Takeover Rumor Effects on Bidding Firms

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ABSTRACT

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This paper examines 680 initial U.S. takeover rumours which name both bidder and target firms from 2002 to 2011. We find that rumours attributed to an insider and those indicating a positive synergy would result from a takeover are significant predictors of future takeover announcements between these rumoured firms. Interestingly, these same rumour types are also significantly related to pre-rumour bidder firm returns. In addition, bidding firm rumour date returns are significantly higher for smaller firms, in line with the literature for bidding firm announcement date effects. Finally, for the subsample of rumoured firms which do engage in the rumored takeover, we find that the longer the interval between the rumour date and announcement date, the more positive the announcement date return. In sum, we interpret results as evidence confirming hypotheses that the anticipation of takeovers should be accounted for in the analysis of announcement date effects.

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1. Introduction

According to Clarkson et al. (2006), any objectively unverified information can be classified as rumour in the merger and acquisition (M&A) market. Despite the fact that some rumours are spread by "word of mouth," there also exist newspapers, newswires, and journals for rumour dissemination. Considering the incapacity to catch all the rumours in the market and the necessity to weed out those completely unsubstantiated, we select the published rumours though they might be not able to represent all the rumours in the market. During the process of rumour dissemination, some rumours can appear more than once in different media. To capture the initial market reaction without fear of the market already impounding this information into its price, we focus on those initial rumours that have not been mentioned within 90 days prior and examine the impact of initial rumours on potential bidding firms.

The efficient market hypothesis suggests that markets could process information rapidly. However, the commonly measured returns (Jensen and Rubach, 1983; Jarrell, Brickley and Netter, 1988; Jarrell and Poulsen, 1989; Andrade and Mitchell and Stafford, 2001) to the bidders is close to zero, while the target shareholders seem to capture the majority of the value gains generated by a merger. Considering continuous bidding activities, it is hard not to wonder the motives for bidders and why they end up with a nearly neutral reaction to announcements. One fair explanation is that the announcement information could have already been released or anticipated before the announcement (Jensen and Ruback, 1983). Rumour is such an important method of information transfer that very few takeover bids for publicly held corporations are true surprises, according to Pound and Zeckhauser (1990).

In this paper, we hand collect 2,074 initial rumours, of which 680 mention the possible bidder and thus are used herein. Compared with former rumour research studies, the sample size is relatively larger (42 observations in Pound and Zechhauser [1990], 60 in Murray [1994], and 476 in Clarkson et al. [2006]), and unlike these research studies, we focus on the bidder instead of the target and analyze rumored bidders' returns.

We find that the size effect for initial rumoured bidder returns is similar to that for announcement bidder returns in Moeller et al. (2004). In addition, we show that merger anticipation lessens the announcement cumulative abnormal returns (CARs), as stated by Cornett et al. (2011), based on our hand-collected sample. The source of the rumours' abnormal returns suggests market participants can use public information to anticipate rumours (i.e., cash ratio and synergies) and have access to information leaks, which means they know about information later revealed by insiders. They use this information to anticipate future announcements and create abnormal trading volumes based on initial rumour information surrounding initial rumour dates. If an initial rumour actually turns into an announcement, the closer it appears to the announcement, the more negative the impact it would have on the announcement.

The remainder of the paper is organized as follows. Section 2 provides the background and literature review. The data and methodology are described in Section 3. Following the data explanation, Section 4 presents the empirical results of the regressions. Finally, Section 5 provides the conclusion.

2. Background and literature review

The financial literature has been long interested in explaining the magnitude and source of abnormal returns to bidding firms. As former literature studies report that the unconditional abnormal announcement return to bidders is close to zero or slightly negative, it is easily concluded that the majority of wealth gained by mergers and acquisitions is captured by the target firms. According to Moeller, Schlingemann, and Stulz (2004), the stock returns of firms announcing a bid yield a sizable effect, which suggests smaller acquirers gain higher announcement returns.

Keown and Pinkerton (1981) indicate that announcement CARs are influenced by information leaks from intermediaries involved in the acquisition negotiation process. Rumours originating in this way have a more negative impact on bidder's returns, as they often represent a fiduciary breach of a confidentiality agreement. Once the

information leaks or is captured by the marketplace, other investors would follow and mimic the trading activity, ruining the announcement surprise.

The market anticipation hypothesis (Jensen and Ruback, 1983) suggests that investors could anticipate a takeover transaction based on rumours in the press, industry trends, or specific public information. The research by Cornett et al. (2011) shows that investors can anticipate the bidder or target's merger candidacy, and further, bidders are more easily anticipated. Song and Walkling (2008) provide strong evidence that initial bidding activity in an industry also has a great ability to predict an acquisition, making bidding a wealth-creating activity.

In the real financial world, it is not easy to distinguish whether a rumour comes from anticipation or an insider leak. However, the information involved in a rumour or, simply, the appearance of a rumour could draw the market's attention or some "reasonable doubts" about the potential takeover. Therefore, what we are trying to ask here is how the rumours would affect bidding firms.

3. Sample data and methodology

In this paper, we define rumours as any public conjecture published in newspapers, newswires, business journals, and/or trade journals that expressly indicate a public U.S. firm (contained within the Center for Research in Security Prices, or CRSP, database) is a likely target of an impending merger or acquisition. Specific sources thoroughly investigated include the databases of the S&P Capital IQ, S&P Takeover Talk, and Zephyr, as well as the online services of Factiva and Pro-Quest (which themselves include thousands of newswires and printed communications, including the Wall Street Journal, the Economist, Bloomberg BusinessWeek, and Dow Jones Newswires, among many others).

To uncover such rumours, a proprietary algorithm was developed by first investigating actual takeover rumours we could easily identify—those available in S&P Takeover Talk, S&P Capital IQ, and Zephyr. We then supplemented this via a Google search of articles containing similar terms. An initial sample of over 100

different takeover rumours thus provided our basis in developing an algorithm to search for additional takeover rumours contained within Factiva and Pro-Quest. This algorithm contained terms such as "strategic alternative," "buyout," "sale of the firm," "looking to be acquired," "takeover candidate," and "takeover chatter," among others, in combination with Boolean logic and another set of terms, such as merger, takeover, rumour, chatter, acquis*, and so on.

We then sifted through these articles uncovered in Factiva (and later Pro-Quest news sources not overlapping with Factiva, such as the Financial Times, Barron's, Mergers & Acquisitions Report, and many others) using this proprietary algorithm. As this algorithm resulted in many false positives, the researchers manually distinguished articles containing takeover rumours from those that did not. This resulted in a process whereby some rumours may have been missed (either not captured by the algorithm or not properly identified as such by the researcher), but rumours that were identified are likely to be accurate (as they are read rather than solely defined by an algorithm).

Once a takeover rumour has thus been identified, the researchers use a new algorithm incorporating only the target firm's name to more accurately uncover any additional preceding rumours. In this way, we ensure the initial takeover rumour within a period of 90 days has been found. Once this takeover rumour has been identified as the initial rumour, it is then assigned a "type," one of nine categories, as detailed in the appendices: MultipleBidder, PEFundor, Analyst, Chatter, Insider, OptionChanges, Synergy, InitiatedByTarget, or TargetFinancialAdvisor.

Then we verified the rumours by checking their announcement dates (if available). If both parties, the bidder and the target, indicate a bid has been made and declare the deal amount, this constitutes an announcement date. We exclude those rumours having an announcement on the same day or one day after for the reason it might be a normal publication time delay by different media. In addition, we also exclude foreign bidders and those no longer listed in the CRSP database. After all, we collected 2,074 rumours, of which 680 indicate a bidder's name, between January 1, 2002 and

December 31, 2011. The rumour description is separated by year in Table 1. As we show, the number of rumours grew from 2002 and peaked at 129 in 2009. A relatively small percentage (12%) finally turned into a takeover announcement. In addition, nearly half (45%) of rumoured bidders are not the only bidder mentioned in the rumour. In terms of the source of the rumour, only 8% involve the PE funder, 46% come from financial analysts, and 20% originate from chatters. Meanwhile, 22% of rumours are from anonymous sources or insiders.

We used the CRSP-COMPUSTAT database to compile financial statement data for the 10-year period from 2002 to 2011. The sample of actual announcements is based on Security Data Company's (SDC) US Mergers and Acquisitions database. We collect the first announcement, wherein the rumoured bidder makes a bid for the target, and we exclude announcements within one day after the rumours.

4. Empirical results

4.1 Rumour abnormal returns and size effect

To determine whether the market reacts efficiently to takeover rumours, we employ the standard event study by estimating the abnormal percentage returns (following Brown and Warner, 1985). The estimation period covers the 240 days, from t-300 through t-61, where day t represents the rumour date. A minimum of 100 daily returns is required; otherwise, the case is dropped. The estimation test yields the CRSP Equal-weighted Index returns using the market model. The abnormal return is the difference between the actual and estimated returns for these potential bidding firms. CARs include the price impact over the (-42,-2), (-1, 0), (-1, 1), (-2, 2), (-3, 3), and (-5, 5) periods. Statistical significance is tested by a T test.

The equally weighted abnormal returns for our sample is given in Column 1 of Table 2. The CARs for the pre-rumour period (-42,-2) are slightly negative (-0.24%), while those around the rumour date, (-1, 0), (-1, 1), (-2, 2), (-3, 3), and (-5, 5), are positive. The results are statistically insignificant, which is also observed by former research studies (i.e., Jensen and Ruback [1983]) when studying the performance of

bidders' announcement CARs. However, the adverse implies that rumours might change the market's reaction to the bidder because they would draw the market's attention to the bidder and increase the probability of a potential acquisition.

Former research (Siganos, 2013) shows the media's attention would explain the price run-up before announcements. Due to the size effect, larger firms would attract relatively greater attention than smaller ones. In addition, Moeller et al. (2004) argue the managers of larger firms might be more prone to overconfidence, and the greater premium paid by large firms decreases the average abnormal returns of large firms. Accordingly, to examine whether the size effect is predicted by a rumour, we divide the sample into two subsamples by firm size. We define the big firms in a given year as those firms whose assets falls above the median of the whole sample, and the rest are labeled as big firms.

Columns 2 and 3 in Table 2 show the CARs for two subsamples of small firms and big firms. The big firms gain insignificant positive pre-rumour returns; however, their rumour CARs are significantly negative. On the other hand, the results for the small firms are quite different from those of big firms. They are insignificantly negative in the pre-rumour period, but significantly positive surrounding the appearance of rumours.

For a robustness test, we followed Moeller et al. (2004) using the percentile of New York Stock Exchange (NYSE) firms in the year in which the rumour is initially mentioned to distinguish different firm sizes. The results are shown in Columns 4 and 5 in Table 2. Considering the bidders involved in rumours most likely have great assets and impact, we select those with total assets within the top 10% percentile of NYSE firms as big firms. The results, shown in Columns 4 and 5 in Table 1, are similar to what we found before. Besides the market model, we also test the Fama-French model, and the size effects are still consistent.

This disparity suggests the existence of a size effect in bidder's rumour returns. The small firms have a nearly 0.65% higher rumour return than the big firms in the two-day rumour period and an even higher return (0.72%) in the three-day rumour

period. Moeller et al. (2004) show a roughly two percentage higher announcement return for acquiring-firm shareholders. Rumour return may not be as high as announcement return, but the similarity of their size effects indicates uncertain information (rumours) could share the pattern of more certain information (announcements); furthermore, considering that firm size could be used as a proxy for the easiness of anticipation, bigger firms could be more likely to be predicted. This also proves evidence that information about an acquisition could have already been known by the market through rumours before the official announcement. As a result, when run-up is incorporated with the announcement returns, there might also suggest no significant results. This underscores the importance of not analyzing announcement dates without a lengthy run-up window as well.

4.2 Regression of bidder rumour CAR

After identifying the abnormal rumour returns, we then focus on pinpointing the source of the abnormal returns. Rumours affect the stock price by absorbing some of the announcement information into the price. Therefore, investors could value the impending merger transaction and prepare for it based on the motivations for the mergers and information carried by the rumours.

The anticipation hypothesis suggests that mergers are driven under certain motivations (generate shareholder value and/or opportunistic benefits), and these motivations could be observed by professional analysts to predict mergers. Cornett et al. (2011) state that mergers, which generate shareholder value, are usually launched under four circumstances: 1) by reallocating resources to withstand economic disturbances; 2) by achieving economies of scale and scope; 3) by gaining access to additional sources of capital that allow the firm to grow; and 4) by exploiting discrepancies in valuation.

Following Cornett et al. (2011), we use sales shock as our proxy for economic disturbance. Sales shock is defined as the absolute value of the difference between the two-year median industry sales growth and the two-year median sales growth for all

firms in the sample. A greater economic disturbance indicates greater management's desire to acquire another firm.

Economies of scale and scope are measured as firm size and sales level. We define firm size as the natural logarithm of total asset, change in size as the percentage change in the book value of the assets of the firm in the previous two years, and sales growth as the percentage change in the firm's net sales in the previous two years. A larger size, a greater change in size, and greater sales growth are associated with a higher possibility of acquisition.

Besides, when facing economic disturbance and pursuing economies of scale and scope, big firms would attempt to reduce competition by intra-industry mergers, and small firms are likely to engage in cross-industry mergers to survive. Therefore, a high industrial concentration ratio is related to a high likelihood of acquisition. In addition, we define the concentration ratio as the ratio of the sales of the largest four firms (in terms of sales) to total industry sales.

For a firm that is further along its lifecycle and exhausts its internal growth opportunities, it might be large and desire the acquisition of external sources to grow. We use resource-growth-mismatch, as with Palepu (1986) and Ambrose and Megginson (1992), to measure desire, which is defined as a dummy variable equal to one if i) sales growth for a firm in the last two years is less than the industry median and the long-term debt ratio is greater than the industry median or ii) if sales growth in the last two years is greater than the industry median and the long-term debt ratio is less than the industry median and zero otherwise. The cash ratio, return on assets (ROA), and price run-up are the proxies for a bidder's capability of gaining such resources: the cash ratio is the ratio of cash to total assets, ROA is the ratio of net income before extraordinary (or non-recurring) items to total assets, and price run-up is the percentage change in a firm's stock price in the prior two years.

We use the share turnover to measure the discrepancies in valuation. Following Gort (1969), a higher share turnover suggests a higher bidder candidacy. The share turnover is measured as the ratio of the number of shares of stock traded for the firm

to the total shares outstanding.

Regarding opportunistic benefits, managers are motivated to propose a series of mergers to build their empire, and firms with a history of mergers are more likely to propose additional bids. Accordingly, we use previous mergers, as with Cornett et al. (2011), to count the number of times a firm proposes a merger bid in the prior two years.

Song and Walkling (2008) suggest that a bidder might be more motivated by merger wave than shareholder value. We define the dormant period, according to Cornett et al. (2011), as the number of months since the last merger in the industry, while industry is defined at the 3-digit SIC (Standard Industrial Classification) level.

In addition to the variables used by Cornett et al. (2011), we use the rumour type dummy labeled in the data collection process to identify the characteristics of rumours. We categorize rumours into four aspects: competition, source of rumour, insider, and supporting evidence.

Competition records whether another bidder is involved in the rumour. Once more than one acquiring firm is mentioned in the rumour, the rumour effect would be shared by multiple participants. We include three common sources of rumours (public equity funder, analyst, and chatter) and expect that different sources of information would bring different market reactions. Insider rumours come from anonymous sources indicating that a certain firm is looking forward to a takeover. These rumours could be information leaks from the negotiation between bidder and target, which represents the illegal information transfer in the pre-announcement period. In terms of the evidence supporting rumours, we collect those market activities and target reactions: option change and strong synergy are repeatedly used by media to support rumours. As well, if a target is initiated by a target or a target has an advisor, this may lend credibility to an impending deal.

The first regression we run is to check whether there is any run-up effect before the rumours. Although we collect only initial rumours within 90 days, information could have leaked or have been anticipated in other untraceable ways. Therefore, we

examine whether the pre-rumour run-up could be explained by these variables. We show the results in Column 1 of Table 3, and it seems some factors dominate the run-up CARs during the (-42,-2) period. As we have expected, bidding firms with excess cash imply they have exhausted their internal growth opportunities and turn to acquire other firms instead of investing in their own. A higher cash ratio, as Harford et al. (2008) argue, indicates a greater desire for the managers to spend their cash on acquisitions. Supporting this theory, we find the cash ratio is positively related to the run-ups at the 1.4% significance level. Another positive factor is a target's strong synergy at the 2% significance level. Insiders (2% significance level), along with abnormal option or volume changes (8% significance level), are the main sources of negative attitudes towards pre-rumour run-ups.

In Column 2 of Table 3, we report the results of regressions on the two-day CARs surrounding the rumour period. The event period examined is the rumour day and one day prior. This regression would help us to understand the source of the abnormal rumour returns. A higher cash ratio is significantly related to higher abnormal returns, extending its pre-rumour pattern during the rumour period.

In Table 4, we regress the rumour CAR on credible rumours (those leading to announcement, considering both rumour period and pre-rumour period. The variables used by Cornett et al. (2011) tend to have a better explanation power on the rumour CARs. Previous sales growth, ROA, cash ratio and price run-up are all significantly related with CAR during both periods and insider rumours are negative predictors of credibility.

Our result shows that some patterns occur even before the rumours are in the press, indicating market participants can use both public information to anticipate rumours (synergies, cash ratio, and target option changes) and have access to information leaks (they seem to know about rumour information later revealed by insiders).

4.3 Logistic regression

We further launch a logistic regression to examine rumours' predictive power,

assuming that the variables we used in Table 3 would help to anticipate future merger announcements. The dependent dummy variable equals 1 if the acquirer makes an SDC announcement for the target after the rumour and 0 otherwise.

In Table 5, we find rumours' predictive power comes mainly from four aspects. The first is the growth of sales, which would present the past growth and imply further expansion through bidding. We find it significant at the 10% level. Another predictive variable is the dormant period. Song and Walkling (2008) find evidence that the abnormal returns of bidding firms are significantly positively related to the length between bid announcements in an industry. Our result shows that after a long dormant period, a rumour is more likely to be true (at the 1% level). The third aspect is insider; as they might get their information directly from the negotiation, it is expected they would increase the possibility of an announcement (10% significance). The last is a strong synergy, which benefits both parties and which is also significantly positively (5%) related to the probability of bidding.

4.4 Price-volume dynamics

In this part, we study whether the abnormal returns appear with any abnormal trading activity, including how the types of rumours could influence trading. We have reported that certain rumour types (i.e., insider) have an impact on pre-rumour returns. It implies the rumour information seems to have already been known by market participants and that the informed trading has taken place before the rumour.

To obverse the price-volume dynamics of the initial rumour, we use the abnormal turnover measure follows Bris (2005) and King (2009) as:

$$AT_{it} = \begin{cases} Turn_{it} - [\overline{Turn_i} + 2\sigma_{Turn}] & \text{if } Turn_{it} > \overline{Turn_i} + 2\sigma_{Turn} \\ 0 & \text{otherwise} \end{cases},$$

where $Turn_{it}$ is the volume of shares traded in bidder firms i on day t divided by the number of shares outstanding. $\overline{Turn_i}$ and σ_{Turn} are the mean and standard deviation of daily turnover in bidder firm i over (-300, -60). Abnormal Turnover (AT) is always positive, because it implies the excess trading volume by insiders. A statistically significant abnormal turnover suggests the turnover that a bidder firm

experienced on a given day is at least two standard deviations greater than the average turnover over (-300, -60).

The daily abnormal return (AR) is adjusted by the CRSP Equal-weighted Index using market model. Similar to our tests before, the estimation period is (-300, -60) and a minimum of 100 daily returns is required. Bid-ask spread is the natural logarithm of the proportional effective bid-ask spread on day t. The number of trades measured as the natural logarithm of the number of transactions on day t, and size is the natural logarithm of the total asset. Rumour type (i.e., multiple bidder, PE funder, analyst, etc.) is the same as before. Besides, we include the interaction terms between AT_{it} and rumour type, examining which rumour types are more likely to trigger abnormal trading.

The results in Columns 1 of Table 6 show that though some information has not been revealed yet in the press, it could be captured by some investors. A negative relation between AR and AT is found, suggesting that AR are lower on trading days with AT. Number of trades is positively related with AR while size is negatively related with AR. PE funders, analysts, chatter, and target's advisor could be positively related with AR during the pre-rumour days with ATs. Multiple bidders are negatively related to AR on the AT days. Insider and option changes have a negative impact on AR, but this is not consistent with AT. Again, the exclusion of the number of trades in Column 2 would not fundamentally change the results.

Column 2 of Table 6 shows the results for the observations in the two-day rumor period. We find a positive relation between AT and AR over the (-1, 0) period at the 1% significance level, meaning ARs are much higher on the days with ATs. Size is, as expected, negatively related to AR. Rumours with PF funder mentioned are shown to be associated positively with ARs by creating abnormal positive trading turnover. In addition, it is the only rumour type in our regression significantly positively related to ARs on the days with ATs. Target's option change shows some positive relation to ARs, but not to ATs. Rumours have a negative influence on AR, but this not consistent with AT. Rumours labeled as analyst, chatter, and initiated by target are all negatively

significantly related to ARs through ATs.

Former studies (Fishe and Robe, 2004; Meubroek, 1992) show that abnormal returns, along with abnormal turnover, are associated with insider trading in the pre-announcement period. However, we find that during the rumour period or the pre-rumour period, which is also included in the pre-announcement period, abnormal trading is related to the rumour information. This finding further provides some evidence that investors could use the rumour information in the merger transaction.

4.5 Announcement CAR and rumour

As we have shown that some rumour predictors could anticipate a future announcement, we then investigate whether a rumour is a "fraud alert" and whether the appearance of initial rumours would affect the stock price responses to a merger announcement. After tracking the rumours, we find that only a small portion (75 out of 680) turns into a real announcement by searching the SDC database for announcements by the same bidder and target after the rumour.

First, we launch an event study to check the CARs in the run-up and announcement period. This study uses the CRSP equal-weighted market model and (-300, -60) estimation period. We calculate CAR (-42,-2) as the run-up CAR following Schwert (1996), along with CAR (-1, 0) as the announcement CAR. Our sample shows in Panel A of Table 7 that bidders have significant negative CARs during the announcement period and insignificant negative run-ups.

Then, we investigate the appearance of rumours or the timing of rumours and determine how it impacts the announcements. Hence, we identify the time gap between rumour and announcement. As this gap varies from a few days to several years, we use LnDays, measured as the natural logarithm of the number of days between rumour and announcement. Besides, we control for information released from the announcement as features of the contract (all equity and all cash), the economic fit between bidder and target (same industry and same state), and the deal attitude (friendly), as with Cornett et al. (2011).

In Panel B of Table 7, Column 1 reports the results of run-up CARs, while Column 2 shows the results of two-day CARs at the merger announcements.

Pound and Zeckhauser (1990) mentioned that if a rumour is information leaked from insiders, they are probably the intermediaries who are actually preparing for an acquisition attempt. Then, if the rumour is proven correct, the acquiring firm should announce a bid relatively shortly thereafter. To the contrary, it might take months or years for anticipation rumours to come to fruition. In addition, the correlation matrix (Table 8) proves the insider mentioned in the rumours and lower LnDays are relatively highly correlated (-0.53). We expect and observe that LnDays is positively related to CAR (-1,0) in our regressions, meaning the closer a rumour occurs to an announcement, the more negative the impact it would have on the announcement CAR. It also implies that trading on an information leak would worsen the bidder's announcement return.

Characteristic of the deal includes the method of payment used by the bidder. All equity is a dummy variable that equals 1 when the deal is financed only with equity and 0 otherwise. As well, all cash is another dummy variable that equals 1 when the deal is financed only with cash and 0 otherwise. Myers and Majluf (1984) state that equity offers tend to overvalue the target. Our results support former research studies, showing that stock payment significantly decreases the bidding firm's shareholder value (two-day CAR and run-up) at the 5% statistical level.

The economic fit considers the industrial and geographical impact on bidder returns. The two dummy variables measure whether the two merger partners are in the same industry using 3-digit SIC codes, as with Cornett et al. (2011), and whether they are located in the same U.S. state. Our results in Table 7 show insignificant support for the industry focus or diversification. As for geographic proximity, the former literature indicates it affects economic fit in two ways: similar culture (Chakrabarti, 2009) and bidder's superior information about the target (Kedia et al.,2005). Accordingly, mergers occurring in the same state should be an advantage for bidder's shareholders. However, we observe a significant negative relation with CAR and

same state. A possible explanation could be when takeover takes place in different states, it would a bigger surprise and less anticipated. And, as Cornett et al. (2011) shown, bigger surprise and less anticipated bidders could win higher abnormal returns.

Attitude towards the bid implies the relative bargaining power of the two parties. For mergers with a tender offer and friendly attitude, acquiring firm shareholders gain more abnormal returns, according to Moeller et al. (2004). However, all our results do not significantly support this hypothesis.

Using a relatively small sample, we find some evidence that the interval between rumour date and announcement date is positively related with bidder's announcement CAR. The longer ago a rumour is, the less anticipated the announcement would be. Therefore, it again proves that anticipation could be important in announcement return study.

5. Conclusion

This paper investigates how the market would react to the bidder when facing the initial information about an acquisition. Despite the difficulty of hand-collected data, we examine 680 initial takeover rumours mentioning the possible bidder, publicized in newspapers, business journals, and newswires between 2001 and 2013. The size effects we find in the rumour abnormal returns seem to capture well the first instance of merger anticipation. We further study the source of rumour abnormal returns and find that market participants anticipate a future takeover by rumours attributed to an insider and those indicating a positive synergy. The abnormal trading turnovers show that market participants would trade on this information, thus impounding the rumour information into the stock price. Finally, we show some evidence that the anticipation power of rumours is related to the length of time between rumour and announcement. After all, this paper supports the anticipation hypothesis that investors could predict potential merger transactions through rumours.

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Appendices

Variable Definition

Sales shock	The absolute value of the difference between the two-year median industry sales growth and the two-year median sales growth for all firms in the sample.	CRSP-COMPUSTAT
Sales shock squared	Square of sales shock	CRSP-COMPUSTAT
Size	The log of total assets.	CRSP-COMPUSTAT
Change in size	The percentage change in the book value of assets of the firm in the last two years.	CRSP-COMPUSTAT
Sales growth	The change in the firm's net sales in the last two years.	CRSP-COMPUSTAT
Concentration ratio	The ratio of sales of the largest four firms (in terms of sales) to total industry sales.	CRSP-COMPUSTAT
Resource-growth-mismatch	A dummy variable equal to one if i) sales growth for a firm in the last two years is less than the industry median and long-term debt ratio is greater than the industry median, or ii) if sales growth in the last two years is greater than the industry median and long-term debt ratio is less than the industry median, and zero otherwise.	CRSP-COMPUSTAT
Return on assets (ROA)	The ratio of net income before extraordinary (or nonrecurring) items to total assets.	CRSP-COMPUSTAT
Share turnover	Ratio of the number of shares of stock traded for the firm to the total shares outstanding.	CRSP-COMPUSTAT
Cash ratio	Ratio of cash to total assets.	CRSP-COMPUSTAT
Previous mergers	Counts the number of times a firm proposes or receives a merger bid in the prior two years.	CRSP-COMPUSTAT
Dormant period	The number of months since the last merger in the industry (industry is defined at the 3-digit SIC level).	CRSP-COMPUSTAT
Price run-up	Percentage change in a firm's stock price in the prior two years.	CRSP-COMPUS

		TAT
Rumor Type		
MultipleBidder	A target has more than one potential bidder mentioned.	Hand-Collected
PEfund	PE or hedge find rumored as buyer OR involved in promoting deal (e.g. has many shares and seen as promoting sale of company) OR conditions seen as ripe for leveraged buyout.	Hand-Collected
Analyst	Rumor is the result of one or more analysts reasoning that a takeover seems logical	Hand-Collected
Chatter	This is a minimalist category designed to reflect unsubstantiated discussion with minimal details provided	Hand-Collected
Insider	Anonymous source cited OR specific details provided without naming a source and not analyst speculation	Hand-Collected
Optionchanges	Target's option or volume increases mentioned as supporting rumor	Hand-Collected
Synergy	Direct synergy estimates mentioned OR specific attributes of the target mentioned as supporting the rumor.	Hand-Collected
InitiatedByTarget	The target firm starts the rumor e.g. they are considering strategic alternatives	Hand-Collected
TargetFinancialAdvisor	Target has retained the services of an investment bank or advisor	Hand-Collected
Ln Days	Natural Logarithm of the number of days between the rumor and actual announcement.	SDC
All stock	Dummy variable equal to one if the payment of the transaction is 100% stock and zero otherwise.	SDC
All cash	Dummy variable equal to one if the payment of the transaction is 100% cash and zero otherwise.	SDC
Same Industry	Dummy variable equal to one if the bidder and target firms are in the same industry, using 3-digit SIC code, and zero otherwise.	SDC
Same State	Dummy variable equal to one if the bidder and target firms are in the same state and zero otherwise.	SDC
Friendly	Dummy variable equal to one if the deal attitude is friendly and zero otherwise.	SDC

Table 1
Distribution of rumor types over the sample period. This table includes all the 680 rumors with bidders mentioned out of 2074 initial rumors collected.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	All
Announced	5	6	9	5	8	10	9	7	13	11	83
MultipleBidder	9	23	19	18	32	39	19	51	57	38	305
PE Funder	0	2	2	9	14	6	4	6	7	8	58
Ananlyst	5	27	29	16	28	31	19	67	55	38	315
Chatter	2	9	6	3	9	11	13	42	22	17	134
Insider	5	10	10	18	18	13	13	12	24	27	150
OptionChanges	1	1	0	4	7	9	2	7	7	5	43
Synergy	0	3	0	2	12	10	16	27	14	12	96
IntiatedByTarget	6	4	5	1	5	8	9	8	18	5	69
TargetHasAdvisor	0	4	3	4	1	4	1	5	9	10	41
All	20	45	47	45	67	64	59	129	108	96	680

Table 2

Rumor abnormal returns: sorted by bidder size

Big (small) bidders have the total asset equals to or greater than the median of the whole sample. Big (small) -NYSE is a robustness test by separating the sample by total asset within (beyond) top 10% percentile of NYSE firms in the same year. Cumulative abnormal return (CAR) is calculated by equally-weighted market model based on the estimation period (-300, -60). A minimum of 100 days' estimation is required. The mean difference is tested by T test. ***, **,* represent the significance level by T test of 1%, 5%, and 10%.

	All	Big	Small	Difference	Big(NYSE)	Small(NYSE)	Difference
	(1)	(2)	(3)	(2)-(3)	(4)	(5)	(4)-(5)
（-42,-5）	-0.42%	0.23%	-1.08%	1.31%	0.25%	-1.07%	1.32%
（-42,-2）	-0.32%	0.14%	-0.78%	0.92%	0.25%	-0.87%	1.12%
（-5,5）	0.22%	-0.18%	0.61%	-0.79%	-0.09%	0.52%	-0.61%
（-2,2）	0.13%	-0.21%	0.47%*	-0.68%*	-0.19%	0.44%*	-0.63%*
(-1,1)	0.10%	-0.26%*	0.46%**	-0.72%***	-0.22%	0.40%*	-0.62%**
(-1,0)	0.02%	-0.30%**	0.37%**	-0.67%***	-0.26%*	0.31%*	-0.57%**
Observations	625	313	312		307	318	

Table 3

Cross-sectional regression analysis of bidder's rumor abnormal returns

This table shows the results of regressions on CAR (-42, -2) and CAR (-1, 0), based on CRSP-COMPUSTAT database and hand-collected rumor types. ***, **,* represent the significance level by T test of 1%, 5%, and 10%.

	CAR(-42,-2)	P>|t|	CAR（-1,0）	P>|t|
Sales Shock	0.0326	0.844	0.0368	0.373
Sale Shock squared	-0.1501	0.606	-0.0082	0.910
Size	0.0035	0.561	-0.0021	0.160
Change In Size	-0.0006	0.965	-0.0002	0.947
Sales Growth	-0.0017	0.781	0.0026	0.104
Concentration Ratio	0.0881	0.122	0.0202	0.155
Resource growth mismatch	0.0034	0.8	0.0028	0.406
ROA	0.0777	0.28	-0.0075	0.674
Turnover	0.001	0.548	-0.0005	0.203
Cash Ratio	0.1631**	0.014	0.0334**	0.044
Price run-up	-0.003	0.546	-0.0018	0.139
Dormant Period	-0.0023	0.634	0.0001	0.902
Previous Merger	-0.0065	0.214	0.0009	0.479
Multiple Bidder	-0.0073	0.601	0.0036	0.307
PE fund	-0.0307	0.246	0.0084	0.201
Analyst	-0.0079	0.63	-0.0023	0.576
Chatter	0.0057	0.753	-0.0021	0.636
Insider	-0.0467**	0.021	-0.0057	0.256
Option Changes	-0.0338*	0.084	0.0057	0.238
Synergy	0.0456**	0.022	-0.0007	0.888
Initiated By Target	-0.048	0.147	-0.0097	0.241
Target Financial Advisor	0.045	0.202	0.0030	0.733
Constant	-0.0693	0.336	0.0109	0.537
Observations	325		326	
Adj R^2	0.0289		0.0249	

Table 4

Cross-sectional regression analysis of bidder's rumor abnormal returns for credible rumours (those leading to an announcement)

This table shows the results of regressions on CAR (-42, -2) and CAR (-1, 0), based on CRSP-COMPUSTAT database and hand-collected rumor types. ***, **,* represent the significance level by T test of 1%, 5%, and 10%.

	CAR(-42,-2)	P>|t|	CAR(-1,0)	P>|t|
Sales Shock	-1.9163**	0.024	-0.2015	0.488
Sale Shock squared	2.9113**	0.046	0.1635	0.745
Size	0.0070*	0.668	-0.0057	0.335
Change In Size	-0.0190	0.383	-0.0069	0.382
Sales Growth	-0.0568**	0.031	-0.0237**	0.013
Concentration Ratio	0.1909	0.291	-0.0590	0.363
Resource growth mismatch	-0.0353	0.393	-0.0264*	0.083
ROA	-0.5069*	0.079	-0.3364***	0.002
Turnover	-0.0043	0.434	-0.0053**	0.012
Cash Ratio	0.6829***	0.008	0.1963**	0.028
Price run-up	0.0694*	0.088	0.0395***	0.009
Dormant Period	-0.0147*	0.070	0.0009	0.746
Previous Merger	-0.0236*	0.065	-0.0054	0.229
Multiple Bidder	0.0352	0.377	0.0134	0.350
PE fund	0.0906	0.293	0.0414	0.184
Analyst	-0.1313***	0.005	-0.0239	0.129
Chatter	-0.0799	0.132	-0.0253	0.182
Insider	-0.1280**	0.015	-0.0442**	0.019
Option Changes	-0.0876**	0.047	0.0055	0.720
Synergy	0.0317	0.453	-0.0192	0.211
Initiated By Target	0.2158	0.194	-0.0385	0.514
Target Financial Advisor	-0.0688	0.549	0.0401	0.334
Constant	0.1273	0.509	0.1807**	0.014
Observations	47		47	
Adj R^2	0.4709		0.3710	

Table 5

Logit regression of announcement probability

This table reports the anticipation power of rumors. The dependent variable equals to one if the bidder makes a bid for the target after the rumor and zero otherwise. The control variables are those collected from CRSP-COMPUSTAT database and rumor types collected by hand. ***, **,* represent the significance level by Z test of 1%, 5%, and 10%.

	Announced	P>|z|
Sales Shock	2.4100	0.58
Sale Shock squared	-1.5720	0.83
Size	0.0376	0.81
Change In Size	0.4214	0.22
Sales Growth	0.4775*	0.09
Concentration Ratio	-2.8298	0.10
Resource growth mismatch	-0.2559	0.48
ROA	-0.6759	0.74
Turnover	-0.0082	0.86
Cash Ratio	0.5588	0.77
Price run-up	-0.1717	0.41
Dormant Period	0.3337***	0.00
Previous Merger	0.2019	0.12
Multiple Bidder	-0.5792	0.14
PE fund	-0.4199	0.60
Analyst	0.2832	0.52
Chatter	-0.0940	0.85
Insider	0.9326*	0.07
Option Changes	0.3792	0.46
Synergy	1.0759**	0.02
Initiated By Target	-1.3427	0.23
Target Financial Advisor	-0.1062	0.91
Constant	-2.3737	0.22
Observations	327	
Pseudo R^2	0.1577	

Table 6

Price-Volume Dynamic: regression on abnormal returns

This table reports the price-volume dynamics based on daily observations during the rumor period (-42, -2) and (-1, 0). Abnormal returns (ARs) are calculated by equally-weighted market model based on the estimation period (-300, -60). A minimum of 100 days' estimation is required. Abnormal turnover (AT) is calculated based on the model in Bris (2005). Ln(ProportionalSpread) is the natural logarithm of the proportional bid-ask spread on that day. Ln(NumberOfTrade) is the natural logarithm of number of transactions on that day. Size is the natural logarithm of total asset. Rumor type is collected by hand, and other variables are collected by CRSP-COMPUSTAT database. ***, **,* represent the significance level by T test of 1%, 5%, and 10%.

	Daily AR（-42，-2)	P>|t|	Daily AR (-1, 0)	P>|t|
	(1)		(2)	
AT	-0.0016***	0.000	0.0059***	0.004
Ln(ProportionalSpread)	-0.0003	0.287	-0.0007	0.610
Ln(NumberOfTrade)	0.0009***	0.002	0.0005	0.709
Size	-0.0008***	0.004	-0.0018	0.114
MultipleBidder	0.0001	0.827	0.0000	0.998
Mul*AT	-0.0011***	0.000	0.0054	0.400
PE Funder	0.0012	0.302	0.0028	0.607
PE*AT	0.0010***	0.001	0.0031**	0.013
Analyst	-0.0006	0.334	-0.0008	0.784
Analyst*AT	0.0012***	0.000	-0.0086***	0.000
Chatter	0.0000	0.965	-0.0023	0.486
Chatter*AT	0.0005**	0.030	-0.0070***	0.001
Insider	-0.0017**	0.022	0.0050	0.117
Insider*AT	0.0020***	0.000	-0.0082***	0.000
OptionChanges	-0.0021**	0.013	0.0045	0.217
Option*AT	0.0022***	0.000	-0.0053**	0.017
Synergy	0.0007	0.329	-0.0036	0.259
Synergy*AT	-0.0008	0.229	-0.0003	0.934
InitiatedByTarget	0.0002	0.841	-0.0008	0.855
Initiated*AT	-0.0016***	0.000	-0.0164**	0.014
TargetHasAdvisor	0.0004	0.704	-0.0034	0.480
Advisor*AT	0.0013*	0.058	0.0017	0.806
Constant	-0.0027	0.280	0.0096	0.394
Observations	6787		439	
Adjusted R^2	0.0417		0.1463	

Table 7

Announcement abnormal returns and regression on announcement CAR

This table shows the announcement CAR and the regression for rumoured bidding firms. Cumulative abnormal return (CAR) is calculated by equally-weighted market model based on the estimation period (-300, -60). A minimum of 100 days' estimation is required. LnDays is the natural logarithm of the number of days between rumor and announcement. SameIndustry is a dummy variable equals to one when the acquirer and the target have the same 3-digit SIC code. SameState is a dummy variable equals to one when both parties have the same geographical state in U.S. CashDeal equals to one when the transaction is 100% paid by cash and zero otherwise. StockDeal equals to one when the transaction is 100% paid by stock. Friendly is a dummy variable when the transaction's attitude is friendly. The announcement variables are collected from SDC database. ***, **,* represent the significance level by T test of 1%, 5%, and 10%.

Panel A	(-42, -2)		(-1,0)	
Announcement	-1.96%		-0.55%*	
Observation	75		75	
Panel B	(-42,-2)	P>|t|	(-1,0)	P>|t|
	(1)		(2)	
LnDays	0.0010	0.890	0.0051**	0.037
SameIndusty	-0.0080	0.798	0.0033	0.747
SameState	-0.0182	0.574	-0.0242**	0.026
CashDeal	-0.0072	0.836	-0.0026	0.820
StockDeal	-0.1296**	0.014	-0.0362**	0.035
Friendly	0.0063	0.861	0.0100	0.398
Constant	-0.0120	0.804	-0.0252	0.114
Observations	68		68	
Adjusted R^2	0.0308		0.1127	

Table 8

Correlation matrix between announcement variables and insider dummy

This matrix report the correlation between the announcement variables collected from SDC database and the insider dummy hand-collected from the rumor type.

	LnDays	SameI	SameS	Cash	Stock	Friendly	Insider
LnDays	1						
SameIndustry	0.15	1					
SameState	0.20	0.10	1				
CashDeal	-0.15	-0.03	-0.04	1			
StockDeal	-0.06	0.01	0.09	-0.25	1		
Friendly	-0.07	0.02	0.25	0.39	0.23	1	
Insider	**-0.53**	-0.16	-0.20	0.01	0.22	0.21	1