What determines the success of bidding firms in M&A deals?

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Abstract

We examine the drivers of bidding success in multiple-bidder merger and acquisition (M&A) announcements. We employ a series of logistic regression analyses and find that higher company value, greater profitability, a friendly offer attitude and a compatibility in industry specialization between bidders and targets serve as powerful determinants of the success of a given M&A attempt when multiple bidders are present. Our findings also suggest that if a small bidder (relative to its target) wants to be the final winner among the multiple bidders, the company's growth opportunities are valued most by the target company's shareholders. A second research is conducted to estimate a series of cross-sectional regression models to explore the determinants of target and bidder announcement returns respectively. Our findings suggest that the market already knows around the time of the bidding which bidder will be successful (unsuccessful). The stocks of successful bidders display the typical price increase on the announcement date that is contrary to the results documented in the literature whereas the abnormal returns of unsuccessful bidders fluctuate dramatically during the same period, which can be discerned clearly from the successful bidders.

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Table of Contents

1. Introduction 1
2. Literature and hypotheses 4
3. Data sources and sample design 12
3.1 Selection of competitive bidders 12
3.2 Collection of firm specific data 13
3.3 Summarized statistics 15
4. Methodology 16
4.1 Measuring Tobin's Q 16
4.2 Logistic regression 16
4.3 Event study and OLS-regression 18
5. Empirical results and robustness tests 20
5.1 Testing for multicollinearity 20
5.2 Logistic regression results 20
5.3 Robustness tests 22
5.4 Event study and OLS regression results 25
6. Conclusions and discussion 28
7. Limitations and future research 29
References 30
Appendix 1 34
Figure 1: Event Study Timeline 34
Figure 2: Daily Mean Abnormal Returns for Bidders and Targets 35
Appendix 2 36
Table 1: Summary of Multi-Bidder M&A Deals per Year 36
Table 2: Definition of Variables 37
Table 3: Distribution of M&A Deals in the Full Sample (Sample Size: 110) 39
Table 4: Characteristics of the Independent Variables 40
Table 5: Correlation Matrix of Independent Variables (Sample Size: 110) 41
Table 6: Logit Estimates for the Probability that a Bidding Firm Succeeds in a Bidding War [a] 42
Table 7: Robustness Tests 44
Table 8: Event Study Results 46
Table 9: Mean- and Median- Difference Tests between Successful and Failed Bidder CAR 47
Table 10: Regression of CARs against Bidding Success 48

1. Introduction

Would you like to risk your life savings on a coin toss? Of course you would not. But yet the leaders of many companies have risked their businesses with similar odds in recent years – by making disastrous acquisitions, especially among mid-cap companies. Recent research indicates that merger and acquisition (M&A)[1] activity has an overall success rate of about 50% - basically a coin toss.

Most prior scholarly research has explored the strategic management and/or organizational culture that influence the success of a corporate merger or acquisition. According to Accenture's M&A Due Diligence – What Corporates Can Learn From Private Equity (2006), 48% of survey respondents considered "planning and executing the integration process" to be the most important factor in the transaction, when they were asked to draw on their recent experience to pinpoint the critical elements of a successful M&A transaction. Epstein (2005) uses the merger of J.P. Morgan and Chase Manhattan Bank in 2000 to illustrate the drivers of merger success and outlines six determinants (i.e., strategic vision and fit, deal structure, due diligence, pre-merger planning, post-merger integration, and external factors) of merger success that emphasize the importance of both strategy and process. These factors are limited to the manager's strategic before and after the announcement. Strategic mismatch alone is insufficient to explain the reason of failure. Greater consideration needs to be taken into financial differences.

In addition, much of other literature empirically examines the impact of merger pricing (see, Mitchell and Stafford (2004)) or target stock liquidity (see, Massa and Xu (2012))

[1] Please note that for expositional convenience, in this paper, the words acquisition, M&A, merger, and takeover are used interchangeably.

on the probability of takeover success. Many of these empirical studies focus on the targets' characteristics, i.e., target size, target leverage, target book-to-market ratio, target resistance, arbitrage spread, deal structure, terminations fees for the target, etc.

However, relatively few studies on the drivers of bidding success in a multiple-bidder takeover have been conducted so far. Our motivation is to fill this gap with empirical evidence. Our key assumption is that there are important differences between the winning bidders and losing bidders which ultimately affect the bidding result. In addition, we believe that managers should be interested in these factors that can influence the likelihood of their bidding success, as this information will help them adjust their company structure and deal structure in ways that maximize the probability of bidding success.

Instead of evaluating the success of the post-merger company (e.g., Lang et al. (1989), Epstein (2005), and also Hoang and Lapumnuaypon (2007)), investigate bidding success in a bidding war. That is to say, we only consider a bidding firm as being successful in the transaction if it beats competitive bidders and acquires the target. Below, we provide an example of a bidding war to illustrate our definition of "success". In 2006, Boston Scientific and Johnson & Johnson bid for Guidant, and finally Boston won the takeover battle and subsequently acquired Guidant. Competitive contests such as these happen frequently in the real business world. To illustrate, Betton et al. (2008) report that the initial bidder wins the bid in only two-thirds of ten thousand initial control bids for US public targets between 1980 and 2005, though the sample is only limited to the initial bidders. Moreover, when a rival bidder appears, the rival wins the bid twice as often as the initial bidder. Our study adds to this research area by examining what factors differentiate winners and losers and lead to bidding success.

There are many other reasons why one bidder is more likely to be successful in a bidding war. By using logistic regressions, Flanagan et al. (2011) find that the probability of tender offer success is increased by the relatedness of the two firms, cross-border status, the existence of termination fees and pre-bid ownership of the target stock, while two-tier transactions[2], a hostile attitude, and competing bids affect success negatively. Walkling (1985) observes that increasing bid premiums or solicitation fees increase the probability of success.

We look at all bidders (not just initial bidders) and construct a dataset of all mergers with at least two competitive acquirers. The sample consists of 110 takover bids in the U.S. market each of which was won by one bidder and that involved one or more unsuccessful (losing) bidders[3]. In this sample, we first compare the firm- and deal-level observable characteristics and CEO pay of winners and losers by using mean and median tests. Consistent with our assumption, the summarized statistics show the difference. We then look at winners' and losers' firm characteristics which include bidder's company value, the bidder's dividend payout, the bidder's liquidity, its leverage ratio, bidding company's profitability, and the bidder's growth opportunity. We find if a bidding firm with higher company value and good profitability, it is more likely to win the bidding war. We also test the effect of deal specifics (i.e., bidder's relative size to the target, its offer attitude to the target, its industry relatedness with the target). Our results are consistent with prior research. As for executive compensation, previous work examining CEO compensation

[2] A two-tier transaction is one in which the bidder offers a high price for shares that are tendered early and a lower price for shares that are tendered later.

[3] We exclude the vast universe of mergers and acquisitions with single bidders that take place in U.S. market from our analysis. Instead our sample of multi-bid takeovers focuses on a small subsample of only 110 firms.

has so far focused on the relationship between CEO pay and company's performance or M&A frequency, while we investigate its impact on the likelihood of bidding success. Our results are robust to various sample selection criteria and controls.

Our selected variables and sample design also allow us to evaluate their effect on the cumulative abnormal returns for bidders and targets around the announcement day. As such, we employ an event study and linear regressions and find that the results vary according to different event windows.

Our paper is organized as follows: in Section 2, we briefly review the prior literature in this area and introduce our hypotheses. Sections 3 and 4 describe the data sample and methodology. The empirical results are discussed in Section 5. Section 6 concludes. Section 7 discusses the limitations of this paper and future research.

2. Literature and hypotheses

Based on the results of an extensive literature review, we select ten potential determinants of bidding success, i.e., the relative size of the bidder to its target, the bidder's book-to-market ratio, the dividends payout ratio of the bidding firm, the bidder firm's liquidity and leverage, its return on equity, the attitude of the transaction (i.e., friendly or hostile), the growth opportunities of the bidding firm as proxied by Tobin's Q, industry relatedness, and the bidding firm's CEO compensation. Table 3 provides definitions for all variables used in this paper.

Firm size is one of the organizational variables whose impact on the success of merger and acquisition has been studied by numerous scientists. In terms of our sample design,

we find it necessary to use relative firm size (*RSIZE*) as one of our deal-specific independent variables. *RSIZE* is calculated as the bidder's market value divided by the target's market value. Following prior studies, we assume that a large bidder seems may have economies of scale that are valued by the small target. At the same time, the acquisition of a relatively small target is less complex. Hawawini and Swary (1990) analyze 123 US-bank mergers and acquisitions between 1972 and 1987, and find that M&A transactions are more favorable for bidders if the targets are small relative to the bidders. Although there is no direct evidence that relative size has an impact on the likelihood of bidding success, we may be able to infer the potential relationship from another point of view. A larger bidder usually has deeper pockets and can afford a larger payment. For instance, Alexandridis et al. (2013) find that large (small) bidders offer a mean acquisition premium of 63% (54%) for small targets, but only 41% (28%) for large targets. Thus, the bigger the acquiring firm's size, the greater the probability it wins the battle. Also, a large firm is diversified and typically has better access to capital markets, thus it may raise funds at a lower cost than a small firm (Dereeper and Turki (2013)). Hence, our first hypothesis reads as follows:

Hypothesis 1: The relative size hypothesis

The bigger the size of the bidder relative to the target, the more likely the bid will be successful.

Second, we employ the market performance of the acquirer as an explanatory variable, as captured by the book-to-market ratio (*BTM*). Dong et al. (2006) argue that firms with low *BTM* ratios are more likely to be overvalued. When stocks are richly priced, bidders can use their inflated shares to pursue acquisitions. Target shareholders rarely complain, since the acquisition price represents a huge premium. On the other hand, evidence shows that

bidding competitions result in substantial premiums paid for the target (Pepall and Richards (2000)). Accordingly, we hypothesize that a greater acquisition premium may contribute to bidding success. Because of data restrictions with respect to the premium (especially for unsuccessful bidders), we use *BTM* to at least partially proxy for the premium.

In addition, a low *BTM* ratio suggests that bidders are well managed and have high potential for future growth, which should make the target firm more willing to be acquired. In other words, the likelihood of bidding success should increase with a lower *BTM* ratio.

Hypothesis 2: Market valuation hypothesis
Bidding firms with a lower book-to-market ratio are more likely to succeed in a bidding war.

Much of the empirical work focusing on dividend pay examines differences in the dividend yield between targets and acquirers. Dereeper and Turki (2013) find that the completion rate of M&A deals increases when that difference is lower. No direct literature shows the relationship between bidding success and acquirer's dividend payout. Previous studies (Fama and French (2001) and DeAngelo et al. (2004)) show that dividend-paying firms generally have larger firm size, higher profitability, and more cash, which imply that firms are running well. All these characteristics should translate into a higher probability of success of the bid. A higher payout ratio also indicates a more mature company with less risk to go bankrupt. Thus we formulate our third hypothesis as follows:

Hypothesis 3: Dividend payout hypothesis

A bidding company with a greater dividend payout ratio is more likely to win a bidding war.

To some extent, a company's ability to meet its short-term obligations is also worthy of consideration. Many studies argue that successful acquisitions improve the bidder's liquidity by changing the firm's characteristics or enlarging the bidder's size. Yet the literature offers few insights into the impact of liquidity on the likelihood of M&A bidding success. We believe that target firms prefer more liquid buyers, as firm's liquidity is one of the important aspects of a firm's financial health. A recent study by Leepsa and Mishra (2014) uses the pre-M&A quick ratio as a proxy for the bidder's short-term liquidity and finds that it is a significant determinant of M&A success. We thus specify the following hypothesis:

Hypothesis 4: Liquidity hypothesis

If higher liquidity of bidding firms is an appreciated characteristic of the target, we expect an acquirer to be more likely to succeed in a bidding war.

Similarly, we employ the leverage ratio (*LEV*) as a proxy for the bidder's capital structure. The greater the amount of debt in the capital structure, the higher the leverage ratio of a company. A high degree of leverage indicates that the firm is exposed to more credit risk and can make the business particularly vulnerable during an economic downturn. The extant literature provides empirical evidence that shows that a firm's capital structure is significantly related to M&A success. For instance, Uysal (2005) confirms that underleveraged bidders pay higher premiums and are more likely to successfully acquire targets. Lin (2013) shows that bidders with greater leverage are less likely to complete a

successful M&A transaction. Chowdhry and Nanda (1993) argue that excess leverage can be used strategically as a commitment to bid aggressively. If this is the case, then highly leveraged bidders are more likely to win takeover contests and we should expect a positive sign for *LEV*. Furthermore, the leverage ratio of a bidding firm can proxy for the survival of the firm, as underleveraged firms are less likely to go bankrupt[4]. As a consequence, the target management tends to resist the merger attempt of a highly leveraged buyer if the benefits of the target management depend on the survival of the bidding firm. Besides, Maloney et al. (1993) use the debt-equity ratio as a measure for excess debt capacity and document a positive relationship between higher leverage and better acquisition decision-making. We thus propose a fifth hypothesis:

Hypothesis 5: Leverage hypothesis

A low leverage ratio indicates that a bidder will likely succeed in a bidding contest.

While a firm's book-to-market ratio provides a long-term measure of the capital market's evaluation of a company, a firm's return on equity (*ROE*) offers a more immediate measure of corporate performance. Therefore, we measure the profitability of bidders by using *ROE*. *ROE* measures a company's profitability by revealing how much profit a company generates with the money shareholders have invested, thus it is considered an important performance indicator by both investors and management (Lindblom and Von Koch (2002)). A high *ROE* ratio also indicates that a bidding company is more profitable than its competitors. Fritsch et al. (2007) employ the cumulative abnormal returns for bidders as a proxy for a deal's success. Nonetheless, when analyzing the target firm's *ROE* and the relation of the target's *ROE* to the bidder's *ROE* as a relative profitability

[4] Zingales (1998) shows that highly leveraged trucking firms are less likely to survive after the deregulation in the trucking industry.

measure, they find that neither the target *ROE* nor the relative *ROE* have any explanatory power for the success of an acquisition. However, prior studies (see, e.g., Hawawini and Swary (1990), Pilloff (1996), and Beitel, Schiereck et al. (2004)) suggest that high relative *ROE* reduces the likelihood of a transaction being successful. To the extent that mergers and acquisitions are meant to discipline underperforming firms, we assume that bidders with a higher *ROE* are more likely to win. Therefore, we expect that greater profitability of the acquirer contributes to the success of an M&A bid.

Hypothesis 6: Bidder profitability hypothesis

There is a positive relationship between the bidder's *ROE* and its likelihood of success in a bidding war.

As Morck (1988) indicates, failing to distinguish adequately between acquisitions with different attitudes can result in misleading findings. Thus, we believe that deal attitude may affect the success rate. Muehlfeld et al. (2006) confirm that the attitude of the transaction (whether hostile or friendly) is a key factor that determines whether an M&A deal is ultimately consummated. Disciplinary takeovers are likely to be hostile, whereas synergistic takeovers are likely to be friendly. One purpose of M&A deals is to achieve synergy, thus we assume that friendly takeovers are easier to complete. Obviously, a friendly M&A offer is easier to achieve, since the target company's management and board of directors agree to the merger or acquisition by a bidding company. To put it another way, hostile takeovers probably result in negative emotions between the management and professional groups between the buyer and the seller, thus leading to a hostile culture where integration and synergies are difficult to achieve. Flanagan et al. (2011) find that hostile attitudes negatively affect tender offer success. Using a sample of 991 tender offers, they show that only 43% of hostile bids are eventually completed while

91% of non-hostile bids are completed. Hence, hypothesis 7 reads as follows:

Hypothesis 7: Attitude hypothesis

If a bidding firm makes a friendly bid, it is more likely to complete the transaction.

Next, we explore a company's growth opportunities. Miller and Modigliani (1961) recognize the impact of growth opportunities on company value. In this paper we select Tobin's Q (*TQ*) as a proxy for the bidder's growth opportunities. Martin (1996) explores the relationship between payment methods and the acquiring firm's growth opportunities. He examines data covering 846 US M&A deals from 1979 to 1988 and finds that acquiring firms with greater growth opportunities are more likely to use share exchanges as a payment method in acquisitions. However, this does not determine whether they are likely to be successful in the deal. Lang et al. (1989) find that the shareholders of high Q bidders gain significantly more than the shareholders of low Q bidders in a sample of successful tender offers. Growth opportunities of a firm also affect its capital structure goal, which further influence the takeover bid. Like Myers (1977) indicates, debt overhang may prevent firms from investing in positive NPV projects. In particular, this effect is costly for growth firms. In our paper, we extend these findings by examining whether bidders with a high Q are more likely to be successful with their takeover bid. Therefore, hypothesis 8 reads as follows:

Hypothesis 8: Growth opportunity hypothesis

Bidding firms with greater growth opportunities (as measured by Tobin's q) are more likely to be successful in achieving the deal.

Same- or cross-industry acquisitions are also associated with the success of an M&A deal.

In this paper, we define an acquisition as a same-industry (i.e., non-diversifying) deal versus a cross-industry (i.e., diversifying) deal according to whether the bidder has the same or a different two-digit SIC code as the target. Flanagan et al. (1998) expect the probability of a successful tender offer to reduce if a bidder is in the same primary industry as the target. Their findings, however, suggest the contrary. Moreover, merging within the same industry makes the bidding firm obtain complementary skills and resources. Related business provides stronger opportunities to gain economies of scope and better develop synergies from physical assets or other functional forms than unrelated business. Since the bidder already possesses the needed technical and managerial skills to run the post-merger entity, we believe that a non-diversifying transaction is easier to be completed. Hence, our ninth hypothesis reads as follows:

Hypothesis 9: Industry relatedness hypothesis
If the bidder is in the same primary industry as the target (i.e., they have a same two-digit SIC code), it is more likely to succeed in a bidding war.

Indeed, measures such as transaction-specific factors and firm-related characteristics are not enough to explain the dynamic behavior of bidders in M&A deals. In this study, we also consider the impact of managerial incentives on bidding success and employ CEO incentive compensation as an explanatory variable. Our approach is based on the notion that highly compensated CEOs are more experienced and are more likely to succeed in a bidding war. Related studies on CEO compensation include Agrawal and Walkling (1994) who find that takeover bids occur more frequently in industries in which the CEO has significantly positive abnormal compensation. Bliss and Rosen (2001) consider a ten-year period from 1986 to 1995 with a sample of 32 banks and find that higher levels of stock-based compensation reduce the probability that banks make acquisitions. More

recently, Grinstein and Hribar (2004) investigate CEO compensation for completing M&A deals. 39% of the acquirers in their sample cite the completion of the deal as a reason for their higher compensation. They further confirm that CEOs who have more power to influence board decisions receive significantly larger bonuses that mainly come in the form of cash. Harford and Li (2003) find that CEOs have clear financial incentive to undertake acquisitions. Buchholtz and Ribbens (1994) examine the influence of a CEO's incentives on the likelihood that target firms will resist takeover attempts. Their results suggest that the greater the level of CEO stock ownership, the lower the likelihood of takeover resistance. Our objective is to test whether highly compensated CEOs are really helpful with takeover bids; thus we formulate hypothesis 10 as follows:

Hypothesis 10: CEO compensation hypothesis
There is a positive relationship between the CEO incentive compensation and the likelihood of bidding success.

In our subsequent analyses, we examine whether these ten explanatory variables can help explain why certain bidders succeed in a bidding war.

3. Data sources and sample design

3.1 Selection of competitive bidders

In this study, we explore the determinants of successful versus unsuccessful takeover bids. Our sample is based on M&A deals with multiple bidders in which both the targets and the bidders are publicly traded firms that are listed on a U.S. exchange. We include all bids in merger contests starting from January 1, 1998 to December 31, 2012 from the SDC Mergers and Acquisitions Database. After that, we retrieve accounting and stock

price data from Compustat (including Execucomp), and the Center for Research in Security Prices (CRSP). To be included in our final sample, firms have to fulfill several criteria. We only consider mergers (SDC deal form M) and acquisitions of majority interest (AM) that are listed on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX) and the NASDAQ. Our final sample consists of 110 takeover bids with multiple bidders and complete data.

Properly differentiating between winners (successful bidders) and losers (unsuccessful bidders) is a critical point in this research[5]. We choose deals with multiple bidders, where bidders are defined as contestants in the same merger fight if they bid for the same target. That is to say, a transaction must have at least two potential acquirers competing for the same target firm. Furthermore, the target company must be successfully (announced & completed transaction) acquired by one of the bidding companies. Therefore, the company that succeeds in completing a merger is classified as the winner, all other bidders as losers. Table 1 provides yearly summary statistics for our sample.

3.2 Collection of firm specific data

In the case that the announcement of M&A has effect on the firm related data during the pre-announcement period, we gather the data that is 92 days (or a quarter) prior to the date announced. We further collect firm stock prices and the number of shares outstanding from CRSP 20 days prior to the announcement. We match CRSP market data with acquirers and targets in the SDC database using the six-digit CUSIP. The firm's

[5] We use SDC flag (Challenged Deal Flag – multiple bidders are bidding for an identical target) for contests bids to identify contestants. The deal status is chosen as completed and unconditional. We select "disclosed value mergers & acquisitions" and "undisclosed mergers & acquisitions". Based on the results given by SDC, we re-select the data manually in order to drop any repeated data.

market value is calculated by the stock price multiplied by the number of shares outstanding. This is used as a proxy for the firm size. The CRSP was accessed via the Wharton Research Data Services (WRDS), University of Pennsylvania. The resulting sample of successful and failed bidders contains 212 and 199 observations, respectively.

We further extract total compensation and total cash compensation data from COMPUSTAT's Execucomp database, using 8-digit CUSIP. Total compensation (TDC1) includes salary, bonuses, the total value of restricted stock granted, the total value of stock options granted (using Black-Scholes), and long term incentive payouts. Total cash compensation (TCC) includes salary and bonuses. The difference between total compensation and total cash compensation (TDC1-TCC) is to capture the options and incentive components of total compensation. This difference, which we call incentive compensation, is one of our independent variables (Cooper et al. (2009)). We further adjust the data of CEO incentive compensation by using consumer price index (CPI) with the year 1997 as the base. Other firm specific characteristics, (i.e., earnings per share, current assets), are from Compustat Fundamental Quarterly. It is necessary to illustrate that all the data we selected is adjusted by 12 months moving measure.

Since the first two digits of standard industrial classification (SIC) code indicate the major group, we define non-diversifying acquisitions as those in which the bidder and target share the two-digit SIC code. We collect the SIC codes from Compustat database, which is better specified than CRSP SIC codes (Kahle and Walkling (1996)). We only include observations that have complete data so that we can generate reasonable estimates in the logistic regression models described below. After deleting all the missing data, we have 110 firms (including both successful and failed bidders) that initiated a merger bid, which is treated as the full sample. Table 2 presents a complete list of all the

variables and their definitions. We will employ *Success Dummy* as our dependent variable in all the logit regressions and the other ten variables as the independent variables. Table 3 shows the distribution of M&A transactions in the full sample in three categories respectively. In the full sample with 110 firms, there are 71 successful bidders and 39 unsuccessful bidders, as there is a lot of missing data in the failed group. Most bidders (74 in 110 firms) have a friendly attitude, but only 16 of the total bidding firms offers a non-diversifying M&A.

3.3 Summarized statistics

Table 4 summarized the statistics of all independent variables that are separated by successful and unsuccessful bidders and the last two columns provide the results for a Satterthwaite t-test for the significance of differences in means and a Wilcoxon median test. As we can see, the average *RSIZE* of successful bidders (115.2377) is much larger than that of failed bidders (9.0026), and moreover, their median test is significantly different under 0.1 possibility. Lower BTM ratio of successful bidding firms (60.8278) implies that high company value makes a difference in the multiple-bidder takeover. Besides, the successful bidders also have the greater average values of *LIQ*, *ROE*, *TQ*, and CEO incentive compensation (*LNCEOINC*), though some of them are not significantly from those of unsuccessful bidders. What's more, the attitude dummy and industry dummy are statistically significant on the basis of both tests, suggesting that bidding firms are significantly more likely to succeed when they are in the same primary industry with the targets and offer friendly takeover. We will show sophisticated analysis in the following sections. This evidence suggests that the characteristic between successful bidders and failed bidders are worthy of studying. Though the descriptive statistics provide us a good understanding of characteristics between successful and failed bidders, we will further conduct a prudent logit regression analysis in the following

section.

4. Methodology

4.1 Measuring Tobin's Q

There are many literature that have studied Tobin's Q with different ways of measure (see Moeller et al. (2004) and Lang et al. (1989)). Among those, we employ Chung and Pruitt's (1994) equation as a measure for Tobin's Q. The approximate Q is simply defined as follows:

$$Approximate\ Q = (MVE + PS + DEBT)/TA$$

where

MVE = share price × the number of common stock shares outstanding,

PS = the value of preferred stock,

DEBT = (current liabilities – current assets) + book value of the long-term debt,

TA = the book value of the total assets.

The estimation of q is simple and tractable, which all data are available in Compustat database.

4.2 Logistic regression

This paper aims to find out the determinants of the likelihood of takeover bidding success. We assume that over the given period of time (from 1998 to 2012), any bidding firm can be assigned to only one of two categories – successful deal or unsuccessful deal. Considering the success of the M&A deal as a dummy dependent variable, we define the

logistic regression model[6] as:

$$p(Success\ Dummy_i) = \frac{1}{1 + e^{-(X_i'\beta_i)}}$$

where

p = the probability for a bidder to win a takeover bid in a bidding war

$Success\ Dummy_i$ = the takeover of the ith firm is successful or not. If success, $Success\ Dummy_i = 1$, and 0 otherwise.

$$X_i'\beta_i = \beta_0 + \beta_{i1} \cdot RSIZE + \beta_{i2} \cdot BTM + \beta_{i3} \cdot DIVIDPAY + \beta_{i4} \cdot LIQ + \beta_{i5} \cdot LEV + \beta_{i6} \cdot ROE + \beta_{i7} \cdot ATTI + \beta_{i8} \cdot TQ + \beta_{i9} \cdot ID + \beta_{i10} \cdot LNCEOINC$$

α_i, β_{it} = the regression parameters for firm i,

In the logistic model, we determine the likelihood of M&A success as a function of firm's specifics, deal characteristics, industry relatedness, and CEO compensation. We can use the variable *RSIZE* as an example to interpret a positive coefficient. A positive coefficient β_{i1} for *RSIZE* says that, holding other variables (i.e., *BTM*, *DIVIDPAY*, *LIQ*, *LEV*, *ROE*, *ATTI*, *TQ*, *ID*, and *LNCEOINC*) at a fixed value, we will see a one-unit increase in *RSIZE* which would then make the successful deal $exp\ (\beta_{i1})$ likely to occur. As mentioned in Section 2.1, we follow the narrow definition of an M&A success. If the bidder is successful in the deal, $Success\ Dummy_i$ is equal to 1; otherwise, $Success\ Dummy_i$ is equal to 0 for its competitors.

[6] As noted in our literature section, the acquisition premium may be an important determinant of bidding success. Nevertheless, evaluating how the premium that a bidder offers for the target firm affects bidding success is hampered by data unavailability, especially for unsuccessful bidders. However, at least to some extent, relative firm's size and the book-to-market ratio serve as proxies for the premium.

4.3 Event study and OLS-regression

Furthermore, we also want to test how factors among those variables mentioned above affect the bidders and targets abnormal return of stocks around the announcement day. Thus, we employ the methodology for conducting an event study, with the intention to detect abnormal returns associated with bidding success, firm and deal specifics, industry and CEO compensation.

The discussion so far has regarded the market model, that relates individual stock returns, as the most beneficial model for estimating normal returns (e.g., Brown and Warner (1985)). Therefore, we review the market model in this analysis and it can be expressed as:

$$R_{it} = \gamma_i + \theta_i R_{mt} + \varepsilon_{it} \qquad E[\varepsilon_{it}] = 0 \qquad var(\varepsilon_{it}) = \sigma^2$$

This equation explains stock i's return in period t, where the constant parameter γ_i and the parameter θ_i for the market return variable (R_{mt}) are estimated econometrically for each individual stock. The stock return also includes an error term, with expectation zero. It is the error term that represents the abnormal return (AR) which reflects the announcement of M&A. Aggregating these error terms across the event window, we can get $CAR_i = \sum_t \varepsilon_{it}$, where t is the length of the event window. Finally, we aggregate the CAR_i across individual stocks and get $\overline{CAR_i} = \sum_i CAR_i$ [7].

We extract the abnormal returns for the bidder's security prices from the CRSP equally-weighted index via Eventus software. By default, the market model parameters are estimated over the period from -255 trading days to -46 days before the

[7] For convenience, we will use CARs instead of $\overline{CAR_i}$ in the following sections.

announcement day. Figure 1 illustrates the event study timeline.

We estimate acquirer or target returns by calculating the AR for the M&A announcement date [0] and the CARs over the two event windows around the acquisition announcement date: (1) 1 day before the event date through 1 day after the event date, [-1,1], (2) 5 days before the event date through 5 days after the event date, [-5,5]. In order to reduce the interaction of the bidders, we divide the full sample into two subsamples - firms winning the bidding wars and firms failing in the bidding wars.

Further, we employ OLS-regression model to investigate the relationship between CARs and bidding success and all the explanatory variables that we previously mentioned. The model is expressed as follows:

$$CAR_i = \mu_i + \sigma_{i1} \cdot Success\ Dummy_i + \sigma_{i2} \cdot RSIZE + \sigma_{i3} \cdot BTM + \sigma_{i4} \cdot DIVIDPAY + \sigma_{i5} \cdot LIQ + \sigma_{i6} \cdot LEV + \sigma_{i7} \cdot ROE + \sigma_{i8} \cdot ATTI + \sigma_{i9} \cdot TQ + \sigma_{i10} \cdot ID + \sigma_{i11} \cdot LNCEOINC + \varepsilon_i$$

where

$CAR_i = \sum_i CAR_i$ the aggregated cumulative abnormal return of the ith firm for the targets, the successful bidders and the failed bidders

$Success\ Dummy_i$ = the deal status. If the deal is success, $Success\ Dummy_i = 1$, and 0 otherwise

μ_i, σ_{it} = the regression parameters for firm i

ε_i = error term

In this model, we consider bidding success as one of the explanatory variables, while the

CARs are put on the left of the equation.

5. Empirical results and robustness tests

5.1 Testing for multicollinearity

Table 5 provides Pearson correlation coefficients for all independent variables. From the table, we can see that there is a severe multicollinearity between bidder's liquidity and leverage ratio (-0.5793). Even though Morck et al. (1988) find that bidding firms that experience hostile takeover bids between 1981 and 1985 are smaller, older, and more slowly growing, and they have lower Tobin's Q, we do not find that there is a strong linear relationship between the attitude and the Tobin's Q, based on the correlation matrix shown in Table 5. It might because our research examines a different time period and the corporate world has been developing. Considering the correlation between liquidity and leverage ratio for bidding firms, we will check the robustness by doing logit regressions with excluding either leverage or liquidity in Section 5.3.

5.2 Logistic regression results

Table 6 presents results for four logit regressions used to estimate the effect of different factors on the likelihood of M&A bidding success. Our sample consists of 110 takeover bids with multiple bidders that occurred between 1998 and 2012. In each model, the dependent variable is a dummy variable that is equal to one if the bid is successful, and zero otherwise. First, in order to examine the effect of CEO compensation, we run the logit regression on the CEO incentive compensation. The result is presented by Model 1. The positive coefficient of CEO incentive compensation (*LNCEOINC*) is statistically significant at the 10 percent level, suggesting that the bidding firm with a larger amount incentive compensation paid to its CEO is more likely to be successful in the bidding war.

Expect the influence of CEO compensation, we want to test the impact of firm specifics in the bidding war. Thus, we employ bidders' book-to-market ratio, dividend payout, liquidity, leverage ratio, return on equity, and Tobin's Q as explanatory variables in the logit regression. Model 2 shows the relationship between the success rate and firm-specific factors. However, we find that the coefficient estimates show few and little significances in Model 2. Only *BTM* is negatively related to the takeover success. This evidence confirms that the high company value (with low book-to-market ratio) is valued most by the targets and the market, which is more likely to increase the likelihood of takeover bids. By way of contrast, we do another logit regression for the M&A deal-specific factors. We use relative size, offer attitude, and industry relatedness as independent variables. Model 3 presents the results for the logit regression. As what was expected, relative size, offer attitude, and industry relatedness have important effects on the likelihood of M&A bidding success.

Furthermore, we run a logistic regression on the full sample with all ten explanatory variables. Model 4 in Table 6 indicates the relationship between these factors and the probability of takeover success. Contrary to what was expected, the relative firm size has no effect on the probability of takeover success. However, we find that book-to-market, offer attitude and industry relatedness for the bidders are positively and significantly related with the probability of M&A success, which is consistent with results of Models 2 and 3. A negative and significant estimate indicates that the book-to-market ratio) reduces the bidders completion rate in takeover bids. Based on the coefficient estimates, the presence of a friendly attitude from a bidder dramatically increases the odds of likelihood of bidding success. Also, the probability of a successful M&A is significantly enhanced by an acquiring firm being in the same primary industry as a target, which is consistent

with the result from Flanagan et al. (2011). Standing in contrast to the studies of Hawawini and Swary (1990), Pilloff (1996), and Beitel, Schiereck et al. (2004), we find that in Model 4 *ROE* has an effect on the success rate, though it is not so significant (under 10 percent). A higher *ROE* can contribute to the success rate, which means the more profitable a bidding company, the more likely for it to be successful in a bidding war. Given these findings, we cannot reject the hypotheses 2, 6, 7, and 9. Although the leverage ratio is not statistically significant under any possibility, it is negatively related to the M&A success, which is partly consistent with the findings of Lin (2013). The potential explanation is that bidders with a higher degree of leverage are unable to provide attractive premiums in takeover offers and thus reducing the likelihood of success. As to the insignificance of *LNCEOINC* in Model 3, we may explain it as the effect of CEO compensation being very weak, compared with the firm or the deal specifics.

5.3 Robustness tests

To check the robustness of the regression results shown in Table 6, we do a series of logit regressions again with different sample groups. The result is presented in Table 7. First, in order to eliminate the effect of extreme values, we remove the top 2% and the bottom 2% of all bids in the full sample that is sorted by relative firm size (*RSIZE*). Nonetheless, we find that the return on equity (*ROE*), offer attitude (*ATTI*), and industry relatedness effects (*ID*) are still associated with the likelihood of M&A bidding success (Model 1).

According to our discussion in section 5.1, the multicollinearity between bidding firm's liquidity and leverage ratio can bias our estimates. Thus, we re-run the regressions of Model 4 in Table 6, by excluding either *LEV* or *LIQ* in the list of independent variables.

Models 2 and 3 in Table 7 report the results for two tests in which we exclude leverage (LEV) and liquidity (LIQ) from our list of regressions. From Model 2, we find that *ROE*, *ATTI*, and *IR* are still positively significant and note that the intercept becomes larger and significant. Particularly, one more variable in Model 3, BTM, becomes significantly negative again, which confirms the results of Model 4 in Table 6. Overall, results do not change by eliminating either *LEV* or *LIQ*.

Look again at the sample period, we notice that the period of financial crisis lies in between 1998 and 2012. The financial crisis has changed the landscape dramatically for takeover bids, especially in U.S. market. To capture the effect of financial crisis, we divide the entire sample into two sub-samples, using the cutoff point of December 31, 2006.

Model 4 in Table 7 shows the results of our logit regression for pre-financial-crisis period from 1998 to 2006. We find that the significance of coefficients for *BTM* and *ROE* become even stronger than in Model 4 of Table 6. Furthermore, a larger estimate of ROE suggests that the degree of company profitability has a greater effect on the likelihood of M&A success. The findings also imply that the support for Hypotheses 2 and 6 is stronger in the pre-financial-crisis period (1998-2006) than that in the entire period (1998-2012). By contrast, no evidence confirms the relationship between the explanatory variables and M&A success in the 2007-2012 period (Model 5[8] of Table 7). One possible explanation could be that the financial crisis has brought chaos to the M&A market and therefore all the determinants should be re-considered or re-selected to adapt to the new environment. As Grave et al. (2012) argue in their research, bidding companies tend to

[8] Since there are only 22 observations in Model 5 of Table 7 but 10 explanatory variables, the inferences drawn from this estimation should be viewed with caution.

choose the M&A targets who are in new consumer markets, instead of focusing on the triad of US, Europe and Japan. Achieving cross-border transaction is becoming more and more attractive and can help the bidding firms' business diversify risk, and maximize control, efficiencies and productivity.

Lastly, we find it does make sense to investigate the determinants of M&A success for small bidders. "Acquisitions" usually refers to a purchase of a smaller firm by a large one. But sometimes, this situation can get inversed. Intuitively, it is more difficult for small bidding firms to acquire the management control of large targets. We find several empirical studies that are related to the small bidders theory (relative to their targets). Hawawini and Swary (1990) analyze 123 US-bank M&A during the period 1972-1987 and confirm that M&A deals are more favorable for bidders if the targets are relatively smaller than the bidders. They also prove that smaller bidders are probably more successful than larger ones. In terms of the stock performance, Sapunji and Friedrichsen (2011) confirm that bidding companies that acquire relatively large targets do better than those acquiring relatively smaller targets. Thus, we think it necessary to test the robustness with regard to the relative firm size.

The remaining columns of Table 7 present related robustness checks. We make two subsets from the entire sample. Model 6[9] provides the results of a sub-sample with *RSIZE* equal to and smaller than 1. As we can see, only *ATTI* and *TQ* can best determine the bidding success, while the coefficient estimates for other variables are not significant. That is to say, if a small bidding company attempts to acquirer a large target, its offer attitude and the firm's growth opportunity (proxied by Tobin's Q) seem to be the positive

[9] Similar to Model 5, since there are only 33 observations in Model 6, the inferences drawn from this model should be treated with caution.

signs to the large target, as well as the financial market. In general, a hostile bidder typically encounters many difficulties, but an interesting finding is that the estimate of *ATTI* is negative. Since our explanatory variables are limited to only ten factors, there might be other fundamentals, which are also valued by the relatively large targets. Compared to Model 6, Model 7 presents completely different results. No evidence shows that any determinants are related to the success rate. We believe that it is because the large bidders own the predominance and these factors have little influence in the transaction.

To summarize, our findings in Table 6 are robust to reduced sample that has extreme values, selected variables, and time periods. Given the empirical results from both Tables 6 and 7, we conclude that the likelihood of bidding success increases with higher company value (lower BTM), higher return on equity, a friendly takeover, and the degree of being in the same primary industry with the target takeover.

5.4 Event study and OLS regression results

Above, we argued that a bidder with higher company value and profitability, a friendly offer attitude, and more industry closeness is more likely to succeed in a bidding war. In this section, we want to investigate how these factors affect the bidders' or targets' abnormal returns around the announcement date. Figure 2 displays the daily abnormal returns of successful bidders, failed bidders, targets and combined entity of successful and failed bidders from 5 days before the event date through 5 days after the event date. Contrary to prior studies, the successful bidder's abnormal returns decrease a few days before M&A is announced, but bounce back after the announcement. However, the abnormal returns of unsuccessful bidders fluctuate dramatically during the same period, which can be discerned clearly from the successful group. We can see that targets' daily

average abnormal returns go up and then fall around the announcement date. Borges and Gairifo (2013) explain it as the pre-announcement run-up of prices being higher when there are rumors published in the median about a possible acquisition.

Table 8 displays the mean and median CARs associated with the announcements of acquisitions by the targets sample, successful-bidders sample, and failed-bidders sample in the U.S. market from 1998 to 2012. Panel A in Table 8 shows the mean *CARs* for the successful bidders in three event windows, which are -0.51%, -0.32%, and -0.19% respectively. Contrary to the typical stock price drop on the announcement date that has been often documented in the literature, we find that the successful bidders display the price increase due to the announcement effect. For those firms who failed in the bidding war, we find that the CARs on time windows [0] and [-5, 5] are strongly significant different from 0 under the 5 percent level and they even earn positive abnormal returns (0.38%) in event window [-1, 1]. When lengthening the time frame pre- and post-announcement, the successful bidders still outperform the failed bidders in the event window [-5, 5]. It appears that the market already knows around the time of the bidding who will be successful and who will be unsuccessful. Though target companies are able to earn positive abnormal returns on the announcement day as well as during the period of [-1, 1], neither results are statistically significant. The last column of Table 8 provides a Wilcoxon median test for the significance of differences between medians and zero. However, we do not find any significant difference. In order to additional understanding of abnormal returns between the successful bidders and the failed bidders, we do the t-test and median test for the mean CARs by three event windows in Table 9. The p-values of the median test in all three windows are not significantly different from zero.

We further estimate a series of OLS regressions of target and bidder cumulative abnormal

returns against the same firm and deal characteristics we have examined in Table 6. Table 10 reports the results of cross-sectional regression analysis, where dependent variable is either target's CARs or the bidder's CARs. Aside from the factors mentioned previously, we add the *Success Dummy* as one of the explanatory variables. This inclusion, however, did not turn out to be explanatory, which is inconsistent with the findings of Brown and Raymond (1986) and Samuelson and Rosenthal (1986). Model 1 in Table 10 shows the regression results of the targets on the announcement day [0]. We find that the bidder's high company value (low *BTM*) and CEO incentive compensation increase the targets stock abnormal returns when the M&A is announced, even though the *BTM* effect is weak. In Model 2, only liquidity and Tobin's Q for the bidders are related with the targets' abnormal returns. However, we are unable to find significant differences in Model 3. It might be due to the fact that the effect of these factors should be limited in the short term for the targets.

Models 4, 5, and 6 present the result of OLS-regression for the bidders in three event windows. Considering Model 4 reporting the results on the announcement day, we observe that only industry relatedness has a positively significant influence on the bidders' abnormal returns. If to consider Model 5, only the coefficient estimates for leverage ratio and return on equity are significantly different from zero. The lower the leverage of a bidding firm, the higher the CAR it will earn around the announcement day. The result is contrary to the findings of Maloney et al. (1993) that bidder's leverage ratio is positively associated with acquirer's three-day CAR. During the event window of [-5, 5], we find that the leverage ratio and industry relatedness lose significance. Instead, Tobin's Q has an influence on the bidder CARs, which is consistent with the findings of Lang et al. (1991) that bidders with low growth opportunities (low q ratio) negatively effect abnormal returns around takeover announcements.

6. Conclusions and discussion

Based on our analysis we are able to identify a number of factors, which have the explanatory power to determine the success of M&A transactions in the US market in a significant way from 1998 to 2012. We use comparative statics with mean- and median-difference tests, logistic regression, and cross-sectional regression analysis, and find that, in general, company value (proxied by *BTM*), bidder's profitability (proxied by *ROE*), offer attitude, and industry closeness have turned out to be the critical drivers of M&A bidding success. Higher company value and profitability, friendly offer, or same primary industry can increase the likelihood of being successful in an M&A offer bid. With the development of M&A market, bidder and target's firm size are no longer important determinant as they were before. But particularly, for small bidding companies, if they want to be the winners in the deal, they are supposed to take more care of the growth opportunities as well as the offer attitude. An interesting finding is that in the multiple-bidder takeover bids among small bidders (relative to their targets), the attitude of being hostile is valued by the potential targets and contributes to the bidding success. What's more, the financial crisis has brought the M&A market into chaos, which leads to the failures of all the determinants. In addition, we investigate the influence of these factors as well as the deal status on the bidder's and target's abnormal returns around the announcement date. The results vary according to different event windows.

More importantly, this paper provides an instruction for the failed bidders in the multiple-bidder M&A offers. Each deal situation is unique and due diligence must also include an understanding of the changing economic environment.

7. Limitations and future research

Even though the new insight and an indicator for the small bidders (relative to the target) are strengths of our study, there are also some weaknesses. First, since there is no significant relationship between the determinants and the deal status in the sub-sample of 2007-2012, we think that future research may focus on investigating the cross-boarder M&A market during that period. It is likely that more potential determinants expressed by the international targets may exist. Second, it is necessary to conduct an in-depth measure of dividend policy, which can include the degree of the difference between bidders and targets in the explanatory variables (Dereeper and Turki (2013)). By doing so, it can provide more insight for a failed competitor in the same takeover offer. Third, the payment method plays a key role in the probability of bidding success. Future study may focus on all cash mergers or all stock mergers, which can be done manually.

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Appendix 1

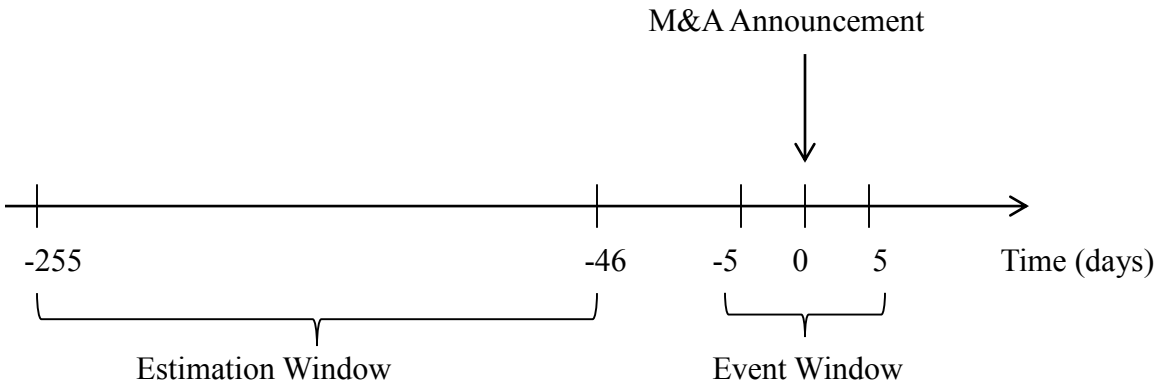

Figure 1: Event Study Timeline

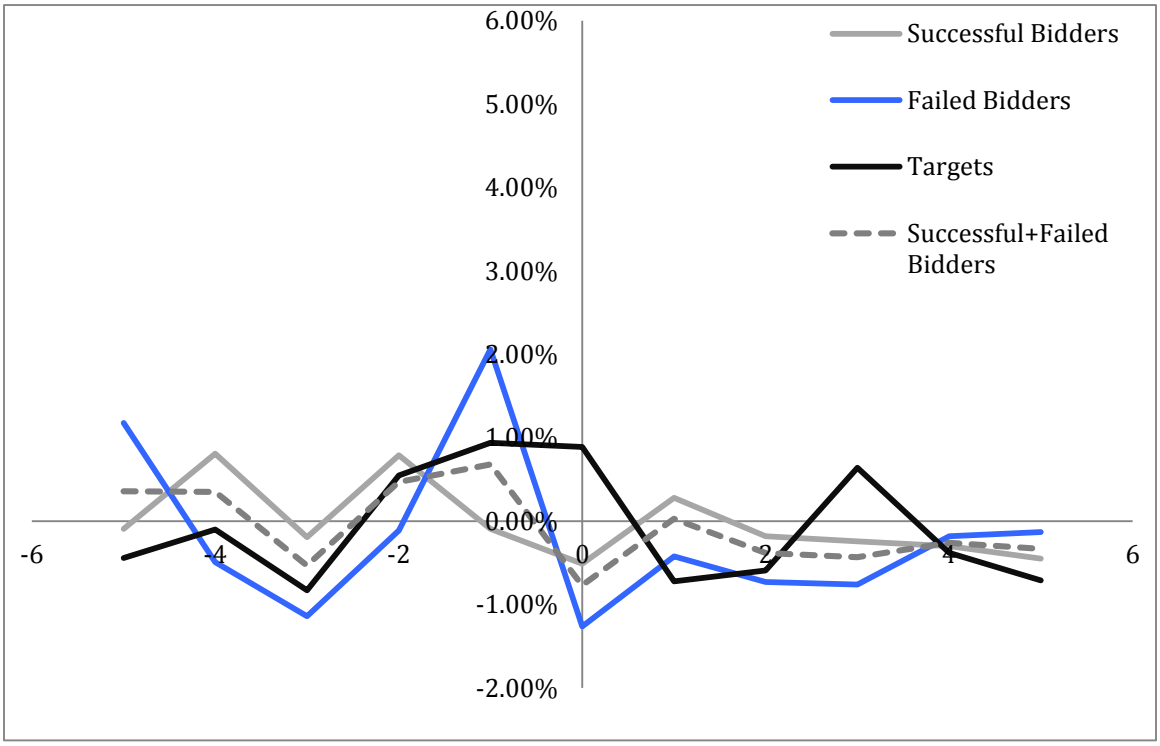

Figure 2: Daily Mean Abnormal Returns for Bidders and Targets

Appendix 2

Table 1: Summary of Multi-Bidder M&A Deals per Year

This table provides information on the number of takeover bids with multiple-bidders from 1998 to 2012. Successful bidders are those firms that succeeded in a bidding war and acquired the target firm, whereas failed bidders are those firms that lost in a bidding war.

Year	Targets	Successful Bidders	Failed Bidders
1998	28	28	28
1999	35	35	43
2000	27	27	38
2001	22	22	27
2002	9	9	9
2003	10	10	13
2004	9	9	14
2005	18	18	21
2006	19	19	23
2007	8	8	8
2008	13	13	14
2009	13	13	14
2010	10	10	11
2011	13	13	16
2012	3	3	3
Total	237	237	282

Table 2: Definition of Variables

This table provides the definition and data sources for all dependent and independent variables used in our analyses.

Variable	Variable Name	Definition	Data Source
Deal Status	*Success Dummy*	Dummy variable: one if the takeover bid is successful, and zero otherwise	SDC Platinum Database
Relative Firm Size	*RSIZE*	Market value of the bidder's equity / Market value of the target's equity	CRSP Database
Book-to-Market Ratio	*BTM*	Book value of the bidding firm / Market value of the bidding firm	Compustat Database
Dividend Payout	*DIVIDPAY*	Dividends per share / Earnings per share for the bidding firm	Compustat Database
Liquidity	*LIQ*	(Current assets - Current liabilities) / Total assets for the bidding firm	Compustat Database
Leverage	*LEV*	Total liabilities / Total assets for the bidding firm	Compustat Database
Return on Equity	*ROE*	Net income / Shareholders' equity for the bidding firm	Compustat Database
Offer Attitude Dummy	*ATTI*	Dummy variable: one if the takeover bid is friendly, and zero otherwise	SDC Platinum Database
Growth Opportunities (Tobin's Q)	*TQ*	Approximate Tobin's Q = (share price × the number of common stock shares outstanding + the value of preferred stock + (current liabilities – current assets) + book value of the long-term debt) / book value of total assets	Compustat Database

Industry Relatedness Dummy	*IR*	Dummy variable: one if the first two digits of the bidder's SIC code are the same as the target's SIC code, and zero otherwise.	Compustat Database
CEO Incentive Compensation	*LNCEOINC*	The natural logarithm of (TDC1-TCC) [a]	Execucomp Database

[a] Total compensation (TDC1) includes salary, bonus, the total value of restricted stock granted, the total value of stock options granted (using Black-Scholes), and long term incentive payouts. Total cash compensation (TCC) includes salary and bonus.

Table 3: Distribution of M&A Deals in the Full Sample (Sample Size: 110)

This table shows the distribution of takeover bids in our full sample, categorized along three dimensions. Our sample includes 110 firms for which all required data is available.

	Frequency	Percent
Deal Status		
Success	71	64.55
Failure	39	35.45
Offer Attitude		
Friendly	74	67.27
Hostile	36	32.73
Two-digit SIC Code		
Same	16	14.55
Different	94	85.45

Table 4: Characteristics of the Independent Variables

This table provides summary statistics for our independent variables, separated by successful and unsuccessful bidders. Obs. is the number of observations in the corresponding category. Th table reports the average, median, standard deviation minimum, and maximum for each variable. The last two columns provides the results for a Satterthwaite T-test for the significance of differences in means and a Wilcoxon median test for the significance of differences in medians between successful and unsuccessful bidders.

	Successful bidders						Unsuccessful bidders							
Variable	Obs.	Mean	Median	St. Dev.	Min.	Max.	Obs.	Mean	Median	St. Dev.	Min.	Max.	T-test (p-value)	Wilcoxon test (p-value)
RSIZE	71	115.2377	4.7940	555.2784	0.0002	4626.52	39	9.0026	1.1529	21.7133	0.0001	99.3133	0.1119	0.0742*
BTM	71	60.8278	0.5097	193.7357	0.0510	1110.02	39	221.4686	0.6668	424.9598	0.0510	1920.24	0.0301**	0.3212
DIVIDPAY	71	0.0684	0.0217	0.1127	0	0.5208	39	0.0974	0.0446	0.1362	0	0.5660	0.2617	0.3212
LIQ	71	0.1807	0.1422	0.1835	-0.1236	0.7013	39	0.1084	0.0891	0.1387	-0.1236	0.4105	0.0222**	0.0742*
LEV	71	0.5380	0.5457	0.2239	0.0361	0.9508	39	0.5766	0.5698	0.2408	0.1074	0.9508	0.4134	0.3212
ROE	71	0.0503	0.0311	0.0982	-0.1206	0.5051	39	0.0467	0.0404	0.0852	-0.0532	0.5052	0.8416	0.8427
ATTI (dummy)	71	0.8169	1	0.3895	0	1	39	0.4103	0	0.4983	0	1	<.0001***	<.0001***
TQ	71	0.4895	0.2136	0.9398	-0.7012	6.3758	39	0.2790	0.1540	0.5347	-0.4105	1.6986	0.1373	0.3212
IR (dummy)	71	0.1932	0	0.4007	0	1	39	0.0513	0	0.2235	0	1	0.0158**	0.0387**
LNCEOINC	71	7.8310	8.2831	2.0094	0	10.5203	39	6.9445	7.6557	2.8652	0	11.8527	0.0917*	0.1649

Table 5: Correlation Matrix of Independent Variables (Sample Size: 110)

This table provides Pearson correlation coefficients for all independent variables.

	RSIZE	BTM	DIVIDPAY	LIQ	LEV	ROE	ATTI	TQ	IR	LNCEOINC
RSIZE	1									
BTM	-0.0669									
	(0.4874)	1								
DIVIDPAY	-0.0746	0.0322								
	(0.4389)	(0.7383)	1							
LIQ	0.2431	-0.1547	-0.3337							
	(0.0105)	(0.1067)	(0.0004)	1						
LEV	-0.1461	-0.0832	0.2621	-0.5793						
	(0.1278)	(0.3875)	(0.0057)	(<.0001)	1					
ROE	-0.0306	0.0397	0.1389	-0.2330	0.3311					
	(0.7512)	(0.6808)	(0.1478)	(0.0143)	(0.0004)	1				
ATTI	0.0986	-0.0360	-0.3233	0.1898	-0.1448	-0.2845				
	(0.3053)	(0.7085)	(0.0006)	(0.0470)	(0.1312)	(0.0026)	1			
TQ	-0.1219	-0.1121	0.0666	-0.0523	0.0258	0.0700	0.0840			
	(0.2047)	(0.2437)	(0.4897)	(0.5871)	(0.7888)	(0.4677)	(0.3828)	1		
IR	-0.0595	0.0758	-0.0010	0.0594	-0.0211	-0.0933	0.1229	-0.1350		
	(0.5371)	(0.4315)	(0.9915)	(0.5378)	(0.8269)	(0.3325)	(0.2009)	(0.1596)	1	
LNCEOINC	-0.1879	-0.2583	0.1672	0.0876	0.1221	0.2286	0.0683	0.1381	-0.0358	
	(0.0493)	(0.0064)	(0.0809)	(0.3630)	(0.2038)	(0.0163)	(0.4785)	(0.1501)	(0.7108)	1

Table 6: Logit Estimates for the Probability that a Bidding Firm Succeeds in a Bidding War [a]

This table presents results for a series of logit regressions used to estimate the effect of different factors on the likelihood of M&A bidding success. Our sample consists of 110 takeover bids with multiple bidders that occurred between 1998 and 2012. In each model, the dependent variable is a dummy variable that is equal to 1 if the bid is successful, and 0 otherwise. Model 1 presents the relationship between the success rate and CEO incentive compensation. Model 2 uses only firm-specific factors as independent variables. Model 3 uses only deal-specific factors as independent variables. Model 4 provides comprehensive results based on all variables. Obs. is the number of observations in the corresponding categories.

Dependent Variable	Success Dummy (1 if the deal is successful, and 0 otherwise)			
	CEO Incentive Compensation	Firm-Specific Factors	Deal-specific Factors	Full Sample
Independent Variables	(1)	(2)	(3)	(4)
Intercept	-0.5510 (0.4046)	0.2144 (0.8118)	-0.9304** (0.0165)	-1.7840 (0.1578)
RSIZE	-	-	0.0148** (0.0631)	0.0129 (0.1160)
BTM	-	-0.0017** (0.0632)	-	-0.0021* (0.0965)
DIVIDPAY	-	-1.1412 (0.5309)	-	0.0859 (0.9690)
LIQ	-	2.8102 (0.1144)	-	1.5487 (0.4519)
LEV	-	-0.0294 (0.9808)	-	-0.2544 (0.8577)

ROE	-	1.9976 (0.4146)	-	5.3895* (0.0700)
ATTI	-	-	1.6873*** (0.0003)	1.9740*** (0.0005)
TQ	-	0.5480 (0.1782)	-	0.6376 (0.1641)
IR	-	-	1.5612** (0.0618)	2.6746** (0.0216)
LNCEOINC	0.1547 (0.0689*)	-	-	0.0417 (0.7117)
Obs.	110	110	110	110
Model p-value	0.0635	0.0326	<.0001	<.0001

[a] p-values are presented in parentheses

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level

Table 7: Robustness Tests [a]

This table provides the results for a series of robustness tests of our logit regressions in Table 6. In each model, the dependent variable is a dummy variable that is equal to 1 if the bid is successful, and 0 otherwise. Model 1 reports results of for a winsorized sample in which we remove the top 2% and bottom 2% of all bids based on relative firm size (RSIZE). Model 2 and 3 show the results for two tests in which we exclude leverage (LEV) and liquidity (LIQ) from our list of regressions. Model 4 and 5 provide estimation results for two sub-samples, with December 2006 as the cutoff point. Model 6 and 7 present estimation results for two sub-samples in which the bidder is either smaller or larger than the target firm (i.e., $RSIZE \leq 1$ or > 1). Obs. is the number of observations in the corresponding categories.

	Winsorized Sample	Excluding Leverage	Excluding Liquidity	1998-2006	2007-2012	$RSIZE \leq 1$	$RSIZE > 1$
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-1.7400	-1.9382**	-1.3299	-1.9934	1.3643	-5.6484	-10.6014
	(0.1713)	(0.0364)	(0.2283)	(0.2734)	(0.7878)	(0.2511)	(0.6461)
RSIZE	0.0131	0.0130	0.0133	0.0161	0.0084	-	-
	(0.1140)	(0.1134)	(0.1067)	(0.1629)	(0.7033)		
BTM	-0.0019	-0.0021	-0.0022*	-0.0048**	-0.0125	0.0011	-0.5977
	(0.1934)	(0.1006)	(0.0801)	(0.0338)	(0.2039)	(0.4552)	(0.7232)
DIVIDPAY	0.0472	0.0445	-0.2376	-3.2037	18.1099	2.9603	-104.1
	(0.9830)	(0.9839)	(0.9120)	(0.3358)	(0.2901)	(0.6511)	(0.2058)
LIQ	1.4452	1.7538	-	3.1528	-14.0547	4.1355	37.5566
	(0.4871)	(0.3067)		(0.3499)	(0.2634)	(0.4457)	(0.5950)
LEV	-0.3257	-	-0.8421	-0.4889	-9.4306	2.1723	8.0677
	(0.8205)		(0.4694)	(0.8087)	(0.2558)	(0.4407)	(0.7622)
ROE	5.3503*	5.2929*	5.1461*	10.2568***	52.7866	-5.2845	232.6
	(0.0700)	(0.0708)	(0.0842)	(0.0093)	(0.2998)	(0.3221)	(0.3211)
ATTI	1.9746***	1.9677***	1.9697***	3.8151***	-2.9930	-2.6498*	72.6307
	(0.0005)	(0.0005)	(0.0005)	(<.0001)	(0.1187)	(0.0552)	(0.1980)

TQ	0.6414	0.6410	0.5970	0.9697	2.5015	1.8288*	-5.7662
	(0.1626)	(0.1601)	(0.1843)	(0.1784)	(0.3276)	(0.0648)	(0.6957)
IR	2.5699**	2.6923**	2.6832**	1.4179	15.5442	-0.5889	-30.2651
	(0.0305)	(0.0212)	(0.0184)	(0.3246)	(0.9386)	(0.7969)	(0.3426)
LNCEOINC	0.0414	0.0405	0.0614	-0.1005	1.0696	0.5478	-5804
	(0.7147)	(0.7193)	(0.5751)	(0.5260)	(0.1371)	(0.3180)	(0.5351)
Obs.	106	110	110	88	22	33	77
Model p-value	<.0001	<.0001	<.0001	<.0001	0.1804	0.2303	<.0001

[a] p-values are presented in parentheses

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level

Table 8: Event Study Results

This table provides information on the mean and median abnormal returns around the announcement day of a takeover bid. Our sample includes 110 takeover bids with multiple bidders that occurred between 1998 and 2012. We differentiate between three different groups – successful bidders, failed bidders, and target firms. We use the CRSP equally-weighted return as the market return and estimate the market model parameters over the period from -255 trading days to -46 days before the event day. The last column provides a Wilcoxon median test for the significance of differences between medians and zero. Obs. is the number of observations in the corresponding categories.

Event Window	Mean CAR (%)	Median CAR (%)	Obs. [a]	Wilcoxon test (p-value)
Panel A: CARs for the successful bidders around the announcement date				
[0]	-0.51*	-0.09	67	0.2961
[-1,1]	-0.32	-0.09	67	0.6338
[-5,5]	-0.19	-0.81	67	0.6786
Panel B: CARs for the failed bidders around the announcement date				
[0]	-1.26**	-1.06	37	0.1660
[-1,1]	0.38	-1.37	37	0.9170
[-5,5]	-1.97**	-3.40	37	0.1864
Panel C: CARs for the target firms around the announcement date				
[0]	0.89	-0.46	62	0.5182
[-1,1]	1.10	-0.62	62	0.6537
[-5,5]	-0.77	-3.02	62	0.3016

[a] the observation is reduced because of the security-events dropped by Eventus.

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level

Table 9: Mean- and Median- Difference Tests between Successful and Failed Bidder CAR

This table provides information on the cumulative abnormal returns of successful and unsuccessful bidders. Our sample includes 110 takeover bids with multiple bidders during the period 1998 and 2012. In the last two columns, we report p-values fro significance tests of differences in mean and median CARs.

	Successful Bidders						Failed Bidders						T-test	Median test
Event Window	Obs.	Mean	Median	St. Dev.	Min.	Max.	Obs.	Mean	Median	St. Dev.	Min.	Max.	(p-value)	(p-value)
[0]	67	-0.0058	-0.0009	0.0453	-0.1978	0.0883	37	-0.0129	-0.0106	0.0557	-0.2315	0.0852	0.5078	0.5409
[-1, 1]	67	-0.0045	-0.0009	0.0771	-0.2561	0.2410	37	0.0019	-0.0137	0.1072	-0.1717	0.5253	0.7514	0.3081
[-5, 5]	67	-0.0063	-0.0081	0.1248	-0.3886	0.2846	37	-0.0249	-0.0340	0.1126	-0.1896	0.5031	0.4407	0.3081

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level

Table 10: Regression of CARs against Bidding Success [a]

This table provides results for a series of OLS regressions of target and bidder cumulative abnormal returns (CARs) against the same firm and deal characteristics we examined in Table 6. In each model, the dependent variable is either the target CARs or the bidder CARs. Models 1, 2 and 3 present results for three regressions of target CARs during different event windows, while Models 4, 5, 6 provide the corresponding results for bidder CARs.

	OLS Regressions of Target CARs			OLS Regressions of Bidder CARs		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	[0]	[-1,1]	[-5,5]	[0]	[-1,1]	[-5,5]
Intercept	-0.0437	-0.0804	-0.0640	0.0060	0.0422	-0.0485
	(0.1663)	(0.1247)	(0.5253)	(0.7302)	(0.2113)	(0.3377)
Success	0.0042	-0.0028	0.0600	0.0003	0.0087	-0.0268
Dummy	(0.6611)	(0.8809)	(0.1016)	(0.9687)	(0.5837)	(0.2787)
RSIZE	-0.0002	-0.0003	-0.0002	<0.0001	<-0.0001	<0.0001
	(0.1035)	(0.1264)	(0.5284)	(0.8174)	(0.7034)	(0.9580)
BTM	<-0.0001***	<.0001	<-.0001	<0.0001	<0.0001	<-0.0001
	(0.0077)	(0.7115)	(0.7395)	(0.5772)	(0.4579)	(0.6155)
DIVIDPAY	0.0255	0.0427	-0.1252	-0.0171	-0.0537	-0.0077
	(0.5963)	(0.6267)	(0.4717)	(0.5771)	(0.3559)	(0.9315)
LIQ	0.0118	0.1171*	-0.0467	-0.0136	-0.0762	0.0172
	(0.7595)	(0.0799)	(0.7197)	(0.6069)	(0.1477)	(0.8293)
LEV	0.0162	0.0498	0.0278	-0.0185	-0.0860**	-0.0251
	(0.5502)	(0. 2960)	(0.7632)	(0.3241)	(0.0209)	(0.6555)
ROE	-0.0134	-0.0819	-0.2589	0.0079	0.0304	-0.0529
	(0.7857)	(0.3838)	(0.1451)	(0.8436)	(0.7149)	(0.6913)
ATTI	-0.0105	-0.0168	-0.0078	-0.0049	-0.0120	0.0213
	(0.2957)	(0.3713)	(0.8252)	(0.5918)	(0.4816)	(0.4063)

TQ	<.0001	0.0309**	0.0215	-0.0028	-0.0126	-0.0208*
	(0.0.9915)	(0.0388)	(0.4882)	(0.4968)	(0.1031)	(0.0894)
IR	0.0152	0.0179	0.0426	0.0100***	0.0356*	0.0175
	(0.2280)	(0.4684)	(0.3466)	(0.0010)	(0.0625)	(0.5575)
LNCEOINC	0.0049*	0.0049	0.0030	0.0017	0.0026	0.0026
	(0.0786)	(0.3173)	(0.7413)	(0.6823)	(0.4171)	(0.5923)
Obs.	57	59	56	99	99	98
Adjusted R^2	0.1118	0.0151	-0.0302	0.0546	0.0558	-0.0136
Model p-value	0.1196	0.3967	0.5901	0.1408	0.1366	0.5610

[a] p-values are presented in parentheses

* indicates significance at the 10 percent level

** indicates significance at the 5 percent level

*** indicates significance at the 1 percent level