1.347)
Ln (Tenure)	0.056***	0.118*	0.059**	0.099*
	(3.649)	(1.732)	(2.219)	(1.850)
Ln (Salary)	−0.009	0.020	−0.003	−0.101
	(−0.320)	(0.274)	(−0.122)	(−0.679)
Ln (Bonus)	−0.008***	−0.007	−0.013***	−0.033**
	(−3.502)	(−0.666)	(−3.645)	(−2.160)
Ln (Vega)	−0.003	0.019	0.011	0.024
	(−0.282)	(0.615)	(1.224)	(1.100)
Acquirer Characteristics				
Ln (News)	−0.005	−0.003	−0.011	−0.013
	(−0.716)	(−0.221)	(−1.411)	(−0.910)
Ln (Assets)	0.038**	0.063**	0.024	0.073
	(2.277)	(2.526)	(1.377)	(1.462)
Leverage	0.034	0.276	0.078	0.164
	(0.469)	(1.584)	(0.781)	(1.443)
M/B	0.036***	0.070***	0.034**	0.059**
	(3.853)	(2.593)	(2.423)	(2.383)
ROA	−0.175	0.256	−0.126	−0.087
	(−1.088)	(0.820)	(−0.602)	(−0.320)
Cash Ratio	−0.027	0.086	0.128	0.230
	(−0.226)	(0.333)	(1.471)	(1.490)
Sales Growth	0.003	0.215	0.167**	0.153
	(0.065)	(0.708)	(2.571)	(0.801)
PastRet	−0.010	0.009	0.029	0.084
	(−0.282)	(0.092)	(0.946)	(0.746)
Vol	3.517***	10.884***	2.296	13.221***
	(3.374)	(2.867)	(1.482)	(4.403)
Target Characteristics				
Ln (Assets)	−0.005	0.003	−0.002	−0.007
	(−0.371)	(0.078)	(−0.071)	(−0.147)
Leverage	−0.135*	−0.249*	−0.279*	−0.404**
	(−1.666)	(−1.660)	(−1.817)	(−2.042)
M/B	−0.000	−0.013	0.021	−0.013
	(−0.019)	(−0.459)	(0.943)	(−0.216)
ROA	0.257*	0.768**	0.274	0.216
	(1.814)	(2.502)	(1.321)	(0.639)
Cash Ratio	0.225***	0.354***	−0.019	−0.233
	(5.968)	(4.895)	(−0.209)	(−1.023)
Sales Growth	−0.025	0.037	−0.039*	−0.008
	(−0.439)	(0.500)	(−1.650)	(−0.140)
PastRet	−0.052**	−0.169**	−0.047	0.058
	(−2.117)	(−2.232)	(−1.543)	(1.466)
Vol	−2.464*	−4.333	0.049	0.667
	(−1.910)	(−1.474)	(0.063)	(0.212)
Year FE	No	Yes	No	Yes
Pseudo-R^2	0.496	0.573	0.414	0.514
N	281	142	278	172

Table 6: CEO incentive horizon and equity sales

This table reports results from difference-in-difference (DID) tests examining the effect of early-announcements on CEO equity sales. The sample includes actual early announced merger firm pairs (acquirer and target) announced between 1993 and 2017 and matched control firm pairs. There are two observations for each firm: one measures CEO equity sales between the early announcement date and definitive agreement announcement date (after-early period), and another measures CEO equity sales using the same days as in the after-early period but in the one year before that (control period). The dependent variable is *EquitySold* that is the number of shares sold by CEOs scaled by the number of shares outstanding in basis points. Panel A reports the mean difference of CEO equity sales for actual early-announced acquirer firms (Treated firms) and hypothetical acquirer firms (Matched firms), and t-test is used for whether the two samples have equal means, where DiD estimators are highlighted in bold. Panel B reports coefficients from the DiD regressions. *Post* equals one (zero) if the CEO equity sales occur during the event period (control period). In Panel B, columns 1 and 4 report estimation results for the full sample, while columns 2,3, 5, and 6 report results based on the value of *Short Horizon*. Other variable definitions can be found in Appendix. All continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year fixed effects. The t statistics using robust standard errors are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: DiD estimator- CEO equity sales

	Industry-Size match			Industry-Size-M/B match		
	Control period	After-early period	DiD	Control period	After-early period	DiD
	(1)	(2)	(2-1)	(3)	(4)	(4-3)
Treated firms (T)	0.011	0.059	0.048	0.011	0.059	0.048
N	50	50		50	50	
Matched firms (M)	0.020	0.008	−0.012	0.026	0.016	−0.010
N	229	229		228	228	
Difference (T-M)	−0.009	0.051***	**0.060****	−0.015	0.043**	**0.058***

Panel B: DiD regressions

	Industry-Size match			Industry-Size-M/B match		
	Full sample	Short Horizon	Long Horizon	Full sample	Short Horizon	Long Horizon
	(1)	(2)	(3)	(4)	(5)	(6)
Early	−0.039	−0.068	0.015	−0.031	−0.068	0.031
	(−1.585)	(−1.163)	(0.522)	(−1.257)	(−1.186)	(0.970)
Post	−0.042	−0.093*	−0.037**	−0.035	−0.081*	−0.012
	(−1.575)	(−1.968)	(−2.464)	(−1.324)	(−1.778)	(−0.736)
*Early*Post*	0.092*	0.142**	0.001	0.086*	0.134*	−0.006
	(1.925)	(1.975)	(0.023)	(1.740)	(1.876)	(−0.125)
CEO Characteristics						
Ln (Age)	0.057	0.109	0.030	−0.005	−0.025	−0.009
	(0.856)	(0.667)	(0.574)	(−0.097)	(−0.153)	(−0.145)
Ln (Tenure)	−0.004	−0.028	−0.001	0.000	−0.022	0.002
	(−0.303)	(−1.116)	(−0.150)	(0.039)	(−0.847)	(0.185)
Ln (Salary)	−0.085*	−0.093**	−0.058***	−0.091*	−0.089*	−0.068**
	(−1.760)	(−2.133)	(−2.768)	(−1.702)	(−1.912)	(−2.516)
Ln (Bonus)	−0.010***	−0.018**	−0.009***	−0.013***	−0.014*	−0.013***
	(−2.671)	(−2.275)	(−2.723)	(−2.976)	(−1.871)	(−3.494)
Ln (Vega)	0.008	0.014	−0.007	0.013**	0.015	−0.001
	(1.304)	(1.220)	(−1.630)	(2.122)	(1.341)	(−0.213)
Acquirer Characteristics						
Ln (News)	0.005	0.019	0.004	0.003	0.012	0.003
	(0.601)	(1.263)	(0.611)	(0.377)	(0.816)	(0.437)
Ln (Assets)	0.028**	0.023	0.022**	0.024*	0.027	0.011
	(2.054)	(1.008)	(2.389)	(1.660)	(1.188)	(1.098)
Leverage	0.069	−0.075	0.110***	0.077	0.037	0.113**
	(1.214)	(−0.484)	(2.753)	(1.386)	(0.267)	(2.493)
M/B	0.016	−0.012	0.025**	0.007	−0.020	0.024**
	(1.094)	(−0.545)	(2.606)	(0.509)	(−0.974)	(2.087)
ROA	0.147	0.470	−0.110	0.057	0.369	−0.180
	(0.790)	(1.620)	(−0.916)	(0.296)	(1.220)	(−1.324)
Cash Ratio	0.075	0.012	0.157**	0.020	0.032	0.078
	(0.959)	(0.067)	(2.364)	(0.276)	(0.197)	(1.196)
Sales Growth	−0.034	0.078	−0.039	−0.011	0.023	−0.014
	(−0.688)	(0.852)	(−1.033)	(−0.239)	(0.225)	(−0.319)

(Continued on next page)

Table 6 (continued)

	Industry-Size match			Industry-Size-M/B match		
	Full sample	Short Horizon	Long Horizon	Full sample	Short Horizon	Long Horizon
	(1)	(2)	(3)	(4)	(5)	(6)
PastRet	0.000	0.008	0.002	0.010	0.010	0.011
	(0.014)	(0.201)	(0.117)	(0.574)	(0.231)	(0.619)
Vol	1.448	1.671	0.146	1.055	2.353	−0.421
	(1.197)	(0.667)	(0.159)	(0.956)	(0.985)	(−0.416)
Target Characteristics						
Ln (Assets)	0.004	−0.002	−0.001	0.012*	0.018	0.008
	(1.008)	(−0.119)	(−0.095)	(1.965)	(1.177)	(1.596)
Leverage	−0.019	0.096	−0.040	−0.093**	−0.120	−0.037
	(−0.617)	(0.993)	(−1.239)	(−2.431)	(−1.088)	(−0.829)
M/B	−0.017*	−0.020	−0.019**	−0.014	−0.026	−0.003
	(−1.874)	(−0.891)	(−1.991)	(−1.279)	(−0.907)	(−0.235)
ROA	0.196**	0.733**	0.077	0.122*	0.171	0.024
	(1.984)	(2.462)	(1.001)	(1.911)	(0.943)	(0.262)
Cash Ratio	0.065	0.116	0.059	0.069	0.161	−0.013
	(1.030)	(0.933)	(1.403)	(1.007)	(1.325)	(−0.258)
Sales Growth	−0.012	0.006	−0.006	−0.009	−0.017	−0.009
	(−0.912)	(0.116)	(−0.358)	(−1.028)	(−0.577)	(−0.568)
PastRet	0.005	−0.069	0.019*	0.006	0.010	0.005
	(0.548)	(−1.583)	(1.732)	(0.781)	(0.334)	(0.358)
Vol	0.075	0.895	0.358	0.050	0.006	0.320
	(0.170)	(0.552)	(0.826)	(0.134)	(0.005)	(0.638)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted- R2	0.131	0.087	0.348	0.154	0.078	0.317
p-value (x^2 test)			0.058			0.056
N	360	180	180	363	182	181

Table 7: Post-merger operating performance

This table reports the results of OLS regressions explaining post-merger abnormal changes in operating performance, following Healey, Palepu, and Ruback (1992). The sample consists of 1,323 US mergers announced between 1993 and 2017. Specifically, the operating performance is calculated as return on assets (ROA), defined as operating income before depreciation divided by market value of assets at the beginning of the fiscal year. The abnormal operating performance is calculated as the difference between operating performance for merged firms and each year's median operating performance in the corresponding Fama-French 48 industry categories. For the pre-merger years, the operating performance is the value-weighted average of acquirer's and target's abnormal operating performance, using the market value of assets at the beginning of fiscal year as weights. We then run a cross-section regression where the dependent variable is the median post-merger abnormal performance over the 3 post-merger years (t+1 to t+3 relative to the merger completion year t), controlling for the abnormal operating performance in the year before the merger (t-1 where t is the early announcement year for early announced deals and agreement announcement year for late announced deals). The regression intercept indicates an estimate of the operating gains to mergers. Panel A reports estimation results for all early-announced mergers and subsamples of short horizon versus long horizon CEOs. Panel B reports estimation results for all merger deals including early-announced deals and late- announced deals. The key explanatory variable is the interaction term *Early Deal*Short Horizon*. *Early Deal* equals one if the deal is classified as the early-announced deals, and zero for late-announced deal. Other variable definitions can be found in Appendix. The t statistics using robust standard errors are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Healey, Palepu, and Ruback (1992) models for early announced deals

	All	Short Horizon	Long Horizon
	(1)	(2)	(3)
Abnormal ROA$_{t-1}$	0.756***	0.710***	0.780***
	(6.555)	(4.203)	(5.153)
Constant	−0.011*	−0.021**	0.004
	(−1.752)	(−2.317)	(0.441)
Adjusted-R2	0.457	0.373	0.615
p-value (x^2 test)		0.041	
N	46	29	17

Panel B: Healey, Palepu, and Ruback (1992) models for all deals

	(1)	(2)	(3)	(4)
Abnormal ROA$_{t-1}$	0.491***	0.491***	0.490***	0.490***
	(10.634)	(10.362)	(10.607)	(10.331)
Early Deal	−0.008	−0.009	0.011	0.013
	(−1.133)	(−1.244)	(1.183)	(1.334)
Short Horizon			0.003	0.004
			(1.208)	(1.383)
*Early Deal *Short Horizon*			−0.030**	−0.035***
			(−2.350)	(−2.639)
CEO Characteristics				
Ln (Age)		−0.005		−0.005
		(−0.356)		(−0.391)
Ln (Tenure)		0.002		0.002
		(1.361)		(1.365)
Ln (Salary)		−0.001		−0.001
		(−0.353)		(−0.384)
Ln (Bonus)		0.000		0.000
		(0.622)		(0.898)
Ln (Vega)		−0.001		−0.002
		(−0.469)		(−0.515)
Deal Characteristics				
Stock Deal		0.005		0.006*
		(1.608)		(1.892)
Diversify		−0.002		−0.002
		(−0.662)		(−0.701)
Tender		0.007		0.007
		(1.504)		(1.585)
Relative Size		−0.010***		−0.010***
		(−2.745)		(−2.755)
Constant	−0.003**	0.019	−0.005**	0.018
	(−2.493)	(0.337)	(−2.428)	(0.327)
Adjusted- R2	0.338	0.350	0.340	0.353
N	1,107	1,107	1,107	1,107

Table 8: Post-merger CEO turnover

This table reports estimation results for a logit model on the likelihood of CEO turnover after mergers, using a sample consists of 1,323 US mergers announced between 1993 and 2017. *Turnover* is a dummy variable that takes value of one if acquirer CEO is replaced within 3 years following the merger completion, and zero otherwise. All regressions control for year fixed effects and Fama-French 48 industry fixed effects. Coefficients of marginal effects are reported. Other variable definitions can be found in Appendix. The t statistics from robust standard errors clustered at the acquirer firm level are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Turnover					
	(1)	(2)	(3)	(4)	(5)	(6)
Early Deal	−0.616***	−0.609***	−0.675***	0.023	0.011	−0.002
	(−7.311)	(−7.642)	(−7.537)	(0.571)	(0.221)	(−0.032)
Short Horizon	−0.010	−0.004	−0.007			
	(−0.753)	(−0.298)	(−0.378)			
*Early Deal *Short Horizon*	0.633***	0.606***	0.648***			
	(6.867)	(6.606)	(6.340)			
WIH				0.004	−0.001	−0.001
				(0.677)	(−0.085)	(−0.079)
*Early Deal *WIH*				−0.022*	−0.026*	−0.033**
				(−1.764)	(−1.826)	(−2.097)
CEO Characteristics						
Ln (Age)		0.192***	0.224**		0.192***	0.222***
		(2.656)	(2.370)		(2.737)	(2.595)
Ln (Tenure)		−0.003	0.002		−0.004	0.002
		(−0.427)	(0.205)		(−0.510)	(0.188)
Ln (Salary)		0.032	0.025		0.032	0.024
		(0.765)	(0.483)		(1.095)	(0.590)
Ln (Bonus)		−0.041	−0.031		−0.041	−0.031
		(−1.549)	(−0.993)		(−1.548)	(−1.009)
Ln (Vega)		0.010*	0.013**		0.010*	0.012**
		(1.923)	(2.095)		(1.942)	(2.088)
Deal Characteristics						
Stock Deal		0.021	0.029*		0.022*	0.030**
		(1.411)	(1.691)		(1.668)	(2.030)
Diversify		−0.009	−0.015		−0.008	−0.016
		(−0.551)	(−0.800)		(−0.539)	(−0.877)
Tender		−0.014	−0.026		−0.014	−0.027
		(−0.679)	(−1.051)		(−0.726)	(−1.088)
High Tech		0.015	0.009		0.016	0.009
		(0.656)	(0.283)		(0.997)	(0.374)
Relative Size		0.020***	0.021**		0.020***	0.021**
		(2.700)	(2.221)		(2.764)	(2.177)
Industry FE	No	No	Yes	No	No	Yes
Year FE	No	Yes	Yes	No	Yes	Yes
Pseudo- R^2	0.025	0.090	0.154	0.002	0.088	0.152
N	1,323	1,221	1,039	1,323	1,221	1,039

Table 9: Robustness tests on the likelihood of early announcements and equity sales

This table reports the robustness tests for Tables 4 and 5 in Panel A and 6 in Panel B by using an alternative matched control sample. The matched sample is generated by matching industry, size, M/B, and acquirer CEO delta. For each actual early-announced merger pair firms, control firms are formed by matching up to 5 acquiring firms (target firms) based on the same 2-digit SIC industry and firm size from Compustat in year t-1, and by matching up to 5 acquiring firms (target firms) based on the same 2-digit SIC industry and propensity scores using firm size, market-to-book ratio, and acquirer CEO delta from Compustat in year t-1. In Panel A, the dependent variable from column 1 to 2 and 3 to 4 is *Early* and *Sell* , respectively. The dependent variable is *Euqitysold* for all columns in Panel B. Other variable definitions can be found in Appendix . Coefficients of marginal effects are reported. The t statistics from robust standard errors clustered at the deal group level are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Alternative matched sample analysis

	Early		Sell	
	(1)	(2)	(3)	(4)
WIH	−0.074**			
	(−2.540)			
Short Horizon		0.173***	0.053	0.011
		(3.040)	(1.096)	(0.225)
Early			-1.772***	-1.613***
			(-7.605)	(-9.296)
*Early*Short Horizon*			1.578***	1.405***
			(7.173)	(8.307)
CEO and firm controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	Yes
Pseudo-R^2	0.228	0.243	0.257	0.390
N	240	240	240	217

Panel B: DiD regressions of alternative matched sample

	Full sample	Short Horizon	Long Horizon
	(1)	(2)	(3)
Early	−0.027	−0.097	0.016**
	(−1.154)	(−1.385)	(2.123)
Post	−0.035	−0.129**	−0.010**
	(−1.055)	(−2.199)	(−2.108)
*Early*Post*	0.092*	0.208**	−0.020*
	(1.790)	(2.447)	(−1.835)
CEO and firm controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted- R2	0.077	0.057	0.226
p-value (x^2 test)		0.001	
N	306	153	153

Table 10: Additional robustness analysis

This table reports sensitivity analyses. Panel A reports the results from placebo tests for CEO's equity sales in DiD analysis. We perform the random selection and estimate 1000 times to obtain the distribution of coeficients on the interaction term (*Early*Post*) and corresbonding t-statistics. Panel B reports results for the likelihood of early-announced deals by adding controls for corporate governance variables and CEO overconfidence. We include two corporate governance variables: *InstiOwn* and *Blockholders*. *InstiOwn* is defined as total fraction of common shares outstanding owned by institutional investors at the most recent report date before the announcement. *Blockholders* is defined as the number of blockholders with at least 5% ownership presents in the firm at the most recent report date before the announcement. *Overconfidence* is an indicator variable that takes the value of one for all years after the CEO's option exceed 67% moneyness, and zero otherwise. For all columns, control variables are identical to those in Table 4. Other variable definitions can be found in Appendix. Coefficients of marginal effects are reported. The t statistics from robust standard errors clustered at the deal level are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Placebo tests for DiD analysis

	Mean	5 Percentile	25 Percentile	Median	75 Percentile	95 Percentile
Industry-Size match						
*Early*Post*	−0.0002	−0.0927	−0.0286	0.0002	0.0290	0.0882
t-statistic	−0.001	−1.793	−0.527	0.001	0.552	1.691
Industry-Size-M/B match						
*Early*Post*	−0.0019	−0.0874	−0.0320	−0.0015	0.0271	0.0823
t-statistic	−0.039	−1.790	−0.650	−0.030	0.535	1.638

Panel B: Robustness tests for CEO incentive horizon and early-announced deal

	Industry-Size match				Industry-Size-M/B match			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WIH	−0.091***	−0.111***			−0.081***	−0.095***		
	(−3.043)	(−3.406)			(−3.005)	(−2.586)		
Short Horizon			0.158***	0.198***			0.163***	0.191***
			(2.881)	(3.081)			(2.884)	(2.786)
InstiOwn	−0.101	−0.184	−0.053	−0.089	−0.163	−0.143	−0.135	−0.086
	(−0.540)	(−0.818)	(−0.278)	(−0.423)	(−0.898)	(−0.685)	(−0.713)	(−0.419)
Blockholders	−0.033	−0.046	−0.040	−0.054*	−0.036	−0.052	−0.039	−0.062**
	(−1.222)	(−1.494)	(−1.461)	(−1.723)	(−1.310)	(−1.613)	(−1.436)	(−2.037)
Overconfidence		0.072		0.077		0.088		0.079
		(0.843)		(0.822)		(0.830)		(0.763)
CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo- R2	0.258	0.344	0.259	0.349	0.241	0.309	0.246	0.320
N	276	224	276	224	271	221	271	271

Chapter 4

Industry Tournament Incentives and M&A Deal Initiation

4.1. Introduction

What are the driving factors that lead to selling-firm decisions? The extant M&A literature has examined several potential reasons for target firms initiating their own sales. For example, target firms with financial and competitive weaknesses are motivated to sell their firms to achieve strategic and financial objectives (Masulis and Simsir, 2018). Aktas *et al.* (2016) examine the effects of chief executive officers (CEOs)' narcissism on deal initiation decisions and show that the target CEOs with higher narcissism are less likely to initiate the takeover. A few recent studies have paid attention to the importance of managerial motivation in merger and acquisition (M&A) deal initiation. For instance, target CEOs with higher stock ownership are incentivized to initiate deals (Fidrmuc and Xia, 2019). Although this stream of literature has explored certain aspects of managerial motivation in deal initiation decisions, it has ignored the impact of managerial tournament incentives on firms initiating their own sales. This study intends to fill this gap.

There is an active and competitive labor market for CEOs, and their compensation is also influenced by other peer firms (e.g., Bizjak *et al*. 2011). Survey evidence from Graham *et al*. (2005) suggests that external labor market opportunities and mobilities are considered to be more important than current compensation packages for CEOs when making firm decisions. CEOs with a stronger desire to progress in the managerial labor market tournament have greater incentives to initiate their firm sales. Guiding their firm through a successful and friendly acquisition may provide them with a good record of their ability and valuable experience that enhances their future job prospects. Furthermore, by actively planning and engaging in their firm sales, they may gain a more preferable position in deal negotiations and a better chance to retain satisfactory jobs and/or private benefits in the combined firm with the larger asset size

under control. Both reasons motivate CEOs with managerial labor market tournament incentives to actively sell their firms. A firm CEO's industry tournament incentive (ITI) reflects his/her potential upward gains from winning the industry tournament prize. Therefore, we hypothesize that firms whose CEOs face stronger ITIs are more likely to initiate their own sales in M&A transactions. For these target-initiated deals, target firm CEOs with stronger ITIs are more likely to retain their jobs in the combined firm. In this paper, we empirically investigate the effect of ITIs on CEOs' decisions to sell their firms, the implications for their deal initiation in M&As, and their subsequent labor market retention.

Following Coles *et al.* (2018) and Huang *et al.* (2019), we calculate two different proxies for a CEO's ITI based on the pay gap between the given firm's CEO pay and measures of the maximal CEO pay in the same industry defined based on the Fama-French 30-industry classification (FF30) and size group. Our sample consists of 499 U.S. domestic deals for public target firms announced between 1997 and 2019, 182 of which are target-initiated, and 317 of which are bidder-initiated.

Our empirical analysis unfolds as follows. We first examine whether a causal link exists between a target firm CEO's ITI and the likelihood of target firm initiating M&A deals, controlling for industry and year fixed effects to account for time-invariant industry factors and time trends. Overall, our empirical results from probit regressions suggest that target CEOs' ITIs increase the likelihood of target initiation. On average, compared to target firm CEOs with weak ITIs, target firm CEOs with strong ITIs have a 3.5% higher probability of initiating their firm sales.

We conduct a battery of tests to check the robustness of our reported findings on the link between target firm CEOs' ITIs and the likelihood of target initiation. First, to alleviate concerns regarding the potential for endogeneity arising from missing latent factors, we estimate instrumented two-stage probit regressions. Following Coles *et al.* (2018) and Huang

et al. (2019), we use the sum of the total compensation of all other CEOs in the same industry classification as the instrument of ITI measures. Second, to further mitigate endogeneity concerns and build support for our hypotheses, we investigate the cross-sectional variations in the effect of industry tournament incentives on the likelihood of target initiation. We separately estimate the instrumented two-stage probit specifications with three distinct paired subsample settings to check if the impact of industry tournament incentives manifests itself more pronounced in domains where target firm CEOs have more potential and chances to achieve upward gains and retain favorable career positions and/or private benefits through selling their firms (i.e., for target firms with young CEOs, short-tenure CEOs, and high-ability CEOs). We find that the positive relation between industry tournament incentives and target deal initiation is more pronounced when target CEOs are more likely to win or participate in the industry tournament prize. Specifically, our results suggest that target firms whose CEOs have stronger ITI are more likely to initiate deals, especially when their CEOs are younger or more talented, and have longer tenures with the target firms. Overall, our findings on the link between target firm CEOs' ITIs and the likelihood of target initiation maintain robust to all these additional checks.

Next, we explore if the industry tournament incentives affect target CEOs' subsequent labor market retention. We posit that when target CEOs with stronger industry tournament incentives engage in target-initiated deals, they also possess better chances of negotiating their own private benefits and pursuing career advancement and upward mobility. Management position retention in the merged firm with larger assets under control is among their favorable career prospects. Our empirical results support this conjecture. We find that industry tournament incentives enhance the likelihood of target CEOs being retained in the merged firm of target-initiated acquisitions. Our results remain stable after testing the instrumented two-stage probit model.

Our paper makes contributions to the following strands of research. First, this paper sheds light on recent literature on M&A deal initiation. With regard to the motives of firms initiating their own sales, Masulis and Simsir (2018) document the firm financial weakness as an important driver for target deal initiation. Focusing on CEO incentives and characteristics, Fidrmuc and Xia (2019) find that CEOs' ownership affects the decision to initiate deals, while Aktas *et al*. (2016) investigate the relation between CEOs' narcissism and deal initiation. Our study adds to this line of research by showing the impact of managerial tournament incentives on target deal initiation: external tournament incentives encourage target CEOs to actively engage in deal initiation, and increase their probability of obtaining a prestigious position in the merged firm. Second, our study contributes to the recent literature on tournament incentives and is most closely tied to the literature on CEO ITIs and corporate policies and strategies. Recent studies have paid attention to the importance of industry tournament incentives to firm performance and investment policy (Coles *et al*. 2018), corporate cash holding (Huang *et al*. 2019), corporate innovation (Nguyen and Zhao, 2021), and stock price crash risk (Kubick and Lockhart, 2021). Our paper complements this line of literature by highlighting the role of industry tournament incentives on deal initiation in M&A decisions. To the best of our knowledge, this paper is the first empirical work that investigates the role of industry tournament incentives in the context of M&As.

The remainder of this chapter proceeds as follows: Section 4.2 reviews the previous literature and develops hypotheses. Section 4.3 describes the sample, variable construction, and empirical methodology. Section 4.4 presents the results and provides a discussion of robustness tests. Section 4.5 concludes.

4.2. Literature Review and Hypotheses Development

4.2.1. Industry tournament incentives and the likelihood of target deal initiation

The main aim of this paper is to understand how managerial labor market incentives would influence decisions on firm sales and deal initiation. In the context of M&As, extant literature has explored various aspects that could drive decisions on deal initiation ((Jensen and Ruback, 1983; Andrade *et al.* 2001). Heitzman (2011) points out that target-initiated deals account for a nonnegligible proportion in M&As, representing about 35% of the sample deals. Regarding the potential reasons for target firms initiating their own sales, a stream of recent studies has explored the role of financial status and managerial motivation. Masulis and Simsir (2018) report that target firms with financial and competitive weaknesses are motivated to sell their firms to achieve strategic and financial objectives. Fidrmuc and Xia (2019) emphasize the importance of managerial motivation in target deal initiation. Aligning with their viewpoint, several studies have paid attention to the target CEO's motivation and linked it to target deal initiation. Aktas *et al.* (2016) show that target CEOs psychological characteristics (narcissism) affect the probability of initiating a takeover. Jenter and Lewellen (2015) find that the retirement age of target CEOs also affects firm sales.

However, extant studies have so far neglected the impact of the target firm CEO's external tournament incentives, i.e., managerial labor market incentives, on decisions of target deal initiation. Prior empirical evidence suggests that managerial labor market incentives are economically important to firms' operation and strategic decisions (Fee and Hadlock, 2003). Coles *et al*. (2018) argue that industry tournament incentives provide CEOs with career-enhancing incentives to shape corporate financial policies. Huang *et al*. (2019) further show that CEOs with industry tournament incentives are motivated to pursue value-added cash policies to achieve career-enhancing goals.

As one of the most important strategic decisions for a firm, M&A deals provide CEOs with industry tournament incentives with substantial potential to achieve career enhancement. Driven by career-enhancing motivations, target firm CEOs facing industry tournament incentives are likely to strategically seek acquirers and proactively engage in deal negotiations. First, target CEOs may believe that selling their firms to other firms with greater potential and competency and proactively engaging in deal negotiations would increase their chances to move up to bigger and more reputable firms. Meanwhile, acquiring firms have motivations to build a competitive advantage by retaining target firm CEOs (Wulf and Singh, 2011). Second, even if they fail to retain in the combined firm after deal completion, target CEOs usually receive a large compensation package including golden parachutes or bonuses (Jenter and Lewellen, 2015). Furthermore, the experience of guiding their firms through successful and friendly acquisitions would provide good evidence of their ability and valuable experience that enhances their future job prospects in the managerial labor market (Hartford,2003). Lastly, external tournament incentives induce excessive risk-taking behaviors due to the option-like payoff structure, which increases target CEOs' risk appetite (Coles *et al.* 2020). It is known that selling firms potentially increase the CEO's risk of losing jobs, which might lead target CEOs with risk-aversion or risk-neutral to less actively engage in deal initiation. However, industry tournament incentives lead to target CEOs' preference for higher risk, resulting in a higher propensity of deal initiation. Therefore, we expect the likelihood of target deal initiation to be positively associated with the target CEOs' industry tournament incentives. We summarize our conjecture in the following hypothesis:

H_1: Target CEOs' industry tournament incentives increase the likelihood of target deal initiation.

4.2.2. The likelihood of target deal initiation in different domains of industry tournament incentives

If the likelihood of target deal initiation is associated with the CEO's managerial labor market incentives, we posit that the impact of industry tournament incentives would manifest itself more pronounced in domains where target firm CEOs have greater potential and chances to win the industry tournament prize, i.e. achieving upward gains, retaining favorable career positions, or reaping private benefits through selling their firms. We expect a stronger effect of industry tournament incentives in the three distinct settings: target firms with young CEOs, with short-tenure CEOs, and with high-ability CEOs.

First, older CEOs would prefer not to move up to another firm to take challenges and have weaker career-enhancing motivations, hence they are less likely to be motivated by industry tournament incentives to initiate deals (Huang *et al*. 2019). Second, the effect of industry tournament prizes relies on target firm CEOs' tenure. Some literature argues that CEOs with longer tenure are beneficial to firm performance and considered to be more valuable (i.e., Kor and Mahoney, 2005), and long-tenured target CEOs are more likely to be retained after mergers (Wulf and Singh, 2011). Target CEOs who have short tenures are less likely to actively seek outside jobs due to a lack of proven performance records, while CEOs with long tenures are more likely to pursue industry tournament prizes with their accumulated performance record with the current company. As a result, target firm CEOs with long tenures tend to face greater incentives to actively initiate deals, relative to short tenures. Third, the industry tournament prize is achieved by winning the managerial labor market competition, which requires CEOs' superior ability and talents. More capable and talented target CEOs are more likely to be recognized by the managerial labor market and achieve industry tournament prizes through planning and guiding their firm sales. These target CEOs are also more likely to be promoted or retained in merged firms after acquisitions (Wulf and Singh, 2011). As a result, target CEOs

with greater abilities potentially face greater industry tournament incentives and hence are more motivated to actively initiate deals. To summarize, these arguments lead to our following hypotheses:

H_{1a}: All else being equal, the positive relation between industry tournament incentives and target deal initiation is stronger for target firms with young CEOs.

H_{1b}: All else being equal, the positive relation between industry tournament incentives and target deal initiation is stronger for target firm CEOs with long tenures.

H_{1c}: All else being equal, the positive relation between industry tournament incentives and deal initiation is stronger for target firm CEOs with more talent.

4.2.3. Industry tournament incentives and target CEO retention

Target CEOs with industry tournament incentives tend to pursue higher compensation packages or better positions in the managerial labor market and are highly likely to actively offer their firms for sale before they go bankrupt when these target firms are financially constrained but still have good operating performance (Masulis and Simsir, 2018; Fidrmuc and Xia, 2019). By actively offering their firms for sale, we argue that target CEOs are more likely to be retained in the combined firms. We summarize our conjecture below:

H_2: Industry tournament incentives increase the likelihood of target CEO retention in the combined firms after target-initiated deals.

4.3. Data and Methodology

4.3.1. Deal sample

To construct the initial M&A deal sample, we extract all announced U.S. domestic M&A deals between 1997 and 2019 from the Thomson Financial SDC Mergers and Acquisitions Database. The sample starts in 1997 as SEC requires public firms to submit their filings in EDGAR from May 1996. We require the following section criteria: (i) both acquirer and target are publicly traded in the U.S. and not from the financial and utility industry (Standard

Industrial Classification (SIC) codes 4900–4999 and 6000–6999, respectively); (ii) deal value exceeds $1 million and deal status is completed; (iii) acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; (iv) deal type must be the "merger", "acquisition of majority interests", or "acquisition of assets". To obtain firm characteristics and stock price data, we match the SDC deal sample with the Compustat and Center for Research in Security Prices (CRSP). This yields a total sample of 1,842 deals.

To obtain target CEOs' compensation-relation variables, we identify available target CEOs in the EexcuComp. We require the data information which is used to calculate compensation-related variables of target CEOs is covered by the EexcuComp. This results in a sample of 547 deals.

To acquire deal initiation information, we search both acquirer and target filings in the EDGAR database. Following Fidrmuc and Xia (2019), we manually collect the initiation party and initiation date from the "Background of the Deal" or "Background of the Merger" sections of DEFM14A, PREM14A, SC14D9, TO-T, and S-4 filings. The background section describes the detailed negotiation and actions of merger firms during the takeover process. Normally, if a target firm intends to sell the firm, the firm's management will consider various strategic opportunities and alternatives and nominate an investment bank to act as its financial advisor in connection with the potential bidders. In this case, the target firm is actively engaging in the selling process prior to receiving any bidder offers. Therefore, we define a deal as target-initiated if the target firm decides to consider strategic alternatives and hire a financial advisor to contact potential buyers. We define a deal as bidder-initiated if a buyer approaches the target firm's management and conveys their interests in the combination of firms, and then the target firm considers the offer and responds to the bidder. In some cases, target firms are approached by multiple bidders during the takeover process and eventually acquired by a third party which

is not the initiating bidder. As these target firms do not consider the sale of the firm prior to bids, these deals are still classified as bidder-initiated acquisitions. However, our required filings are not available for all deals in the EDGAR database. In 33 cases, we fail to obtain the initiation data, and in 15 cases, we are unable to classify the initiation party. Lastly, during the period of 1997-2019, we can find the deal initiation information for 499 deals, of which 182 deals are target-initiated and 317 deals are bidder-initiated.

Table 1 presents the sample distribution across years (Panel A) and target firms' Fama-French 30 industries (Panel B). Panel A shows the number of target-initiated and bidder-initiated deals in each announcement year. Target-initiated deals account for 36.5% of total deals and the remaining 63.5% are bidder-initiated deals, which is comparable to 35.4% of target-initiated deals and 64.6% of bidder-initiated deals reported in Masulis and Simsir (2018). Panel B shows target-initiated deals distribute across various industries, with the top five industries: Personal and Business, Business Equipment, Healthcare, Retail, and Petroleum and Natural, accounting for 63.7% of total target-initiated deals.

*****insert table 1 here*****

4.3.2. Industry tournament incentives measure

Following Coles *et al.* (2018), we measure the industry tournament incentives as the difference between the total compensation paid to the CEO and the total compensation to the second-highest paid CEO in the same Fama-French 30-Industry classification. CEO's total compensation is defined as the sum of base salary, bonus, the value of restricted stock grants, the Black-Scholes value of option grants, and other long-term incentive plans. Coles *et al*. (2018) recommend using the second-highest compensation in the industry to proxy for the maximal CEO pay since there might be possible outliers of the highest compensation in the industry which may be not representative for tournament winners. Therefore, we use the pay gap between the focal firm's CEO and the second-highest-paid CEO in the same FF30 industry as

our first measure of ITI (*Indgap1*). The second ITI measure considers the common industry practice that firms often select industry peer firms of similar size as the performance benchmark for CEOs pay. As a result, we divide the sample into two groups based on whether net sales are above or below the industry median in each year (Coles *et al.* 2018) and define *Indgap2* as the pay gap between the focal firm's CEO and the second-highest-paid CEO in the firm's industry-size group. In line with Coles *et al.* (2018), we treat negative industry pay gaps as missing values and take a natural logarithm of ITI measures to normalize the distribution. For both ITI measures, target CEOs are considered to face stronger industry tournament incentives when pay gaps are larger.

4.3.3. Measures of other CEO performance incentives

To conduct the empirical tests, we include a battery of control variables informed by prior studies (e.g., Cole *et al.* 2018; Fidrmuc and Xia, 2019; Masulis and Simsir, 2018). First, we control for a set of target CEO-level characteristics and incentives including the internal pay gap between senior executives and the CEO (*Firmgap*), equity-based compensation incentives (*Delta*), option-based compensation incentives (*Vega*), target CEO ownership (*Ownership*), and CEO age (*Age*). Prior studies show that firm internal tournament incentives negatively affect acquisition performance (Hasan *et al.* 2020) and both CEO delta and vega effects influence the likelihood of acquisitions and merger outcomes (Hagendorff and Vallascas, 2011; Croci and Petmezas, 2015). Further, Yim (2013) finds that younger CEOs are more likely to make acquisitions. In line with Kini and Williams (2012), *Firmgap* is measured as the pay gap between CEO's total compensation and median vice president (VP) compensation. *Delta* (*Vega*) is the change in dollar value of CEO stock option for a 1% change in the stock price (volatility of stock returns) (Coles *et al.* 2006). Related to CEO incentives, Fidrmuc and Xia (2019) show that the target CEOs' ownership encourages target CEOs to actively initiate deals, and

Ownnership is defined as the total fraction of shares outstanding owned by target CEOs at the end of the last fiscal year.

4.3.4. Baseline specifications

Our empirical tests are divided into two parts. We begin our empirical analysis by examining the relation between the target CEO's industry tournament incentives and the likelihood of target deal initiation. To conduct this analysis, we estimate the following probit model including the lagged ITI measures and industry and year fixed effects:

$$Target\ Initiation = \alpha + \beta_1 Ln(Indgap_{t-1}) + \delta\ Controls_{t-1} + \varepsilon_t \quad (1)$$

where $Target\ Initiation$ is the binary variable that equals one if the deal is classified as target-initiated, and zero for bidder-initiated. *Ln(Indgap)* is our main variable of interest that captures the effect of the target CEO's industry tournament incentives on the likelihood of target deal initiation, defined as in Section 3.2. For control variables, we include a set of target CEO characteristics and compensation-related variables (e.g., *Firmgap*, *Delta*, *Vega*, *Ownership*, and *Age*), target firm characteristics, and industry-level measures. The target firm characteristics include the firm size (*Size*), the market-to-book ratio (*M/B*), sales growth ratio (*Sale Growth*), the return-on-assets ratio *(ROA*), institutional ownership (*Instown*), the buy-and-hold abnormal returns for firms' stock over the past 12 months (*Past Ret*), and target firm's stock volatility (*Volatility*). Prior literature shows these firm characteristics and operating performance influence acquisition likelihood and merger outcomes (Hartford, 1999; Shleifer and Vishny, 2003; Edmans *et al.* 2012). We consider the financial distress and constraints of target firms. Masulis and Simsir (2018) suggest that target firms with financial constraints and weaknesses are motivated to initiate deals. To control for the target firm's financial distress and weakness, we use three proxies which include the target firms' leverage ratio *(Leverage*), the low Altman Z-score (*Low Z–score*), and *SA Index* (Hadlock and Pierce, 2010). Following Fidrmuc and Xia (2019), we also control for the target industry-specific measures: target industry competition

(*HHI)* and industry similarity (*Ind Similarity*), and *M&A Activity*. In this study, all dollar values are inflation-adjusted to 2008 dollars. Robust standard errors are clustered at the industry and year level. All variables' definitions can be found in the Appendix.

4.4. Empirical Results

4.4.1. Univariate analysis

Table 2 presents a comparison of target CEOs' characteristics, firm characteristics, deal characteristics, and industry shocks between target- and bidder-initiated deals in our sample. We winsorize all continuous variables at the 1st and 99th percentiles to avoid any bias caused by outliers. Panel A of Table 2 focuses on a set of target CEO characteristics and compensation-related variables. We note that target CEOs of target-initiated deals have stronger industry tournament incentives relative to bidder-initiated deals and the mean difference for *Ln(Indgap1)* is significant at the conventional level. Consistent with Fidrmuc and Xia (2019), we find that target CEOs of target-initiated deals have significantly higher ownership relative to bidder-initiated deals, compared to those of bidder-initiated deals, and the mean difference is significant at the 10% level. This supports the argument that target CEOs' incentives matter for the M&A negotiation process. The average target CEO's age is about 55 years old, which is similar to Jenter and Lewellen (2015) in both target- and bidder-initiated deals.

Panel B of Table 2 focuses on the firm characteristics and shows that targets in target-initiated deals have significantly lower institutional ownership and smaller size as in Fidrmuc and Xia (2019). All other firm characteristics are similar for targets in target- and bidder-initiated deals. Panel C in Table 2 shows that target-initiated deals are less likely to be tender offers and more likely to offer stock payment. Target- and bidder-initiated deals have similar industry competition, industry similarity, and M&A activities (Masulis and Simsir, 2018).

*****insert table 2 here*****

4.4.2. Industry tournament incentives and deal initiation

We first examine the relation between target CEOs' ITI and target deal initiation. Table 3 presents the result of probit regression for Equation (1). Coefficients of marginal effects are reported. Columns 1 and 2 report the result based on the first ITI measure (*Ln(Indgap1)*), while Columns 3 and 4 report results based on the second ITI measure (*Ln(Indgap2)*).

For all specifications, the coefficients of ITI measures are positive and significant at least the 10% or 5% level, suggesting that target CEOs with higher industry tournament incentives increase the probability of target initiation. This result is consistent with our hypothesis H_1. Turning to the economic significance, a one-standard-deviation increase in *Ln(Indgap1)* in column 2 and *Ln(Indgap2)* in column 4 increases the probability of target-initiated deals by 3.5% and 2.1%, respectively. For other variables, results are generally consistent with prior literature. For instance, consistent with Fidrmuc and Xia (2019), we find that target CEOs with higher ownership are motivated to initiate deals. Also, columns 2 and 4 show that both coefficients of *Low Z-score* and *SA Index* are positive and insignificant, indicating that target-initiated firms are not financially distressed.

Overall, results in Table 3 provide the supporting evidence for our hypothesis H_1, suggesting that the external tournament incentives increase the likelihood of target CEOs initiating deals. Consequently, target CEOs' ITI is an important driver for decisions in the deal initiation.

*****insert table 3 here*****

4.4.3. Two-stage IV model

One might be concerned that endogenous problems may confound our prior findings on the impact of CEOs' industry tournament incentives on target deal initiation. Although the previous probit model uses lagged compensation-related variables and controls for a set of important variables to alleviate the endogeneity concerns, one empirical challenge is that ITI measures

are potentially endogenously determined by the CEO compensation of focal firms. Since the CEO pay policy is widely influenced by many factors including other CEOs, firms, and industry characteristics, which may be potentially related to deal initiation decisions. To avoid producing biased regression results and mitigate endogenous concerns, we attempt to address this potential issue using various techniques.

First, we estimate Equation (1) using the two-stage IV Probit model. In our setting, the IV Probit model first estimates the OLS regression of ITI measures using an instrument variable and then estimates the probit regression of target deal initiation by using the predicted value of ITI measures. Following Coles *et al.* (2018), we define the instrument variable as the sum of the total compensation of all other CEOs in the same industry, excluding the highest-paid CEOs (*Totcomp*). We also take a natural logarithm of *Totcomp* to normalize the distribution. The rationale for this instrument is that industry total CEO compensation indicates the ability to pay. The higher the industry's ability to pay executives, the higher the maximum compensation received by CEOs in the industry, and the greater the pay gap for other CEOs in the industry. We expect that this instrument satisfies the exclusion restriction as the target firm's decision to initiate deals would not be directly influenced by the sum of CEOs' compensation in the industry. As a result, we believe the instrument, *Ln(Totcomp),* could affect the likelihood of initiating deals only through its effect on the industry tournament incentives measure, indicating our instrument is likely to satisfy exclusion conditions. We fully understand the difficulties in identifying instruments satisfying exclusion. One should interpret results with caution.

Panel A of Table 4 presents the results of the two-stage IV Probit model. The dependent variable is the natural logarithm of the ITI measures in the first stage (Column 1, 3, 5,7), while the dependent variable is *Target Initiation* in the second stage (Column 2, 4, 6, 8). In the first stage, all columns show that the instrument variable, *Ln(Totcomp),* is positively related to the industry tournament incentives measures (both *Ln*(*Indgap1)* and *Ln*(*Indgap2)*), and coefficients

are significant at the 1% level. The First-stage F-tests are also significant at the 1% level, indicating this instrument satisfies the relevance conditions. Moreover, Kleibergen-Paap LM tests and Anderson-Rubin F-tests show that the instrument is relevant and not weakly identified[17]. The estimated coefficients on other control variables are similar to those reported by Coles *et al.* (2018). We further test the IV independence assumption by using the approach of Kedagni and Mourifie (2020). This approach is used to test the validity of instruments by employing a sample splitting procedure and an inference method for intersection bounds. We split the sample at the 20^{th}, 40^{th}, 60^{th}, and 80^{th} percentiles of the dependent variable, respectively. In this test, the null hypothesis is that instruments meet the independence assumption, if the lower bound of the confidence interval is positive, then the null hypothesis (independence assumption) is rejected. Results are reported in Panel B and show lower bounds of confidence intervals for *Ln(Totcomp)* are all negative. Thus, the null hypothesis fails to reject, indicating our IV meets the independence assumption and supports its validity. Collectively, these tests show that this instrument is valid, which is consistent with prior findings (Coles *et al.* 2018; Huang *et al*. 2019).

The second-stage results reported in Columns 2 and 4 of Table 4 show that the coefficients of instrumented *Ln*(*Indgap1)* are both positive and significant at the 5% level, while Columns 6 and 8 show that coefficients of instrumented *Ln*(*Indgap2)* are significantly positive at the 1 % level. This indicates that our baseline results are robust with the instrumental variable approach. The economic significance is also large. For instance, Column 4 shows that a one-standard-deviation increase in instrumented *Ln(Indgap1)* increases the probability of target initiation by 34%, which is more than nearly 10 times the probit estimations in Column 2 of Table 3. Collectively, the results in Table 4 further confirm hypothesis H_1 that the external tournament incentives of target CEOs increase the likelihood of initiating deals.

[17] Because the model is just identified, the overidentification test is not allowed.

*****insert table 4 here*****

4.4.4. CEO characteristics and the effect of industry tournament incentives on target initiation

Next, we investigate the cross-sectional variations in the effect of industry tournament incentives of CEOs on the likelihood of target-initiated deals. If the managerial labor market incentives affect the target initiation decisions, it is expected that the effect of industry tournament incentives would be more pronounced when target CEOs have more potential and chances to win the industry tournament prize. Specifically, we posit that the likelihood of target-initiated deals driven by industry tournament incentives is increased (i) when target CEOs are young, (ii) when target CEOs have long tenures, (iii) when target CEOs have high abilities. To examine these predictions, we divide the sample into two subsamples based on the median age of target CEOs, median tenures of target CEOs, and median abilities of target CEOs. Following Tan (2021), we define the target firm's CEO ability as the industry-adjusted ROA. Then we separately estimate the second-stage IV Probit model for each subsample.

Table 5 reports the results for the effect of the three target CEOs-related characteristics to win the industry tournament prize on the likelihood of deal initiation. The key explanatory variable is the instrumented *Ln(Indgap1)* (*Ln(Indgap2*)) in Panel A (B), and first-stage coefficients are omitted for brevity. Consistent with our hypothesis, we find that the subsample of target CEOs with a higher probability to win the industry tournament prize increases the probability of target deal initiation. For instance, the coefficient of the instrumented *Ln(Indgap1)* is 0.515 and significant at the 5% level for young CEOs while it is insignificant for old CEOs. This evidence supports our hypothesis that the positive relation between industry tournament incentives and target deal initiation is stronger for target firms with young CEOs than those with old CEOs. Similarly, we find that the coefficients of instrumented *Ln(Indgap1)* are significantly positive when target CEOs have long tenures and high ability, but insignificant for

target CEOs with short tenures and low ability. This also supports our argument that the target CEOs are more likely to engage in deal initiation when they face a greater chance to win the industry tournament prize. Panel B repeats the above subsample analysis using the second ITI's measure *Ln(Indgap2)* and the results are not changed.

Overall, results in Table 5 further support our argument that target firms whose CEOs have stronger industry tournament incentives are more likely to initiate deals, especially when target CEOs are younger and more talented, and have longer tenures.

*****insert table 5 here*****

4.4.5. Target CEOs' retention

In this section, we test hypothesis H_2 that industry tournament incentives increase the likelihood of target CEOs' retention in the combined firms after target-initiated acquisitions. This prediction is important, given that the upward mobility in the managerial labor market and career development are the main motivation for target CEOs' external tournament incentives (Coles *et al.* 2018; Graham *et al.* 2005). To examine this hypothesis, we estimate Equation (2) with a probit model:

$$CEO\ Retention = \alpha + \beta_1 Ln(Indgap_{t-1}) + \beta_2 Target\ Initiation + \beta_3 Ln(Indgap_{t-1}) * Target\ Initiation + \delta\ Controls_{t-1} + \varepsilon_t \quad (2)$$

where *CEO Retention* is a dummy variable, which equals 1 if the target CEOs obtain a significant position in combined firms, and zero otherwise. The interest here is the coefficient of the interaction term *Ln(Indgap)*Target Initiation*. We include a set of control variables to control for other incentives, firm fundamentals, and deal characteristics, which could affect the likelihood of target CEOs being retained after mergers. For target CEO and firm characteristics, we include *Firmgap*, *Vega*, *Delta*, *Ownership*, *Age*, *Size*, *Leverage*, *M/B*, and *ROA*. Following Wulf and Singh (2011), we control for deal characteristics including whether the deal is classified as a tender offer (*Tender*), methods of payment (*Stock Deal*), and the deal relative

size (*Relative Size*). Both year and industry fixed effects are included in the model, and standard errors are two-way clustered by the firm and industry levels.

Columns 1 and 2 in Table 6 show that coefficients of the *Target Initiation* are both negative but only statistically significant in column 2 (at the 10% level), indicating that target-initiated deals have a negative effect on the probability of target CEOs being retained in merged firms. However, when looking at the interaction term (*Ln(Indgap1)* Target Initiation*), the coefficients become positive and significant at the 5% level in both columns 1 and 2. It suggests that target CEOs' industry tournament incentives mitigate the negative effect of target initiation on the probability that target CEOs obtain a prestigious position in the merged firm. Relative to target CEOs with low ITI in target-initiated deals, target CEOs with high ITI are more likely to be retained in the combined firms. This finding is consistent with our hypothesis H_2. When changing to the second ITI measure, columns 3 and 4 show that our results continue to hold.

*****insert table 6 here*****

Next, we estimate Equation (2) with a two-stage IV Probit model to account for potential endogenous issues of ITI measures. As discussed in section 4.4.3, ITI measures might be endogenous variables and thus the interaction term (*Ln(Indgap)* Target Initiation*) could be endogenous as well. To address this potential concern, we use *Ln(Totcomp)* as the instrument for *Ln(Indgap)* and *Ln(Totcomp)*)**Target Initiation* as the instrument for *Ln(Indgap)* Target Initiation*. Specifically, we estimate the first-stage regressions for two endogenous variables. Then we estimate the second-stage probit model using the predicted value of *Ln(Indgap)* and *Ln(Indgap)* Target Initiation* from instruments. For brevity, we only report the second-stage results from the two-stage IV Probit model.

Table 7 reports the results and shows that for all specifications, coefficients of the interaction term between ITI measures and *Target Initiation* are positive and significantly at least the 5% level, providing evidence that industry tournament incentives increase the

likelihood of target CEOs' retention in the combined firms after target-initiated acquisitions. Moreover, the instrument tests in all columns suggest that the instrument variables are collectively valid and relevant. Taken together, results in Table 7 confirm the baseline findings of target CEOs' retention in target-initiated deals are robust after addressing potential endogenous issues. Furthermore, bidder firms are more likely to retain target CEOs with higher ITIs in target-initiated acquisitions, which supports the managerial labor market incentive-based explanation for target deal initiation.

*****insert table 7 here*****

4.4.6. Other robustness tests

Some issues may confound our results. First, someone may concern that ITI measures are correlated with governance factors. To alleviate this concern, we estimate the baseline models by controlling additional governance variables, including firm-level governance quality (*G-index*) and CEO-chair duality. *G-index* of Gompers *et al.* (2003) reflects the number of anti-takeover provisions and CEO-chair duality is a dummy variable that equals one if the target CEO is also the chairman of the board. Our main findings remain intact after including these governance controls. Second, we include additional target CEOs' characteristics which could affect the probability of target CEOs winning the industry tournament prize. Specifically, we consider whether target CEOs are the founder and target CEOs' managerial abilities. To measure target CEOs' general ability, we use managerial scores developed by Demerjian *et al.* (2012). Our results continue to hold.

Furthermore, we conduct the robustness check for the main analysis using the FF48 industry classification to compute *Indgap1* and *Indgap2*. Finally, we examine the robustness of our main results are robust to an alternative instrument of ITI. Following Huang *et al.* (2019) and Coles *et al.* (2018), we use the total number of target CEOs in the same industry as the

instrument for ITI measures. These robustness tests with alternative industry classifications and instruments show our main findings persist.

4.5. Summary and Conclusions

In this paper, we examine the relation between industry tournament incentives and target-deal initiation. We propose that the managerial labor market with tournament-like progression can incentivize managers to actively offer their firms for sale. By doing so, target firm CEOs with stronger industry tournament incentives are able to reap potential upward gains from winning the industry tournament prize and gain job retention in the combined firms. Using a sample of 499 U.S. domestic M&A deals with publicly listed target firms announced between 1997 and 2019, we document a greater likelihood of deal initiation for target firms whose CEOs face stronger industry tournament incentives. This evidence is more pronounced when CEOs are younger and more talented and have longer tenures. Collectively, these results suggest target firm CEOs are motivated to actively sell their firms when they have greater industry tournament incentives. Furthermore, our results show that target firm CEOs with stronger industry tournament incentives in target-initiated deals have a greater chance to retain positions in the combined firms after deal completion.

This study provides additional support to studies on M&A deal initiation, particularly the target deal initiation (Masulis, and Simsir, 2018; Fidrmuc and Xia, 2019), by highlighting that industry tournament incentives of top management, as a type of managerial motivation, is an important driver of takeover. As an external promotion-based incentive, industry tournament incentives differ from intra-firm tournament incentives, and other CEO incentives such as risk-taking incentives (vega) and alignment-of-interest incentives (delta), which are beyond the control of boards and internal governance structure. Our research also adds to studies on industry tournament incentives by providing evidence that industry tournament incentives can play a substantial role in the context of M&As, apart from influencing corporate policies,

strategies, and performance suggested by extant literature on CEO ITIs (e.g., Coles *et al*. 2018; Huang *et al*. 2019; Nguyen and Zhao, 2021; Kubick and Lockhart, 2021).

Our paper has important implications in real business practice by drawing attention to the role of ITIs in corporate takeover activities. Our study suggests that boards should consider ITIs when formulating top management incentive mechanisms and internal governance structures that are under their control to influence managerial behavior. It is also worth for firms and boards to pay attention to ITIs when developing strategies for corporate takeover activities or designing corporate antitakeover devices to guard firms against attacks from the market for corporate control.

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Table 1: The distribution of deal initiation

This table reports the distribution of year (Panel A) and Fama-French 30 industries (Panel B) for deal initiation by a target firm and a bidder. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. Deal initiation information is from the SEC Edgar filings.

Panel A: Distributions across years

Year	Target initiated	Bidder initiated	Total deals
	(1)	(2)	(3)
1997	16	24	40
1998	20	19	39
1999	15	24	39
2000	15	23	38
2001	8	12	20
2002	2	7	9
2003	3	8	11
2004	8	11	19
2005	8	18	26
2006	5	17	22
2007	5	20	25
2008	2	11	13
2009	8	13	21
2010	6	12	18
2011	5	7	12
2012	4	13	17
2013	8	8	16
2014	5	14	19
2015	13	16	29
2016	5	16	21
2017	6	9	15
2018	6	7	13
2019	9	8	17
Total	182	317	499

Panel B: Distributions across Fama-French 30 industries

Industry	Target initiated	Bidder initiated	Total deals
	(1)	(2)	(3)
Personal and Business	35	46	81
Business Equipment	32	78	110
Healthcare	20	48	68
Retail	16	14	30
Petroleum and Natural	13	25	38
Other	66	172	238
Total	182	317	499

Table 2: Summary statistics

The table reports the summary statistics for target firms from target-initiated deals versus bidder-initiated deals. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and the deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. Deal initiation information is from the SEC Edgar filings. All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. I test for mean differences using the t-test allowing for unequal variance. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	All		Target initiated (T)		Bidder initiated (B)		Mean difference
	N	Mean	N	Mean	N	Mean	(T–B)
Panel A: Target CEO characteristics							
Indgap1($ millions)	470	30.732	169	30.925	301	30.623	0.302
Ln (Indgap1)	470	2.887	169	3.036	301	2.803	0.233*
Indgap2($ millions)	459	16.508	168	16.946	291	15.749	1.197
Ln (Indgap2)	459	1.864	168	2.039	291	1.763	0.276
Firmgap ($ millions)	470	3.353	169	3.133	301	3.477	–0.344
Vega ($ millions)	463	0.105	165	0.102	298	0.108	–0.006
Delta ($ millions)	463	0.371	165	0.377	298	0.367	0.010
Age	469	55.328	168	55.060	301	55.478	–0.418
Tenure	468	6.378	169	6.379	299	6.378	0.001
Ownership	469	0.820	169	1.177	300	0.620	0.557*
Panel B: Target firm characteristics							
Assets ($ millions)	468	3,633.426	169	3369.434	299	3782.639	–413.205*
Leverage	465	0.209	167	0.163	298	0.172	–0.009
M/B	468	2.115	169	2.131	299	2.105	0.026
ROA	465	0.125	168	0.121	297	0.127	–0.006
Liquidity	465	0.492	167	0.511	298	0.482	0.029
Low Z–score	470	0.162	169	0.148	301	0.169	–0.021
SA Index	469	-3.682	169	–3.632	300	–3.712	0.080
Sale Growth	470	0.131	169	0.124	301	0.135	–0.011
Instown	466	0.761	167	0.717	299	0.786	–0.069***
Past Ret	470	0.031	169	0.064	301	0.013	0.051
Volatility	470	0.029	169	0.029	301	0.028	0.001
Panel C: Deal characteristics							
Relative Size	469	2.564	169	2.579	300	2.555	0.024
Tender	470	0.211	169	0.148	301	0.246	–0.098***
Stock Deal	470	0.228	169	0.290	301	0.193	0.097**
Panel D: Industry characteristics							
HHI	467	0.225	168	0.229	299	0.222	0.007
Ind Similarity	467	4.141	168	3.913	299	4.269	–0.356
M&A Activity	470	0.110	169	0.110	301	0.111	–0.001
Totcomp ($ millions)	470	591.777	169	578.944	301	598.983	20.039

Table 3: Target initiation and industry tournament incentives

The table reports the results from probit regressions of the industry tournament incentives on the likelihood of target initiation. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is a dummy variable, *Target* initiation which equals 1 if the deal is classified as the target-initiated deal, and zero for the bidder-initiated deal. Ln(*Indgap1*) is the natural logarithm of *Indgap1* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. Ln(*Indgap2*) is the natural logarithm of *Indgap2* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
Ln(Indgap1)	0.0312*	0.0346**		
	(1.956)	(1.968)		
Ln(Indgap2)			0.0180**	0.0212**
			(2.052)	(2.396)
Ln(Firmgap)	–0.0085	0.0141	–0.0010	0.0260
	(–0.353)	(0.506)	(–0.041)	(0.930)
Ln(Vega)	–0.0160	–0.0196	–0.0216	–0.0189
	(–0.842)	(–1.033)	(–1.175)	(–1.006)
Ln(Delta)	0.0098	0.0002	0.0077	–0.0023
	(0.430)	(0.006)	(0.332)	(–0.076)
CEO Ownership	0.0259***	0.0234**	0.0265**	0.0228**
	(2.798)	(2.331)	(2.493)	(2.012)
Ln (CEO Age)	–0.2345	–0.2389	–0.2527	–0.2563
	(–1.148)	(–1.128)	(–1.214)	(–1.191)
Ln(Size)		0.0096		–0.0063
		(0.283)		(–0.186)
Leverage		–0.2358		–0.2654
		(–1.307)		(–1.438)
M/B		0.0260		0.0359
		(1.039)		(1.424)
ROA		–0.5017		–0.5003
		(–1.644)		(–1.639)
Sale Growth		–0.0802		–0.0359
		(–0.706)		(–0.313)
Instown		–0.0785		–0.0797
		(–0.508)		(–0.506)
Past Ret		0.0261		0.0268
		(0.516)		(0.532)
Volatility		–5.0172*		–4.8532*
		(–1.740)		(–1.755)
SA Index		0.0755		0.0723
		(1.296)		(1.230)
Low Z–score		0.0492		0.0464
		(0.648)		(0.607)
HHI		0.0500		0.0151
		(0.374)		(0.111)
Ind Similarity		–0.0012		–0.0021
		(–0.167)		(–0.295)
M&A Activity		–0.1868		–0.1626
		(–1.185)		(–0.999)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.132	0.161	0.133	0.163
N	385	375	378	369

Table 4: Target initiation and industry tournament incentives: IV model

The table reports the results from IV probit regressions of the industry tournament incentives on the likelihood of target initiation. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. Panel A reports results of two-stage IV probit regressions. The dependent variable is a dummy variable, *Target initiation*, in Column 2,4,6, and 8, while the dependent variable is the natural logarithm of *Indgap1* (*Indgap2*) in Column 1 and 3 (5 and 7). *Target initiation* equals 1 if the deal is classified as the target-initiated deal, and zero for the bidder-initiated deal. *Ln(Indgap1)* is the natural logarithm of *Indgap1* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. *Ln(Indgap2)* is the natural logarithm of *Indgap2* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. The instrument for *Indgap1* and *Indgap2* is the Totcomp which is the sum of total compensation of all other CEOs in the same industry classification, except for the highest-paid CEO, following Coles et al. (2018). All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The t statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively. Panel B reports results of IV independence assumption test by using the method of Kedagni and Mourifie (2020) and confidence intervals in parentheses are reported.

Panel A: Two-stage IV probit estimation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Frist stage Ln(Indgap1)	Second stage Target Initiation	Frist stage Ln(Indgap1)	Second stage Target Initiation	Frist stage Ln(Indgap2)	Second stage Target Initiation	Frist stage Ln(Indgap2)	Second stage Target Initiation
Predicted Ln(Indgap1)		0.3489**		0.3390**				
		(2.175)		(2.160)				
Predicted Ln(Indgap2)						0.3034***		0.3179***
						(3.397)		(3.095)
Ln(Firmgap)	–0.2575***	0.0433	–0.3704***	0.1321	–0.3417**	0.0856	–0.5621***	0.2149**
	(–3.572)	(0.526)	(–2.995)	(1.345)	(–2.019)	(1.158)	(–3.222)	(2.399)
Ln(Vega)	–0.0039	–0.0428	0.0117	–0.0601	0.0933	–0.0738	–0.0838	–0.0257
	(–0.088)	(–0.708)	(0.297)	(–0.979)	(1.106)	(–1.428)	(–1.068)	(–0.430)
Ln(Delta)	–0.0032	0.0183	–0.0899	0.0130	0.0392	–0.0021	0.0074	–0.0188
	(–0.074)	(0.267)	(–1.144)	(0.141)	(0.373)	(–0.033)	(0.045)	(–0.206)
CEO Ownership	–0.0344**	0.0866***	–0.0099	0.0752**	–0.0632*	0.0826***	0.0019	0.0617*
	(–2.154)	(3.225)	(–0.676)	(2.419)	(–1.681)	(3.112)	(0.052)	(1.864)
Ln (CEO Age)	0.0507	–0.6697	–0.0754	–0.7074	0.9000	–0.8134	–0.4023	–0.5584
	(0.136)	(–1.063)	(–0.227)	(–1.056)	(1.024)	(–1.392)	(–0.638)	(–0.861)
Ln(Size)			0.1619	–0.0135			0.6095***	–0.1782
			(1.442)	(–0.125)			(3.291)	(–1.491)
Leverage			–0.6274	–0.5665			–0.0568	–0.6933
			(–1.514)	(–0.976)			(–0.060)	(–1.185)
M/B			0.0051	0.0769			–0.4378**	0.2090**
			(0.130)	(1.024)			(–2.487)	(2.315)

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Table 4 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Frist stage Ln(Indgap1)	Second stage Target Initiation	Frist stage Ln(Indgap1)	Second stage Target Initiation	Frist stage Ln(Indgap2)	Second stage Target Initiation	Frist stage Ln(Indgap2)	Second stage Target Initiation
ROA			0.5763	–1.7004*			1.5047	–1.7750*
			(0.892)	(–1.793)			(1.065)	(–1.958)
Sale Growth			–0.1422	–0.1983			–2.1524**	0.4845
			(–1.017)	(–0.546)			(–2.118)	(1.025)
Instown			0.8872*	–0.4784			0.3562	–0.3292
			(1.791)	(–0.947)			(0.510)	(–0.710)
Past Ret			0.0250	0.0803			–0.0285	0.0869
			(0.235)	(0.507)			(–0.066)	(0.478)
Volatility			22.6966***	–21.5048**			13.0942	–17.1124**
			(2.818)	(–2.161)			(0.785)	(–2.123)
SA Index			–0.2391	0.2751			–0.3143	0.2586
			(–1.288)	(1.458)			(–1.252)	(1.502)
Low Z–score			0.3150*	0.0679			0.0568	0.1042
			(1.676)	(0.268)			(0.175)	(0.451)
HHI			0.0723	0.1289			0.1807	–0.0238
			(0.234)	(0.316)			(0.352)	(–0.066)
Ind Similarity			–0.0065	–0.0033			0.0180	–0.0119
			(–0.462)	(–0.154)			(0.543)	(–0.590)
M&A Activity			0.4101**	–0.6994			–1.0838	–0.1812
			(1.992)	(–1.467)			(–0.545)	(–0.241)
Ln(Totcomp) IV	1.2809***		1.2849***		1.2164***		1.2643***	
	(4.543)		(5.551)		(3.706)		(4.904)	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.124		0.171		0.033		0.125	
N	385	385	375	375	378	378	369	369
First-stage F–test: p-value	0.00***		0.00***		0.00***		0.00***	
Kleibergen-Paap LM statistic	14.72***		12.99***		9.66***		8.54***	
Anderson-Rubin F-statistics	5.73**		4.91**		5.72**		4.97**	

Panel B: IV independence assumption test

	10%	5%	1%
p20	[-0.481, inf)	[–0.515, inf)	[–0.587, inf)
p40	[–0.867, inf)	[–0.894, inf)	[–0.951, inf)
p60	[–0.753, inf)	[–0.781, inf)	[–0.837, inf)
p80	[–0.536, inf)	[–0.560, inf)	[–0.611, inf)

Table 5: The effect of industry tournament incentives and CEO characteristics on the probability of target initiation

The table reports results from IV probit regressions (second stage only) of the industry tournament incentives on the likelihood of target initiation for subgroups based on CEO characteristics that affect the probability of winning industry tournament incentives. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is *Target initiation* in all columns,which equals 1 if the deal is classified as the target-initiated deal and zero for the bidder-initiated deal. Ln(*Indgap1*) is the natural logarithm of *Indgap1* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. Ln(*Indgap2*) is the natural logarithm of *Indgap2* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. Young (old) CEOs subsamples are defined by below (above) median age of CEOs in Column 1 (2). Long-tenure (short-tenure) CEOs subsamples are defined by above (below) median tenure of CEOs in Column 3 (4). High-ability (low-ability) CEOs subsamples are defined by the above (below) median industry-adjusted ROA in Column 5 (6). All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The t statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Ln(Indgap1) instrumented cross-sectional variations of the effect of industry tournament incentives

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Predicted Ln(Indgap1)	0.5154**	0.0958	0.5392***	0.3115	1.1437***	0.3147
	(2.195)	(0.417)	(2.690)	(0.854)	(3.304)	(1.122)
Ln(Firmgap)	–0.1015	0.1730	–0.0950	0.3814**	–0.1534	0.2045
	(–0.583)	(1.152)	(–0.625)	(2.421)	(–0.830)	(1.045)
Ln(Vega)	–0.3137**	–0.0309	–0.0317	0.0340	–0.1413	–0.0193
	(–2.537)	(–0.247)	(–0.259)	(0.310)	(–0.705)	(–0.208)
Ln(Delta)	0.2552	–0.0485	–0.0611	–0.4323**	0.2820	–0.1173
	(1.289)	(–0.279)	(–0.420)	(–2.182)	(0.927)	(–0.799)
CEO Ownership	0.1784***	0.0724	0.0531	–0.0223	0.2063	0.0118
	(2.735)	(1.416)	(1.539)	(–0.177)	(1.497)	(0.292)
Ln(CEO Age)			–3.2412**	0.1081	–2.3941*	–0.4990
			(–2.532)	(0.110)	(–1.885)	(–0.511)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	146	186	158	178	106	232
Ln(Totcomp) IV	1.0156***	3.0164***	2.6129***	0.9826***	1.1932***	1.1932***
	(10.385)	(3.842)	(3.195)	(7.342)	(4.632)	(4.632)
First-stage F-test :p-value	0.00***	0.00***	0..02**	0.00***	0.00***	0.00***
Kleibergen–Paap LM statistic	10.27***	12.35***	7.09***	10.27***	8.71***	4.73**
Anderson-Rubin F-statistics	3.37*	0.21	3.42**	0.67	6.28**	0.43

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Table 5 (continued)

Panel B: Ln(Indgap2) instrumented cross-sectional variations of the effect of industry tournament incentives

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Predicted Ln(Indgap2)	0.4409***	0.0877	0.4706***	0.4067	0.7597***	0.2781
	(4.238)	(0.443)	(6.787)	(1.337)	(2.683)	(1.167)
Ln(Firmgap)	0.3508	0.1579	0.1565	0.4813***	–0.0985	0.2491
	(1.607)	(1.025)	(0.905)	(3.222)	(–0.501)	(1.322)
Ln(Vega)	–0.2570*	–0.0184	0.0391	0.0316	0.1550	0.0185
	(–1.729)	(–0.141)	(0.470)	(0.279)	(0.489)	(0.196)
Ln(Delta)	0.1231	–0.0570	–0.0687	–0.2974	0.1790	–0.2152*
	(0.517)	(–0.324)	(–0.389)	(–1.295)	(0.627)	(–1.666)
CEO Ownership	0.1633**	0.0722	0.0368	–0.0677	0.1405**	–0.0423
	(2.378)	(1.442)	(1.182)	(–0.602)	(2.074)	(–0.690)
Ln(CEO Age)			–1.8562	0.0907	–1.3650	–0.0940
			(–1.117)	(0.108)	(–1.004)	(–0.099)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	142	185	156	173	108	230
Ln(Totcomp) IV	0.8554***	3.4484***	1.1628	1.0972***	1.1475***	1.2809***
	(3.039)	(3.533)	(0.837)	(3.945)	(8.246)	(2.655)
First-stage F-test :p-value	0.00***	0.00***	0..02**	0.02**	0.00***	0.03**
Kleibergen–Paap LM statistic	6.26**	11.47***	5.19**	6.75**	4.79**	5.54**
Anderson-Rubin F-statistics	3.46*	0.15	2.88*	2.55*	3.54*	1.18

Table 6: Target CEOs retention

The table reports the results from probit regressions of target CEOs rentention after target-initiated acquisitions. The sample covers deals announced between 1997 and 2019, which are extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is a dummy variable, *CEO Retention*, which equals 1 if the target CEO obtain a significant position in combined firms, and zero otherwise. *Target initiation* equals 1 if the deal is classified as the target-initiated deal, and zero for the bidder-initiated deal. Ln(*Indgap1*) is the natural logarithm of *Indgap1* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. Ln(*Indgap2*) is natural logarithm of *Indgap2* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	CEO Retention			
	(1)	(2)	(3)	(4)
Ln(Indgap1) Target Initiation*	0.0890**	0.1073**		
	(1.985)	(2.548)		
Ln(Indgap2) Target Initiation*			0.0495	0.0609*
			(1.339)	(1.692)
Ln(Indgap1)	–0.0455**	–0.0482***		
	(–2.257)	(–3.154)		
Ln(Indgap2)			0.0028	0.0055
			(0.244)	(0.474)
Target Initiation	–0.1983	–0.2559*	–0.0355	–0.0715
	(–1.266)	(–1.779)	(–0.328)	(–0.700)
Ln(Firmgap)	0.0149	–0.0006	0.0272	0.0157
	(0.592)	(–0.024)	(1.146)	(0.613)
Ln(Vega)	–0.0040	–0.0085	–0.0076	–0.0101
	(–0.235)	(–0.478)	(–0.481)	(–0.602)
Ln(Delta)	0.0531**	0.0041	0.0479**	0.0087
	(2.341)	(0.165)	(2.010)	(0.322)
CEO Ownership	–0.0370*	–0.0317*	–0.0342*	–0.0348*
	(–1.808)	(–1.786)	(–1.757)	(–1.929)
Ln (CEO Age)	–0.1083	–0.1948	–0.0605	–0.1139
	(–0.583)	(–1.056)	(–0.323)	(–0.602)
Ln(Size)		(–0.043)		0.0257
		0.0441		(0.930)
Leverage		(1.585)		0.3178*
		0.3084**		(1.959)
M/B		(1.969)		0.0288
		0.0211		(1.342)
ROA		(0.999)		0.2729
		0.1567		(1.004)
Tender		–0.1161***		–0.1356***
		(–2.858)		(–3.474)
Stock Deal		0.1542***		0.1396***
		(2.849)		(2.610)
Ln(Relative Size)		–0.0026		–0.0245
		(–0.264)		(–0.438)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.259	0.366	0.250	0.359
N	221	215	213	207

Table 7: Target CEOs retention: IV Model

The table reports results from IV probit regressions (second stage only) of target CEOs retention after target-initiated acquisitions. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is a dummy variable, *CEO Retention*, which equals 1 if the target CEO obtains a significant position in combined firms, and zero otherwise. Ln(*Indgap1*) is the natural logarithm of *Indgap1* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. Ln(*Indgap2*) is the natural logarithm of *Indgap2* which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. The instrument for *Indgap1* and *Indgap2* is the *Totcomp* which is the sum of total compensation of all other CEOs in the same industry classification, except for the highest-paid CEO, following Coles et al. (2018). The instrument for *Ln(Indgap1)*Target Initiation* and *Ln(Indgap2)*Target Initiation* is the *Ln(Totcomp)*Target Initiation.* All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	CEO Retention			
	(1)	(2)	(3)	(4)
Predicted Ln(Indgap1) Target Initiation*	0.7234**	0.9017***		
	(2.202)	(2.766)		
Predicted Ln(Indgap2) Target Initiation*			0.8687***	0.9683***
			(3.148)	(2.905)
Predicted Ln(Indgap1)	0.1628	0.0121		
	(0.366)	(0.031)		
Predicted Ln(Indgap2)			–0.2276	–0.2627
			(–0.880)	(–1.061)
Target Initiation	–1.9343*	–2.4791**	–1.5479**	–1.8472**
	(–1.749)	(–2.166)	(–2.094)	(–2.043)
Ln(Firmgap)	0.2333*	0.1124	0.1090	0.0555
	(1.714)	(0.599)	(0.679)	(0.293)
Ln(Vega)	–0.0009	0.0124	–0.0252	–0.0339
	(–0.009)	(0.105)	(–0.288)	(–0.441)
Ln(Delta)	0.1868	0.0660	0.1778	0.1243
	(1.594)	(0.387)	(1.334)	(0.953)
CEO Ownership	–0.1012	–0.0836	–0.1306	–0.0850
	(–1.077)	(–0.709)	(–1.241)	(–0.833)
Ln (CEO Age)	–0.4116	–1.2094	0.0834	–0.4714
	(–0.472)	(–1.270)	(0.096)	(–0.534)
Ln(Size)		0.2303		0.0497
		(1.276)		(0.348)
Leverage		1.3027		0.9206
		(1.531)		(1.023)
M/B		0.1951		0.1006
		(1.352)		(0.479)
ROA		–1.0218		0.8082
		(–0.708)		(0.469)
Tender		–0.2625		–0.4692
		(–0.614)		(–1.438)
Stock Deal		1.0264***		0.6216
		(2.913)		(1.248)
Ln(Relative Size)		–0.3750		–0.3640
		(–0.980)		(–1.216)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R^2	0.153	0.188	0.112	0.127
N	229	224	218	213
First-stage F-test : p-value *Ln(Indgap1(2))*	0.00***	0.00***	0.00***	0.00***
First-stage F-test: p-value *Ln(Indgap1(2))* Target Initiation*	0.00***	0.00***	0.00***	0.00***
Kleibergen-Paap LM statistic	15.16***	13.10***	9.20***	7.62***
Anderson-Rubin F-statistics	6.16***	6.40***	7.06***	7.27***

Chapter 5

5.1. Conclusions

The thesis aims to contribute to the literature on M&As, by investigating the role of investor attention and managerial incentive horizons on early-announced deals. In addition, this thesis provides additional empirical evidence on deal initiation by examining the relation between industry tournament incentives and target-initiated deals. Chapter 2 to 4 in the thesis individually answer the following research questions: whether investors pay much attention to early announcements of takeovers and how this attention influences capital market perceptions to early announcements; whether CEOs' short incentive horizons drive the decision to announce early; whether CEOs industry tournament incentives affect firm sales by initiating M&A deals.

In Chapter 2, I test an investor-attention-based interpretation of firms' early announcements by employing the abnormal Google search volume index and abnormal trading volume as the proxies for investor attention. Using a sample of 1,302 M&A transactions announced by U.S. public companies between 1 January 2005 and 31 December 2018, I find that a positive relationship between early-announced deals and their attracted investor attention. Moreover, I find that early-announced deals with high investor attention exhibit higher short-term market reactions relative to those deals with low investor attention, and this higher market reaction is eventually reversed in the long term. Overall, these findings support the prediction of the price pressure hypothesis that investor attention can temporally boost the acquirer's stock price.

In Chapter 3, I empirically examine the relation between CEOs' incentive horizons and early announcements by using a comprehensive measure of incentive horizons developed by Chi *et al*.(2019). Within my sample analysis, I find that short-horizon CEOs are more likely to announce a deal early before signing the definitive agreements and sell equities shortly following early announcements. In the long-term analysis of deal outcomes, I find that early-announced deals initiated by short-horizon CEOs significantly underperform in the long-term

operating performance, compared to early-announced deals with long-horizon CEOs. The costs to short-horizon CEOs exist in that short-horizon CEOs in early-announced deals are more likely to be replaced due to lower deal quality. Taken together, these results suggest that managerial incentive horizons play a vital role in corporate acquisitions.

In Chapter 4, I explore the effect of industry tournament incentives on deal initiation. Using a sample of 499 U.S. domestic M&A deals with public listed target firms announced from 1997 to 2019, I document that target CEOs' industry tournament incentives increase the likelihood of target-initiated deals. This positive relation is more pronounced for target CEOs with lower age, longer tenures, and more abilities. Furthermore, target firm CEOs with stronger industry tournament incentives have a greater chance to retain positions in the combined firms after deal completion. Collectively, these findings highlight industry tournament incentives of top executives, as a type of managerial motivation, is an important driver of firm sales.

Future research can conduct different aspects of these M&A studies. First, due to data limitations, this thesis mainly focuses on U.S. M&A deals. Given that early-announced deals and target-initiated deals could happen in any market, future research may be interesting to conduct these tests on different regions and regulation settings. Second, to account for potential endogeneity issues, this thesis has employed various techniques and methods including propensity score matching analysis, two-stage simultaneous equations, DiD analysis, and two-stage IV models, which are easily used in other samples.

Appendix A

Variable definitions for Chapter 2

Variable	Definition	Source
AbSVI	The difference between a firm's daily SVI and its average same-day SVI of the week during the past ten weeks, scaled by the average. Daily SVI is standardized across months using monthly SVI as follows: SVI= SVIdaily × SVImonthly /100.	Google
AbVOL	The difference between a firm's daily dollar trading volume and its average same-day dollar trading volume of the week during the past ten weeks, scaled by the average.	CRSP
Attention_AbSVI (first disclosure day)	The AbSVI on the day that the proposed deal information is first released to the market (i.e., the early announcement day for early-announced deals, the announcement day for late-announced deals). We use the natural logarithm of (1+*AbSVI*) to normalize the distribution.	Google
Attention_AbVOL (first disclosure day)	The AbVOL on the day that the proposed deal information is first released to the market (i.e., the early announcement day for early-announced deals, the announcement day for late-announced deals). We use the natural logarithm of (1+*AbVOl*) to normalize the distribution.	CRSP
Attention_AbSVI (total)	The sum of *Attention_AbSVI (first disclosure day)* and the search volume based measure of definitive agreement signing date for early-announced deals, and *Attention_AbSVI (total)* equals *Attention_AbSVI (first disclosure day)* for late-announced deals.	Google
Attention_AbVOL (Total)	The sum of *Attention_AbVOl (first disclosure day)* and the trading volume based measure of definitive agreement signing date for early-announced deals, and *Attention_AbVOL (total)* equals *Attention_AbVOL (first disclosure day)* for late-announced deals.	CRSP
Analyst	The number of analysts providing earnings forecast for bidder firm *i* at the end of last fiscal quarter *t*, in regressions we use natural logarithm.	I/B/E/S
$BHAR_{1,12}$	The bidder firm's buy-and-hold abnormal returns for the period of 12 months after the early announcement date or definitive agreement singing date for early and late-announced deals, respectively. Following Hirshleifer et al. (2009), the benchmark portfolio is calculated by using a five by five size and book-to-market matched portfolio based on the market capitalization at the end of June and book value of equity for the last fiscal year-end divided by the market value of equity in the last December	CRSP, SDC
$BHAR_{1,24}$	The bidder firm's buy-and-hold abnormal returns for the period of 24 months after the early announcement date or definitive agreement singing date for early and late-announced deals, respectively. Following Hirshleifer et al. (2009), the benchmark portfolio is calculated by using a five by five size and book-to-market matched portfolio based on the market capitalization at the end of June and book value of equity for the last fiscal year-end divided by the market value of equity in the last December.	CRSP, SDC
Bidder CAR [−1, +1]	The market model adjusted abnormal returns to the bidder over (-1, +1) window surrounding the first disclosure day of the deal, i.e. early announcement date for early-announced deal and announcement date for late-announced deal. The CRSP value-weighted index returns are used as the benchmark over the period starting 205 days and ending 6 days prior to the event date.	CRSP, SDC

(continued on next page)

Appendix A (continued)

Variable	Definition	Source
Bidder agreement CAR [−1, +1]	Bidder agreement CAR is CAR [−1, +1] on the date of signing definitive agreement for early-announced deals only.	CRSP, SDC
Bidder adj CAR [−1, +1]	Bidder adj CAR is the CAR and bidder agreement CAR for early announcement deals, and the bidder CAR for late-announced deals.	CRSP, SDC
Combined CAR [−1, +1]	Combined CAR is the value-weighted average of CARs of acquirer and target. The weights are based on the market value of equity of acquirer and target four days prior to the event announcement day. The weights are based on the market value of equity of acquirer and target four days prior to the event announcement day.	CRSP, SDC
Combined agreement CAR [−1, +1]	The Combined CAR on the date of signing definitive agreement for early-announced deals only.	
Combined adj CAR [−1, +1]	Combined adj CAR is the value-weighted average of adjusted CARs of the bidder and target. The weights are based on the market value of equity of acquirer and target four days prior to the event announcement day.	CRSP, SDC
BTM	The ratio of book value of equity to the market value of equity for firm *i* at the end of last fiscal quarter *t*.	Compustat
Deal size	Total value of the transaction as reported by SDC in USD billions	SDC
Diversify	Equals one if the bidder and target is not from the same group of Fama- French 48 industries, and zero otherwise.	SDC
Early	Equals one in case the deal is announced before a definitive agreement is signed, and zero otherwise.	SDC
Early_exjoint	Equals one in case the deal is announced before a definitive agreement is signed and not confirmed by the target on the same day, and zero otherwise.	
Early_exhostile	Equals one in case the deal is announced before a definitive agreement is signed and not hostile deals, and zero otherwise.	SDC
HighAtt	Equals one if the abnormal Google search volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbSVI (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise	Google
HighAbvol	Equals one if the abnormal trading volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbVOL (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise	CRSP
HighTech	Equals one if bidder and target are both from high technical industries defined by Loughran and Ritter (2004), and zero otherwise.	SDC
InstOwn	The ratio of shares holding by institutional investors scaled by total shares outstanding for firm *i* using the most recent information during quarter *t*.	Thomson Financial 13F
Leverage	The ratio of book value of debt to market value of total assets for firm *i* at the end of last fiscal quarter *t*.	Compustat
Raw return	The raw stock return of the firm *i* on the day *t*.	CRSP
Relative size	The deal size reported from SDC divided by the bidder firm's market value of equity 4 weeks prior to the announcement.	SDC
Run up	Market-adjusted buy-and-hold return (BHAR) of the acquirer/target firm's stock over the period beginning 205 days and ending 6 days prior to the announcement.	CRSP
Sigma	The standard deviation of the bidder's and target's market-adjusted daily returns from CRSP over the period starting at 205 and ending 6 days prior to the announcement.	CRSP
Size	The total assets for firm *i* at the end of last fiscal quarter t in USD billions, in regressions we use natural logarithm.	Compustat
Full stock payment	Equals one if the deal is fully paid in stock, and zero otherwise	SDC
Tender	Equals one if the deal is a tender offer, and zero otherwise.	SDC

Table A.1: Gaussian kernel matching analysis

The table reports robustness tests for Table 6 by using the Gaussian kernel matching approach. We cover 64 early-announced deals and 1,238 late-announced deals from 2005 to 2018. The treatment group includes early-announced deals, and the control group includes late-announced deals. We match firms using Gaussian kernel matching techniques. The matching matrix includes *Bidder Size*, *Bidder Leverage*, *Bidder BTM*, *Bidder Run up*, *Bidder Sigma*, *Target Size*, *Target Leverage*, *Target BTM*, *Target Run up*, *Target Sigma*, *Full Stock Payment*, *Diversify*, *HighTech*, *Tender*, and *Relative Size*. The dependent variable is *bidder CAR [−1, +1], bidder adj CAR [−1, +1], combined CAR [−1, +1],* and *combined adj CAR [−1, +1]* in columns (1) to (4), respectively. *Early* equals one in case the deal is announced before a definitive agreement is signed, and zero otherwise. *HighAtt* equals one if the abnormal Google search volume on the first disclosure day of the deal (i.e., the early announcement date for early-announced deals and the announcement date for late-announced deals), *Attention_AbSVI (first disclosure day)*, is in the top quartile of sample firms, and zero otherwise. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year and Fama-French 48-industry fixed effects. Robust standard errors are two-way clustered at the firm and industry level. The *t* statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Bidder *CAR [−1, +1]*	Bidder adj *CAR [−1, +1]*	Combined *CAR [−1, +1]*	Combined adj *CAR [−1, +1]*
	(1)	(2)	(3)	(4)
Early	0.008	0.013	0.001	0.013
	(0.791)	(1.209)	(0.063)	(1.173)
Early × HighAtt	0.034*	0.050**	0.046**	0.062**
	(1.745)	(1.999)	(2.067)	(2.173)
HighAtt	-0.006	-0.005	-0.004	-0.004
	(-0.737)	(-0.695)	(-0.616)	(-0.560)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted-R^2	0.058	0.072	0.109	0.123
N	683	683	683	683

Appendix B

Variable definitions for Chapter 3

Variable	Definition	Source
Age	The age of the CEO at the end of year t-1.	ExecuComp
Assets	Total assets at the end of fiscal year t–1.	Compustat
Blockholders	The number of blockholders with at least 5% ownership presents in the firm at the most recent report date before the announcement.	Institutional Holding 13F
Bonus	The CEO's cash bonus at the end of fiscal year t-1.	ExecuComp
Cash Ratio	The ratio of cash equivalents divided by total book assets at the end of fiscal year t-1.	Compustat
Diversify	Equals one if the bidder and target is not from the same group of Fama- French 48 industries, and zero otherwise.	SDC
Early	Equals one for the actual early-announced merger deals, and zero otherwise.	EDGAR; SDC
Early Deal	Equals one for the early-announced merger deals, and zero for late-announced deals.	EDGAR; SDC
EquitySold	The number of shares sold by CEOs scaled by the number of shares outstanding, measured in basis points.	TFN
Forced Turnover	Equals one if there is a forced CEO turnover event for the firm within 3 years following the merger completion, and zero otherwise.	SDC
High Tech	Equals one if bidder and target are both from high technical industries defined by Loughran and Ritter (2004), and zero otherwise.	Compustat
InstiOwn	The total fraction of common shares outstanding owned by institutional investors at the most recent report date before the announcement.	Institutional Holding 13F
Leverage	The ratio of long-term debt plus short-term debt divided by the book value of total assets at the end of fiscal year t-1.	Compustat
M/B	The ratio of the market value of assets divided by book value of assets, where the market value of assets is estimated as the book value of assets plus the difference between market and book value of equity, measured at the end of fiscal year t-1.	Compustat
News	The number of news articles for acquirer firms in the year prior to the first deal announcement.	Factiva
Overconfidence	Equals one for all years after the CEO's option exceeds 67% moneyness, and zero otherwise.	ExecuComp
PastRet	The buy-and-hold abnormal returns for firms' stock over the past 12 months where the benchmark return is the CRSP value-weighted index	CRSP
Post	Equals one (zero) if the CEO equity sales occur during the event period (control period).	TFN
Relative Size	The ratio of deal size reported from SDC to the acquirer firms' total assets at the end of fiscal year t-1.	SDC
ROA	Operating income before depreciation divided by the market value of assets at the beginning of the fiscal year.	Compustat
Salary	The CEO's salary at the end of fiscal year t-1.	ExecuComp
Sale Growth	Firm sales in year t minus sales in year t-1 scaled by sales in year t-1.	Compustat
Sell	Equals one if CEOs sells any share from the early announcement date to late agreement announcement date, and zero otherwise	TFN
Short Horizon	Equals one if the CEO's weighted incentive horizon is lower than the median values of WIH, and zero otherwise.	ExecuComp
Stock Deal	Equals one if the deal is fully paid in stock, and zero otherwise	SDC
Tender	Equals one if the deal is a tender offer, and zero otherwise.	SDC
Tenure	The difference between year t and the year in which the CEO is appointed from ExecuComp.	ExecuComp
Turnover	Equals one if acquirer CEOs is replaced within 3 years following the merger completion, and zero otherwise.	ExecuComp
Vega	The change in dollar value of CEO stock option for a 1% change in the annualized standard deviation of stock returns at the end of fiscal year t-1.	ExecuComp
Vol	The standard deviation of the firm's daily stock returns from the past one year	CRSP
WIH	The weighted incentive horizon is calculated as the sum of the restricted stock horizon times delta of restricted stock scaled by total delta; unvested stock option horizon times delta of unvested stock option scaled by total delta; 4 years times delta of minimum required unrestricted holdings scaled by total delta, and 0 year times the delta of above minimum level of required holdings scaled by total delta.	ExecuComp

Table B.1: CEO incentive horizon and equity net sales

This table reports results from difference-in-difference (DID) tests examining the effect of early announcements on CEO equity net sales. The sample includes actual early announced merger firm pairs (acquirer and target) announced between 1993 and 2017 and matched control firm pairs. There are two observations for each firm: one measures CEO equity sales between the early announcement date and definitive agreement announcement date (after-early period), and another measures CEO equity sales using the same days as in the after-early period but in the one year before that (control period). The dependent variable is *Net sale* , which is calculated as the number of shares sold by CEOs minus the number of shares purchased scaled by the number of shares outstanding in basis points. Panel A reports the mean difference of CEO equity net sales for actual early-announced acquirer firms (Treated firms) and hypothetical acquirer firms (Matched firms), and t-test is used for whether the two samples have equal means, where DiD estimators are highlighted in bold. Panel B reports coefficients from the DiD regressions. *Post* equals one (zero) if the CEO equity sales occur during the event period (control period). In Panel B, columns 1 and 4 report estimation results for the full sample, while columns 2,3, 5, and 6 report results based on the value of *Short Horizon*. Other variable definitions can be found in Appendix. All continuous variables are winsorized at 1st and 99th percentiles. All regressions control for year fixed effects. The t statistics using robust standard errors are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: DiD estimator- CEO equity net sales

	Industry-Size match			Industry-Size-M/B match		
	Control period	After-early period	DiD	Control period	After-early period	DiD
	(1)	(2)	(2-1)	(3)	(4)	(4-3)
Treated firms (T)	0.011	0.058	0.048	0.011	0.059	0.048
N	50	50		50	50	
Matched firms (M)	0.020	0.008	−0.012	0.015	0.011	−0.004
N	229	229		215	215	
Difference (T-M)	−0.009	0.050***	**0.060****	−0.004	0.048**	**0.052***

Panel B: DiD regressions

	Industry-Size match			Industry-Size-M/B match		
	Full sample	Short Horizon	Long Horizon	Full sample	Short Horizon	Long Horizon
	(1)	(2)	(3)	(4)	(5)	(6)
Early	−0.039	−0.067	0.015	−0.028	−0.066	0.023
	(−1.584)	(−1.465)	(0.758)	(−0.916)	(−1.092)	(1.045)
Post	−0.042	−0.094	−0.037*	−0.029	−0.086*	−0.004
	(−1.580)	(−1.340)	(−1.833)	(−1.357)	(−1.817)	(−0.356)
*Early*Post*	0.093*	0.143*	0.001	0.080*	0.137*	−0.018
	(1.935)	(1.752)	(0.037)	(1.949)	(1.831)	(−0.587)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted- R2	0.132	0.089	0.348	0.088	0.061	0.008
p-value (x^2 test)		0.059			0.032	
N	360	180	180	353	177	176

Table B.2: Distribution of CEO turnover in deal sample

This table reports the distribution of CEO turnover in the deal sample, covering 1,323 US mergers announced between 1993 and 2017. *Turnover* is a dummy variable that takes value of one if acquirer CEO is replaced within 3 years following the merger completion, and zero otherwise.

	Full sample	Early-announce deal	Late- announced deals.
	(1)	(2)	(3)
Turnover	357	16	341
No Turnover	966	35	931
Total	1,323	51	1,272

Table B.3: PSM matching results

The table reports matching results for Industry-Size-M/B sample by using a propensity score matching analysis. The sample includes early-announced merger pairs and matched control firm pairs from 1993 to 2017. The treatment group includes actual early-announced merger pair firms, and the control group includes hypothetical early-announced merger pairs. The matched sample contains, for each actual early announced merger pair firms, formed by matching up to 5 acquiring firms (target firms) based on the same 2-digit SIC industry. Then matched firms are selected based on propensity scores estimated from a logit model of *Early* dummy variable on firm characteristics: *Ln(Assets)* and *M/B* ratio. All variables are defined in Appendix and all continuous variables are winsorized at 1st and 99th percentiles.

	Before Matching				After matching			
	Treatment	Control	Difference	P-value	Treatment	Control	Difference	P-value
Propensity score	0.006	0.005	0.001	0.000	0.006	0.006	0.000	0.825
Ln(Assets)	6.236	5.427	0.809	0.000	6.236	5.964	0.272	0.297
M/B	1.481	1.541	–0.059	0.442	1.481	1.393	0.089	0.294

Appendix C

Variable definitions for Chapter 4

Variable	Definition	Source
Age	It is the age of the CEO at the end of fiscal year t–1.	ExecuComp
CEO ability	The difference between firm–year ROA and industry-year ROA.	Compustat
CEO retention	A dummy variable equals 1 if the target CEO obtains a significant position in combined firms, and zero otherwise.	ExecuComp
Delta	The change in dollar value of CEO stock option for a 1% change in the stock price	ExecuComp
Firmgap	The pay gap between CEO's total compensation and the median vice president (VP) compensation at the end of fiscal year t–1.	ExecuComp
HHI	Herfindahl–Hirschman index based on TNIC-3 industry developed by Hoberg and Phillips (2016).	Hoberg-Phillips Data Library
Ind similarity	The paired firm similarity score for all peer firms based on the TNIC-industry developed by Hoberg and Phillips (2016).	Hoberg-Phillips Data Library
Indgap1	The difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification at the end of fiscal year t–1.	ExecuComp
Indgap2	The difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group at the end of fiscal year t–1.	ExecuComp
Instown	The total fraction of shares outstanding owned by institutional blockholders at the end of fiscal year t–1	TIF
Leverage	The ratio of long-term debt plus short-term debt divided by the book value of total assets at the end of fiscal year t–1.	Compustat
Low Z-score	A dummy variable sets to 1 if the z-score is lower than 1.81, and zero otherwise. Z-score is calculated as 1.2 * working capital/total assets + 1.4 * retained earnings/total assets + 3.3 * EBIT/total assets + 0.6 * market capitalization/book value of debt + 0.999 * total sales/total assets.	Compustat
M&A activity	The total number of firms with a takeover in the same first three-digit SIC code as the sample firm over one year just before the initiation date divided by the total number of firms in the same first three-digit SIC code in Compustat.	Compustat; SDC
M/B	The ratio of market value of assets divided by book value of assets, where the market value of assets is estimated as the book value of assets plus the difference between market and book value of equity, measured at the end of fiscal year t–1.	Compustat
Ownership	The total fraction of shares outstanding owned by the CEO at the end of fiscal year t–1.	TIF
Past ret	The buy-and-hold abnormal returns for firms' stock over the past 12 months where the benchmark return is the CRSP value-weighted index	CRSP
Relative Size	The ratio of deal size reported from SDC to the acquirer firms' total assets at the end of fiscal year t–1.	SDC
ROA	EBIT divided by the total assets at the end of fiscal year t–1.	Compustat
Size	The natural logarithm of total assets at the end of fiscal year t–1.	Compustat
Sale growth	The sales in fiscal year t are divided by sales of fiscal year t–1.	Compustat
Stock Deal	A dummy variable sets to 1 if the deal is fully paid in stock, and zero otherwise.	SDC
SA Index	Following Hadlock and Pierce (2010), SA Index $=-0.737 \times (\text{Size}) + 0.043 \times (\text{Size}^2) - 0.04 \times (\text{Age})$, where size is the natural log of book value of assets (inflation adjusted to 2008 dollars) and age is the number of years the firm has been on Compustat with a non-missing stock price.	Compustat
Target initiation	A dummy variable equals one if the deal is classified as the target-initiated deal, and zero for the bidder-initiated deal.	EDGAR; SDC
Tender	A dummy variable sets to 1 if the deal is the tender offer, and zero otherwise	SDC

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Appendix C (continued)

Variable	Definition	Source
Tenure	It is the difference between year t and the year in which the CEO is appointed from ExecuComp.	ExecuComp
Totcomp	The sum of total compensation of all other CEOs in the same industry classification, except for the highest-paid CEO	ExecuComp
Vega	The change in dollar value of CEO stock option for a 1% change in the annualized standard deviation of stock returns at the end of fiscal year t–1.	ExecuComp
Volatility	The standard deviation of the firm's daily stock returns from the past one year.	CRSP

Table C.1: Frist-stage results of cross-section effects of industry tournament incentives

The panel A reports first-stage results of panel A in Table 5 based on the two-stage of IV probit regressions. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is Ln(*Indgap1*) , the natural logarithm of *Indgap1* , which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification. Young (old) CEOs subsamples are defined by below (above) median age of CEOs in Column 1 (2). Long-tenure (short-tenure) CEOs subsamples are defined by above (below) median tenure of CEOs in Column 3 (4). High-ability (low-ability) CEOs subsamples are defined by the above (below) median industry-adjusted ROA in Column 5 (6). All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The t statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel A: Ln(Indgap1) instrumented cross-sectional variations of the effect of industry tournament incentives

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Ln(Firmgap)	–0.1886***	–0.1310	–0.1882*	–0.2029***	–0.1544***	–0.5670***
	(–3.748)	(–1.602)	(–1.757)	(–4.138)	(–2.879)	(–2.732)
Ln(Vega)	0.0218	0.0019	0.0276	0.0039	0.0020	0.0208
	(0.701)	(0.039)	(0.445)	(0.090)	(0.044)	(0.325)
Ln(Delta)	–0.0016	0.0242	0.0934	0.0101	0.0719	–0.1788
	(–0.031)	(0.307)	(1.213)	(0.119)	(0.953)	(–1.464)
CEO Ownership	–0.0386***	0.0158	–0.0358**	0.0666*	0.0019	0.0061
	(–2.744)	(0.651)	(–2.452)	(1.750)	(0.137)	(0.212)
Ln (CEO Age)			0.9699	–0.9285***	–0.3429	0.4144
			(0.927)	(–3.638)	(–1.023)	(0.698)
Ln(Size)	0.0424	–0.0311	–0.0405	0.0029	–0.0433	0.3834*
	(0.707)	(–0.334)	(–0.505)	(0.046)	(–0.714)	(1.862)
Leverage	0.0785	–0.2951	0.2884	0.2673	–0.1104	–1.4886**
	(0.377)	(–0.631)	(0.460)	(0.965)	(–0.385)	(–1.975)
M/B	0.0178	–0.0419	–0.0405	0.0431	–0.0634*	–0.0155
	(0.625)	(–0.596)	(–0.810)	(1.528)	(–1.690)	(–0.227)
ROA	0.6705**	–0.7815	–0.3567	0.3988		
	(2.290)	(–0.994)	(–0.520)	(0.871)		
Sale Growth	–0.1923	–0.4463	0.0206	–0.2986*	–0.2643	–0.0661
	(–1.627)	(–1.263)	(0.089)	(–1.873)	(–1.587)	(–0.262)
Instown	0.2542*	0.6662	0.3202	0.6819***	0.0699	1.7551*
	(1.669)	(1.062)	(0.684)	(2.719)	(0.299)	(1.853)

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Panel A (continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Past Ret	–0.1168*	0.3295	0.1922	–0.0035	0.1975**	–0.0127
	(–1.853)	(1.297)	(1.131)	(–0.039)	(2.475)	(–0.097)
Volatility	19.4983***	7.4371	25.0356*	11.3623**	22.0856***	24.4446**
	(5.219)	(0.610)	(1.797)	(2.445)	(4.208)	(2.172)
SA Index	–0.1620**	0.2210	0.3716	–0.2322***	–0.1626	–0.1436
	(–2.075)	(1.100)	(1.317)	(–2.657)	(–1.495)	(–0.500)
Low Z–score	–0.1041	0.3473	–0.1609	–0.0161	–0.2523	0.8187**
	(–0.901)	(0.995)	(–1.055)	(–0.133)	(–1.544)	(2.051)
HHI	0.9443**	–0.6340	–0.7429	0.6047**	0.7196**	–0.3099
	(2.380)	(–1.252)	(–1.326)	(2.199)	(2.563)	(–0.698)
Ind Similarity	0.0066	–0.0307	–0.0486	0.0063	–0.0014	–0.0258
	(0.735)	(–1.092)	(–1.482)	(0.548)	(–0.139)	(–1.157)
M&A Activity	1.0214***	–0.3750	–0.4589	0.3066	0.2612	0.0053
	(2.635)	(–0.744)	(–0.768)	(1.343)	(0.290)	(0.014)
Ln(Totcomp) IV	1.0156***	3.0164***	2.6129***	0.9826***	0.9738***	1.6140***
	(10.385)	(3.842)	(3.195)	(7.342)	(9.379)	(3.864)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.342	0.335	0.145	0.330	0.397	0.293
N	146	186	158	178	108	235

The panel B reports first-stage results of panel B in Table 5 based on the two-stage of IV probit regressions. The sample covers deals announced between 1997 and 2019, which is extracted from the SDC Mergers and Acquisitions Database. The following extraction criteria are used: acquirer and target are publicly traded in the U.S. and not from the financial and utility industry; deal value exceeds $1 million and deal is completed; acquirer firms must have less than 50% of target shares before the merger and control at least 50% of the target shares after transactions; deal type must be sated as the merger, acquisition of majority interests, or acquisition of assets. We then match this deal sample with the CRSP and Compustat Execucomp database. The dependent variable is Ln(*Indgap2*) , the natural logarithm of *Indgap2* , which is the difference between the total compensation paid to the CEO and the total compensation to the second-highest-paid CEO in the same Fama-French 30-Industry classification and size group. Young (old) CEOs subsamples are defined by below (above) median age of CEOs in Column 1 (2). Long-tenure (short-tenure) CEOs subsamples are defined by above (below) median tenure of CEOs in Column 3 (4). High-ability (low-ability) CEOs subsamples are defined by the above (below) median industry-adjusted ROA in Column 5 (6). All variables are defined in Appendix. All continuous variables are winsorized at 1st and 99th percentiles, and all dollar-value variables are expressed in 2008 dollars. Robust standard errors are doubled clustered at the industry and year level. Coefficients of marginal effects are reported. The t statistics are reported in the parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level, respectively.

Panel B: Ln(Indgap2) instrumented cross-sectional variations of the effect of industry tournament incentives

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Ln(Firmgap)	-1.1247***	0.0395	-0.4849	-0.4711**	-0.0749	-0.6903***
	(-2.894)	(0.300)	(-1.349)	(-2.376)	(-0.977)	(-2.984)
Ln(Vega)	0.0001	-0.1376	-0.1124	-0.0756	-0.1598***	-0.0963
	(0.001)	(-1.556)	(-0.595)	(-0.622)	(-2.832)	(-0.731)
Ln(Delta)	0.2695	0.0030	0.1425	-0.0355	0.0278	0.1025
	(0.664)	(0.028)	(0.369)	(-0.190)	(0.320)	(0.534)
CEO Ownership	-0.1239	0.0602	-0.0557	0.1868*	0.0057	-0.0017
	(-1.367)	(1.427)	(-0.947)	(1.863)	(0.383)	(-0.028)
Ln (CEO Age)			1.8794	-0.5949	0.1766	0.0559
			(0.987)	(-0.880)	(0.309)	(0.062)
Ln(Size)	0.8256**	0.3711***	0.7522**	0.3970*	0.2546***	0.7155***
	(2.130)	(2.967)	(2.223)	(1.938)	(3.157)	(3.449)
Leverage	2.7957**	-2.0704***	-2.5384	2.2370**	-0.2140	-0.0677
	(2.017)	(-2.677)	(-1.536)	(2.554)	(-0.428)	(-0.046)
M/B	-0.6188***	-0.3347***	-0.9951***	-0.2418*	-0.1491**	-0.7872**
	(-2.614)	(-2.725)	(-2.938)	(-1.761)	(-2.138)	(-2.464)
ROA	-1.4262	0.7927	-0.3395	2.5101		
	(-0.626)	(0.592)	(-0.204)	(1.461)		
Sale Growth	-3.1813**	-0.9386*	-1.7925**	-3.0132**	-0.6879	-1.9077*
	(-2.372)	(-1.775)	(-2.015)	(-1.984)	(-1.451)	(-1.820)
Instown	1.0293	-0.0589	0.0512	0.7883	0.2068	0.8411
	(0.695)	(-0.067)	(0.046)	(1.083)	(0.508)	(0.665)

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Panel B (continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Young CEOs	Old CEOs	Long-tenure CEOs	Short-tenure CEOs	High-ability CEOs	Low-ability CEOs
Past Ret	0.4179	0.1477	1.1823**	-0.4660	0.2328*	-0.3083
	(0.808)	(0.551)	(2.372)	(-0.873)	(1.876)	(-0.502)
Volatility	-13.9802	13.8116	57.8688**	2.1836	0.7078	21.1123
	(-0.701)	(0.919)	(2.462)	(0.098)	(0.087)	(1.133)
SA Index	0.1068	0.2408	0.1478	-0.2195	-0.2847*	-0.2702
	(0.175)	(0.875)	(0.303)	(-0.717)	(-1.730)	(-0.620)
Low Z–score	0.1920	-0.1674	-0.0266	-0.7532*	-0.1804	0.1090
	(0.359)	(-0.343)	(-0.043)	(-1.776)	(-0.600)	(0.232)
HHI	1.3655	0.0002	0.0915	0.7250	1.2600***	0.1684
	(1.400)	(0.000)	(0.103)	(1.177)	(3.213)	(0.231)
Ind Similarity	0.1048*	0.0021	-0.0292	0.0052	0.0303	-0.0101
	(1.881)	(0.067)	(-0.539)	(0.149)	(1.592)	(-0.269)
M&A Activity	-0.1882	-4.8773**	-5.4704**	1.6634	4.1904***	-2.1293
	(-0.126)	(-2.061)	(-2.453)	(1.009)	(3.642)	(-0.769)
Ln(Totcomp) IV	0.8554***	3.4484***	1.1628	1.0972***	1.1475***	1.2809***
	(3.039)	(3.533)	(0.837)	(3.945)	(8.246)	(2.655)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.276	0.331	0.125	0.332	0.22	0.277
N	142	185	156	173	108	230