Takeover Anticipation and Abnormal Returns

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Abstract

This paper documents that part of takeover synergies is incorporated in the target and acquirer stock prices prior to the event window of previous studies, around takeover anticipation date. This result suggests that those studies might quantify only partial wealth effect of acquisitions. This paper introduces a new approach, which estimates the parameters of expected return model from pre-anticipation period, to control the consequences of early anticipations on measurement of abnormal returns. Contrary to a benchmark event study, this approach finds that the daily average abnormal returns to the target (acquirer) shareholders is smaller by 3.06 (1.71) basis points in cash acquisitions, and greater by 4.4 (2.12) basis points in equity deals. These improvements are economically important as daily returns of the US treasury notes range from 1.13 to 1.78 basis points in the sample period. Overall, using anticipation-adjusted event study in this paper sheds light on magnitude of acquisition returns, and so on some well-documented takeover results.

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1. Introduction

Merger and acquisitions (M&A) literature usually assumes that an acquisition is either unpredictable before its first public announcement date or predictable only in a short interval prior to that date. A study may control any leakage of information about future M&A or any sort of M&A anticipations by extending its event window towards the pre-announcement period. The estimated excess returns can only be identified as abnormal returns (AR) if M&A are totally unanticipated prior to the event window. However, if some expectations about the bids have already been formed, the estimated AR might only measure partial wealth effect of M&A, and so inference about their effect might be misleading. In spite of maturity of this literature, studies that examine robustness of the event study methodology against the unpredictability assumption are scarce.[1] This paper addresses this issue by investigating the consequences of early M&A anticipations on the outcomes of a takeover event study.

Relevant information about future M&A are indeed released prior to the event window of previous studies. The event window in Schwert (1996) starts earlier than other studies in the literature (i.e. at Day -126), so this study assumes that M&A cannot be anticipated more than six months in advance. However, using a sample of 124 completed M&A between US public firms between 2003 and 2006, Figure 1 shows that even this assumption is violated greatly for this sample since 69% of them are anticipated prior to Day -126.

Insert Figure 1 here

Irani (2014) identifies a break date as deal-anticipation date during the pre-announcement period when the variance-covariance structure of the target and acquirer stock returns changes according to hypothetical shifts after that break date. A hypothetical shift is a significant decline in target variance and (or) any significant changes in the rest of moments (acquirer variance, the acquirer-target covariance, and the acquirer-target correlation) during the pre-announcement period. According to his anticipation mechanism, those hypothetical shifts occur when the market anticipates a pair firms with synergistic gains from their merger are going to merge. He documents that the merging likelihood increases significantly around anticipation dates, indicating that some investors in the market do anticipate M&A by incorporating their beliefs in the variance-covariance structure of the anticipated pairs. Moreover, the mechanism suggests that those investors should collect part of the synergistic gains when they anticipate M&A. This paper extends that study by focusing on the synergistic gains to those anticipators. While it is difficult (if not impossible) to identify those anticipators, one can examine abnormal gains around those dates. Furthermore, if presumed anticipation dates are detected arbitrarily in Irani (2014), the abnormal returns (AR) and the cumulative average abnormal returns (CAAR) around those dates should be insignificant. The first goal of this paper is thus to test whether the AR and CAAR are significant for the acquirer and target stocks around the deal-anticipation dates.

[1] Existent few studies use mainly a cross-sectional measure to estimate the unanticipated part of AR (Bhagat and Jefferis, 1991; Cai, Song and Walkling, 2011; Betton, Eckbo, Thompson, and Thorburn, 2014).[1] However, they do not address this concern, and also overlook effects of cross-sectional variation in the M&A anticipation dates on the estimates of AR. Since some M&A are anticipated earlier than the others (Irani, 2014), controlling this variation can provide insights on the correct acquisition returns.

The significance of those measures implies that some expectations about the impacts of potential M&A are incorporated in the stock prices long before the announcement day. In other words, part of synergistic gains is discounted around the deal-anticipation dates. If this is the case, then M&A anticipations can yield biased estimates of an expected return model, and so the acquisition returns and the statistical inference, which will make the results of standard event studies difficult to interpret. The second goal of this paper is hence to examine whether the early anticipation of M&A causes significant changes in the AR and CAAR to the acquirer and target shareholders around the announcement date.

The main results of this paper are as follows. First, I find that anticipating the target (acquirer) firms generates a significant average monthly abnormal return of 1.61% (1.28%). This result not only confirms the anticipation mechanism proposed by Irani (2014), but also indicates that the part of perceived synergistic gains are incorporated in the stock price of anticipated pairs long prior to the event window of previous takeover studies (at deal-anticipation time).

Second, accounting for early M&A anticipations matters for accuracy of the acquisition returns. Measurement error in CAAR is larger for the target compared to the acquirer firms, is dependent on the payment-form, and increases with the size of event-window. Controlling anticipations reduces the daily average abnormal returns to the target (acquirer) shareholders by 3.06 (1.71) basis points in cash acquisitions, and increases it by 4.4 (2.12) basis points in equity deals. These improvements are also economically considerable since they exceed daily returns of the US treasury notes in the sample period (1.13 to 1.78 basis points). These results are robust against use of various models for the expected (normal) returns and various event windows around the announcement date. Overall, evidence here suggests that ignoring anticipations causes previous takeover studies to measure only partial impact of bid announcements.

This paper contributes to the M&A literature in the following ways: First, it proposes a new time series approach by adjusting the standard event study method to control anticipation impacts on the estimates of AR. The choice of both estimation- and event-windows is arbitrary in this literature. Although several event windows might be employed for sensitivity analysis, only one fixed interval across all event firms is usually used to estimate the parameters of an expected return model. In contrast to this "one-size-fits-all" approach for selecting the estimation-window, this paper introduces a float estimation window in which the parameters are estimated from the pre-anticipation segment of each deal. Since the event is unexpected in that segment, the proposed "float" approach compared to the "fixed" one can generate more accurate estimates, and so lead to more reliable inferences.

Second, a puzzle exists in this literature due to extensively documented insignificant (or slightly negative) returns to the acquirer shareholders (e.g., Cai et al., 2011): why acquirers should involve in M&A that do not enhance their value. Results in this paper confirm this result as they lose significantly 2.64% over the (-1, 1) interval around the announcement date. However, findings around the deal-anticipation date indicate the opposite. The CAAR to the acquirer shareholders are positively trending after this date, e.g., they gain a significant 11.51% over the nine months interval starting from the anticipation date. This paper provides new insights into this puzzle by revealing that the acquirer shareholders indeed collect their gains long before the announcement date.

Third, the behavior of CAAR during the post-anticipation segment in this paper extends the rationales for the choice of payment method in M&A. Previous studies (e.g., Hansen, 1987; Fishman, 1989; and Eckbo, Giammarino, and Heinkel, 1990) advocate that the asymmetric information about the share value of acquirer firms plays an important role in the choice of payment method. This hypothesis indicates that when the acquirers are overvalued (undervalued) and can conceal their fair value from the target firms, they offer equity (cash) to bid target shares. However, results here indicate that both of merging firms have less asymmetric information about each other's share value since their prices follow similar trend between the deal-anticipation and announcement dates. Namely, when both the target and acquirer shares are undervalued (overvalued) relative to the average merging firm in this period, an all-cash (or an all-equity) offer is more likely.

Finally, relaxing the M&A unpredictability assumption in this paper shed some lights on the following well-documented M&A results. Firstly, Jensen and Ruback (1983) and Martynova and Renneboog (2008) review many M&A studies and report a skewed division of acquisition gains: target shareholders gain large abnormal returns while acquirers do not. A recently growing literature documents that part of this evidence is due to disregarding predictability of M&A in previous studies (Becher, 2009; Cornett et al., 2011; Cai et al., 2011). While this paper supports this new literature, it also indicates that this assumption increases (decreases) the skewed division in the cash (equity and mixed) offers. Secondly, AR to both target and acquirer shareholders in cash-financed deals exceeds those in equity-exchange deals (e.g., Travlos, 1987; Schwert, 1996). This paper mainly confirms this evidence though it also documents that part of this differential gains is due to the unpredictability assumption. Finally, general consensus indicates that while long-horizon event studies need to be further purified; "short-horizon methods are quite reliable" (Khotari and Warner, 2007). The results here show that this assumption can lead to false inferences about the CAAR in short-horizon event windows as well (e.g., even in an event window of 11 days surrounding the announcement date, from Day -5 to Day 5).

The rest of paper is organized as follows: Section 2 presents empirical design: sample construction, methodological issues associated with estimating the performance measures via the fixed and float models, and the hypotheses. Section 3 documents results. Section 4 discusses robustness tests and finally Section 5 summarizes and provides concluding remarks.

2. Empirical Design

2.1. Sample Construction

Table 1 shows that a takeover is sampled from the Bureau Van Dijk Zephyr database using transaction form of "merger" or "acquisition". The sample period is June 2003 to June 2006, which corresponds to the sixth M&A wave.[2] The sample consists all completed acquisitions between U.S. publicly listed target and acquirer firms. This definition leads to 1647 deals.

Insert Table 1 here

It is then required that (i) an acquirer gains entire control of a target firm by acquiring 100% of the target shares in a takeover transaction, (ii) the method of payment is all-cash, all-equity and the mixed of cash and equity payments, (iii) an bid offer takes between 19 and 253 trading days

[2] Martinova and Renneboog (2008) demonstrate that the beginning of the sixth M&A wave in mid-2003 coincides with the gradual recovery of economic and financial markets after the early 2000s IT bubble. The takeover market, however, slows down after the 2007 financial crisis.

from its first announcement date to be completed[3], (iv) the deal value exceeds \$50 million, (v) both acquirer and target firm are not banks, (vi) an acquirer has only one bid record in the sample period, (vii) targets have a stock price exceeding \$2 on Day -42, and (viii) both firms have more than 120 adjusted daily-closed stock prices during the pre-announcement period in Thomson Financial DataStream. After these restrictions, the final sample contains 124 deals with enough return data to estimate the expected return models, and to perform the statistical tests. The sample splits to 54 all-Cash, 32 all-Equity and 38 Mixed-payment deals.

The deal-anticipation dates for this sample are employed from Irani (2014). Figure 1 illustrates a substantial variation in those dates, so I divide the sample into four "Quartile" subsamples based on the distribution of the deal-anticipation date. This subsampling is to examine whether gains to the anticipators varies with the time lag between the deal-anticipation and the announcement dates. The "1Q", "2Q", and "3Q" subsample contains those deals that are anticipated in the first quartile (Day -360 to Day -254), the interquartile (Day -253 to Day -134), and the third quartile (Day -133 to Day -1) of the deal anticipation distribution relative to the public bid announcement date (Day 0), respectively. The "No" subsample denotes those deals that are not anticipated. There are 28, 53, 27, and 16 deals in the "1Q", "2Q", "3Q", and "No" subsamples, respectively.

2.2. Models for Measuring Abnormal Returns

Daily log-returns (henceforth, the returns) of acquirer and target stocks are computed in the following way:

$$r_{i,n,t} = \ln\left(\frac{P_{i,n,t}}{P_{i,n,t-1}}\right), \tag{1}$$

where $i = ACQ$ or TRG; n (= 1, …, 124) is the index for deals in the sample; t (= -379, ..., 0, ..., C) is the daily subscript. $r_{Acq,n,t}$ and $r_{Trg,n,t}$ represent the realized returns to acquirer and target shareholders involved in deal n at day t; and $P_{Acq,n,t}$ *and* $P_{Trg,n,t}$ is their adjusted closing prices at day t. Similar to Schwert (1996), the sample observation period for each of target and acquirer daily return series starts -379 days prior to the first public bid announcement day (t = 0) and terminates at the delisting date of the target shares, which is C days after the announcement date. The pre (post)-announcement period is from Day -379 to Day -1 (Day 0 to Day C).

Event studies employ a number of models to decompose the observed returns of a security during the event-window into "normal" and "abnormal" returns. Simulations of Brown and Warner (1985) indicate that the estimates from the market model (MM) among those models, as a model of expected ("normal") returns, with the parametric *t*-test generates reliable results. Therefore, main results in this paper will be based on this model. The performance of other models against the market model is examined in the Robustness section.

[3] According to the William Act of 1968, only bid offers for subsidiaries of U.S. public targets or private targets can be completed in a shorter period. The daily prices (and so returns) are usually unobservable for these firms, and so they are excluded from the sample.

2.2.1. *Fixed Estimation Window*

I follow Schwert (1996) in defining the size of estimation and event windows around the bid announcement day. The estimation window is from Day -379 to Day -127, and contains 253 daily returns to estimate the parameters of an expected return model. The event window is from Day -126 till delisting of the target stocks during the post-announcement period (Day C), in which AR and CAAR are estimated.[4] Since the size of the estimation (and event) window is constant across cross-sections of event firms, this approach is called " Fixed" estimation approach.

Let $A_{i,n,t}$ denote abnormal return to the security *n* of either target or acquirer at day *t*. For every security, the abnormal return for each day in the event window is estimated using the following approach:

Benchmark Model (MM126)

$$A^{b}_{i,n,t} = r_{i,n,t} - \hat{\alpha}^{b}_{i,n} - \hat{\beta}^{b}_{i,n} r_{m,t} \quad , \quad t = (-126, \cdots, 0, \cdots, C) \text{, } \textit{benchmark event window} \tag{2}$$

$$r_{i,n,\tau} = \alpha^{b}_{i,n} + \beta^{b}_{i,n} r_{m,\tau} + \varepsilon^{b}_{i,n,\tau} \quad , \quad \tau = (-379, \cdots, -127) \text{, } \textit{benchmark estimation window,} \tag{3}$$

where $r_{m,t}$ is the log-return of the market portfolio at day *t*. The S&P 500 index is used as a proxy for the market portfolio. Ordinary least-squares (OLS) regression is performed over the benchmark estimation window to obtain estimates $\hat{\alpha}^{b}_{i,n}$ and $\hat{\beta}^{b}_{i,n}$ of $\alpha^{b}_{i,n}$ and $\beta^{b}_{i,n}$, respectively.[5]

Starting an event window at a fixed pre-event date indicates the implicit unpredictability assumption, so the benchmark model assumes that M&A are unpredictable prior to Day -126 but anticipatable afterwards. The results of this model will be compared with those of an event study that accounts for cross-sectional variations in M&A anticipation dates, which is called "Float" approach. This comparison provides insights about the size of bias in the AR and CAAR when unpredictability assumption is imposed in takeover event studies. However, using this "benchmark estimation window" leads to a smaller bias, because it has more days during its event window (126 days) to recognize any early anticipation effects compared to other studies, whose event windows usually start closer to the announcement date (e.g., Day -42). Results in robustness section indeed verify that the bias magnifies when I consider an alternative market model whose event window starts at Day -63.

2.2.2. *Float Estimation Window*

Contrary to the benchmark model, the estimation window in the following proposed approach varies across anticipated deals based on each deal's anticipation date. Therefore, this approach is called the "float" estimation window.

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[4] C varies across deals in this sample with min of 28 days, median of 73 days, and max of 253 days.

[5] Eq. (3) and subsequent parameter equations (otherwise stated) are estimated with no missing daily returns in the benchmark estimation period for 120 target and acquirer return series. The parameters for rest of series are estimated with fewer returns due to the missing returns.

The first and the second goal of this paper concern behavior of AR and CAAR around the deal-anticipation and the public bid announcement events, respectively. AR are hence estimated separately around these two events in the following ways:

(1) AR around the Deal-Anticipation Date

(a) If a deal is anticipated

$$\begin{cases} A^{f}_{i,n,t} = r_{i,n,t} - \hat{\alpha}^{f}_{i,n} - \hat{\beta}^{f}_{i,n} r_{m,t} &, \ t = (P_n, \cdots, -1) \qquad post-anticipation\,segment \\ A^{f}_{i,n,t} = \varepsilon^{f}_{i,n,t} &, \ t = (P_n - 126, \cdots, P_n - 1) \qquad pre-anticipation\,segment \end{cases} \tag{4}$$

$$r_{i,n,\tau_n} = \alpha^{f}_{i,n} + \beta^{f}_{i,n} r_{m,\tau_n} + \varepsilon^{f}_{i,n,\tau_n} \quad , \quad \tau_n = (-379, \cdots, P_n - 1) \qquad float\ estimation\ window, \tag{5}$$

where P_n is the anticipation date for deal n relative to its public bid announcement day ($P_n < 0$), $\hat{\alpha}^{f}_{i,n}$ and $\hat{\beta}^{b}_{i,n}$ are the OLS estimates of $\alpha^{f}_{i,n}$ and $\beta^{f}_{i,n}$, respectively.

Irani (2014) documents that deal-anticipation affects both the target and acquirer return series, so returns from pre-anticipation segment (-379 to P_n-1) should be used to estimate the parameters of the market model; otherwise they are biased. This argument explains why the float estimation window considers only returns from this segment for anticipated deals in Eq. (5).

Eq. (4) shows that the event window around the deal-anticipation date is divided into two segments: pre-anticipation and post-anticipation segments. AR during the pre-anticipation segment for anticipated deals are the residuals from Eq. (5), and those for post-anticipation are the out-of-sample prediction errors. We assumed that M&A are totally unexpected in the pre-anticipation segment, but significance of AR imply that they are expected to some extent. So, AR are estimated in this segment to examine this assumption. Moreover, only returns that might be affected by deal-anticipation event are used to construct AR and CAAR during the post-anticipation period. First, the sample is limited to the anticipated deals (108 out of 124 deals). Second, the post-anticipation segment starts from the anticipation day of each deal (P_n) and end a day before its announcement (Day -1). This definition excludes the announcement and the subsequent returns from analysis; otherwise, the anticipation and the bid announcement effects will be confounded.

(b) If a deal is unanticipated

$$A^{f}_{i,n,t} = r_{i,n,t} - \hat{\alpha}^{f}_{i,n} - \hat{\beta}^{f}_{i,n} r_{m,t} \quad , \quad t = (-126, \cdots, -1) \qquad pre-anticipation\,segment, \tag{6}$$

where $\hat{\alpha}^{f}_{i,n}$ and $\hat{\beta}^{b}_{i,n}$ are the OLS estimates of $\alpha^{f}_{i,n}$ and $\beta^{f}_{i,n}$ estimated from the benchmark estimation window in Eq. (3).

Irani (2014) identifies that 16 out of 124 deals are unanticipated, and so totally unexpected until their announcement day. Thus, to avoid mixing the effects of deal-anticipation and the announcement events for these deals, their AR are only estimated during the pre-anticipation segment (-126, …, -1). They are just AR in the pre-announcement part of the benchmark event window. This definition helps to use the full sample to examine statistical significance of AR during the pre-anticipation segment.

(2) AR around the Announcement Date

$$A^f_{i,n,t} = r_{i,n,t} - \hat{\alpha}^f_{i,n} - \hat{\beta}^f_{i,n} r_{m,t} \qquad , \quad t = (-126, \cdots, 0, \cdots, C)\, , benchmark\ event\ window, \qquad (7)$$

$\hat{\alpha}^f_{i,n}$ and $\hat{\beta}^b_{i,n}$ are the OLS estimates of $\alpha^f_{i,n}$ and $\beta^f_{i,n}$ estimated from the float estimation window in Eq. (5) for anticipated deals, and from the benchmark estimation window in Eq. (3) for unanticipated deals.

The event window is identical between the float and benchmark approaches in order to compare their results around the announcement event. Moreover, the parameters and AR are the same between the float and benchmark approaches for those 16 unanticipated deals because the estimation and event windows are identical in this case, and equal to those of the benchmark approach. Any differences between the results of these two approaches are only due to those 108 anticipated deals for which the float and benchmark estimation windows do not coincide.

Event studies assume that the estimation and event windows do not overlap. In order to have the same number of firms over the event window across two approaches, this assumption is relaxed in the float approach for 23 deals that are anticipated within the event window $(-126 \le P_n \le -1)$. The benchmark event window for these deals is divided into two segments: while AR during the pre-anticipation segment (-126 to P_n) are the OLS residuals from Eq. (5), $\varepsilon^f_{i,n,t}$, those for the post-anticipation segment (P_n+1 to C) are just out-of-sample predictions errors from Eq. (7). Identifying residuals as AR for this subsample is beneficial since they are in-sample forecasts, and free from the out-of-sample forecast errors.[6] However, the estimation and event windows are apart for 69% of deals that are anticipated during the benchmark estimation window $(P_n \le -127)$. Overall, the float approach compared to the benchmark one contains on average fewer returns in its estimation window.

2.3. Measuring Cumulative Average Abnormal Returns

2.3.1. CAAR Around the Deal-Anticipation Date

It should not be surprising to observe insignificant AR at or around the deal-anticipation date because true anticipation dates lie in some confidence interval from the estimated ones. Brown and Warner (1985) suggest considering longer event windows to capture the full effects of events with uncertainty about their occurrence date. The behaviors of CAAR are hence studied over longer event windows to identify any potential wealth effects of M&A anticipations. However, The choice of event window is not straightforward because of a tradeoff: while the probability of including the true event date increases with the length of event window, the test can lose its power if there is no new information about the event in the longer windows.[7] To resolve this

[6] Patell (1976) explains that the variance of AR increases due to the out-of-sample predictions.
[7] Simulations of Brown and Warner (1985) indicate that a longer event window lowers the power of detecting true significant CAAR. For instance, they report for an actual CAAR of 1%, the frequency of rejecting the null of zero

issue, various event windows are hence considered around the estimated anticipation dates to construct CAAR.

Information can be gradually disseminated in the market if only a portion of investors has access to it, because they want to camouflage their informational advantage. M&A anticipation is not public information since it is available for a portion of market participants who are able to anticipate takeovers (e.g., experts in the M&A market). So this type of information is expected to diffuse gradually. Using longer event windows are thus useful here due to their ability to detect any trend in CAAR series, which in turn can confirm the gradual diffusion of information.

Since the standard deviation of CAAR gets larger with the length of event window (see Eq. 16 in Appendix A), detecting significant effects of an event becomes difficult in longer event windows. Trending CAAR over longer windows, however, can offset this deteriorating effect of the standard deviation. Therefore, there should be some probability of releasing new information about the event in longer windows to justify their use. Put differently, such a longer windows are more appropriate if one expects that relevant signals about a forthcoming bid offer to magnify over time. This might be the case here since more relevant information about the likelihood of merging can be leaked (e.g., from the negotiations) getting closer to the announcement day. Nevertheless, longer windows might include events unrelated to the M&A anticipation, e.g., some non-M&A firm-specific news. The portfolio theory suggests that this type of news can be diversified in a large portfolio that contains many stocks. Simply, some event firms might have positive idiosyncratic news and some negative ones in a given event day but their effects are highly likely to be canceled each other out when the daily average abnormal returns (AAR) is computed. Thus, the portfolio abnormal returns (i.e., AAR) are more likely to capture effects of new information about the anticipation event over long-term windows.

2.3.2. CAAR Around the Bid Announcement Date

Event studies usually focuses only on a very short event window around the bid announcement day to identify the wealth effects of M&A. This is a plausible design since the bid announcement day is known with certainty. However, there are others reasons that motivate using longer event window even around this certain event. First, when one interested, e.g., in examining any leakage of information during the pre-announcement period and (or) unexpected reactions to the bid announcement during the post-announcement period (e.g., any under- or over-reactions in contrast to the Efficient Market Hypothesis of Fama, 1970). For instance, Schwert (1996) and Smith and Kim (1994) find that CAAR to the target firms' stocks start to run up around Day -42 and Day -60, respectively. Second, many M&A studies investigate why acquirers' managers choose different payment method to finance takeover transactions. According to the asymmetric information hypothesis, the acquiring firms offer equity bids when its share is overvalued, and offer cash bids when the share of either target or acquirer is undervalued (e.g., Hansen, 1987; Fishman, 1989; and Eckbo, Giammarino, and Heinkel, 1990).[8] Overall, one needs to start the event window long before the announcement day to address the above issues.

CAAR in the market model decreases from 80.4% to 13.2% when the event window is increased form one day to an 11-day interval.

[8] There are various competing hypotheses that justify the financing choice of acquirers: e.g., asymmetric information, tax considerations, capital structure and managerial control motives, and behavioral motives. See, for instance, Martin (1996), Betton, Eckbo, Thorburn (2008), and Ismail and Krause (2010) for further details.

For enhance readability and brevity of notations, acquirer/target subscript *i,* indicators for the quartile and payment subsamples, and superscript for benchmark and float approaches are omitted from the subsequent equations. Let $\overline{A}_t$ and $CAAR(t_1,t_2)$ denote the daily average abnormal return (AAR) at day t, the cumulative average abnormal return (CAAR) computed from day t_1 to t_2, respectively. AAR and CAAR are estimated around the deal-anticipation and the announcement events in the following ways.

$$\overline{A}_t = \frac{1}{N_t}\sum_{n=1}^{N_t} A_{n,t} \qquad \begin{cases} t = (P\text{-}126,\cdots,P,\cdots,P+189), & \text{A Deal is Anticipated at Day P} \\ t = (\text{-}126,\ \cdots,0,\cdots,C), & \text{A Bid is Announced at Day 0} \end{cases} \tag{8}$$

$$CAAR(t_1,t_2)=\sum_{t=t_1}^{t_2}\overline{A}_t, \tag{9}$$

where N_t is the number of securities whose AR are available at day *t*. N_t is constant around the announcement event between -379 and 28, and decrease continuously afterwards since some deals are completed earlier than others. Moreover, due to the cross-sectional variation in P_n across anticipated deals, N_t for the deal-anticipation event is inconstant, and reaches its maximum one-day before the deal-anticipation date (see Appendix Figure 1).

2.4. Hypotheses

All test statistics for examining the following null hypotheses have the Student's t-distribution, satisfy various conditions (heteroscedacticty, zero correlation, and unequal sample sizes), and are presented in detail in Appendix A. Moreover, the Appendix Table 1 provides an overview of the following hypotheses.

2.4.1. Goal 1: Average Anticipation Effect

The following hypotheses address the first goal of this paper by examining gains to anticipators of target and acquirer firms.

Null Hypothesis 1: *the average AR at the anticipation day (P) and the surrounding days is equal to zero.*

Null Hypothesis 2: *the CAAR over an event window around the anticipation day (P) is equal to zero.*

Irani (2014) motivates that a bid is anticipated if the market can perceive synergistic gains to the potential merging candidates. If the Efficient Market Hypothesis holds, the potential synergistic gains should be discounted and incorporated in the share price of target and acquirer firms around the anticipation date. Moreover, since both target and acquirer shareholders can share those gains, I use a right tailed test to examine whether CAAR to the target and acquirer anticipators are significantly positive.

The following two sub-hypothesis examines whether anticipators can anticipate additional characteristics of M&A at the anticipation time.

Null Hypothesis 2a: *the CAAR over an event window is similar across quartile subsamples.*

This hypothesis investigates whether CAAR varies with the time lag between the deal-anticipation and the public announcement dates. Given that the average annual inflation (CPI) for US ranges between 2.27% and 3.39% in the sample period, the time value of money is positive. Therefore, waiting can be costly for those anticipators who buy those share at the anticipation time and hold them until the public bid announcement date to obtain the full wealth effects of their predictions. The anticipators' gain can hence shrink with the waiting time because longer the waiting, higher the interest expenses will be. If the market can anticipate the waiting time, then those deals that are anticipated earlier than others should generate a smaller CAAR in any given event window. Therefore, I use a left tailed test statistic for examining this hypothesis.

Null Hypothesis 2b: *the CAAR over an event window is similar across payment-form subsamples.*

It is well documented that M&A that are financed (partly or completely) with acquirer shares generate lower CAAR than those financed totally with cash around the announcement date (e.g., Travlos, 1987; Schwert, 1996). This hypothesis hence assesses whether the differential gains between equity and cash deals also exist around the anticipation date or not. The interpretation of any differential gains across payment subsamples around the deal-anticipation event is different from the one around the announcement event. The reason is that M&A are anticipated only by some market participants during the pre-announcement period since they are not publicly announced yet. Moreover, Irani (2014) finds that the payment-form is on average anticipated three months after the deal anticipation date, and only in a portion of anticipated deals (in 77 out of 108 anticipated deals). These evidences disclose uncertainty about the future payment-form at the time of deal anticipation. Any significant difference in the CAAR across payment subsamples during the post-anticipation segment can provide some insights about this uncertainty. Overall, if the market can partially anticipate the payment method, the CAAR in the equity deals should be smaller than those of cash deals in any given event window around the deal-anticipation even. So, I apply a left tailed test to assess this hypothesis.

2.4.2. Goal 2: Difference in Measurement of the Fixed and Float Approaches

The following hypotheses address the second goal of this paper by investigating whether the difference between performance measures of the fixed benchmark and the float approaches are significant around the announcement day. These tests assess how the results of a takeover event study can be biased when it assumes that M&A are unpredictable.

Null Hypothesis 3: *the mean of abnormal returns (AAR) at day t around the bid announcement day (Day 0) based on the fixed approach is equal to that of the float approach.*

Null Hypothesis 4: *the mean of daily AAR over an event window around the bid announcement (Day 0) based on the fixed approach is equal to that of the float approach.*

This hypothesis intends to examine whether the fixed and float approaches generate similar CAAR over an event window around the public bid announcement. One way to do so is to investigate whether the two approaches estimate different average daily AAR over a given event window, because the CAAR is the sum of those daily AAR in that window.

Null Hypothesis 4a*: the difference between the fixed and the float approaches in measuring mean of AAR to the target shareholders over an event window is equal to that of the acquirer shareholders.*

M&A literature documents a skewed division of gains between the target and acquirer shareholders around the bid announcement day: target shareholders receive the major part of gains while acquirers can even lose (Jensen and Ruback, 1983; and Martynova and Renneboog, 2008). Part of this skewed division might be explained by ignoring the predictability of M&A in estimating the performance measures. The above sub-hypotheses address this concern by examining whether the size of bias in the CAAR estimates due to the unpredictability assumption is different between the target and acquirer firms.

3. Results

3.1. Gains to the Anticipators of Target and Acquirer Firms

Table 2 and 3 summarize the results of testing the first hypothesis, and show that the daily AAR to the target and acquirer shareholders around the anticipation day (P), respectively. Target shareholders gain 0.64% one day after the anticipation date. This gain is caused by significant AAR of the equity and mixed subsamples (1.79%, and 1.48%), suggesting that the market may be able to distinguish partly the payment-forms at least at this day. Those significant gains indicate that the anticipation date is estimated with a reasonable accuracy, and some investors impose their anticipation information on the stock prices of target firms.

Inset Table 2 here

Table 3 shows that the daily average returns to the acquirer shareholders are normal in this interval except for Day (P+4), whose AAR is -0.59%. The most significant AAR (i.e., -1.73%, -1.13%, and 1.12%) are observed for the 3Q subsample among quartile subsamples in the post-anticipation segment (P, P+10), suggesting that the market may perceive that these deals will be announced shortly after the anticipation date. Overall, statistically and economically significant AAR is observed occasionally for target, acquirer, and their subsamples around the anticipation date.

These results might be contrary to our expectation at first glance. However, given that the deal-anticipation information is not publicly available for all investors, so we observe significant AAR randomly. In other words, if we find significant AAR at majority of event days, then one can doubt that the anticipation mechanism captures some public information rather than the anticipation information, which holds only by a portion of the market investors.

Inset Table 3 here

Figure 2 verifies that the effects of deal-anticipation are not concentrated in a few days around the anticipation event, and the CAAR are indeed positively trending during the post-anticipation period. These positive trends are consistent with the notion that the any information about the M&A anticipations are indeed diffused gradually to the market, and justify using longer event windows to examine the wealth effects of anticipating merging firms.

Inset Figure 2 here

The two upward sloping CAAR series in Figure 2 suggests that the market perceives some synergistic gains to the anticipated deals, and divides these gains between target and acquirer shareholders around the anticipation event in particular. These positive CAAR hence confirm the deal-anticipation mechanism proposed by Irani (2014) in which perceiving synergetic gains at the anticipation time shift the second-order moments of the stock returns of the potential target and acquire firms. Moreover, the positive CAAR to the target shareholders around the anticipation event suggests that the part of synergistic gains is discounted before the announcement date. Thus, previous event studies might document only partial impact of M&A on the target shareholders because they only focus on the realized gains around the announcement event. Furthermore, the positively trending CAAR for the acquirer shareholders here shed light on the puzzle of why acquirer enter into acquisitions with zero or negative announcement returns. The acquirer shareholders indeed collect their gains long before the expected date of previous M&A studies, around the deal anticipation date.

While $H_0^{(2)}$ implies that the CAAR to the target and acquirer shareholders oscillates around the zero level, the rising CAAR after that deal-anticipation date in Figure 2 advocates the opposite. The returns to the anticipators of target (acquirer) firms are indeed economically substantial since they gain an average monthly AR of 1.61% (1.28%) during the post-anticipation period. Anticipating targets generates slightly greater returns, over long-terms in particular. Table 4 and 5 summarize the results of examining the statistical significance of those gains for both target and acquirer and their quartile and payment subsamples over various event windows, and mainly confirms the conclusions made from Figure 2. [9]

Inset Table 4 here

The first three event windows in these tables show the result of testing $H_0^{(2)}$ for the pre-anticipation period. Since the parameters are estimated via returns from this period, any significant CAAR in this period may indicate the poor statistical performance of the expected returns model (Eq. 5 and 6), and in turn may also cast doubt about the validity of the estimated AR during the post-anticipation period (Eq. 4). This null is not rejected for any of target, acquirer

[9] The tests reported in Table 4 and 5 ($H_0^{(2)}$) are conservative to some extent in rejecting the null of zero CAAR compared to those around the bid announcement day. This is due to fact that the daily estimated standard deviation from the pre-anticipation segment (Eq. 11 in Appendix A) for the full sample and the subsamples exceeds those from the benchmark estimation window (Eq. 13 in Appendix A) by 6% to 14%, and this difference is even amplified by a factor of $\sqrt{(t_2 - t_1 + 1)}$, i.e. square root of length of the event window. This overestimation is caused by fewer cross-sections returns in estimating the daily portfolio returns (i.e., AAR), and shorter time span for estimating the portfolio standard errors from the pre-anticipation period.

firms and their subsamples in the (P-126, P-1) interval, suggesting the performance measures in the post-anticipation period mainly capture the wealth effects of the anticipation event. [10]

Inset Table 5 here

Furthermore, Figure 2 presents two steep upswings in the CAAR over the (P, P+30), and (P+106, P+189) intervals. Table 4 and 5 shows the anticipators of target and acquirer firms gain statistically significant CAAR by 3.73% and 3% in the first interval, respectively. CAAR also becomes statistically significant at the conventional levels for both target and acquirer series in the last trending interval. For example, the CAAR to the buy-and-hold investors who anticipate a target and acquirer firm seven months in advance (the CAAR from Day P to Day P+147) is 10.21% and 7.03%, respectively. Overall, the second null hypothesis of zero CAAR to the anticipators is clearly rejected.

Figure 2 displays the two CAAR series fluctuate around a constant level in the (P+31, P+105) interval. The test statistics in Table 4 and 5 shrinks as the event windows get longer within this stable interval. This is obvious since the CAAR (the numerator of test) are almost constant in this interval while the standard deviation (the denominator) increases with the length of the event window. The overall insignificance of results for the full target and acquirer samples in this interval tempts to conclude that this is a period with no new information about potential M&A. However, the behavior of CAAR in various subsamples needs to be considered before making this conclusion, which will be addressed in the next subsection.

3.2. Two Uncertainties at the Time of Deal Anticipation

This section investigates possible sources of observed trend in the CAAR during the post-anticipation segment. Deal-anticipation and payment-form subsamples may explain those trends.

3.2.1. Waiting Time

Table 4 and 5 report that those who anticipate the deal six months in advance can benefit a CAAR of 5.54% and 4.68% on the target and acquirer shares while CAAR to someone who anticipates nine months before increases sharply to 14.52% and 11.51%. Does this evidence indicate that the earlier the M&A anticipations, the greater the gains is to the anticipators? To answer this question, I study the behavior of CAAR across the deal-anticipation ("quartile") subsamples.

Panel A of Figure 3 and 4 exhibit CAAR to the target and acquirer shareholders across quartile subsamples during the post-anticipation segment. First, the CAAR in theses figures suggests the opposite of the above claim: the earlier the M&A anticipations, the lower is gains to the anticipators. This is apparent from the plot of 1Q subsample, which contains deals with the earliest anticipation date, since it has the smallest CAAR across quartile subsamples. Moreover, the figures also show that the CAAR of 2Q subsample are higher than those of 1Q but lower than 3Q subsample. Those deals that are announced within six month from the anticipation date (3Q

[10] The CAAR, e.g., for 3Q subsamples in the (P-42, P-1) event window are positive and significant. This result should not cause doubt on the expected return model since it simply shows that the positive residuals for this subsample are concentrated in this interval while negative ones are mainly located in the (P-126, P-43) interval.

subsample) generate the highest CAAR over the post-anticipation segment. These results, which are also confirmed by statistical tests reported in Table 4 and 5, reject the $H_0^{(2a)}$, and lead to conclude that the gains to the M&A anticipators shrinks with the waiting time.

Inset Figure 3 here

Results in Table 4 and 5 indicate that the CAAR in the (0, 20) interval is similar across quartile subsamples for both the targets and acquirers. These findings indicate that the anticipators are incapable to distinguish various quartile subsamples even one month after the deal-anticipation date. Therefore, when a forthcoming deal is anticipated for the first time during the pre-announcement period, the anticipator is not able to predict how long it will take from the anticipation date to the first public bid announcement date. Overall, anticipators face with uncertainty about waiting time until the announcement date.

Inset Figure 4 here

The market starts to distinguish partly quartile subsamples two months after the anticipation date. Table 4 shows a significant CAAR of 8.85% for 3Q subsample of target firms. The quartile comparison test marginally rejects the $H_0^{(2a)}$ since this CAAR is higher than that for 1Q subsample (2.01%) by 6.84%. However, it is not different from that of 2Q subsample. Similar results are also reported for the (0, 105) interval. The market cannot hence distinguish 2Q from 1Q subsample in the first six months from the deal anticipation date. However, the CAAR of 2Q becomes statistically different from those of 1Q subsamples in the (0, 147), (0, 189) event windows. Underperformance of 1Q relative to 2Q subsample is economically substantial since their CAAR difference is -15.76% and -18.02% in those windows, respectively. These results suggest that the market receives some relevant signals about the announcement date of 2Q subsample after six months from the anticipation date. Generally, the signals about potential M&A become stronger close to the announcement date in all quartile subsamples. This evidence is in line with a finding in Irani (2014) in which the merging likelihood is increasing with proximity to the announcement date. However, it does not mean that an anticipator can gain if s/he waits, e.g., for seven months. S/he can lose a CAAR of -0.78% after seven months of waiting if the anticipated deal takes more than one year to be announced. Given the difficulty in timing the public bid announcement, waiting can be very costly for anticipators.

Furthermore, Table 5 reports that the results for the acquirers' quartile subsamples are similar to those reported for the targets. In fact, the differences between quartile subsamples are more pronounced in the acquirer case. For instance, the significance of CAAR for 3Q subsample starts in event windows that end at or after Day P+30. The CAAR for 3Q subsample for acquirers differ not only from those of 1Q but also from those of 2Q subsample in both the two and three months' event windows, suggesting the market in the acquirer case is more successful in anticipating the likely announcement time.

The highly positive AAR for the 3Q in the (P+31, P+105) interval indicates release of M&A news for this subsample, but that for the 1Q and 2Q subsamples is low (even negative). Thus, those opposite returns cancel each other out when the portfolio AAR are computed for the full sample in that interval. This line of reasoning advises the observed less trending CAAR series for the full sample in this period cannot be interpreted as a period of no new information. Similar inference can be made based on the divergent CAAR across payment subsamples in that period (see Panel B of Figure 3 and 4).

3.2.2. Payment-form

Panel B of Figure 3 and 4 exhibits that the CAAR to the target and acquirer shareholders vary substantially with the payment-form during the post-anticipation segment, respectively. The tests for difference in CAAR in the (P, P+20) event window (see Table 4 and 5) indicates the CAAR is weakly different (at 10% level) only between mixed and cash subsamples for the targets, and between equity and cash subsamples for the acquirers. Mainly similar CAAR in that interval suggest that the bid is anticipated but not its payment-form, which in turn confirms the uncertainty about the future payment-form at the time of deal-anticipation.

This result also confirms one of the main results in Irani (2014): the payment-form is anticipated after the deal-anticipation date. This result is justified with the following reasons: (1) the deal and payment-form anticipation dates coincide only in 45 out of 108 anticipated deals, (2) the payment-form is not detected for 31 anticipated deals, and (3) the market also anticipates the payment-form of the rest of deals (32) in a more recent date, so the deal and payment-form anticipation dates do not coincide for these deals.

Around the middle of those figures (after Day P+63 and P+105 for targets and acquirers), the CAAR across payment-subsamples becomes distinct. Table 4 and 5 confirm those distinctions, for any event window that ends at or after Day P+105 in particular. The reason for this evidence is that the market receives relevant signals about the most likely payment-form of the anticipated deals around those dates. This arrival time of new information, which is based on the behavior of CAAR, is also consistent with a finding in Irani (2014): it takes on average three months (63 business days) for the market to pinpoint the most likely payment-form of the anticipated deals. Therefore, these two results are in agreement that the most likely time for release of any signals about the offered payment-form is on average is about three months after the del-anticipation date.

The difference in CAAR between cash and equity subsamples is economically considerable for both the target and acquirer samples, e.g., -28.04% and -17.92% in the (0, 147) interval, respectively. This example suggests how expensive can it be for anticipator if the expected payment-form will be different from the announced one. Additionally, Figure 3 and 4 show the maximum difference in CAAR across quartile subsamples is around 15% while that for payment-form subsamples is about 40%. This implies that the potential loss due to wrong payment-form anticipation exceeds that of the incorrect expectations about the announcement time. In other words, risk involved in the payment-form is greater than that of the waiting time.

The payment-from comparison tests in Table 4 and 5 indicate the CAAR (of both target and acquirer firms) in equity offers exceeds those of cash offers, e.g., in the (P, P+126) interval by 28.29% and 14.89%. These results are contrary to the well-documented results in M&A event studies and the alternative of hypothesis 2b: the cash-financed deals generate greater returns than those of equity-financed ones. While this contradiction might be puzzling at first glance, it can be explained by behavior of CAAR between the anticipation and announcement dates. Panel B of Figure 3 and 4 demonstrate that the CAAR to the both target and acquirer firm in the all-equity and mixed-payment deals surpasses those in all-cash deals. When both the target and acquirer firms underperform the average merging firm (the full M&A sample) during the post-anticipation segment, an announcement of all-cash bid is more likely. However, an all-equity (or a mixed) offer is more likely when both of them outperform the average firm. This finding extends the rationales for the choice of payment-form in M&A, and proposes that the both merging firms have less asymmetric information about the value of both target and acquirer shares at the time of bid announcement.

Overall, results suggest that the anticipators profit from anticipating the merging firms. However, M&A anticipation is not a risk-free activity and cannot be classified as a pure arbitrate opportunity since anticipators experience two uncertainties at the time of deal anticipation: the waiting time until the announcement and the eventual offered payment-form. The findings indicate that the longer the eventual waiting time, the smaller are gains to the anticipators. The payment-form is riskier than the waiting time since incorrect (correct) payment-form anticipation generates greater loss (gain).

3.3. Improving Performance Measures by Controlling Predictability of M&A

So far, results indicate that some relevant information about the future takeover transactions are incorporated in the target and acquirer stock prices long before the bid announcement day, i.e., during the post-anticipation segment. This section investigates whether controlling these early anticipations can improve measurement of acquisition gains around the bid announcement date (Day 0).

Table 6 and 7 represent the daily AAR to the target and acquirer samples and their payment-form subsamples around the announcement day (from Day -10 to Day 10), respectively. The fixed benchmark and float approaches estimates separately AAR. Those tables also report difference between the two estimates, and whether those differences are statistically significant.

Inset Table 6 here

Table 6 and 7 show the largest daily gains (losses) occurs for the target (acquirer) shareholders at Day 0 and Day 1. These results are similar to the findings of previous M&A event studies, and so confirm comparability of our sample to theirs.

Inset Table 7 here

The $H_0^{(3)}$ is not rejected for both the full target and acquirer samples. However, it is rejected in the payment-form subsamples, and so both approaches generate some different daily AAR. Table 6 and 7 show that the fixed benchmark approach overestimates the daily AAR to the target and acquirer shareholders in the cash offers. The difference is statistically significant for more days in the target's subsample. The magnitude of bias in those significant days is ranging from 3.8 to 6.2 basis points (bps), which are economically substantial. For several days in the (-10, 10) interval, the fixed benchmark approach underestimates significantly the daily AAR to the target and acquirer shareholders in both the equity and mixed offers. The overestimations in the cash offers offset the underestimations in the equity and mixed offers, and so makes the AAR of two approaches to be similar in the full samples. Generally, the significant differences are observed in the daily AAR in this short interval. The particularly interesting question is that how these differences are accumulated over long-term event windows, i.e., whether they cancel each other out or cause divergence in the CAAR.

Insert Figure 5 here

Figure 5 and 6 depict the CAAR to the target and acquirer shareholders in the full sample and the payment-form subsamples in the (-126 to 63) interval, respectively. This interval covers nine months around the announcement date. Figure 5 and 6 show that the two approaches generate rather similar CAAR in the full sample, but their CAAR series diverge from each other in the payment-subsamples. The fixed approach overestimates (underestimates) the CAAR to both the target and acquirer shareholders in the cash (the equity and mixed) offers.

Insert Figure 6 here

The direction of bias in the CAAR around the announcement date is inconsistent with the direction of trends in CAAR during the post-anticipation segment. Namely, the fixed benchmark approach underestimates the CAAR of equity offers around the announcement date while those CAAR during the post-anticipation segment are positively trending. The following mechanism explains reasons for this inconsistency. Using outperformed returns from the post-anticipation period of equity offers in the fixed benchmark estimation window causes overestimation of the parameters of the market model, which in turn inflates the "normal" returns over the event window.[11] Consequently, the overestimated expected returns lead to a lower AR, and so underestimation of CAAR to the equity (cash) offers around the announcement date. The opposite mechanism holds for the cash offers, and explains why their CAAR are overestimated around the announcement date. In sum, these inconsistencies are indeed an artifact of using the fixed estimation window to estimate the parameters, and then use those biased parameters to anticipate the AR during the event window.

Table 8 and 9 represent differences between the mean of fixed and float AAR over various event windows for the target and acquirer firms, respectively. Consistent with the above overestimation and underestimation results, the $H_0^{(4)}$ is significantly rejected, which proves that the fixed and float approaches estimate differently a time-series of AAR. This result holds consistently in various event windows, and more importantly, sign of the difference is constant across the event windows of each payment-form subsample. Therefore, the observed differential trend between the fixed and float CAAR is not caused by a few returns from a specific event window.

Insert Table 8 here

Table 8 and 9 show also the difference in mean of AAR in the payment-form subsamples is ranging, e.g., from -4.4 to 3.06 bps for the targets, and from -2.12 to 1.71 bps for the acquirers in the (-126, 63) interval. Given that the daily average returns to the US treasury notes is ranging from 1.13 to 1.78 bps (based on their maturity) in the sample period of this paper, using the fixed estimation approach leads to economically substantial errors in measuring acquisition returns.[12]

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[11] This statement assumes that the observed return series for both the market and the merging firms are on average positive during the event window. This is the case for this study and usually valid for others M&A studies as well since the literature documents that M&A are more frequent in the beginning of M&A waves, i.e., M&A are mainly announced in the bull markets.

[12] Historical data for the interest rates is from the Federal Reserve Board: http://www.federalreserve.gov/releases/h15/data.htm

Insert Table 9 here

Furthermore, the fixed benchmark approach can result in invalid statistical inferences. For instance, Table 8 indicates that the fixed approach estimates a marginally significant CAAR of 4.83% to the target shareholders in cash offers during the run up period (-42, -1). Conversely, the float approach indicates that this CAAR is indeed 3.49% and more importantly statistically insignificant in conventional levels. Result of previous studies (e.g., Schwert, 1996) that regress the markup premium (e.g., CAAR in the (0,126) interval) on this run-up CAAR can biased due to the measurement error in CAAR.

The previous literature mainly acknowledges that the short-horizon event studies are reliable methods in measuring the effects of the corporate events on the shareholders' wealth (see, e.g., Khotari and Warner, 2007). The results here also confirm this idea by showing that the measurement error in the CAAR increases with the length of event-window. However, the test for the difference in mean of AAR (which is reported in Table 8 and 9) finds that the AAR and the related CAAR can be incorrectly measured even in a short event window of 11 days around the announcement day (the (-5, 5) interval). For example, the average daily gains to the target (acquirer) shareholders in the equity offers are significantly underestimated by 4.33 bps (1.94 bps) in this interval.[13] These results hence suggest that if the event is assumed to be unpredictable, the measurement errors can exist even in the short-horizon event studies.

Table 8 and 9 further illustrate that the average daily gains are misestimated rarely for the full sample of merging firms. The reason is that the overestimated AR in the cash subsample offset the underestimated ones in the equity and mixed subsamples when the performance measures are estimated for the full sample. This finding suggest that the unpredictability assumption can lead to substantial measurement error in the AR and CAAR of the full sample if a study uses a sample whose composition is different from the one employed here. In other words, if the major portion of sample is financed via cash (equity), then it is more likely that the fixed approach overestimates (underestimates) the acquisition returns. This line of reasoning suggests that a well-balanced composition of M&A sample can reduce the risk of measurement error in the full sample.

To sum up, the results in this section reveals that the M&A unpredictability is a restrictive assumption and controlling it can improve estimating (and inferring) the true effects of M&A on the wealth of shareholders around the announcement date.

3.4. Implications of the Improved Measurements

This section presents the implications of the float estimation approach for three well-documented M&A results: the skewed division of gains between target and acquirer shareholders, the total synergistic gains, and the differential gains across payment-forms.

3.4.1. Skewed Division of Gains between Target and Acquirer Firms

Results of the *t*-test in Table 10 indicate that the $H_0^{(4a)}$ is rejected in the full sample and payment-form subsample over several event windows. The unpredictability assumption leads to

[13] There might be some small sample issues with performing the *t*-test for a very short interval, but the results also indicate measurement errors even in a three-day event window (-1, 1).

higher absolute measurement error in the CAAR of target firms compared to those for the acquirer firms. In particular, the overestimation (underestimation) of the gains to the target shareholders in the cash (equity and mixed) offers exceeds those of acquirers. For instance, the fixed estimation approach estimates the skewed division of gains (i.e., the difference in CAAR) between the target and acquirer shareholders in cash offer is [19.63% - (- 4.95%) =] 24.58% in the (-126, 63) interval while the float approach estimates this value is [13.81% - (- 8.21%) =] 22.02%. Thus, the fixed approach overestimates this skewed division by (24.58% - 22.02% =) 2.56% in this interval. Table 10 shows that the related daily average is overestimated by 1.35 bps, which is statistically significant at 1% significance level (with a *t*-statistic of 3.2).

Insert Table 10 here

Table 10 reports similar significant results for the equity and mixed subsamples except that their sign of difference is reverse to the one for the cash subsample. Moreover, the size of daily overestimations (underestimations) in cash (equity) offers is also economically considerable since it is ranging from 0.63 bps (-1.99 bps) to 2.26 bps (- 3.8 bps). All in all, using the fixed estimation approach increases (decreases) the skewed division of gains between the target and acquirer shareholders in the cash (equity and mixed) offers around the announcement day.

3.4.2. Total Synergistic Gains

The above results can also improve measurement of the total synergistic gains to the merging firms. It is well documented (e.g., Bradley Desai, and Kim, 1988) that this total value is usually positive, suggesting that the takeover transactions enhance the value of the combined entity. For instance, the fixed estimation approach estimates the total synergistic gains (i.e., the sum of CAAR) to the target and acquirer shareholders in equity offers is [9.37% + (- 7.26%) =] 2.11% in the (-10, 10) interval while the float approach's estimates is [10.28% + (- 6.84%) =] 3.44%.[14] Thus, the fixed approach underestimates the total synergistic gains by (2.11% - 3.44% =) -1.33% in this interval, which in turn might lead to rejection of the synergistic motives in favor of other alternatives (e.g., the managerial incentives) for choice of acquirers' equity as the payment method. The fixed estimation approach overestimates (underestimates) the total synergistic gains in the cash (equity and mixed) offers.

3.4.3. Differential Gains between Offered Payment-forms

Table 11 and 12 present how CAAR are different across payment subsamples around the announcement day for the target and acquirer firms, respectively. The differential CAAR are computed via the fixed benchmark and float approaches. In general, the fixed benchmark approach underestimates economically the differential CAAR between equity and cash subsample. For example, the fixed approach estimates that the equity subsample underperforms

[14] I follow Bradley Desai, and Kim (1988) in defining the total synergistic gains, which is equal the CAAR to a value-weighted portfolio of the acquirer and target firms. Given that Irani (2014) finds that the target and acquirer firms are on average in similar size a year before the first public announcement in equity subsample, I focus on this subsample in this example for simplicity of the computation of the total synergistic gains. However, it is easy to extend the analysis to the cash and mixed offers in which the average relative size of target to acquirer firms is around 0.2 and 0.44, respectively.

slightly the cash one by -0.16% in the pre-announcement period (-126, -1). However, the float approach indicates that it indeed outperforms by 9.5%. These results are expected since the previous findings here indicate that the fixed approach underestimate (overestimates) CAAR of the equity (cash) deals.

Insert Table 11 here

More importantly, using the fixed approach leads to incorrect statistical inference about the differential gains in some event windows. For example, Table 12 shows that the fixed approach estimates the differential CAAR between the equity and cash offers in the run up period (-42, -1) for the acquirers is 4.71% and statistically insignificant. Simply, shares of acquirer firms perform equally in the cash and equity bids during this period. On the contrary, the float approach shows that this differential CAAR is indeed 6.15% and statistically significant. A correct conclusion based on the float approach could be that the acquirers' shares are overvalued in the equity bids relative to the cash ones during this period.

Insert Table 12 here

4. Robustness Tests

4.1. Uniform Vs. Float Anticipation Date

Does assuming a uniform anticipation date across event firms approximate results of the float approach? If this is the case, then use of the float approach, which considers the whole distribution of deal-anticipation dates to estimate CAAR, is unnecessary. To investigate this issue, I use the median of deal-anticipation distribution (Day -190) as a uniform anticipation date. By doing so, I assume that all deals are anticipated uniformly 190 trading days before the announcement (i.e., P_n = -190 for all n). This assumption reduces the float approach to the fixed approach. This case is called the "distant estimation window (MM189)", and represented in Eq. (36 and 37) in Appendix B. Moreover, two other approximations are employed to examine how the results are sensitive to the choice of uniform date: P_n = -127 and -64. The first approximation reduces the float model to the "Benchmark Model (MM126)" in Eq. (2 and 3), and the second one to the "Close Estimation Window (MM63)" in Eq. (34 and 35) in Appendix B.

Insert Figure 7 here

Comparing those three CAAR series with that of the float approach in the post-anticipation segment (P, P+189) provides insights of how imposing uniform anticipation dates can affect the measurement of the anticipators' gains. Figure 7 and 8 depict the CAAR to the target and acquirer firms and the payment-form subsamples based on those approaches, respectively.[15] These figures provide insufficient evidence that the three CAAR series based on the uniform

[15] Note that AR and CAAR are estimated from the uniform anticipation date (P_n) until the day before the announcement date (-1) to capture only the deal-anticipation effect. This explains why the plot of CAAR for the MM63 and MM126 finishes earlier than those of the float and MM189 since they have fewer days during their post-anticipation segment.

deal-anticipation assumption approximate the CAAR series of the float approach. They track float CAAR only in short-term event windows (less than three months), and in the cash and equity subsamples in particular. However, the uniform approaches do not follow the path of the float CAAR in mid- to long-term intervals. In fact, the uniform approaches overestimate the CAAR in the cash deals and underestimate them in the rest. These results confirm that the cross-sectional variation in the deal-anticipation dates contains important information for measuring anticipators' gains around the deal-anticipation event. The consequences of those assumptions on CAAR around the announcement date will be investigated in the next section.

Insert Figure 8 here

4.2. Alternative Models for the Expected Returns

This section addresses whether using alternative expected return models instead of the fixed benchmark model (MM126) can generate similar measurement errors around the announcement date. Simply, it investigates whether the measurement errors are a function of the expected return model. If so, which one is the best model in mimicking CAAR of the float approach? Appendix B presents those alternative models for the fixed estimation approach: the mean adjusted model, the market adjusted model and two alternative market models (MM63, MM189)

Figure 9 and 10 depict one measure for cumulative returns of the market and seven different measures for cumulative returns to the target and acquirer shareholders over the (-63, 63) interval, respectively. The first evidence in these figures indicates that the market and the raw target and acquirer return series are trending in this six-month interval around the announcement date.[16] Thus, an ex-ante model of returns is necessary to decompose the observed raw return series into two parts: the expected part (which captures the trend in the market) and the unexpected part (which captures any takeover effects).

Insert Figure 9 here

The literature suggests that the simple mean-adjusted model and the market-adjusted models can be used for that decomposition. However, Figure 9 and 10 indicate that the CAAR of these two models underperform generally those three market models in tracking the float CAAR. Finally, the benchmark model (MM126) outperforms the other two market models in tracking the float CAAR. This result explains why all comparisons between the fixed and float estimation approaches in this paper is based on the benchmark estimation approach. Overall, using other alternative fixed estimation approaches (rather than this benchmark model) increases the documented measurement errors in performance measures around the announcement date.

Insert Figure 10 here

[16] In those figures, "Raw Returns" depicts the cumulative daily average realized returns to the merging firms, and "S&P500" is the cumulative daily average realized returns to the S&P500 index, which is a proxy for the US equity market.

5. Summary and Concluding Remarks

Takeover event studies often assume that the M&A are not anticipatable prior to the event window. Irani (2014), however, shows that the majority of M&A are anticipated long before the event window of previous studies. This paper examines the consequences of these early anticipations on the outcomes of a takeover event study.

First, this paper introduces a new float estimation approach, in which the parameters of the expected return model are estimated from the pre-anticipation segment of each deal, to control any adverse effects of early anticipations on the measurement of AR and CAAR around the announcement date. Second, the performance measures estimated by this float approach are compared with those of a fixed benchmark model, which is based on the estimation approach of Schwert (1996). The comparison results indicate that the M&A unpredictability assumption leads to significant errors in estimating (and in inferring) the performance measures around the announcement day. The fixed approach overestimates (underestimates) the CAAR to the target and acquirer shareholders in the cash (in both the equity and mixed) offers. These results are robust against use of various models for the expected (normal) returns and various event windows around the announcement date.

This paper provides further results about the deal-anticipation event. First, the significant positively trending CAAR to the acquirer and target series during the post-anticipation period (1) indicate that part of synergistic gains from the future M&A are incorporated in their stock prices long before the announcement date, (2) so confirms the anticipation mechanism proposed by Irani (2014) in which expecting synergetic gains from merging of potential pair-firms is the main motive for anticipating M&A, and (3) provides some new insights into a well-documented puzzle in M&A literature: negligible gains to the acquirer shareholders around the bid announcement date. Indeed, they indeed collect their division of synergistic gains long before the announcement date, around the deal-anticipation date. Second, anticipating merging firms is a profitable activity but it is not a risk-free one since the anticipators faces two types of uncertainties at the anticipation time: the waiting time until the announcement date and the eventual offered payment-form. The anticipators' gains shrink with the waiting time. The payment-form is riskier than the waiting time since incorrect (correct) payment-form anticipation generates greater loss (gain). Finally, a deal is more likely to be financed with cash (equity) if both target and acquirer shares are undervalued (overvalued) in the post-anticipation period. Both of merging firms have less asymmetric information about their share value at the bid announcement. This result hence adds to the rationales for the choice of payment method in M&A.

The results around the announcement event also reveal that assuming unpredictable M&A in the fixed benchmark estimation approach (1) increases (decreases) the skewed division of gains between the target and acquirer shareholders in the cash (equity and mixed) offers, (2) overestimates (underestimates) the total synergistic gains in the cash (equity and mixed) offers, and (3) misestimates the differential CAAR between the offered payment-forms.

Are these measurement errors specific to the sample period used in this paper? The results here indicate that the equity (cash) payment is more likely when both target and acquirer firms are overvalued (undervalued) during the post-anticipation period. Thus, both firms have less asymmetric information about each other's share value at the announcement date, which in turn can provide rather fair merger valuation for both parties. This result is highly likely to hold regardless of the sample period used in a takeover event study. Therefore, if deals are anticipatable before the announcement date, then the standard fixed estimation approaches can generate unreliable acquisition returns. The reason is that when fixed approaches estimate expected returns, they ignore that M&A are anticipatable. This conjecture suggests similar errors might be detected for other M&A markets and other sample periods; however, this is as an agenda for future studies.

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Appendix

A. Test Statistics

1) Goal 1: Average Anticipation Effects

The test statistic for examining the **Null Hypothesis 1** at each event day *t* over the [P-10,⋯,P,⋯,P+10] interval is

$$Z_t = \frac{\bar{A}_t}{\hat{S}(\bar{A}_t)}, \tag{10}$$

where

$$\hat{S}(\bar{A}_t) = \frac{1}{\sqrt{190}}\sqrt{\left(\sum_{t=P-190}^{P-1}(\bar{A}_t - \bar{\bar{A}})^2\right)} \tag{11}$$

$$\bar{\bar{A}} = \frac{1}{190}\sum_{t=P-190}^{P-1}\bar{A}_t. \tag{12}$$

Eq. (10) indicates that the test statistic is the ratio of AAR at day *t* to its estimated standard deviations, as shown in Eq. (11). The standard deviation is estimated from a time series of AAR (i.e., "portfolio" excess returns).[17] Thus, the test statistic accounts for cross-sectional dependence in the firm-specific AR (Brown and Warner, 1980 and 1985), which is more beneficial if the sample is not drawn from diverse industries (concentrated on a few industries).[18] If the $\bar{A}_t$ are independent and identically distributed, and normal, the test statistic has the Student's *t*

[17] Given that the median of deal-anticipation date is -190, there are 190 returns left during the pre-announcement period. Thus, to distribute evenly the returns of the pre-announcement period (-379 to -1) across pre- and post-anticipation segments, the Eq. (11) is estimated with 190 daily AAR from the pre-anticipation segment. There are no missing returns during this estimation window for various quartile and payment subsamples except for 1Q subsample, whose estimation window contains only 65 daily AAR. In this case, there are at least 20 event firms during that window to estimate the AAR and the "portfolio" standard deviation.

[18] The standard deviation is based on the AAR of the estimation period, and so underestimated since the AR are the out-of-sample prediction errors, and needs to be adjusted. Patell's (1976) adjustment is used for estimating the standard deviation of this test and subsequent tests but there is no significant change in the main results. Those results are available upon request from the author.

However, this paper uses the portfolio approach due to the following reasons: first, Patell's approach standardizes AR of each series with an estimate of its standard deviation, which is mainly based on the residuals variance of the market model. The float approach has fewer returns than the fixed benchmark approach during its estimation period, and so its estimates of the standard deviation exceed systematically those of the benchmark model. This fact suggests that the float approach has lower power in detecting the true AAR and CAAR. Second, Patell's approach standardizes AR of each series before forming the portfolio of merging firms. This standardization can lead to a different sign between the tests statistics based on the Patell's approach and the related performance measure (e.g., AAR, CAAR). This can be puzzling and make the interpretation of results to some extent difficult.

distribution under the null hypothesis. Moreover, since the degree of freedom is around 200, the test statistic is assumed unit normal.

$$\hat{S}(\bar{A}_t) = \frac{1}{\sqrt{252}} \sqrt{\left(\sum_{t=-379}^{-127} (\bar{A}_t - \bar{\bar{A}})^2 \right)} \tag{13}$$

$$\bar{\bar{A}} = \frac{1}{253} \sum_{t=-379}^{-127} \bar{A}_t. \tag{14}$$

Table 6 and 7 reports test statistics for examining whether the mean of AR at each event day t (over the $[-10,\cdots,0,\cdots,10]$ interval) around the public bid announcement date (0) is equal to zero. I use the same test statistic as calculated in Eq. (10), but with a different standard deviation, which is estimated from Eq. (13 and 14). The major difference to the previous test is the use of the benchmark estimation window (which contains 253 returns) to obtain an estimate of the portfolio standard deviation.

The test statistic for examining the **Null Hypothesis 2** over an event window is

$$SZ_{t_1,t_2} = \frac{CAAR(t_1,t_2)}{\hat{S}\left(CAAR(t_1,t_2)\right)} \tag{15}$$

$$\hat{S}\left(CAAR(t_1,t_2)\right) = \sqrt{(t_2 - t_1 + 1)}\, \hat{S}(\bar{A}_t), \tag{16}$$

where (t_1, t_2) represent the event window for which the CAAR and the test statistic is computed. If Z_t from Eq. (10) is i.i.d. and normally distributed over this event window, SZ_{t_1,t_2} has unit normal distribution. The test statistics in Eq. (15) uses AR estimated around the deal-anticipation event when it addresses the second hypothesis. However, it uses AR estimated around the bid announcement event to examine the significance of CAAR in Table 8 and 9.

The following test statistic $D1Q2Q_{t_1,t_2}$ in Eq. (17) is an example of how the **Null Hypothesis 2a** is examined over an event window. It tests whether the CAAR to those anticipators who wait more than one year (1Q subsample) are smaller than those who wait between 6 and 12 months (2Q subsample).

$$D1Q2Q_{t_1,t_2} = \frac{SZ^{1Q}_{t_1,t_2} - SZ^{2Q}_{t_1,t_2}}{\sqrt{2}}. \tag{17}$$

The following test statistic DEC_{t_1,t_2} in Eq. (18) is an example of how the **Null Hypothesis 2b** is examined over an event window. It tests whether the CAAR to the shareholders in all-equity offers are smaller than those in all-cash offers.

$$DEC_{t_1,t_2} = \frac{SZ^{Equity}_{t_1,t_2} - SZ^{Cash}_{t_1,t_2}}{\sqrt{2}}. \quad (18)$$

Given the independence across both quartile and payment subsamples, and since each SZ_{t_1,t_2} has unit normal distribution in the absence of abnormal performance, the test statistic for assessment the difference between the CAAR of any two subsamples (e.g., $D1Q2Q_{t_1,t_2}$ and DEC_{t_1,t_2}) is also unit normal.

2) *Goal 2: Difference in Measurement of the Fixed and Float Approaches*

Let $\bar{D}_{A_t}$ denote the difference between average abnormal returns (AAR) of the fixed and float approaches at day *t* around the public bid announcement date (0). The test statistic for examining the significance of $\bar{D}_{A_t}$ at each event day *t* over the $[-10,\cdots,0,\cdots,10]$ interval, the **Null Hypothesis 3,** is

$$T_{A_t} = \frac{\bar{D}_{A_t}}{\hat{S}(D_{A_t})\big/\sqrt{N_t}}, \quad (19)$$

where

$$\bar{D}_{A_t} = \left(\sum_{n=1}^{N_t} D_{A_{n,t}} \Big/ N_t\right) \quad (20)$$

$$\hat{S}(D_{A_t}) = \sqrt{\frac{1}{N_t - 1}\sum_{n=1}^{N_t}\left(D_{A_{n,t}} - \bar{D}_{A_t}\right)^2} \quad (21)$$

$$D_{A_{n,t}} = A^b{}_{n,t} - A^f{}_{n,t}. \quad (22)$$

$D_{A_{n,t}}$ in Eq. (22) designates the difference in the abnormal return to the shareholders of firm *n* at day *t* due to the "repetitive measurements". In other words, both the float and the fixed benchmark approaches measures the same cross-sectional $A_{n,t}$ (i.e., $A^b_{n,t}$ and $A^f_{n,t}$). The two measurements are correlated since the parameters of the market model are estimated via some common returns during the estimation windows, i.e., the estimation window of the fixed benchmark (-379, -127) and of the float (-379, P_n) methods overlaps each other. To deal with this issue, the third null hypothesis is examined by the paired two-sample *t*-test. This test does not use data from the estimation-window to find the standard deviation, and uses a cross-sectional estimate (Eq. 21). Thus, it examines whether the cross-sectional average difference in the measurements of AR at day *t* (i.e., $\bar{D}_{A_t}$) is equal to zero. If those cross-sectional differences (

$D_{A_{n,t}}$) are independent, identically distributed, and normal, the test statistic converges to the Student's t distribution with (N_t-1) degree of freedom under the null hypothesis.[19]

The test for examining the **Null Hypothesis 4** considers two time-series of AAR estimated by the fixed and float approaches, and tests whether the average of these two series are different from each other. Let $\bar{D}_{\bar{A}_{(t_1,t_2)}}$ denote the difference in mean of average abnormal returns between these two approaches over the event window (t_1, t_2). The test statistic is

$$T_{\bar{A}_{(t_1,t_2)}} = \frac{\bar{D}_{\bar{A}_{(t_1,t_2)}}}{\hat{S}(D_{\bar{A}_{(t_1,t_2)}}) \Big/ \sqrt{(t_2 - t_1 + 1)}}, \tag{23}$$

where

$$\bar{D}_{\bar{A}_{(t_1,t_2)}} = \left(\sum_{t=t_1}^{t_2} D_{\bar{A}_t} \Big/ (t_2 - t_1 + 1) \right) \tag{24}$$

$$\hat{S}(D_{\bar{A}_{(t_1,t_2)}}) = \sqrt{\frac{1}{(t_2 - t_1)} \sum_{t=t_1}^{t_2} \left(D_{\bar{A}_t} - \bar{D}_{\bar{A}_{(t_1,t_2)}} \right)^2} \tag{25}$$

$$D_{\bar{A}_t} = \bar{A}_t^b - \bar{A}_t^f. \tag{26}$$

Since both the float and the fixed benchmark approach measures the same daily AAR, so the two time series of AAR are paired. The fourth null hypothesis is thus examined by the paired two-sample t-test, which accounts for the dependence in the two measurements. The standard deviation of test is estimated via the daily difference in the measurements of AAR over the event window ($D_{\bar{A}_t}$) by Eq. (25). The test in Eq. (23) examines whether the average difference in the measurements of AAR over an event window ($\bar{D}_{\bar{A}_{(t_1,t_2)}}$) is equal to zero. If those daily differences ($D_{\bar{A}_t}$) are independent, identically distributed, and normal, the test statistic converges to the Student's t distribution with (t_2 - t_1) degree of freedom under the null hypothesis.

The above iid-normal assumption (mainly the time-series dependence part) might be violated for financial time-series, which in turn may lead to erroneous inferences. First, although the sixth M&A wave is considered as the sample period, the event firms are dispersed over this period, and so the time-series dependence is not triggered with clustering of M&A around any calendar date. Thus, the time-series dependence in firm-specific AR (if exists) can be removed when each security's AR is combined with those of other securities to build daily AAR, which is the equally weighted return to the portfolio of merging firms. Moreover, the time-series dependence might

[19] The Wilcoxon (1945) signed-rank test is performed to examine the median of daily differences. The result of this non-parametric test confirms those of the parametric t-test, suggesting that the normality assumption is not a concern here.

be not a major issue here since the test in Eq. (23) is performed over a time-series of differential AAR. This is due to the fact the differencing might eliminate some part of any remained time-series dependence. Second, diagnostic tests are additionally performed to examine the time series properties of AAR of fixed and float approaches, and their daily differences. Accordingly, the Ljung-Box (1978) and Shapiro-Wilk (1965) test is used to examine the independence and normality assumptions, respectively. Those tests generally confirm the zero-correlation and normality assumptions. Finally, in addition to this and the subsequent parametric independent two-sample t-test in Eq. (27), the Wilcoxon (1945) signed-rank and rank-sum tests are performed. While the t-tests can perform poorly with non-normal data, the rank-tests are non-parametric and robust against non-normality, and can be more reliable (see, e.g., Corrado and Zivney, 1992; and Ahern, 2009). The Wilcoxon tests do not generate different results.[20] Overall, the collective evidence indicates that the results are robust against the iid-normal assumption.

The test statistic for examining the **Null Hypothesis 4a** is

$$T^{TRG-ACQ}_{\bar{A}_{(t_1,t_2)}} = \frac{\overline{SD}_{\bar{A}_{TRG,(t_1,t_2)}} - \overline{SD}_{\bar{A}_{ACQ,(t_1,t_2)}}}{\sqrt{\left(\hat{S}(SD_{\bar{A}_{TRG,(t_1,t_2)}})^2 + \hat{S}(SD_{\bar{A}_{ACQ,(t_1,t_2)}})^2\right)\Big/(t_2-t_1+1)}}, \tag{27}$$

where

$$\overline{SD}_{\bar{A}_{TRG,(t_1,t_2)}} = \left(\sum_{t=t_1}^{t_2} SD_{\bar{A}_{TRG,t}} \Big/ \left(t_2-t_1+1\right)\right) \qquad \overline{SD}_{\bar{A}_{ACQ,(t_1,t_2)}} = \left(\sum_{t=t_1}^{t_2} SD_{\bar{A}_{ACQ,t}} \Big/ \left(t_2-t_1+1\right)\right) \tag{28}$$

$$\hat{S}(SD_{\bar{A}_{TRG,(t_1,t_2)}}) = \sqrt{\frac{1}{\left(t_2-t_1\right)}\sum_{t=t_1}^{t_2}\left(SD_{\bar{A}_{TRG,t}} - \overline{SD}_{\bar{A}_{TRG,(t_1,t_2)}}\right)^2} \qquad \hat{S}(SD_{\bar{A}_{ACQ,(t_1,t_2)}}) = \sqrt{\frac{1}{\left(t_2-t_1\right)}\sum_{t=t_1}^{t_2}\left(SD_{\bar{A}_{ACQ,t}} - \overline{SD}_{\bar{A}_{ACQ,(t_1,t_2)}}\right)^2} \tag{29}$$

$$SD_{\bar{A}_{TRG,t}} = \frac{\bar{A}^b_{TRG,t}}{\hat{S}\left(\bar{A}^b_{TRG,t}\right)} - \frac{\bar{A}^f_{TRG,t}}{\hat{S}\left(\bar{A}^f_{TRG,t}\right)} \qquad SD_{\bar{A}_{ACQ,t}} = \frac{\bar{A}^b_{ACQ,t}}{\hat{S}\left(\bar{A}^b_{ACQ,t}\right)} - \frac{\bar{A}^f_{ACQ,t}}{\hat{S}\left(\bar{A}^f_{ACQ,t}\right)}. \tag{30}$$

Let $\overline{SD}_{\bar{A}_{TRG,(t_1,t_2)}}$ denote the difference between the fixed benchmark and float approaches in measuring the mean of standardized AAR to the target shareholders over the event window (t_1, t_2). Each AAR is standardized in Eq. (30) by a standard deviation, which is estimated using "portfolio" excess returns form the benchmark estimation window (Eq. 13). Given that the target AR are more volatile than those of acquirer, this standardization is necessary before comparing those average differences between the target and acquirer samples. Since the target and acquirer samples and their standardized difference in measurements of AAR ($SD_{\bar{A}_{TRG,t}}$ and $SD_{\bar{A}_{ACQ,t}}$ in Eq. 30) are independent, this hypothesis will be examined by the independent (unpaired) two-sample *t*-test. The standard deviation of test is estimated via the $SD_{\bar{A}_{TRG,t}}$ and $SD_{\bar{A}_{ACQ,t}}$ over the event window (t_1, t_2). If $SD_{\bar{A}_{TRG,t}}$ and $SD_{\bar{A}_{ACQ,t}}$ are independent, identically distributed, and normal, the

[20] Those results are not reported here for the sake of brevity, and are available upon request from the author.

test statistic converges to the Student's *t* distribution under the null hypothesis. The degree of freedom for this t-test is calculated using the Welch's (1947) formula.

B. Alternative Expected Return Models for the Fixed Estimation Window

This paper considers in the robustness section other two well-known models (which are used by Brown and Warner, 1980 and 1985) for generating the ex-ante expected returns (i.e., "normal" returns).

(1) Mean Adjusted Returns

$$A^{M}_{i,n,t} = r_{i,n,t} - \bar{r}_{i,n} \quad , \quad t = (-63, \cdots, 0, \cdots, C) \tag{31}$$

$$\bar{r}_{i,n} = \frac{1}{253} \sum_{t=-379}^{-127} r_{i,n,t} \quad , \quad \tau = (-379, \cdots, -127)\text{, } \textit{benchmark estimation window}, \tag{32}$$

where $\bar{r}_{i,n}$ is the sample average of security *i*'s daily return in the (-379, -127) estimation period. While the mean adjusted returns model is usually considered as the simplest model for generating the expected returns, Brown and Warner (1980, 1985) find that it often generates similar results to those of more sophisticated models. This model can yield valid results in the plateau (normal) markets. However, the market is trending in this sample period due to its coincidence with the recovery period after the IT bubble. Since this model can be errornous in the trending markets, alternative models, which can capture the trend in the market, are additionally used. Those models adjust for any market wide trend by using a proxy of the market portfolio returns in the ex-ante expected return model.

(2) Market Adjusted Returns

$$A^{Mkt}_{i,n,t} = r_{i,n,t} - r_{m,t} \quad , \quad \tau = (-379, \cdots, -127)\text{, } \textit{benchmark estimation window}, \tag{33}$$

where $r_{m,t}$ is the log-return of the S&P 500 index for day *t*, and computed as Eq. (1). The market adjusted returns model assumes that ex-ante expected return for day *t* is identical across securities, and is equal to the returns on the market portfolio at that day. This model is also consistent with the Capital Asset Pricing Model (CAPM) proposed by Sharpe (1964) if the beta of all securities is equal to one.

(3) Alternative OLS Market Model

The Market Model (MM), which is also based on the CAPM, relaxes the assumption of identical ex-ante expected returns across securities by allowing α and β to vary across securities. Moreover, the market model can be an improvement over the two-abovementioned models since it can potentially reduce the variance of AR, which in turn can lead to a better identification of event effects.

The estimation window for most event studies ends much closer to the event day (between Day -40 and Day -5). Since the portion of anticipated M&A increases with the closeness of that end date to the announcement day, those approaches can be even further subject to the use of biased data in estimating the event effects. To investigate the sensitivity of results for the choice of fixed estimation windows, other two alternative market models in addition to the benchmark one (MM126) are considered here. Each of these two alternatives has 190 daily returns in their estimation window but the starting date differs between them. In one hand, "close estimation window", which is the closest window to the event date among the three fixed estimation windows, starts at Day -253, and so ends at Day -64.[21] On the other hand, "distant estimation window" starts at Day -379 (similar to the benchmark window) but ends at Day -190 (the median of deal-anticipation dates). This is the farthest window from the announcement date. This exercise is performed not only to compare those alternative methods but also to provide some insights into the optimal window that minimizes the difference between the results of fixed and float approaches.

(3-1) Close Estimation Window (MM63)

$$A^{c}_{i,n,t} = r_{i,n,t} - \hat{\alpha}^{c}_{i,n} - \hat{\beta}^{c}_{i,n} r_{m,t} \quad , \quad t = (-63, \cdots, 0, \cdots, C)\text{, close event window} \tag{34}$$

$$r_{i,n,\tau} = \alpha^{c}_{i,n} + \beta^{c}_{i,n} r_{m,\tau} + \varepsilon^{c}_{i,n,\tau} \quad , \quad \tau = (-253, \cdots, -64)\text{, close estimation window.} \tag{35}$$

OLS regression is performed over the close estimation window to obtain estimates $\hat{\alpha}^{c}_{i,n}$ and $\hat{\beta}^{c}_{i,n}$ of $\alpha^{c}_{i,n}$ and $\beta^{c}_{i,n}$, respectively.

(3-2) Distant Estimation Window (MM189)

$$A^{d}_{i,n,t} = r_{i,n,t} - \hat{\alpha}^{d}_{i,n} - \hat{\beta}^{d}_{i,n} r_{m,t} \quad , \quad t = (-189, \cdots, 0, \cdots, C)\text{, distant event window} \tag{36}$$

$$r_{i,n,\tau} = \alpha^{d}_{i,n} + \beta^{d}_{i,n} r_{m,\tau} + \varepsilon^{d}_{i,n,\tau} \quad , \quad \tau = (-379, \cdots, -190)\text{, disatnt estimation window.} \tag{37}$$

OLS regression is performed over the close estimation window to obtain estimates $\hat{\alpha}^{d}_{i,n}$ and $\hat{\beta}^{d}_{i,n}$ of $\alpha^{d}_{i,n}$ and $\beta^{d}_{i,n}$, respectively.

[21] One may wonder why closer estimation windows are not considered here. Note using such closer windows can remove part of relevant information about the takeover events. The reason is that the CAAR to the target firms' stocks can start to run up around Day-42, as reported by Schwert (1996), and even earlier around Day -60 according to Smith and Kim (1994). Thus, the "close estimation window" ends at day-64 to capture any run up in AR during the pre-announcement part of the event window.

Figure 1

Distribution of Deal Anticipation Date

This figure shows the distribution of cross-sectional deal anticipation dates relative to the first public bid announcement day (= Day 0). Bar *i* represents the percentage of deals that are anticipated in the month *i* prior to the announcement day. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006. Around 13% of deals (16 out of 124 deals) are unanticipated, which is partly captured by the bar surrounding Day 0. Irani (2014) identifies a break date as deal-anticipation date during the pre-announcement period when the variance-covariance structure of the target and acquirer stock returns changes according to the hypothetical shifts after that break date. A hypothetical shift is a significant decline in target variance and (or) any significant changes in the rest of moments (acquirer variance, the acquirer-target covariance, and the acquirer-target correlation) during the pre-announcement period.

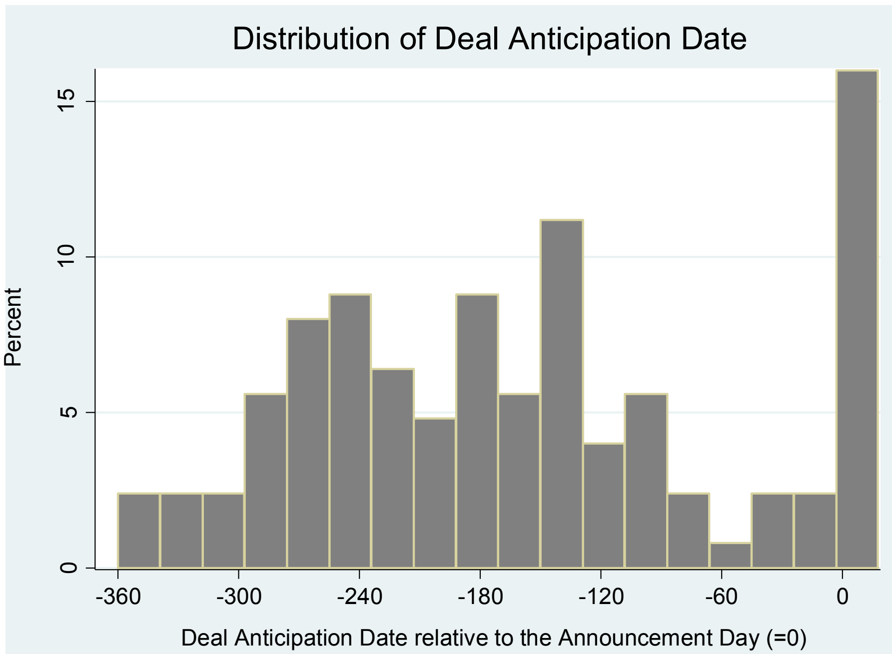


Figure 2

Gains to the Anticipators of Target and Acquirer Firms

This figure illustrates the cumulative average abnormal returns (CAAR) to the target and acquirer firms over the post-anticipation period. Using the S&P 500 index, the market model estimates the abnormal return (AR) at day t around the deal-anticipation event (Day P_n) for each anticipated series. The parameters of the market model are estimated from the float estimation window, which contains returns from the pre-anticipation segment of each anticipated deal. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, from which 108 deals are anticipated. The deal-anticipation dates are employed from Irani (2014). The number of anticipated deals is decreasing over the post-anticipation period with the maximum of 108 firms at the anticipation day (P). For readability the reference point in the horizontal axis in this figure (the deal-anticipation event) is represented by Day 0 instead of Day P.

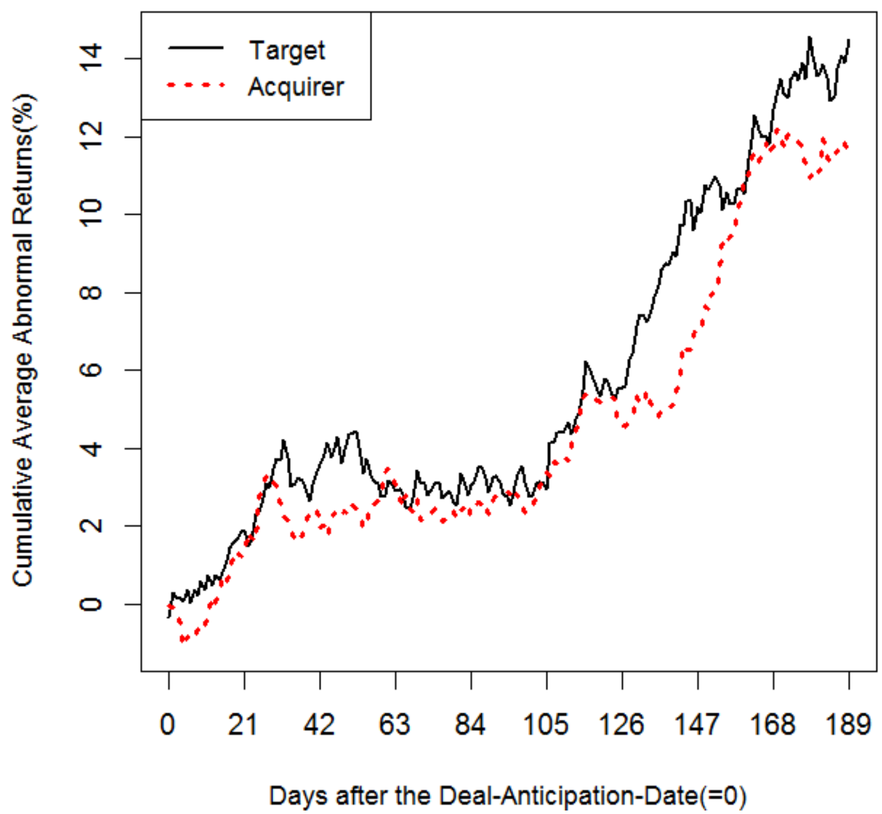


Figure 3

Gains to the Anticipators of Target Firms across Quartile and Payment-form Subsamples

This figure illustrates the cumulative average abnormal returns (CAAR) to the target and acquirer shareholders and across quartile and payment-form subsamples over the post-anticipation period. Using the S&P 500 index, the market model estimates the abnormal return (AR) at day *t* around the deal-anticipation event (Day P_n) for each anticipated series. The parameters of the market model are estimated from the float estimation window, which contains returns from the pre-anticipation segment of each anticipated deal. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal-anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. The number of anticipated deals in the main sample and the subsamples is decreasing over the post-anticipation period with the maximum at the anticipation day (*P*). For readability the reference point in the horizontal axis of Panel A and B of this figure (the deal-anticipation event) is represented by Day 0 instead of Day *P*.

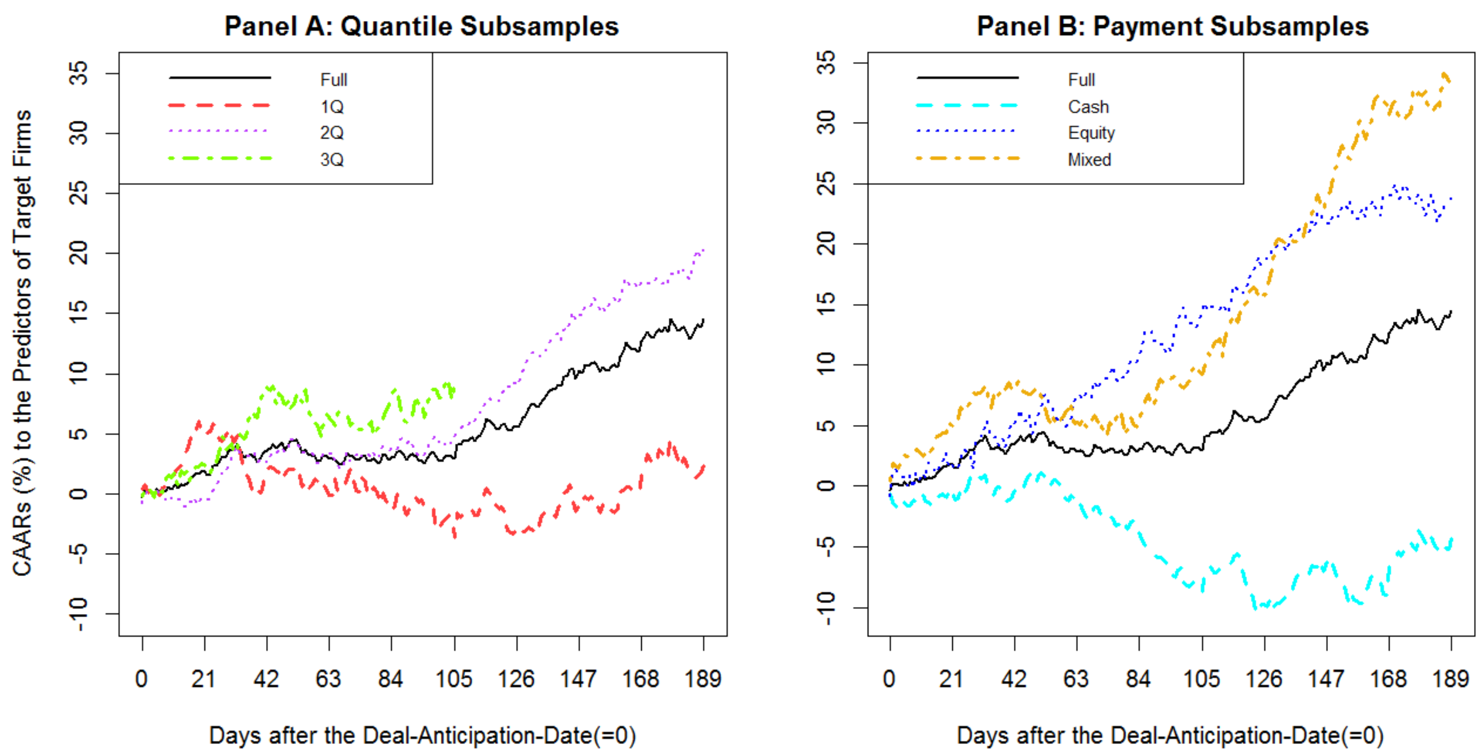


Figure 4

Gains to the Anticipators of Acquirer Firms across Quartile and Payment-form Subsamples

This figure illustrates the cumulative average abnormal returns (CAAR) to the target and acquirer shareholders and across quartile and payment-form subsamples over the post-anticipation period. Using the S&P 500 index, the market model estimates the abnormal return (AR) at day *t* around the deal-anticipation event (Day P_n) for each anticipated series. The parameters of the market model are estimated from the float estimation window, which contains returns from the pre-anticipation segment of each anticipated deal. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal-anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. The number of anticipated deals in the main sample and the subsamples is decreasing over the post-anticipation period with the maximum at the anticipation day (*P*). For readability the reference point in the horizontal axis of Panel A and B of this figure (the deal-anticipation event) is represented by Day 0 instead of Day *P*.

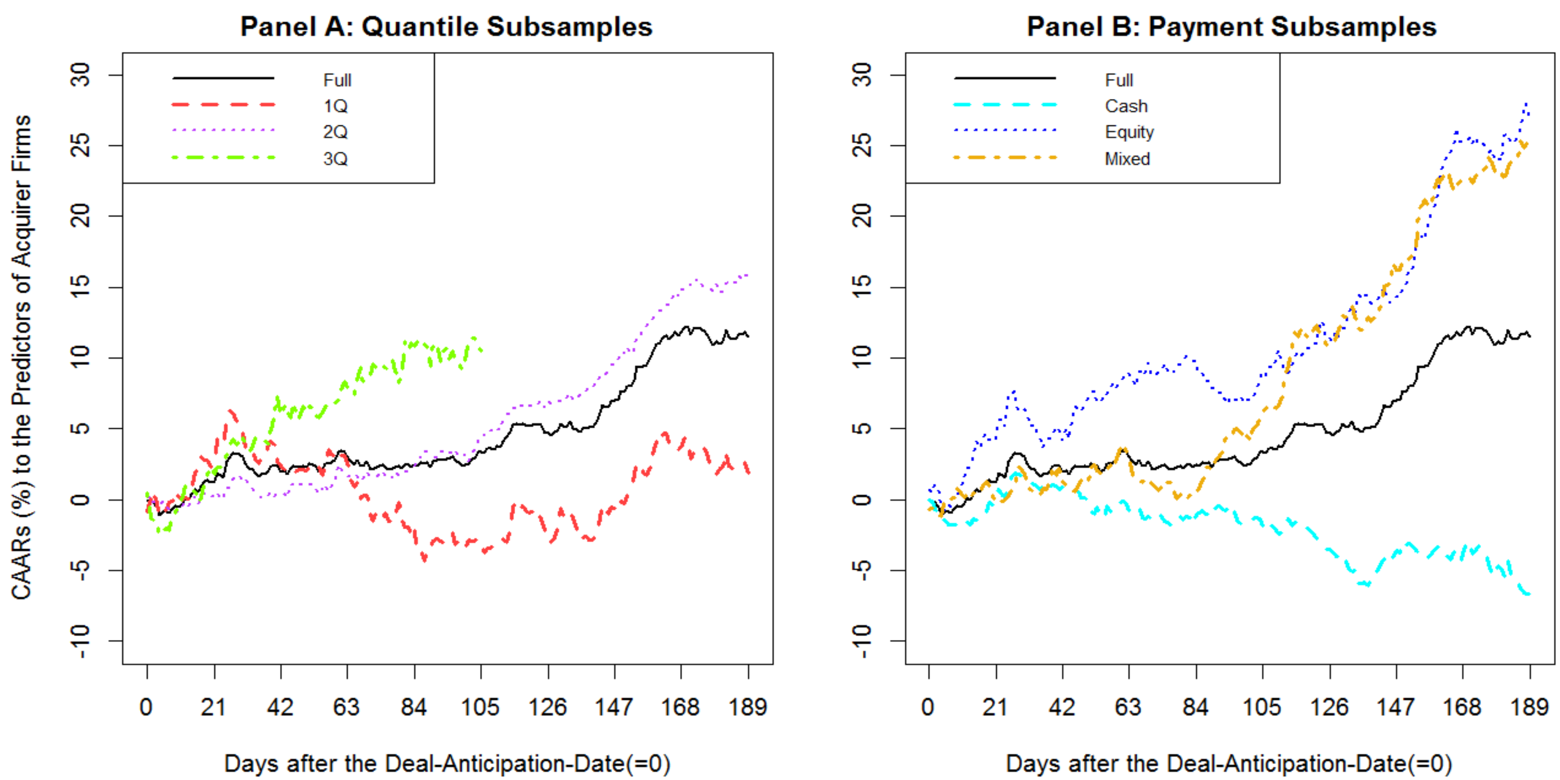


Figure 5

Gains to Target Shareholders around the Announcement Date - Fixed vs. Float Estimation Approaches

This figure shows how the fixed and float approaches measure cumulative average abnormal return (CAAR) to the target shareholders (in the full sample and payment-form subsamples) around the first public bid announcement date (0). Using the S&P 500 index, the market model estimates the abnormal return (AR) at day *t* around the announcement. The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval for each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. During the event window [i.e., the (-126, 63) interval], the fixed and float cumulative average abnormal return (CAAR) at day *t* is the sum of the fixed and float AAR over the (-126, *t*) interval, respectively. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids.

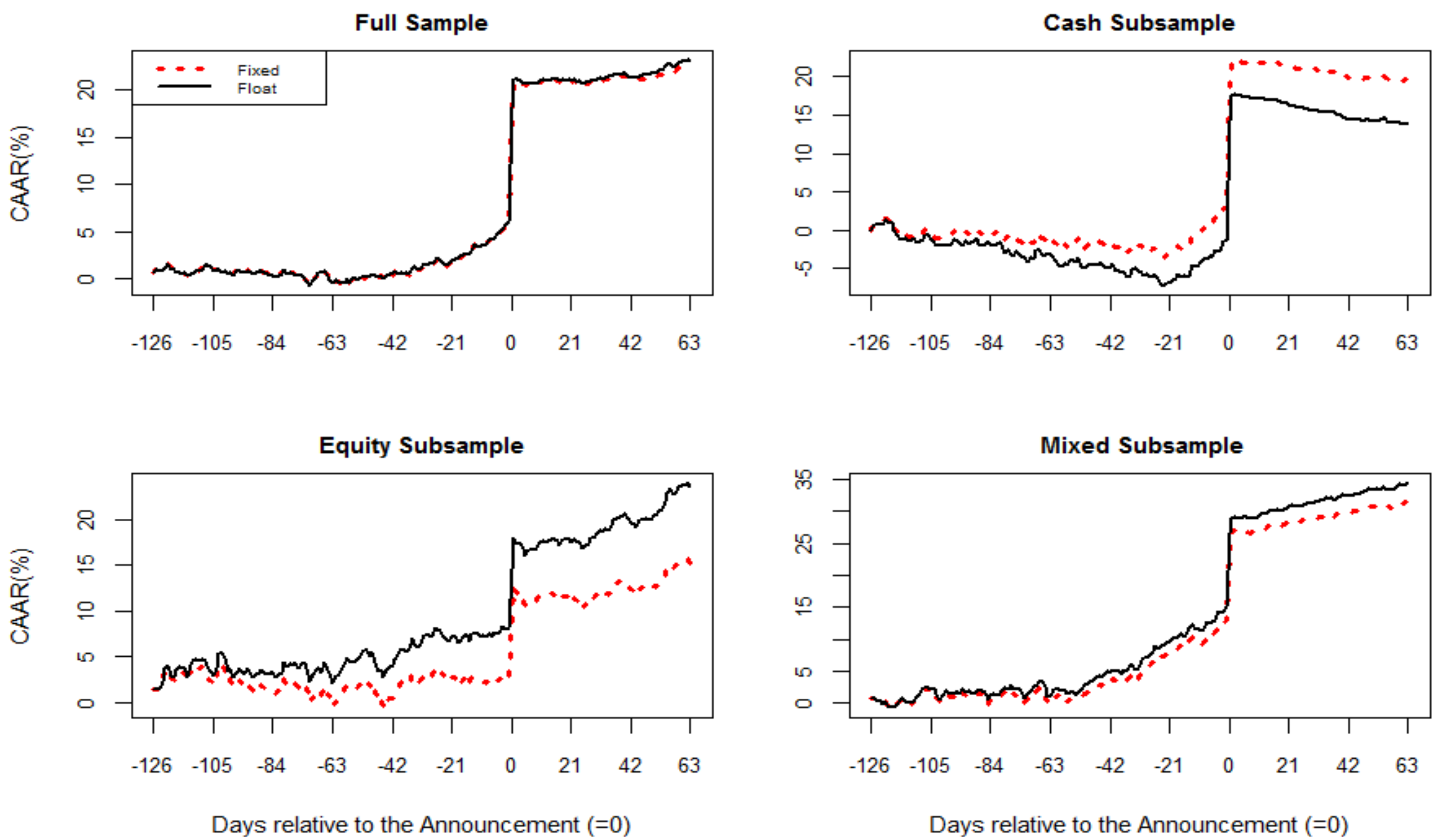


Figure 6

Gains to Acquirer Shareholders around the Announcement Date - Fixed vs. Float Estimation Approaches

This figure shows how the fixed and float approaches measure cumulative average abnormal return (CAAR) to the acquirer shareholders (in the full sample and payment-form subsamples) around the first public bid announcement date (0). Using the S&P 500 index, the market model estimates the abnormal return (AR) at day *t* around the announcement. The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval for each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. During the event window [i.e., the (-126, 63) interval], the fixed and float cumulative average abnormal return (CAAR) at day *t* is the sum of the fixed and float AAR over the (-126, *t*) interval, respectively. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids.

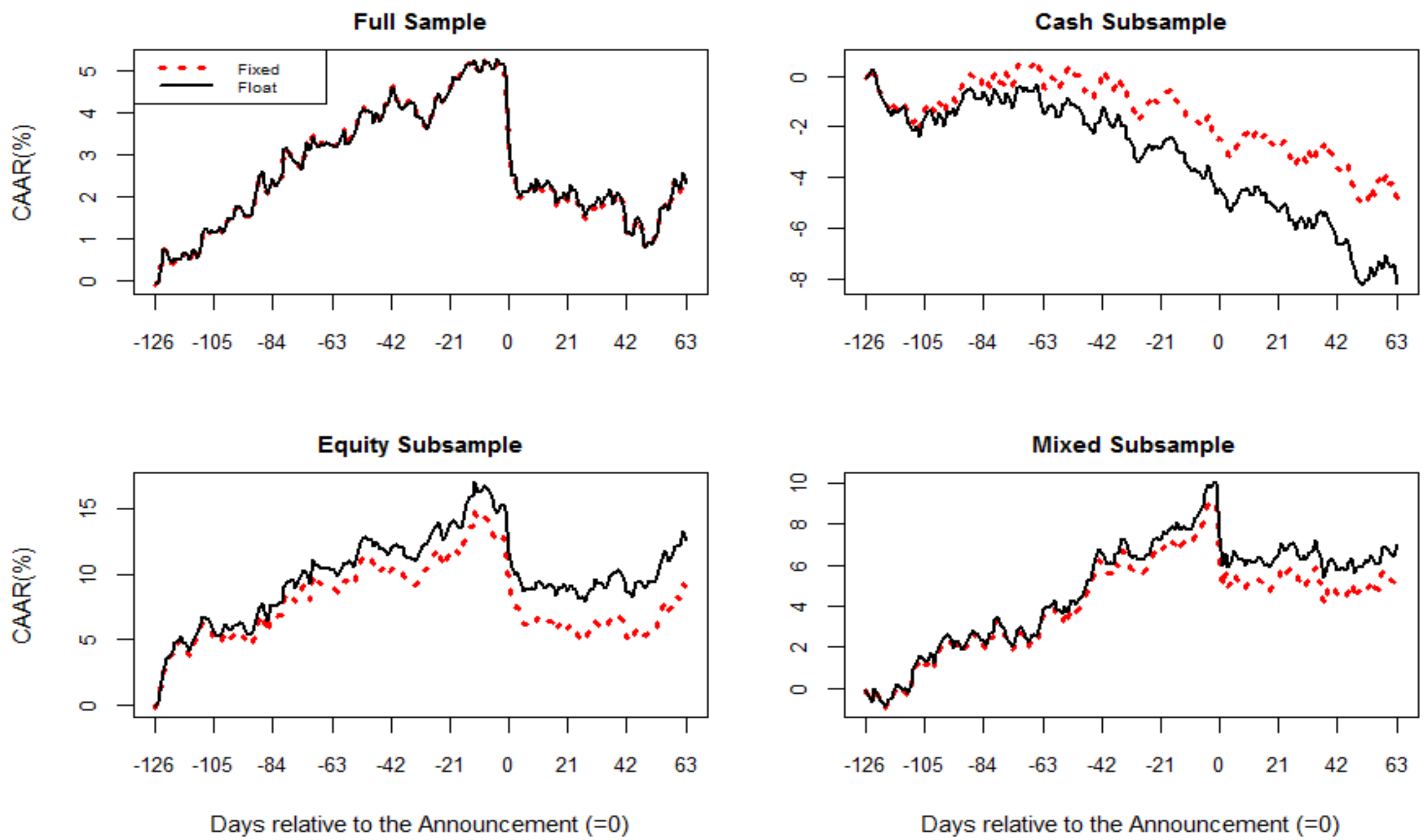


Figure 7

Gains to the Anticipators of Target Firms – Fixed vs. Float Anticipation Date

This figure shows how assuming a uniform ("fixed") and variable ("float") anticipation date across merging firms affect the measurement of cumulative average abnormal return (CAAR) to the target shareholders over the post-anticipation period. Using the S&P 500 index, the market model (MM) estimates the abnormal return (AR) at day *t* around the deal-anticipation event (Day P_n) for each anticipated series. The parameters of the market model are estimated: (1) from three fixed estimation windows that are based on the three uniform anticipation dates: -190, -127 and -64. The MM189, MM126, and MM63 fixed estimation windows contain returns from the (-379, -190), (-379, -127), and (-379, -64) intervals of each series, respectively, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each anticipated deal. The CAAR are computed by summing the AAR over the post-anticipation segment, which ends one day before the bid announcement day. This means that the post-anticipation segment for those three fixed model is (-189, -1), (-126, -1), and (-63, -1), respectively. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The number of anticipated deals in the main sample and the subsamples is decreasing over the post-anticipation segment with the maximum at the anticipation day (*P*). For readability the reference point in the horizontal axis of this figure (the deal-anticipation event) is represented by Day 0 instead of Day *P*.

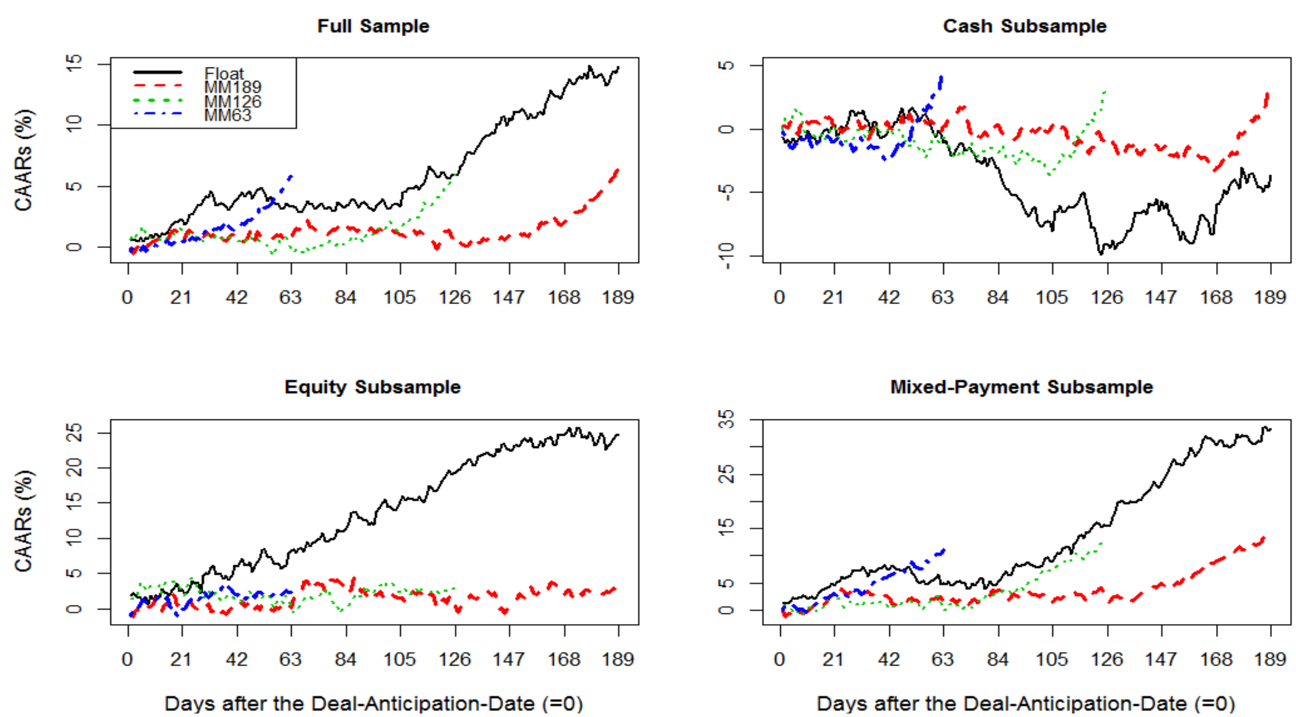


Figure 8

Gains to the Anticipators of Acquirer Firms – Fixed vs. Float Anticipation Date

This figure shows how assuming a uniform ("fixed") and variable ("float") anticipation date across merging firms affect the measurement of cumulative average abnormal return (CAAR) to the acquirer shareholders over the post-anticipation period. Using the S&P 500 index, the market model (MM) estimates the abnormal return (AR) at day *t* around the deal-anticipation event (Day P_n) for each anticipated series. The parameters of the market model are estimated: (1) from three fixed estimation windows that are based on the three uniform anticipation dates: -190, -127 and -64. The MM189, MM126, and MM63 fixed estimation windows contain returns from the (-379, -190), (-379, -127), and (-379, -64) intervals of each series, respectively, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each anticipated deal. The CAAR are computed by summing the AAR over the post-anticipation segment, which ends one day before the bid announcement day. This means that the post-anticipation segment for those three fixed model is (-189, -1), (-126, -1), and (-63, -1), respectively. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The number of anticipated deals in the main sample and the subsamples is decreasing over the post-anticipation segment with the maximum at the anticipation day (*P*). For readability the reference point in the horizontal axis of this figure (the deal-anticipation event) is represented by Day 0 instead of Day *P*.

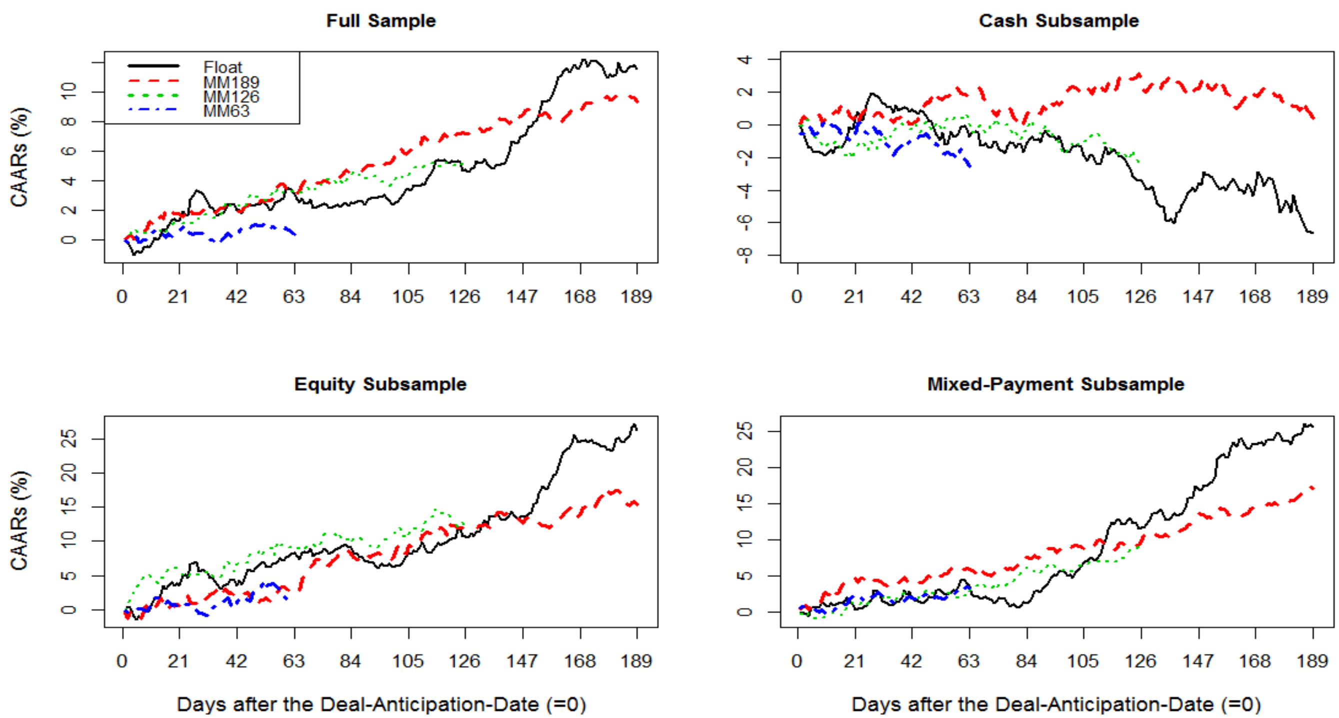


Figure 9

Gains to Target Firms around Announcement Date via Various Expected Return Models

This figure shows how various expected return models measure cumulative average abnormal return (CAAR) to the target shareholders (in the full sample and payment-form subsamples) around the first public bid announcement date (0). Using the S&P 500 index, the market model estimates the daily average abnormal return (AAR) around the announcement date. The parameters of the market model (MM) are estimated: (1) from three fixed estimation windows: MM189, MM126, and MM63 that contain returns from the (-379, -190), (-379, -127), and (-379, -64) intervals of each series, respectively, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. Moreover, the mean adjusted and the market adjusted return models are used as alternative expected return models to estimates the daily average abnormal return (AAR). During the event window [i.e., the (-63, 63) interval], the CAAR at day *t* for each estimation model is the sum of its estimated AAR over the (-63, t) interval. Raw Returns is the cumulative daily average realized returns to the target firms, and S&P500 is the cumulative daily average realized returns to the S&P500 index over this event window. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids.

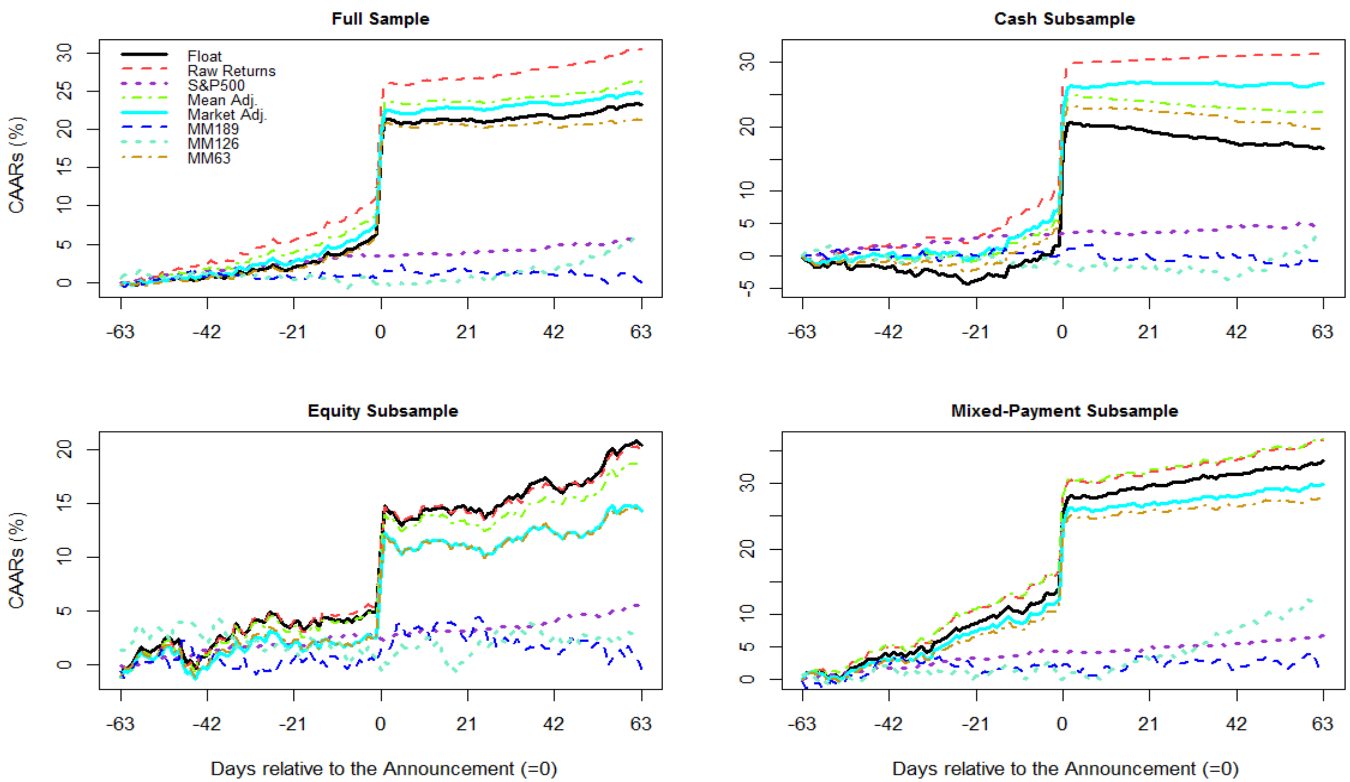


Figure 10

Gains to Acquirer Firms around Announcement Date via Various Expected Return Models

This figure shows how various expected return models measure cumulative average abnormal return (CAAR) to the acquirer shareholders (in the full sample and payment-form subsamples) around the first public bid announcement date (0). Using the S&P 500 index, the market model estimates the daily average abnormal return (AAR) around the announcement date. The parameters of the market model (MM) are estimated: (1) from three fixed estimation windows: MM189, MM126, and MM63 that contain returns from the (-379, -190), (-379, -127), and (-379, -64) intervals of each series, respectively, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. Moreover, the mean adjusted and the market adjusted return models are used as alternative expected return models to estimates the daily average abnormal return (AAR). During the event window [i.e., the (-63, 63) interval], the CAAR at day *t* for each estimation model is the sum of its estimated AAR over the (-63, t) interval. Raw Returns is the cumulative daily average realized returns to the acquirer firms, and S&P500 is the cumulative daily average realized returns to the S&P500 index over this event window. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids.

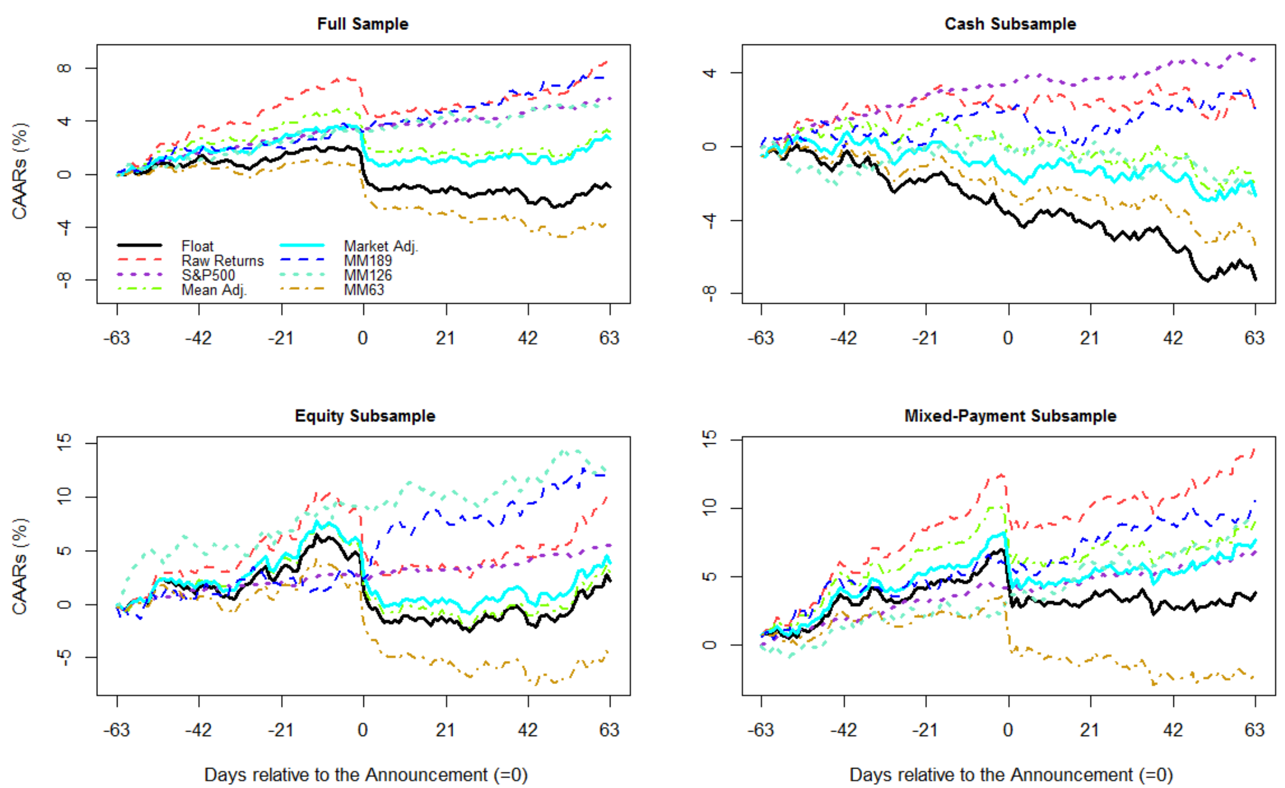


Table 1
Sample Selection

This table describes how the M&A sample is selected. All initial bids are all completed “merger” and “acquisitions” between U.S. publicly listed target and acquirer firms between June 2003 and June 2006, and retrieved from the Bureau Van Dijk Zephyr database. Adjusted daily-closed prices of securities and the S&P 500 index (adjusted for the splits and dividend distributions) are from Thomson Financial DataStream.

Selection Criteria	Source	Number of Exclusions	Sample Size
All initial completed mergers and acquisitions between U.S. publicly listed firms during the period 6/2003 to 6/2006	Zephyr		1647
Bid offer is for 100% of the target shares	Zephyr	1120	527
Payment-form is Cash, Equity, or Mixed	Zephyr	78	449
Completion date is between 19 and 253 days	Zephyr	37	412
Deal value > $50 million	Zephyr	78	334
Both acquirer and target firm are not banks	Zephyr	108	226
One bid record for any acquirer	Zephyr	46	180
Targets stock price on Day -42 > $2	DataStream	13	167
At least 120 daily stock prices are available in the pre-announcement period	DataStream	43	124
Final Sample			**124**

Table 2

Daily Average Abnormal Returns to the Target Shareholders around the Deal-Anticipation Date

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the deal-anticipation event (Day P_n). Its parameters are estimated from the float estimation window, which contains returns from the pre-anticipation segment. I use the deal-anticipation dates from Irani (2014). The test statistic for the significance of AAR at day *t* is explained in Eq. (10, 11, and 12) in Appendix A. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10% , 15%, and 20% level for a two-tailed test, respectively.

		Quartile Subsamples			Payment Subsamples		
Relative Day	**Full Sample**	**1Q**	**2Q**	**3Q**	**Cash**	**Equity**	**Mixed**
P-10	-0.28	-0.44	-0.35	-0.17	-0.29	0.65	-1.06 ††
P-9	0.08	0.59	-0.22	-0.05	0.51	0.35	-0.75
P-8	0.58 ††	2.55 ***	-0.08	-0.26	0.94 **	-0.52	0.98
P-7	-0.36	-1.46 *	0.09	-0.07	-0.20	-1.14 ††	0.07
P-6	-0.04	0.37	-0.22	-0.28	0.11	0.54	-0.76
P-5	-0.59 ††	-1.99 ***	-0.44	-0.24	-0.55	-1.12 †	-0.22
P-4	0.36	-0.20	0.08	1.61 ***	0.25	-0.01	0.83
P-3	0.19	0.27	-0.06	0.49	0.20	0.61	-0.17
P-2	0.11	0.25	0.16	0.14	-0.12	0.15	0.41
P-1	0.25	-0.39	0.40	0.28	0.26	0.27	0.21
P	-0.36	0.40	-0.83 ††	-0.20	-0.59	-0.81	0.41
P+1	0.64 *	0.33	0.78 †	0.67	-0.69 ††	1.79 **	1.48 **
P+2	-0.11	-0.76	0.28	-0.22	-0.37	0.39	-0.22
P+3	-0.04	-0.11	-0.02	0.00	0.20	-0.32	-0.13
P+4	-0.08	0.55	-0.21	-0.52	-0.35	-0.27	0.51
P+5	0.32	-0.32	0.37	0.96 ††	0.45	-0.07	0.51
P+6	-0.34	-0.19	-0.41	-0.36	-0.28	-0.67	-0.12
P+7	0.31	0.62	0.40	-0.24	0.07	0.87	0.15
P+8	-0.14	0.19	-0.86 ††	1.13 *	0.42	-1.08 †	-0.05
P+9	0.38	0.37	0.39	0.34	-0.31	1.24 ††	0.54
P+10	-0.21	0.09	-0.37	-0.23	0.02	-0.54	-0.24

Table 3

Daily Average Abnormal Returns to the Acquirer Shareholders around the Deal-Anticipation Date

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the deal-anticipation event (Day P_n). Its parameters are estimated from the float estimation window, which contains returns from the pre-anticipation segment. I use the deal-anticipation dates from Irani (2014). The test statistic for the significance of AAR at day *t* is explained in Eq. (10, 11, and 12) in Appendix A. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10% , 15%, and 20% level for a two-tailed test, respectively.

		Quartile Subsamples			Payment Subsamples		
Relative Day	**Full Sample**	**1Q**	**2Q**	**3Q**	**Cash**	**Equity**	**Mixed**
P-10	0.07	0.14	0.12	0.01	-0.15	0.50	0.03
P-9	-0.09	-0.33	-0.27	0.23	0.09	-0.25	-0.20
P-8	-0.35	0.25	-1.32 ***	0.71 *	-0.25	-0.35	-0.49
P-7	0.04	-0.85	0.62 †	0.12	-0.26	0.37	0.17
P-6	-0.05	0.26	-0.12	-0.22	0.06	0.09	-0.34
P-5	0.01	-0.54	0.12	-0.01	0.12	-0.36	0.17
P-4	-0.05	-0.19	0.26	-0.65 *	0.61 **	-0.75	-0.41
P-3	0.16	0.54	-0.02	0.31	-0.21	0.01	0.81 †
P-2	0.38 †	0.70	0.13	0.93 **	-0.05	1.15 *	0.32
P-1	-0.29	-0.95	-0.13	-0.24	-0.36	-0.43	-0.07
P	-0.04	-0.87	0.17	0.43	-0.06	0.69	-0.69
P+1	-0.06	0.96	0.16	-1.73 ***	-0.04	-0.25	0.10
P+2	-0.14	0.58	-0.51	-0.15	-0.57 *	0.64	-0.24
P+3	-0.27	-0.83	-0.07	-0.05	-0.41 †	-0.18	-0.15
P+4	-0.59 **	-1.04 †	-0.10	-1.13 ***	-0.42 †	-1.26 **	-0.20
P+5	0.26	0.17	0.23	0.44	0.06	-0.40	1.19 **
P+6	-0.05	0.44	-0.42	0.21	-0.32	0.37	-0.05
P+7	-0.03	0.37	-0.18	-0.18	-0.01	-0.17	0.06
P+8	0.33	0.09	0.12	1.12 ***	0.01	1.06 *	0.11
P+9	0.13	0.75	-0.20	0.12	-0.07	-0.12	0.63
P+10	-0.07	-0.43	-0.15	0.57	-0.12	0.22	-0.29

Table 4

Cumulative Average Abnormal Returns around the Deal-Anticipation Date to the Anticipators of Target Firms

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the deal-anticipation event (Day P_n). The cumulative average abnormal return (CAAR) is computed by summing the AAR over the event window (t_1, t_2). The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. The parameters of the market model are estimated from the float estimation window, which contains returns from the pre-anticipation segment of deals. The test statistic for the significance of CAAR over the event window (t_1, t_2) is explained in Eq. (15 and 16 in Appendix A), for the significance of difference in CAAR across quartile subsample over the event window (t_1, t_2) in Eq. (17 in Appendix A), and across payment-form subsample over the event window (t_1, t_2) in Eq. (18 in Appendix A) in the paper. The second raw of each event window represents the value of related test statistic. ***, **, *, ††, and † denotes statistical significant at the 1% (0.5%) , 5% (2.5%) , 10% (5%), 15% (7.5%) and 20% (10%) level for a two-tailed test (a one-tailed test), respectively.

	CAAR (%)							Difference in CAAR across Subsamples (%)					
		Quartile Subsamples			Payment Subsamples			Quartile Comparison			Payment Comparison		
Event Window	**Full Sample**	**1Q**	**2Q**	**3Q**	**Cash**	**Equity**	**Mixed**	**(1Q - 2Q)**	**(1Q - 3Q)**	**(2Q - 3Q)**	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**
(P-126, P-1)	-2.87	-8.48	0.13	-2.71	-1.35	-5.57	-2.91	-8.61	-5.77	2.84	-4.22	-1.56	-2.66
	-0.70	-0.98	0.02	-0.41	-0.25	-0.63	-0.37	-0.71	-0.41	0.30	-0.27	-0.09	-0.18
(P-42, P-1)	1.81	2.24	-0.40	6.28††	3.72	-0.70	1.23	2.64	-4.04	-6.68	-4.42	-2.49	-1.93
	0.77	0.45	-0.11	1.63	1.21	-0.14	0.27	0.39	-0.84	-1.23	-0.95	-0.66	-0.29
(P-20, P-1)	0.41	0.56	-2.13	2.27	2.10	-0.51	-1.20	2.69	-1.71	-4.40	-2.61	-3.30	0.69
	0.25	0.16	-0.84	0.86	0.99	-0.15	-0.39	0.71	-0.49	-1.20	-0.80	-0.97	0.17
(P-10, P+10)	0.67	0.73	-1.10	2.79	-0.31	0.32	2.39	1.82	-2.06	-3.89	0.64	2.71	-2.07
	0.40	0.21	-0.42	1.03	-0.14	0.09	0.75	0.44	-0.58	-1.02	0.17	0.63	-0.47
(P, P+20)	1.84	5.35††	-0.32	2.51	-0.45	1.74	5.32*	5.67	2.84	-2.83	2.20	5.77†	-3.58
	1.10	1.51	-0.12	0.92	-0.21	0.48	1.67	1.16	0.42	-0.74	0.49	1.33	-0.84
(P, P+30)	3.73*	4.83	2.93	4.18	0.72	4.21	7.68**	1.90	0.65	-1.25	3.49	6.96	-3.47
	1.83	1.12	0.93	1.27	0.27	0.96	1.99	0.14	-0.10	-0.24	0.49	1.21	-0.72
(P, P+42)	3.58††	2.01	2.58	8.85**	-0.35	5.16	7.87*	-0.57	-6.84†	-6.27	5.51	8.22†	-2.71
	1.50	0.40	0.70	2.27	-0.11	1.00	1.73	-0.21	-1.33	-1.11	0.79	1.30	-0.51
(P, P+63)	2.91	-0.08	3.28	6.29†	-1.69	7.38	5.29	-3.36	-6.37	-3.01	9.07	6.99	2.08
	1.00	-0.01	0.73	1.32	-0.45	1.17	0.95	-0.52	-0.95	-0.42	1.14	0.99	0.16
(P, P+105)	2.96	-3.62	4.79	9.10††	-8.67*	14.36*	9.29†	-8.41	-12.72†	-4.31	23.03**	17.96**	5.07
	0.79	-0.46	0.82	1.49	-1.77	1.77	1.30	-0.90	-1.37	-0.47	2.51	2.17	0.34
(P, P+126)	5.54†	-2.90	9.12†		-9.70*	18.59**	15.75**	-12.01			28.29***	25.45***	2.84
	1.35	-0.33	1.43		-1.81	2.10	2.01	-1.25			2.76	2.70	0.06
(P, P+147)	10.21**	-0.78	14.98**		-6.30	21.74**	23.91***	-15.76††			28.04**	30.21***	-2.17
	2.30	-0.08	2.18		-1.09	2.27	2.83	-1.60			2.38	2.77	-0.39
(P, P+189)	14.52***	2.32	20.34***		-4.23	23.78**	33.79***	-18.02*			28.01**	38.02***	-10.01
	2.89	0.22	2.61		-0.65	2.19	3.53	-1.69			2.01	2.95	-0.94

Table 5

Cumulative Average Abnormal Returns around the Deal-Anticipation Date to the Anticipators of Acquirer Firms

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day t around the deal-anticipation event (Day P_n). The cumulative average abnormal return (CAAR) is computed by summing the AAR over the event window (t_1, t_2). The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are employed from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal anticipation distribution, respectively. There are 28, 53, and 27 deals in the 1Q, 2Q, and 3Q subsamples, respectively. The parameters of the market model are estimated from the float estimation window, which contains returns from the pre-anticipation segment of deals. The test statistic for the significance of CAAR over the event window (t_1, t_2) is explained in Eq. (15 and 16 in Appendix A), for the significance of difference in CAAR across quartile subsample over the event window (t_1, t_2) in Eq. (17 in Appendix A), and across payment-form subsample over the event window (t_1, t_2) in Eq. (18 in Appendix A) in the paper. The second raw of each event window represents the value of related test statistic. ***, **, *, ††, and † denotes statistical significant at the 1% (0.5%) , 5% (2.5%) , 10% (5%), 15% (7.5%) and 20% (10%) level for a two-tailed test (a one-tailed test), respectively.

	CAAR (%)							Difference in CAAR across Subsamples (%)					
		Quartile Subsamples			Payment Subsamples			Quartile Comparison			Payment Comparison		
Event Window	**Full Sample**	**1Q**	**2Q**	**3Q**	**Cash**	**Equity**	**Mixed**	**(1Q - 2Q)**	**(1Q - 3Q)**	**(2Q - 3Q)**	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**
(P-126, P-1)	-0.68	-3.42	1.22	0.78	-0.44	-2.94	0.78	-4.64	-4.20	0.44	-2.51	1.22	-3.73
	-0.22	-0.41	0.24	0.18	-0.13	-0.43	0.12	-0.45	-0.42	0.04	-0.21	0.17	-0.39
(P-42, P-1)	1.57	-3.05	3.61	5.37**	0.31	0.19	4.59	-6.65†	-8.42**	-1.76	-0.12	4.28	-4.40
	0.87	-0.63	1.22	2.18	0.16	0.05	1.17	-1.30	-1.99	-0.68	-0.08	0.72	-0.79
(P-20, P-1)	-0.26	-0.01	-1.97	2.98*	0.10	-2.16	0.83	1.96	-2.99	-4.95*	-2.26	0.73	-2.99
	-0.21	0.00	-0.96	1.75	0.08	-0.79	0.31	0.68	-1.24	-1.92	-0.61	0.16	-0.78
(P-10, P+10)	-0.70	-0.77	-1.58	0.84	-2.38*	0.58	0.47	0.81	-1.61	-2.42	2.92†	2.81†	0.11
	-0.54	-0.22	-0.75	0.48	-1.68	0.21	0.17	0.37	-0.50	-0.87	1.33	1.31	0.03
(P, P+20)	1.23	2.32	0.20	2.38†	-0.35	4.43††	0.40	2.12	-0.06	-2.18	4.78†	0.75	4.03
	0.96	0.67	0.09	1.37	-0.25	1.59	0.15	0.41	-0.49	-0.90	1.30	0.28	1.02
(P, P+30)	3.00*	5.02	1.35	4.53**	1.55	6.36*	1.78	3.67	0.50	-3.17	4.81	0.23	4.58
	1.92	1.20	0.53	2.14	0.92	1.87	0.53	0.47	-0.66	-1.14	0.68	-0.28	0.95
(P, P+42)	1.98	2.38	0.37	5.92**	0.91	4.18	1.33	2.01	-3.54†	-5.55††	3.27	0.42	2.86
	1.08	0.48	0.12	2.38	0.46	1.05	0.33	0.25	-1.34	-1.59	0.42	-0.09	0.50
(P, P+63)	3.06†	2.64	1.61	7.88***	-0.78	8.95*	2.93	1.03	-5.24††	-6.28††	9.73††	3.71	6.02
	1.36	0.44	0.44	2.59	-0.32	1.83	0.60	0.00	-1.52	-1.52	1.52	0.65	0.87
(P, P+105)	3.40	-3.20	4.46	10.53***	-1.91	8.98†	6.23	-7.66	-13.73**	-6.07	10.89††	8.14	2.75
	1.18	-0.41	0.95	2.69	-0.61	1.43	1.00	-0.96	-2.20	-1.23	1.44	1.14	0.31
(P, P+126)	4.68††	-2.85	6.90†		-3.50	11.39*	10.97††	-9.75			14.89*	14.47*	0.42
	1.48	-0.34	1.34		-1.02	1.66	1.61	-1.18			1.89	1.86	0.04
(P, P+147)	7.03**	-0.65	9.69*		-3.63	14.29*	16.22**	-10.33			17.92**	19.85**	-1.93
	2.06	-0.07	1.74		-0.98	1.93	2.20	-1.28			2.06	2.25	-0.19
(P, P+189)	11.51***	1.88	15.87**		-6.68††	26.99***	24.82***	-13.98*			33.67***	31.51***	2.17
	2.98	0.18	2.51		-1.59	3.21	2.97	-1.65			3.40	3.23	0.17

Table 6

Daily Average Abnormal Returns to Target Shareholders around the Announcement Day - Fixed vs. Float Approaches

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The test statistic for the significance of the AAR at day *t* is explained in Eq. (10, 13, and 14 in Appendix A), and for the significance of the cross-sectional average difference between fixed and float AR at day *t* in Eq. (19 to 22 in Appendix A) of the paper. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10%, 15%, and 20% level for a two-tailed test, respectively.

	Full Sample			**Cash Subsample**			**Equity Subsample**			**Mixed Subsample**		
Relative	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)
Day	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float
-10	0.07	0.07	-0.1	0.33	0.30	2.8	0.11	0.15	-4.3	-0.33	-0.32	-0.7
-9	0.23	0.23	0.0	0.56 †	0.52	4.3	-0.33	-0.28	-4.4	0.23	0.25	-2.4
-8	0.44	0.44	0.1	-0.09	-0.13	3.8 ††	0.29	0.32	-2.9	1.32 **	1.34 **	-2.6
-7	0.04	0.02	2.1	0.45	0.40	5.6 **	-0.32	-0.29	-2.5	-0.25	-0.26	0.9
-6	0.10	0.11	-0.9	-0.19	-0.22	2.3	0.46	0.51	-4.4	0.22	0.24	-2.6
-5	0.49 ††	0.51 ††	-1.3	1.10 **	1.09 **	0.8	-0.18	-0.13	-4.9	0.20	0.21	-1.3
-4	0.32	0.32	0.0	-0.22	-0.27	4.8 ††	0.17	0.22	-5.5	1.21 ***	1.23 **	-2.3
-3	0.14	0.13	0.1	0.09	0.07	2.0	0.44	0.50	-6.4 ††	-0.06	-0.09	2.9
-2	0.55 ††	0.53 ††	1.8	1.37 ***	1.33 ***	4.2 †	-0.22	-0.19	-2.9	0.02	0.00	2.3
-1	0.29	0.31	-1.8	0.05	0.03	2.0	-0.01	0.05	-5.9 †	0.89 ††	0.93 ††	-3.8
0	11.96 ***	11.96 ***	-0.2	15.71 ***	15.68 ***	3.4	6.34 ***	6.40 ***	-6.0	11.36 ***	11.36 ***	-0.3
1	3.02 ***	3.04 ***	-1.3	3.24 ***	3.25 ***	-1.0	3.48 ***	3.51 ***	-2.8	2.33 ***	2.34 ***	-0.5
2	0.04	0.04	-0.4	0.26	0.23	3.5	-0.77	-0.72	-5.0	0.41	0.43	-2.2
3	-0.17	-0.18	0.7	-0.12	-0.16	4.3 †	0.01	0.05	-3.9	-0.39	-0.38	-0.4
4	-0.19	-0.20	0.6	-0.10	-0.13	2.7	-0.58	-0.57	-0.7	0.00	0.01	-1.2
5	-0.13	-0.15	1.1	-0.14	-0.19	5.1 *	-0.72	-0.68	-3.8	0.37	0.37	-0.3
6	0.10	0.11	-0.8	0.03	0.01	2.5	0.52	0.57	-4.8	-0.15	-0.13	-2.2
7	-0.10	-0.08	-2.1	0.00	-0.01	0.8	0.01	0.09	-8.1 ††	-0.33	-0.31	-1.2
8	-0.02	-0.02	0.9	-0.11	-0.16	5.5 *	-0.03	0.00	-3.0	0.13	0.16	-2.3
9	0.03	0.02	0.6	0.06	0.00	6.2 **	0.00	0.03	-3.5	0.01	0.05	-4.1 †
10	0.30	0.30	0.2	0.12	0.08	3.5	0.70	0.75	-5.1 †	0.23	0.23	-0.1

Table 7

Daily Average Abnormal Returns to Acquirer Shareholders around the Announcement Day - Fixed vs. Float Approaches

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The test statistic for the significance of the AAR at day *t* is explained in Eq. (10, 13, and 14 in Appendix A), and for the significance of the cross-sectional average difference between fixed and float AR at day *t* in Eq. (19 to 22 in Appendix A) of the paper. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10%, 15%, and 20% level for a two-tailed test, respectively.

	Full Sample			**Cash Subsample**			**Equity Subsample**			**Mixed Subsample**		
Relative	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)	AAR (%)		Dif. in AAR (bps)
Day	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float	Fixed	Float	Fixed - Float
-10	-0.03	-0.01	-2.0	-0.17	-0.17	-0.1	0.14	0.16	-2.3	0.03	0.07	-4.7 ††
-9	0.26	0.27	-1.5	0.11	0.10	0.9	0.24	0.26	-1.7	0.50	0.54	-4.7 ††
-8	-0.07	-0.07	-0.4	-0.09	-0.11	1.4	-0.03	-0.02	-1.2	-0.07	-0.05	-2.1
-7	-0.01	-0.01	0.2	-0.03	-0.04	1.3	-0.36	-0.33	-3.1	0.32	0.30	1.6
-6	-0.13	-0.14	0.5	-0.22	-0.26	3.7 ††	-0.52	-0.49	-2.9	0.32	0.33	-1.2
-5	0.02	0.04	-1.3	0.08	0.08	0.6	-0.7	-0.69	-0.9	0.55	0.59	-4.6 ††
-4	0.16	0.19	-2.6 ††	0.45 ††	0.45 ††	0.1	-0.52	-0.48	-4.0 ††	0.33	0.38	-5.2 †
-3	-0.14	-0.13	-0.8	-0.54 *	-0.55 *	0.9	0.52	0.53	-1.1	-0.13	-0.10	-3.0
-2	0.00	0.00	0.5	-0.25	-0.28	2.9	0.14	0.16	-1.9	0.23	0.24	-1.0
-1	-0.25	-0.25	0.0	-0.26	-0.27	1.0	-0.50	-0.49	-1.5	-0.03	-0.03	0.0
0	-1.6 ***	-1.6 ***	-0.1	0.14	0.12	1.9	-3.24 ***	-3.23 ***	-1.4	-2.67 ***	-2.66 ***	-1.8
1	-0.79 ***	-0.78 ***	-0.2	-0.19	-0.18	-1.4	-1.06 *	-1.06 *	-0.3	-1.4 ***	-1.42 ***	1.5
2	-0.02	-0.03	1.0	-0.13	-0.15	2.3	-0.61	-0.59	-1.5	0.64	0.63	1.3
3	-0.32	-0.31	-0.6	-0.35	-0.36	0.9	0.15	0.16	-1.7	-0.67	-0.65	-1.7
4	-0.17	-0.16	-0.8	-0.13	-0.14	1.6	-0.65	-0.61	-3.5	0.16	0.18	-1.9
5	0.11	0.12	-0.2	0.35	0.32	2.6	-0.82 †	-0.79 †	-3.4 ††	0.57	0.58	-1.6
6	-0.04	-0.04	-0.4	0.00	-0.03	3.2	0.10	0.12	-2.2	-0.22	-0.18	-4.1
7	0.05	0.06	-1.1	0.34	0.33	0.3	-0.10	-0.08	-1.8	-0.25	-0.22	-2.5
8	0.19	0.17	1.7	0.28	0.26	2.4	0.14	0.17	-2.4	0.09	0.05	4.1 **
9	-0.21	-0.20	-1.2	-0.07	-0.09	1.6	-0.21	-0.19	-2.0	-0.41	-0.37	-4.3 ††
10	0.31	0.31	0.6	0.15	0.12	2.7	0.63	0.63	-0.7	0.27	0.29	-1.4

Table 8

Cumulative Average Abnormal Return to Target Shareholders around the Announcement Day - Fixed vs. Float Approaches

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The fixed and float cumulative average abnormal return (CAAR) is computed by summing the fixed and float AAR over the event window (t_1, t_2), respectively. The test statistic for the significance of CAAR over the event window (t_1, t_2) is explained in Eq. (15 and 16 in Appendix A), and for the significance of the difference between the mean of fixed and float AAR over the event window (t_1, t_2) in Eq. (23 to 26 in Appendix A) of the paper. The second raw of each event window represents the value of related test statistic. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10% , 15%, and 20% level for a two-tailed test, respectively.

	CAAR (%)								**Difference in Mean of AAR (bps)**			
	Fixed				**Float**				**Fixed - Float**			
Event Window	Full	Cash	Equity	Mixed	Full	Cash	Equity	Mixed	Full	Cash	Equity	Mixed
(-126, 63)	22.53***	19.63***	15.22††	31.67***	23.14***	13.81**	23.59**	34.43***	-0.32***	3.06***	-4.4***	-1.45***
	4.77	3.30	1.54	3.79	4.88	2.31	2.39	4.11	-3.15	19.64	-36.17	-8.08
(-126, -1)	6.00††	2.96	2.80	13.03*	6.12††	-1.37	8.13	15.08**	-0.10	3.43***	-4.23***	-1.63***
	1.56	0.61	0.35	1.91	1.59	-0.28	1.01	2.21	-0.79	18.96	-27.31	-7.60
(-126, -43)	0.36	-1.88	0.40	3.51	0.42	-4.86	3.97	4.94	-0.07	3.55***	-4.25***	-1.70***
	0.12	-0.47	0.06	0.63	0.13	-1.22	0.60	0.89	-0.49	15.00	-21.06	-6.27
(-42, -1)	5.64**	4.83*	2.40	9.5**	5.70***	3.49	4.16	10.14***	-0.14	3.20***	-4.19***	-1.49***
	2.54	1.73	0.52	2.42	2.56	1.24	0.89	2.57	-0.71	11.89	-17.98	-4.26
(-20, -1)	4.29***	6.14***	0.06	5.20*	4.27***	5.45***	0.90	5.44**	0.06	3.47***	-4.20***	-1.19**
	2.79	3.18	0.02	1.92	2.78	2.81	0.28	2.00	0.48	10.34	-11.40	-2.38
(-10, 10)	17.52***	22.41***	9.37***	17.43***	17.53***	21.72***	10.28***	17.67***	-0.04	3.23***	-4.31***	-1.16**
	11.15	11.31	2.86	6.27	11.13	10.92	3.13	6.34	0.50	7.77	-12.13	-2.29
(-5, 5)	16.31***	21.24***	7.96***	16.35***	16.32***	20.93***	8.44***	16.42***	-0.06	2.88***	-4.33***	-0.64
	14.34	14.82	3.35	8.13	14.32	14.54	3.55	8.14	0.62	4.66	-8.29	-0.41
(-1, 1)	15.28***	19.00***	9.81***	14.59***	15.31***	18.96***	9.96***	14.63***	-1.11	1.42	-4.88*	-1.52
	25.72	25.39	7.91	13.88	25.72	25.22	8.02	13.89	-0.10	1.37	-3.81	-0.15
(0, 20)	15.08***	18.63***	8.98***	15.17***	15.10***	17.94***	9.88***	15.47***	-0.11	3.27***	-4.28***	-1.41***
	9.59	9.41	2.74	5.46	9.59	9.02	3.01	5.55	0.13	7.43	-10.43	-2.90
(0, 42)	15.06***	16.96***	9.62**	16.75***	15.24***	15.79***	11.54**	17.33***	-0.42**	2.72***	-4.47***	-1.34***
	6.70	5.99	2.05	4.21	6.76	5.55	2.45	4.34	-2.17	7.71	-18.70	-4.29

Table 9

Cumulative Average Abnormal Return to Acquirer Shareholders around the Announcement Day - Fixed vs. Float Approaches

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The fixed and float cumulative average abnormal return (CAAR) is computed by summing the fixed and float AAR over the event window (t_1, t_2), respectively. The test statistic for the significance of CAAR over the event window (t_1, t_2) is explained in Eq. (15 and 16 in Appendix A), and for the significance of the difference between the mean of fixed and float AAR over the event window (t_1, t_2) in Eq. (23 to 26 in Appendix A) of the paper. The second raw of each event window represents the value of related test statistic. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10% , 15%, and 20% level for a two-tailed test, respectively.

	CAAR (%)								Difference in Mean of AAR (bps)			
	Fixed				Float				Fixed - Float			
Event Window	**Full**	**Cash**	**Equity**	**Mixed**	**Full**	**Cash**	**Equity**	**Mixed**	**Full**	**Cash**	**Equity**	**Mixed**
(-126, 63)	2.22	-4.95	8.57	5.69	2.33	-8.21*	12.59††	6.98	-0.06	1.71***	-2.12***	-0.68***
	0.63	-1.18	1.04	0.76	0.66	-1.94	1.52	0.93	-0.74	15.06	-18.17	-4.69
(-126, -1)	4.84*	-2.57	12.35*	9.03††	4.90*	-4.61†	14.86**	10.02*	-0.05	1.62***	-1.99***	-0.79***
	1.68	-0.75	1.84	1.48	1.70	-1.34	2.21	1.64	-0.48	11.58	-13.45	-4.34
(-126, -43)	4.27*	-0.42	9.79*	6.29	4.23*	-1.87	11.45**	6.80†	0.05	1.72***	-1.98***	-0.61***
	1.82	-0.15	1.78	1.26	1.80	-0.66	2.08	1.36	0.53	9.47	-10.09	-2.86
(-42, -1)	0.57	-2.15	2.56	2.74	0.67	-2.74†	3.41	3.22	-0.25*	1.42***	-2.00***	-1.15***
	0.34	-1.09	0.66	0.78	0.40	-1.38	0.88	0.91	-1.68	6.85	-9.55	-3.39
(-20, -1)	0.25	-1.54	0.52	2.55	0.34	-1.78†	0.97	2.81	-0.45*	1.21***	-2.22***	-1.30**
	0.22	-1.13	0.20	1.05	0.29	-1.29	0.36	1.15	-2.03	3.96	-7.54	-2.39
(-10, 10)	-2.67**	-0.53	-7.26***	-1.86	-2.58**	-0.84	-6.84**	-1.48	-0.42*	1.46***	-1.99***	-1.77***
	-2.28	-0.38	-2.64	-0.74	-2.20	-0.59	-2.49	-0.59	-1.97	5.28	-9.40	-3.32
(-5, 5)	-2.98***	-0.82	-7.29***	-2.42†	-2.93***	-0.95	-7.08***	-2.25	-0.47††	1.21**	-1.94***	-1.63**
	-3.52	-0.81	-3.67	-1.34	-3.45	-0.94	-3.56	-1.24	-1.79	2.99	-5.61	-2.58
(-1, 1)	-2.64***	-0.31	-4.81***	-4.11***	-2.63***	-0.32	-4.77***	-4.11***	-0.1†	0.48	-1.07††	-0.09
	-5.95	-0.59	-4.63	-4.36	-5.94	-0.61	-4.60	-4.35	-1.96	0.38	-2.85	-0.16
(0, 20)	-2.78**	-0.21	-5.89**	-3.82††	-2.80**	-0.58	-5.54**	-3.66††	0.1	1.74***	-1.69***	-0.75††
	-2.37	-0.15	-2.15	-1.53	-2.39	-0.41	-2.02	-1.47	0.43	6.58	-6.57	-1.68
(0, 42)	-3.70**	-1.07	-7.16*	-4.5	-3.75**	-1.97	-6.21††	-4.26	0.12	2.09***	-2.21***	-0.56**
	-2.20	-0.53	-1.82	-1.26	-2.23	-0.98	-1.58	-1.19	0.99	10.47	-9.19	-2.03

Table 10

Skewed Division of Gains between Target and Acquirer Shareholders

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The fixed and float cumulative average abnormal return (CAAR) is computed by summing the fixed and float AAR over the event window (t_1, t_2), respectively. Column 1, e.g., is the difference between the CAAR of the fixed and float over the event window (t_1, t_2) for the target firms. Column 2 to 8 are constructed similarly across payment-form subsamples of the target firms, the acquirer firms, and their payment-form subsamples. The test statistic for the significance of difference between the fixed and float mean of AAR to the target shareholders and that of the acquirer shareholders over the event window (t_1, t_2) is explained in Eq. (27 to 30 in Appendix A) of the paper. The second raw of each event window represents the value of related test statistic. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 1%, 5%, 10% , 15%, and 20% level for a two-tailed test, respectively.

	Difference in CAAR of Fixed and Float (%)								Difference in CAAR of Fixed and Float (%)				Difference in Mean of AAR of Fixed and Float (bps)			
	Target				Acquirer				Target - Acquirer				Target - Acquirer			
	Full	Cash	Equity	Mixed	Full	Cash	Equity	Mixed	Full	Cash	Equity	Mixed				
Event Window	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1-5**	**2-6**	**3-7**	**4-8**	**Full**	**Cash**	**Equity**	**Mixed**
(-126, 63)	-0.60	5.82	-8.37	-2.76	-0.10	3.26	-4.02	-1.29	-0.50	2.56	-4.35	-1.47	-0.26*	1.35***	-2.29***	-0.77***
													-1.64	3.20	-10.09	-2.74
(-126, -1)	-0.12	4.33	-5.33	-2.06	-0.06	2.04	-2.50	-0.99	-0.06	2.28	-2.82	-1.06	-0.05	1.81***	-2.24***	-0.84**
													-0.17	4.42	-7.96	-2.50
(-126, -43)	-0.06	2.98	-3.57	-1.43	0.04	1.45	-1.66	-0.51	-0.10	1.54	-1.91	-0.92	-0.12	1.83***	-2.27***	-1.10***
													-0.72	3.21	-6.16	-2.84
(-42, -1)	-0.06	1.34	-1.76	-0.63	-0.10	0.60	-0.84	-0.48	0.04	0.75	-0.92	-0.14	0.11	1.78***	-2.18***	-0.34
													0.83	3.31	-5.24	-0.31
(-20, -1)	0.01	0.69	-0.84	-0.24	-0.09	0.24	-0.44	-0.26	0.10	0.45	-0.40	0.02	0.51*	2.26***	-1.99***	0.12
													1.91	3.70	-3.05	0.43
(-10, 10)	-0.01	0.69	-0.91	-0.24	-0.09	0.31	-0.42	-0.37	0.08	0.38	-0.49	0.13	0.38*	1.82***	-2.32***	0.61†
													1.82	2.77	-4.15	1.43
(-5, 5)	-0.01	0.32	-0.48	-0.07	-0.05	0.13	-0.21	-0.18	0.05	0.18	-0.26	0.11	0.41 ††	1.67**	-2.39**	0.99††
													1.71	2.17	-2.68	1.66
(-1, 1)	-0.03	0.04	-0.15	-0.05	0.00	0.01	-0.03	0.00	-0.03	0.03	-0.11	-0.04	-1.01	0.94	-3.80††	-1.43
													0.14	1.07	-2.22	-0.05
(0, 20)	-0.02	0.69	-0.90	-0.30	0.02	0.37	-0.35	-0.16	-0.04	0.32	-0.54	-0.14	-0.21	1.52*	-2.59***	-0.66
													-0.25	1.95	-4.20	-0.58
(0, 42)	-0.18	1.17	-1.92	-0.58	0.05	0.90	-0.95	-0.24	-0.23	0.27	-0.97	-0.34	-0.54**	0.63	-2.25***	-0.78††
													-2.25	-0.06	-4.68	-1.43

Table 11

Differential Gains across Payment-forms to the Target Shareholders via Fixed and Float Approaches

Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day *t* around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The fixed and float cumulative average abnormal return (CAAR) is computed by summing the fixed and float AAR over the event window (t_1, t_2), respectively. Then, the difference between the CAAR of two payment-form subsamples is computed based on the fixed benchmark and the float approaches. The test statistic for the significance of difference in CAAR across payment-form subsample over the event window (t_1, t_2) is explained in Eq. (18 in Appendix A) in the paper. The second raw of each event window represents the value of related test statistic. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 0.5%, 2.5%, 5%, 7.5% and 10% level for a left-tailed test, respectively.

	Difference in CAAR between Payment Subsamples (%)					
	Fixed			**Float**		
Event Window	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**
(-126, 63)	-4.41	12.04	-16.44††	9.78	20.62	-10.83
	-1.24	0.35	-1.59	0.06	1.27	-1.22
(-126, -1)	-0.16	10.07	-10.23	9.50	16.45*	-6.96
	-0.18	0.92	-1.11	0.91	1.76	-0.85
(-126, -43)	2.28	5.39	-3.11	8.83†	9.81††	-0.98
	0.38	0.78	-0.40	1.29	1.49	-0.20
(-42, -1)	-2.44	4.68	-7.12†	0.67	6.65	-5.98
	-0.86	0.49	-1.35	-0.25	0.94	-1.19
(-20, -1)	-6.09**	-0.94	-5.15†	-4.55*	-0.01	-4.54
	-2.23	-0.89	-1.34	-1.79	-0.57	-1.22
(-10, 10)	-13.03***	-4.98***	-8.05**	-11.44***	-4.05***	-7.39**
	-5.98	-3.57	-2.41	-5.51	-3.24	-2.27
(-5, 5)	-13.28***	-4.89***	-8.39***	-12.49***	-4.51***	-7.98***
	-8.11	-4.73	-3.38	-7.77	-4.52	-3.25
(-1, 1)	-9.19***	-4.42***	-4.77***	-9.00***	-4.33***	-4.67***
	-12.36	-8.14	-4.22	-12.17	-8.01	-4.15
(0, 20)	-9.65***	-3.46***	-6.19*	-8.06***	-2.48**	-5.59*
	-4.72	-2.79	-1.92	-4.25	-2.45	-1.80
(0, 42)	-7.34***	-0.21	-7.13††	-4.25**	1.53	-5.79†
	-2.78	-1.25	-1.53	-2.19	-0.85	-1.34

Table 12

Differential Gains across Payment-forms to the Acquirer Shareholders via Fixed and Float Approaches

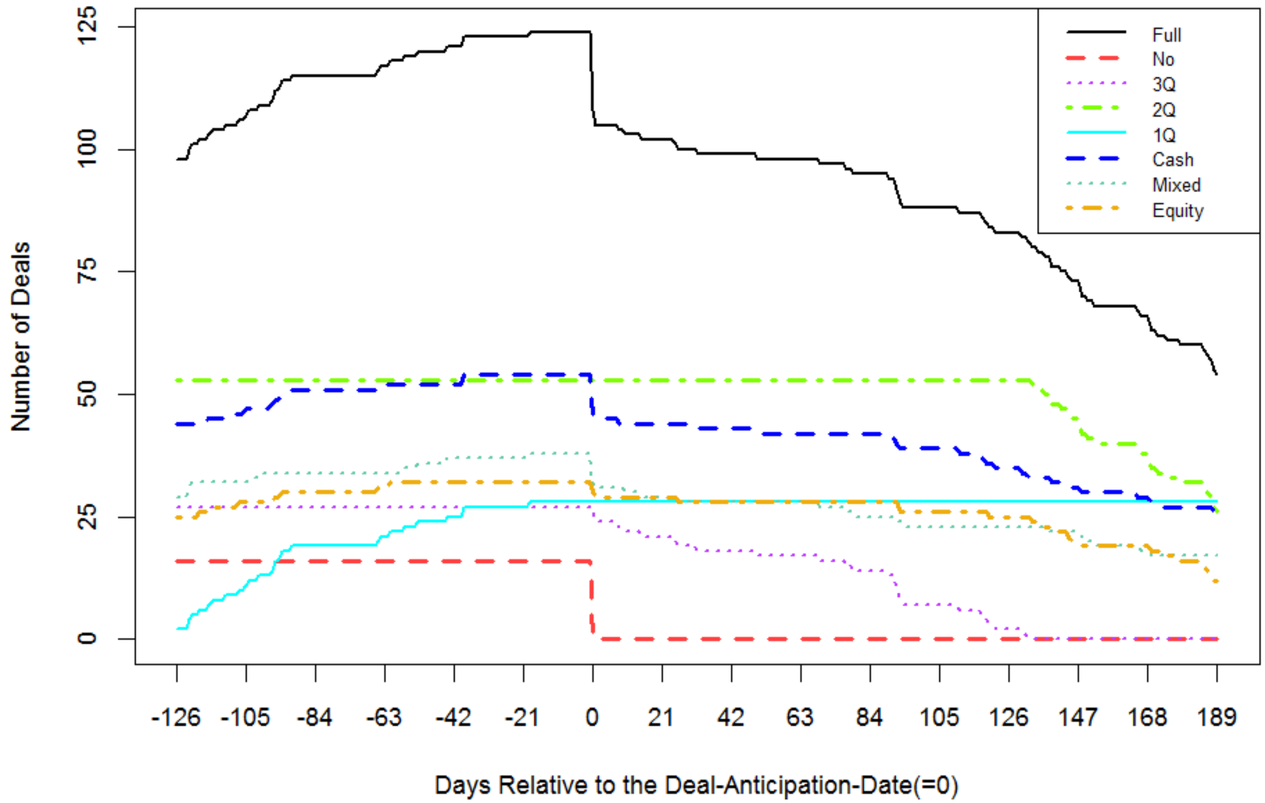
Using the S&P 500 index, the market model estimates the average abnormal return (AAR) at day t around the announcement date (0). The parameters of the market model are estimated: (1) from the fixed benchmark estimation window, which contains returns from the (-379, -127) interval of each series, and (2) from the float estimation window, which contains returns from the pre-anticipation segment of each deal. The fixed and float cumulative average abnormal return (CAAR) is computed by summing the fixed and float AAR over the event window (t_1, t_2), respectively. Then, the difference between the CAAR of two payment-form subsamples is computed based on the fixed benchmark and the float approaches. The test statistic for the significance of difference in CAAR across payment-form subsample over the event window (t_1, t_2) is explained in Eq. (18 in Appendix A) in the paper. The second raw of each event window represents the value of related test statistic. The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. ***, **, *, ††, and † denotes statistical significant at the 0.5%, 2.5%, 5%, 7.5% and 10% level for a left-tailed test, respectively.

	Difference in CAAR between Payment Subsamples (%)					
	Fixed			Float		
Event Window	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**	**(Equity - Cash)**	**(Mixed - Cash)**	**(Equity - Mixed)**
(-126, 63)	13.52††	10.64†	2.88	20.80**	15.19**	5.61
	1.57	1.37	0.20	2.45	2.03	0.42
(-126, -1)	14.92*	11.60††	3.33	19.47**	14.63**	4.83
	1.83	1.57	0.26	2.51	2.10	0.40
(-126, -43)	10.21†	6.71	3.50	13.32**	8.66†	4.65
	1.37	1.00	0.37	1.94	1.43	0.51
(-42, -1)	4.71	4.89†	-0.18	6.15††	5.97††	0.18
	1.24	1.32	-0.08	1.59	1.62	-0.03
(-20, -1)	2.06	4.09††	-2.03	2.75	4.59*	-1.84
	0.94	1.54	-0.60	1.17	1.73	-0.56
(-10, 10)	-6.73††	-1.33	-5.40†	-6.00†	-0.65	-5.36†
	-1.60	-0.26	-1.34	-1.34	0.00	-1.34
(-5, 5)	-6.47**	-1.60	-4.87*	-6.13*	-1.29	-4.84*
	-2.02	-0.37	-1.65	-1.86	-0.22	-1.64
(-1, 1)	-4.50***	-3.80***	-0.69	-4.45***	-3.79***	-0.66
	-2.86	-2.67	-0.20	-2.82	-2.65	-0.17
(0, 20)	-5.68†	-3.61	-2.08	-4.96	-3.08	-1.88
	-1.41	-0.97	-0.44	-1.14	-0.75	-0.39
(0, 42)	-6.09	-3.44	-2.66	-4.24	-2.30	-1.95
	-0.91	-0.51	-0.40	-0.43	-0.15	-0.27

Appendix Figure 1

Number of Firms across Quartile and Payment-form Subsamples around the Deal-Anticipation Date

Given the cross-sectional variation in the deal-anticipation date across anticipated deals, the number of firms around the deal-anticipation event (0) is inconstant for the full sample, across quartile and payment-form subsamples. It reaches its global maximum one-day before the deal-anticipation date (-1) as explained below: The full sample consists of 124 completed acquisitions between U.S. public firms from 2003 to 2006, and splits to 54 Cash, 32 Equity and 38 Mixed-payment bids. The deal-anticipation dates are taken from Irani (2014) who finds that 108 (out of 124) deals are anticipated. The 1Q, 2Q, and 3Q subsample contains those deals that are anticipated in the first quartile, the interquartile, and the third quartile of deal anticipation distribution, respectively. The No subsample denotes those deals that are not anticipated. There are 28, 53, 27, and 16 deals in the 1Q, 2Q, 3Q and No subsamples, respectively.



Appendix Table 1
Overview of Hypotheses

This table presents an overview of the null hypotheses used in this paper, the event for which the performance measure and the test statistic is computed, the alternative hypothesis, the expected sign of the test for the target and acquirer sample based on a priori knowledge (if it is available), and the table in which the results of testing the null is reported for the target and acquirer samples. AAR and CAAR denote the daily average abnormal return at an event day and the cumulative average abnormal return over an event window (longer than one way), respectively.

				Expected Sign		Results	
Hypothesis	**Statement**	**Event**	**Alternative Hypothesis**	**Target**	**Acquirer**	**Target**	**Acquirer**
$H_0^{(1)}$	AAR is insignificant	Anticipation	Two-tailed Test	+	+	Table 2	Table 3
$H_0^{(2)}$	CAAR is insignificant	Anticipation	Right-tailed Test	+	+	Table 4	Table 5
$H_0^{(2a)}$	No difference between CAAR of two quartile subsamples	Anticipation	Left-tailed Test	−	−	Table 4	Table 5
$H_0^{(2b)}$	No difference between CAAR of two payment subsamples	Anticipation & Announcement	Left-tailed Test	−	−	Table 4 and 11	Table 5 and 12
$H_0^{(3)}$	No difference between AAR of Fixed and Float approaches	Announcement	Two-tailed Test	Unknown	Unknown	Table 6	Table 7
$H_0^{(4)}$	No difference between CAAR of Fixed and Float approaches	Announcement	Two-tailed Test	Unknown	Unknown	Table 8	Table 9
$H_0^{(4a)}$	Difference between CAAR of Fixed and Float approaches for the target firms is equal to that for the acquirer firms	Announcement	Two-tailed Test	Unknown	Unknown	Table 10	