

Target Valuation and its Effect on Acquirer Acquisition Behavior

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A Thesis In
The Department Of
Finance

Presented in Partial Fulfillment of the Requirements
For the Degree of Master of Science (Finance) at
Concordia University
Montreal, Québec, Canada

August 2023

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CONCORDIA UNIVERSITY

School of Graduate Studies

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Abstract

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A long-standing theory in mergers and acquisitions is that overvalued firms can create value by using stock payment as an acquisition option. This study challenges the notion that firm overvaluation is a driver of stock acquisitions. These acquisitions do not lead to major synergy gains. Additionally, we examine the reason why firms opt for stock acquisitions by examining acquisition completion time, synergies, premiums and returns. We find that stock overvaluation is not a significant motive for stock acquisitions as the benefit from overvalued acquisitions is offset by negative synergy, returns and high premiums.

ACKNOWLEDGEMENT

I would like to thank every person that has helped me on this journey to achieve an MSc. In Finance at JMSB. I have learned a lot throughout the journey, and I am forever grateful for JMSB's professors for enlightening me on the field of finance. The experience gained from this degree is immense and its scope is very wide.

I would like to thank all of my peers at JMSB that made this an enjoyable, joyful and fun collaborative experience. I would also like to thank my friends and family back home that have supported me unconditionally throughout this degree.

I would like to Thank Dr. Saif Ullah for supporting me throughout the degree, in both his great course and his thesis supervision. He has provided me with much needed mentorship, insight and help in finance, and I am forever grateful for his efforts.

Thank you all.

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1. Introduction

Mergers and acquisitions are a crucial aspect of the business world. Companies use mergers and acquisitions for multiple reasons ranging from strategic expansion, diversification or risk reduction, all of which is in an attempt to increase profits. By that, M&A is a big focus in finance, and often times the focus of study is the financing options for acquisitions. One of the biggest questions in M&A is cash vs stock acquisitions, which option is better? And when should you opt for cash or stock?

Studies such as Rhodes-Kropf, Robinson and Viswanathan (2005), Dong, Hirshleifer, Richardson and Teoh (2006), and Ang and Cheng (2006) state that acquirors are more overvalued than their target before merger announcements and that the more overvalued a firm is the higher the likelihood of choosing stock as a payment method. Studies like Fu, Lin and Officer (2013) challenge this notion and claim that overvalued acquirors overpay for their acquisitions, which nullifies the benefit of using overvalued stocks for acquisitions.

Savor and Lu (2009) claim that failing a merger is worse than consummating it, while Fu, Lin and Officer (2013) challenge that claim, stating that it is based on the assumption that all stock acquisitions are motivated by stock overvaluation. Additionally, they state that their sample overvaluation does not motivate all stock acquisitions. In light of these studies, it is important to ask the question of what really motivates stock acquisitions? And do acquirors offer stock acquisitions in anticipation of a failed acquisition?

In this paper we study mergers and acquisitions of firms located in the US and completed between 2003 and 2019. We examine deal premiums, returns and synergy to better understand the rationale behind choosing stock as a method of payment. We conduct an event study approach to

understand mergers and acquisitions from both acquiror and target side, we find that overvalued acquirors tend to have negative abnormal returns in the period after an acquisition when their target is overvalued, however they tend to have positive abnormal return if the acquiror is overvalued and the target is undervalued. We also conduct a regression analysis on acquisition premiums, buy and hold returns and synergy. We find that the acquiror overvaluation does not entirely explain the premiums paid by stock acquisitions, or the buy and hold returns or the added value from synergy. These results contradict the notion that firms exploit overvaluation to offer stock options, which could point us towards an alternate motive for offering stock payment.

2. Literature Review

Mergers, in the neoclassical view, are seen as a tool to improve efficiency in response to industry shocks according to Mitchell and Mulherin (1996). Shleifer and Vishny (2003) find that the neoclassical view is very strong in explaining mergers, however they state that it does not completely explain why firms would use cash or stock. Loughran and Vijh (1997) find that markets react inefficiently to merger news, and cash offers outperform stock acquisitions significantly. Healy et al. (1992) find that conglomerate mergers improve profitability, while Ravenscraft and Scherer (1987) find the opposite result. These factors indicate that the neoclassical view on mergers is not complete, regardless of how strong it is.

It is commonly believed that stock acquisitions are driven by stock overvaluation. Shleifer and Vishny (2003) theorize that firms tend to use their overvalued stock to increase their shareholder wealth. This theme in M&A research is also supported by Rhodes-Kropf, Robinson and Viswanathan (2005), Dong, Hirshleifer, Richardson and Teoh (2006) and Ang and Cheng

(2006), all of which show that stock mergers tend to happen when the acquirers are more overvalued when compared to their targets. There has been counter evidence to this; however, Fu, Lin and Officer (2013) claim that despite the fact that overvalued stock acquisitions benefit shareholders, the benefit only exists when offers do not have high premiums. In reality, overvalued acquirers pay high premiums to targets which generates negative synergy and leads to a decline in shareholder's value. This loss causes the acquirer stock to drop in value way more significantly than the overvaluation correction. Their research also suggests that there could be an agency problem, as acquirer CEOs gain rewards despite the outcome of the stock merger. On the other hand, Savor and Lu (2009) find that there could be value to stock acquisitions, supporting the "overvalued equity" hypothesis. Mitchell, Pulvino and Stafford (2004) support the arbitrageur hypothesis, stating that stock bidders have a price pressure effect on their stock during their acquisition due to the effect arbitrageur activity, which would explain the stock price movements during a stock acquisition.

There are also other factors to consider in stock acquisitions, one of which is agency problems. Harford and Li (2007) find that acquirer CEOs gain significant benefits in overvalued equity acquisitions, specifically stock and option grants. They find that these benefits outweigh the drop in equity value post-acquisition. Similarly, Gu and Lev (2011) find that overvalued equity acquisitions are usually followed by large goodwill write-offs in the period after acquisition. This would support Jensen's (2005) theory that equity overvaluation results in higher shareholder agency costs.

However, there have also been contradictory studies on stock acquisitions, Ben-David, Drake and Roulstone (2014) find that stock acquirers perform the same as similarly valued non-acquirers, indicating that stock deals' reason for underperforming could be due to separate reasons. As put by Rau and Stouraitis (2011), stock acquisitions are financing activities and investment activities, whereas cash acquisitions are purely investment activities. Golubov, Petmezas and Travlos (2016) argue that stock acquisitions should be looked at as being not only an acquisition issue, but also an equity issue. Their analysis finds that if equity financing is separated from the announcement return of stock acquirers, the method of payment would have no significant explanatory power in acquirer returns. There have been explanations for the dip in stock value after mergers, and the most prominent one is the release of negative information about issuer value as stated by Myers and Majluf (1984).

Akbulut (2013) examines the question of whether overvalued stock acquisitions benefit acquirer shareholders. He finds that overvalued equity does drive stock acquisitions, however overvalued acquisitions tend to destroy shareholder value in the long and short run.

Aside from Cash Vs Stock acquisitions, there have been other topics studied in M&A. Andersen et. Al. (2005) finds that firm betas vary significantly around a merger announcement date. Margsiri, Mello and Ruckes (2007) study how firms decide to expand internally or externally using M&A. Morellec (2004) and Lamberecht and Myers (2007) examine manager-shareholder conflicts and external markets within the context of corporate control.

Regardless of the reasons why stock acquisitions have different results than cash acquisitions, or whether they are any different to begin with, there must be an inherent reason as to why companies would choose stock acquisitions knowing well enough that cash acquisitions may seem more advantageous. Agency problems could be a cause, but it also could be a simpler

reason. This paper examines the possibility of firms using equity acquisitions with prior knowledge that their stocks will underperform in the period following the announcement.

3. Hypotheses

The aim of the study is to examine the underlying motive for acquisition and whether acquirors offer stock acquisitions due to a preconceived prediction that the deal will result in a loss rather than stock acquisitions being a sole catalyst for deal failure. By that, we must examine deals from both target and acquiror side. We look at acquiror and target misvaluation, and how that could affect the market's reaction to M&A deal announcements.

We theorize that overvalued acquirors will generally receive a negative market reaction in M&A deal announcements, except for when they acquire undervalued targets, where they could realize positive market reactions as an undervalued target means that acquirors can gain from the M&A deal, even in the circumstance where the acquiror is overvalued. However, there would be no gain for the acquiror if they acquired an overvalued target, which would result in a negative market reaction for them. Thus, based on these dynamics we could infer the following hypotheses:

***H1A:** if the acquiror and the target are overvalued, the acquiror will receive a negative market reaction, while the target will receive a positive market reaction around the announcement date.*

***H1B:** if the acquiror is overvalued but the target is undervalued then the post-announcement market reactions for the acquiror and target are positive.*

***H1C:** if the target is overvalued but the acquiror is undervalued then the target will have positive post-announcement reaction, while the that of acquirors tends to be negative.*

We then do a regression analysis to establish the effect of acquiror/target overvaluation on deal synergy, premiums, time to completion and buy and hold returns.

There have been multiple studies that examine acquisition completion time and the factors that affect it. Bainbridge (1990) states that prolonged deal duration causes higher legal charges and it distracts managers from other profitable merger deals. Additionally, a prolonged deal completion time will expose the deal to more market changes and shifts, which could make deal financing a harder task. Luypaert and Maeseneire (2015) state that shorter completion times could save firms from heavy financial losses. They also study the factors that affect completion time, they find that shareholder support shortens deal completion duration, while deal hostility lengthens it. Thus, we could infer that shortening deal duration may save money, which in turn would make an acquisition more lucrative and could preserve the inherent synergy in acquisitions. It is important to understand the effect of misvaluation on deal completion time, as it is an indicator of the efficiency of a deal, meaning that it could have an effect on losses and synergies in a merger. We theorize that overvalued targets would want to complete acquisitions faster to reduce costs and operate more efficiently before their valuation corrects. Hence, our H2A hypothesis is as follows:

H2A: Acquisitions with more overvalued targets will have a shorter completion time.

Fu et. al (2013) do an analysis on acquisition premiums and they study the effect of relative overvaluation and deal characteristics on premiums paid. They find that deal terms and deal characteristics do not fully explain the high premiums paid by bidders, leading them to believe that stock bidders overpay their targets significantly. They also find that the relative overvaluation of the acquiror has an effect on the premium paid, as acquirers pay higher premiums when they are relatively more overvalued. Thus, we believe that acquiror valuation will have a significant effect on the premium paid, we also want to examine the multiple valuation segments and how they affect premiums. We theorize based on the literature that when acquirors are overvalued, targets will

demand a higher premium to compensate for the additional overvaluation of the acquiror stock. Hence, our hypothesis for the premium is as follows:

H2B: Targets will demand a higher premium if the acquiror is more overvalued.

After analyzing premiums, we could look at synergy to identify whether there is a justification for stock acquirors' premiums or not. Shleifer et. al (2003) suggest that suggest that high synergies could be generated from mergers, but not from equity offerings. Fu et. al (2013) state that overvalued stock acquirers significantly underperform after their acquisitions, suggesting that overvalued acquirors do not benefit from using their stock as a method of payment. They also emphasize that cash acquisitions benefit from higher synergies than stock acquisitions. Thus, we could infer that stock acquirors do not benefit from synergies as much as cash acquirors. We can also infer that in general, overvalued stock acquirors generate little to no synergies. Therefore, our hypothesis for synergy is as follows:

H2C: Acquisitions will have lower synergy when the acquiror is more overvalued.

To further examine the validity of overvalued stock acquisitions and whether they are justified or not, we examine the long run abnormal returns. There are two opposing findings in the literature regarding long run abnormal returns, Savor et. al (2009) find that not consummating a deal results in worse long run abnormal returns than consummating it, arguing that completing stock acquisitions is value creating for acquiror shareholders. On the other hand, Fu et. al (2013) argue that the result for Savor et. al (2009) does not account for misvaluation, which when accounted for would offset any value created by consummating a stock deal. Fu et. al (2013) show that the market-adjusted buy-and-hold returns for overvalued acquirors are worse than their

counterparts if they complete their stock acquisition. Thus, since we are accounting for overvaluation, we expect to see worse market-adjusted buy-and-hold returns for acquirors that are overvalued, we also account for target overvaluation to understand if overvalued acquirors could benefit from stock acquisitions in certain circumstances. Our Fourth Hypothesis is as follows:

***H2D:** Overvalued Acquirors will realize a negative market-adjusted buy-and-hold returns.*

4. Data

We have obtained our mergers and acquisitions data from the Securities Data Company (SDC) US M&A database. The initial sample consists of the following criteria:

1. The acquisition is completed between the years of 2003 and 2019.
2. The acquirer and the target are public firms listed on NYSE, AMEX or Nasdaq.
3. The minimum deal value is \$10 million and at least 1% of the acquirer market value of equity.
4. The acquirer owns less than 50% of the target's shares pre-announcement and owns 100% of the target's shares post-transaction.
5. Payment is either 100% cash or 100% equity.
6. Acquirer and target both have a positive book value of assets and equity at the end of the fiscal year prior to the announcement.

The initial sample consists of 1034 acquisitions, 559 of which are cash and 475 of which are stock. We are able to extract control data on the sample using Wharton WRDS Compustat and the event study tool by WRDS.

[Table 1 about here.]

The sample size is smaller as compared to previous studies such as Fu et. al. (2013), and that is since there was a concentration of deal activity in the late 1980s up until the 1990s which

have much higher activity than recent years. Additionally, our sample includes more cash acquisitions than stock acquisitions as compared to Fu et. al's (2013) paper, which had more stock acquisitions than cash. The current division in our sample is 54% cash and 46% stock, whereas Fu et. al's (2013) paper consisted of 33% cash acquisitions and 67% stock acquisitions. Their paper includes a sample for up to the year of 2006, where we can notice shift in acquisitions is apparent as from the year 2005 onwards more cash acquisitions were made than stock. This drastic shift could indicate that the market adjusted to inefficiencies brought on by stock acquisitions. It is also possible that the Sarbanes-Oxley Act of 2002 induced this shift, as it also made it harder for top managers to conduct fraudulent acquisitions driven by agency conflict. Thus, we chose our sample to be in the years following the Sarbanes-Oxley Act of 2002 to avoid the shift induced by the act. Overall, stock acquisitions remain a significant offering option as 46% of our sample consists of stock, yet it is not as prevalent as it used to be in the 80s and 90s.

5. Methodology:

This section provides an explanation of the different tests that will be done to study our sample. We first employ an event study approach followed by our regression models.

Event Study:

An event study approach will help us understand how financial markets react to mergers and acquisitions. Abnormal returns (AR) are the primary measure used for the unexpected effects of an acquisition on the market. We will be using the market model AR throughout the study, with an estimation window of (-255, -46) and value weighted results are examined.

The output of the results is obtained from Eventus in Wharton Research Data Services (WRDS). We study the Cumulative Abnormal Return on multiple event windows to draw conclusions on our sample. We first calculate the Abnormal Returns per this formula:

$$AR_{jt} = R_{jt} - (\alpha + \beta_j R_{Mt}) \quad (1)$$

Where R_{jt} is the return of a security j at a time t . α and β are the security model factors. R_{Mt} is the market return at time t .

Then for the Cumulative Abnormal Returns the formula is as follows:

$$CAR(t1, t2) = \sum_{t=t1}^{t2} AR_t \quad (2)$$

Regression Analysis:

One of the presumed conditions for stock acquisitions is the overvaluation of the acquirer as compared to the target. As a starting point, we need to establish the findings in literature stating that overvalued equity motivates stock acquisitions. The measure of misvaluation is derived from Rhodes-Kropf, Robinson, and Viswanathan's (2005) model that separates a firm's market-to-book equity ratio into multiple components:

$$Misvaluation = Ln\left(\frac{M}{B}\right) = Ln\left(\frac{M}{V}\right) + Ln\left(\frac{V}{B}\right) \quad (3)$$

Where M is the market value of equity, B is the book value of equity and V is the intrinsic value of equity. $Ln(M/V)$ is a proxy for misvaluation. The model has been used in multiple studies,

notably Hertz and Li (2010) and Fu et. al (2013). Similar to Shleifer and Vishny (2003), we assume that markets are inefficient.

We do an analysis on completion time to examine the effect of misvaluation on deal completion time. Deal completion time is a simple variable that has been often used in M&A analysis (e.g., Ekelund, Ford and Thornton, 2001; Luypaert and De Maeseneire, 2015) which measures completion time as the difference between the deal completion date and the deal announcement date measured in days:

$$\textit{Time to completion} = \textit{Deal Completion Date} - \textit{Deal Announcement Date}$$

To address the worthiness of the acquisition for the acquiror, we would have to estimate the acquisition premium, as it is critical for acquirors to not overpay with a premium that is very high. We use the model for premiums that is used by Schwert (1996), Barger, Schlingemann, Stulz and Zutter (2008) and Fu et. al. (2013) that calculate it as the cumulative abnormal return (CAR) for 42 days before the announcement:

$$AP_1 = \sum_{t=-42}^T (R_{jt} - (\alpha + \beta_j R_{Mt})) \quad (4)$$

Where $t=0$ is the day of announcement and $t=T$ for the day of the completion.

Savor and Lu (2009) find that stock equity bidders that do not complete their acquisitions have worse long-run abnormal returns than stock bidders that have successful deals. To address the question of returns, we calculate the buy and hold returns based on the model of Loughran and Ritter (1997). Our buy-and-hold returns are based on a 24-month period:

$$BHR_j[0, T] = (\prod_{t=0}^T (1 + R_{jt}) - 1) - (\prod_{t=0}^T (1 + R_{Mt}) - 1) \quad (5)$$

Where $t=0$ is the month acquisition announcement. R_{jt} is the monthly return for stock j at a month t , R_{Mt} is the monthly CRSP Value-weighted index at month t , and T is the holding period.

A number of studies (e.g, Betton, Eckbo and Thorburn, 2008; Harford, Humphery-Jenner and Powel, 2012; Martin and Shalev, 2017; Field and Mkrtchyan, 2017; Suk and Wang, 2021) measure acquisition synergy as the combined CAR around merger announcement date. We calculate the CAR using the value weighted method, we use the (-1,+1) CAR around the announcement date of the acquisition for both the acquiror and the target, after which we use the weights of the acquiror and target as the market value of each 4 weeks prior to the announcement date divided by their total combined market value 4 weeks prior to the acquisition.

$$Synergy = \frac{MV_{TARGET4WK}}{MV_{TOTAL4WK}} * CAR(-1, +1)_{Target} + \frac{MV_{ACQUIROR4WK}}{MV_{TOTAL4WK}} * CAR(-1, +1)_{Acquiror} \quad (6)$$

We also control for OROA (Operating returns on assets) which was used in Fu et. al's (2013) paper. The measure for OROA is the earnings before interest, taxes and depreciation divided by a firm's total assets:

$$OROA = \frac{EBITDA}{Assets} \quad (7)$$

To evaluate the impact of acquiror and target misvaluation on acquisitions, we do a regression model that includes a multitude of control and interaction variables. In general, our regression model is structured as follows:

$$Y_i = Misvaluation_{A_{t-1}} + Misvaluation_{B_{t-1}} + DUM_{OfferType} + OROA_{t-1} + Size_{t-1} \\ + Leverage_{t-1} + Industry_{t-1} + DUM_{segments} \\ + Misvaluation \times DUM_{OfferType} + e$$

Where Y_i is the dependent variable. The same model is used for Premiums, Synergy, Log(Completion Time) and two-year BHR following acquisition which are our dependent variables. We control for offer type (cash or stock), OROA, Size (log of total asset), Leverage, Industry. We also control for equity sales (SSTK) to study the effect of companies that sell equity to finance cash acquisitions and the companies that use debt to finance acquisitions. We also add additional financial ratio control variables to the model for both the acquiror and the target which are outlined in table 5.

[Table 5 about here.]

6. Analysis:

In this section we present and study the results of our event study and regression models.

Event Study:

A crucial element to analyze is the effect that mergers and acquisitions have on acquirors and targets in response to the merger event. To study that, we can conduct an event study on firms to understand market reactions by studying stock prices of the affected firms. Martynova and Renneboog (2008) state that the M&A announcement represents new market information. This means that investors alter their expectations on the firms involved, which can be studied by looking at the abnormal returns in stock prices.

We can segregate the event study into multiple samples, and since we are studying the relative misvaluation of targets and acquirors, we can look at the following samples:

1. **Segment 1:** Overvalued acquirors and overvalued targets
2. **Segment 2:** Overvalued acquirors and undervalued targets
3. **Segment 3:** Undervalued acquirors and overvalued targets

The event study is done on multiple windows, with day 0 being the acquisition event date.

The effect of the acquisitions on targets was much more significant than on the acquirors, as targets experience positive and significant abnormal returns during the windows around the event date. The acquirors experienced negative abnormal returns for all of the windows, however it is not as significant for targets. This confirms previous literature on mergers and acquisitions that acquirors tend to have negative abnormal returns while targets have positive abnormal returns.

[Table 3 about here.]

[Table 4 about here.]

Overvalued Acquiror and Overvalued Target:

Returns for stock acquirors are negative but not significant, except for the (1,30) window where acquirors have significant negative abnormal returns. Cash acquisitions for acquirors have a similar result, and the difference between cash and stock acquisitions is insignificant. Targets of stock acquisitions in this segment have positive abnormal returns for all event windows, while targets in cash acquisitions realize higher positive abnormal returns than stock acquisitions. These results are in line with existing literature on mergers and acquisitions. We find support for the H1A hypothesis as acquirors have negative abnormal returns while targets have positive abnormal returns.

Overvalued Acquiror and Undervalued Target:

Stock acquirors experience negative returns in the short run around the event date, however in the (1,30) window acquirors have positive and significant abnormal returns. This is in contrast to the total and the overvalued/overvalued segment, where overvalued acquirors tend to have negative abnormal returns. Cash acquirors tend to have similar returns in the event windows, however they do have a more significant and positive return for the (1,30) window, which could indicate that cash acquirors recover their prices more rapidly. As for stock offer targets, they

experience positive abnormal returns, however these returns are not as significant in the (1,30) window, while they are significant in the other sample windows. Targets in cash offers also have similar returns, however they tend to be more positive as compared to stock offers. We find partial support for the H1B hypothesis, as targets do tend to have positive returns, while acquirors have varied returns across the event windows.

Undervalued Acquiror and Overvalued Target:

Acquirors tend to have negative but mostly insignificant abnormal returns in the short run, however they do have positive abnormal return in the (1,30) window, but that is not statistically significant. Targets have significant positive abnormal returns in all windows, including the (1,30). Targets of cash acquisitions tend to have more positive abnormal returns as compared to stock acquisitions, however overall they both have positive and highly significant positive abnormal returns. We find some support for the H1C hypothesis since targets realize significant positive abnormal returns.

Misvaluation:

Fu et. al.'s (2013) paper shows that bidders are usually more overvalued than their targets, additionally they show that stock bidders are more overvalued than cash bidders, and that the targets of stock bidders are also more overvalued than cash bidders. This explanation is in line with Dong, Hirshleifer, Richardson and Teoh's (2006) findings that state that acquirors are dominantly overvalued relative to their targets. However, our model shows that acquirors are not always more overvalued with respect to the targets, also showing that targets could be slightly more overvalued than the acquirors. This is not in line with Shleifer and Vishny's (2002) market driven hypothesis that firms are usually more overvalued than their targets. Despite that, Shleifer and

Vishny (2003) suggest that overvaluation is a motive for stock-acquisitions, however they explicitly mention that not every stock acquisition is driven by stock relative overvaluation. The change in the relative overvaluation of acquirors over targets could be an indication of shifting market trends, it also could indicate that relative overvaluation does not necessarily have to apply in the modern market. This also puts greater emphasis on overvaluation with respect to the market rather than overvaluation with respect to the deal sides.

[Table 7 about here.]

Time to completion:

Time to completion is a good indicator for complications regarding acquisitions, as we theorize that more overvalued targets tend to have a longer completion time. Our results point towards more overvalued targets having a shorter completion time. This shows some evidence in support of our hypothesis as the results are significant and negative. We are also able to pinpoint a segment that significantly and negatively affects deal completion time which is segment 2(Overvalued Acquirors and Undervalued target). Additionally, acquisition hostility and offer type have much higher explanatory significance in determining completion time for acquisitions indicating that while target overvaluation is important, other variables are much more significant. Additionally, bigger targets have longer deal completion time, which indicates that bigger targets may require extra due diligence and extra details in the deal completion process. Additionally, the sale of stock prior to acquisition (SSTK) is significant and it increases completion time, however it has a small effect on deal completion time. Overall, overvalued targets are a significant factor in determining completion time, as the more overvalued a target is the less time it needs to complete

a merger. We find support for our hypothesis, which states that acquisitions with more overvalued targets have a shorter deal completion time.

[Table 9 about here.]

Acquisition Premiums:

We then do a regression analysis to examine the variables that affect acquisition premiums using the misvaluation variable as our main dependent variable. Additionally, our control variables are similar to Barger, Schlingemann, Stulz, and Zutter (2008). The sample contains both cash and stock acquisitions, including an indicator variable for cash vs stock acquisitions. The following table presents the regression results, and it includes an interaction term between the misvaluation of acquirors, targets and the cash/stock indicator variable. The table shows that the misvaluation terms of the acquiror and target are not significant, however the interaction term between the acquiror and target and acquisition type is positive and significant. Additionally, the operating returns on assets for acquirors and targets are significantly negative. As for other controls, they remain in line with literature regarding acquisitions. The regression results suggest that deal terms do not necessarily explain the higher premiums paid by overvalued bidders. We find limited support for our hypothesis as despite our results not being significant to ascertain a relationship between misvaluation and acquisition premiums, the interaction of offer type and acquiror/target misvaluation is significant. Premiums however, are more explained by other variables such as offer type and acquiror characteristics rather than misvaluation. Thus, we could examine synergy as it can be another possible reason why firms overpay.

[Table 10 about here.]

Acquisition Synergy:

Shleifer and Vishny (2003) suggest that high synergies could be a reason why firms could justify high premiums. To address the question of whether synergies justify overvalued stock acquisitions, we examine synergy in a similar regression test to see the effect of acquiror and target misvaluation in determining synergy.

The regression results show that despite the model having some explanatory value for synergy as it has an R squared value of 0.122, misvaluation variables and their relative interaction are not significant, however payment type does have a significant and positive value, indicating that cash acquisitions can explain higher synergies in acquisitions which is in line with literature on cash acquisitions. Larger acquiror firms also have a negative and significant effect on synergy. We also find that more overvalued acquirors and more overvalued targets tend to have negative synergy, however the results are not significant. Thus, we find no evidence to support our hypothesis. The results are in line with previous studies indicating that stock acquisitions destroy value rather than create it, as there is no segment that creates value significantly, raising questions about the significance of stock acquisitions. Fich, Starks and Yore (2008) argue that executive compensation is the main driver for CEOs to engage in acquisition deals, and that is specifically true for deals that do not add firm value. Additionally, Grinstein and Hribar (2004) show that CEOs influence board decisions to receive high M&A bonuses. This could indicate that there is an agency problem in stock acquisitions, as they provide no economic benefit and managers are the biggest winners from them. This would explain why stock acquisitions do not create value, as their main purpose is not to create value from the start.

[Table 11 about here.]

Acquisition Buy and Hold Returns:

So far, the evidence suggests that acquirors tend to overpay for their targets, with little to not long-run synergy. The results suggest that overvalued acquirors do not create value from stock acquisitions. Savor and Lu (2009) find that stock bidders that do not complete deals realize larger losses in the long run, indicating that stock acquisitions create value for acquirors. By that, we conduct a regression analysis on buy and hold returns, using similar controls in the previous regression.

The regression results point towards misvaluation not being a significant factor in determining buy and hold returns. However, we find that there is one segment that has a positive and significant coefficient for buy and hold returns, and that would be the undervalued acquiror overvalued target segment. This means that buy and hold returns are influenced positively by this segment. To further investigate the reason for this, we control for relative size in the segment. After controlling for relative size, we find that the segment is still significant. This indicates that segment 3 is the only segment (undervalued acquirors and overvalued targets) that could benefit from a higher and significant BHR. Overall, we find little evidence to support our hypothesis that more overvalued acquirors have higher buy-and-hold returns, despite segment 3's significance.

[Table 12 about here.]

7. Conclusion

The study focuses on a sample of mergers and acquisitions between the years of 2003 and 2019. We find that overvalued acquirors tend to have positive post-acquisition abnormal return if

their target is overvalued, otherwise it is negative in the other scenarios. Targets usually always get positive abnormal returns regardless of their relative overvaluation. We also find that there is no conclusive evidence regarding synergies, premiums and buy-and-hold returns with respect to acquisitions and the misvaluation of the involved parties. These results are similar to Fu, Lin and Officer's (2013) results, which suggest that acquiror CEOs get considerable benefits for themselves despite poor acquisition performance. This alludes to there being an agency problem in stock acquisitions, as it would be more profitable for shareholders if overvalued acquirors did not initiate stock acquisitions. However, our evidence points towards there not being significant synergies or returns to justify the higher premiums that overvalued acquirors pay, suggesting that overvalued acquirors could be leveraging their stock acquisitions with prior knowledge that the deals will fail, especially that overvalued acquirors tend to have positive abnormal returns in the post-acquisition period, even when the target is overvalued.

The field of mergers and acquisitions is a complex field with a multitude of factors affecting the M&A world. Cash vs stock acquisitions has been a long-lasting debate between researchers over the rationale behind choosing either option. The existence of an agency problem does not negate our findings regarding prior knowledge of deal failure. Further knowledge could be pursued in the field of M&A to explore managerial bias in selecting payment methods.

References

- Akbulut, M. E. (2013). Do Overvaluation-Driven Stock Acquisitions Really Benefit Acquirer Shareholders? *The Journal of Financial and Quantitative Analysis*, 48(4), 1025–1055.
- Andersen, Torben G., Tim Bollerslev, Francis X. Diebold, and Jin Wu, (2005), Realized beta: Persistence and predictability, in Thomas B. Fomby and Dek Terrell, eds.: *Advances in Econometrics: Econometric Analysis of Financial and Economic Time Series Volume 20 Part 2* (Elsevier, New York).
- Ang, J., Cheng, Y., (2006). Direct evidence on the market-driven acquisition theory. *Journal of Financial Research* 29, 199–216.
- Bainbridge, S. M. (1990) Exclusive merger agreements and lock-ups in negotiated corporate acquisitions, *Minnesota Law Review*, 75, 239–334.
- Ben-David, I., Drake, M. S., & Roulstone, D. T. (2015). Acquirer valuation and acquisition decisions: Identifying mispricing using short interest. *Journal of Financial and Quantitative Analysis*, 50(1-2), 1-32.
- Betton, S., Eckbo, B. E., & Thorburn, K. S. (2008). Corporate takeovers. *Handbook of empirical corporate finance*, 291-429.
- Bradley, M., Desai, A., Kim, E., (1983) The rationale behind interfirm tender offers: Information or synergy?. *Journal of Financial Economics* 11 183-206.
- Dong, M., Hirshleifer, D., Richardson, S., Teoh, S., (2006). Does investor misvaluation drive the takeover market? *Journal of Finance* 61, 725–762.

- Ekelund Jr, R. B., Ford, G. S., & Thornton, M. (2001). The measurement of merger delay in regulated and restructuring industries. *Applied Economics Letters*, 8(8), 535-537.
- Fich, E., Starks, L., Yore, A., (2008). CEO deal-making activities, CEO compensation, and firm value. Unpublished working paper. Drexel University and the University of Texas at Austin, Philadelphia, PA, and Austin, TX.
- Field, L. C., & Mkrtychyan, A. (2017). The effect of director experience on acquisition performance. *Journal of Financial Economics*, 123(3), 488-511.
- Fu, F., Lin, L., Officer, M., (2013) Acquisitions driven by stock overvaluation: Are they good deals? *Journal of Financial Economics* 109 24-39
- Golubov, A., Petmezas, D., & Travlos, N. G. (2016). Do stock-financed acquisitions destroy value? New methods and evidence. *Review of Finance*, 20(1), 161-200.
- Grinstein, Y., & Hribar, P. (2004). CEO compensation and incentives: Evidence from M&A bonuses. *Journal of financial economics*, 73(1), 119-143.
- Gu, F., Lev, B., (2011). Overpriced shares, ill-advised acquisitions, and goodwill impairment. *Accounting Review* 86, 1995–2022.
- Harford, J., & Li, K. (2007). Decoupling CEO wealth and firm performance: The case of acquiring CEOs. *The Journal of Finance*, 62(2), 917-949.
- Harford, J., Humphery-Jenner, M., & Powell, R. (2012). The sources of value destruction in acquisitions by entrenched managers. *Journal of financial economics*, 106(2), 247-261.

- Healy, P., Palepu, K., Ruback, R., (1992). Does corporate performance improve after mergers?
Journal of Financial Economics 31, 135–176
- Jensen, M. C. (2005). Agency costs of overvalued equity. *Financial management*, 34(1), 5-19.
- Lambrecht, Bart, and Stewart C. Myers, 2007, A theory of takeovers and disinvestment, *Journal of Finance* 62, 809–845.
- Loughran, T., & Ritter, J. R. (1997). The operating performance of firms conducting seasoned equity offerings. *The journal of finance*, 52(5), 1823-1850.
- Loughran, T., Vijh, A., (1997). Do long-term shareholders benefit from corporate acquisitions?
Journal of Finance 52, 1765–1790.
- Luybaert, M., & De Maeseneire, W. (2015). Antecedents of time to completion in mergers and acquisitions. *Applied Economics Letters*, 22(4), 299-304.
- Malmendier, U., Opp, M., Saidi, F., (2016) Target revaluation after failed stock takeover attempts: cash versus stock. *Journal of Financial Economics* 119 92-106
- Margsiri, Worawat & Mello, Antonio & Ruckes, Martin. (2008). A Dynamic Analysis of Growth via Acquisition. *Review of Finance*. 12. 635-671.
- Martin, X., & Shalev, R. (2017). Target firm-specific information and acquisition efficiency. *Management Science*, 63(3), 672-690.
- Martynova, M., Renneboog, L. (2008), A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking and Finance*, 32(10), 2148-2177.
<https://doi.org/10.1016/j.jbankfin.2007.12.038>

- Mitchell, M., Mulherin, H., (1996). The impact of industry shocks on takeover and restructuring activity. *Journal of Financial Economics* 41, 193–230.
- Mitchell, M., Pulvino, T., Stafford, E., 2004. Price pressure around mergers. *Journal of Finance* 59, 31–63.
- Morellec, Erwan, 2004, Can managerial discretion explain observed leverage ratios? *Review of Financial Studies* 17, 257–294.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.
- Rau, P. R., & Stouraitis, A. (2011). Patterns in the timing of corporate event waves. *Journal of Financial and Quantitative Analysis*, 46(1), 209-246.
- Ravenscraft, D., Scherer, F., (1987). Mergers, Selloffs, and Economic Efficiency. Brookings Institution, Washington
- Rhodes-Kropf, M., Robinson, D., Viswanathan, S., (2005). Valuation waves and merger activity: the empirical evidence. *Journal of Financial Economics* 77, 561–603.
- Rhodes-Kropf, M., Viswanathan, S., (2004). Market valuation and merger waves. *Journal of Finance* 59, 2685–2718.
- Savor, P. G., & Lu, Q. (2009). Do stock mergers create value for acquirers?. *The journal of finance*, 64(3), 1061-1097.
- Schwert, G., (1996). Markup pricing in mergers and acquisitions. *Journal of Financial Economics* 41, 153–192

Shleifer, A., Vishny, R., (2003) Stock market driven acquisitions. *Journal of Financial Economics* 70 295-311

Suk, I., & Wang, M. (2021). Does target firm insider trading signal the target's synergy potential in mergers and acquisitions?. *Journal of Financial Economics*, 142(3), 1155-1185.

Tables

Table 1: Yearly Distribution of Cash and Stock Acquisitions

The sample of mergers and acquisitions from 2003 to 2019. The sample consists of 559 stock-financed and 475 cash-financed mergers and acquisitions that were completed during 2003-2019. We chose 2003 as our beginning year to avoid the effects of the Sarbanes-Oxley act in 2002 that had significant effects on the M&A market.

Year	Cash	Stock
2003	35	47
2004	36	44
2005	34	30
2006	48	24
2007	56	26
2008	29	18
2009	21	20
2010	38	22
2011	19	11
2012	33	16
2013	22	21
2014	33	32
2015	39	29
2016	44	26
2017	30	35
2018	30	42
2019	12	32
Total	559	475

Table 2: Industry Distribution

The table contains data regarding the industries of the firms in our sample. We use the 2-Digit SIC code to classify industries. The frequency and relative frequency of the industries are shown.

Industry	SIC	Frequency	(%)
Metal Mining	10	3	0.48
Coal Mining	12	1	0.16
Oil and Gas Extraction	13	9	1.43
Nonmetallic minerals	14	1	0.16
General Building Contractors	15	2	0.32
Heavy Construction	16	1	0.16
Food & Kindered Products	20	8	1.27
Tobacco Products	21	2	0.32
Textile Mill Products	22	1	0.16
Apparel & Other Textile Products	23	4	0.64
Paper & Allied Products	26	2	0.32
Printing & Publishing	27	6	0.96
Chemical & Allied Products	28	44	7.01
Petroleum & Coal Products	29	3	0.48
Rubber & Miscellaneous Plastic Products	30	2	0.32
Leather & Leather Products	31	2	0.32
Primary Metal Industries	33	4	0.64
Fabricated Metal Products	34	4	0.64
Industrial Machinery & Equipment	35	30	4.78
Electronic & Other Electric Equipment	36	44	7.01
Transportation Equipment	37	8	1.27
Instruments & Related Products	38	53	8.44
Miscellaneous Manufacturing Industries	39	2	0.32
Railroad Transportation	40	1	0.16
Trucking & Warehousing	42	1	0.16
Water Transportation	44	2	0.32
Transportation by Air	45	1	0.16
Communications	48	15	2.39
Electric, Gas & Sanitary Services	49	14	2.23
Wholesale Trade - Durable Goods	50	12	1.91
Wholesale Trade - Nondurable Goods	51	6	0.96
General Merchandise Stores	53	1	0.16
Apparel & Accessory Stores	56	5	0.80
Furniture & Home furnishings Stores	57	1	0.16
Eating & Drinking Places	58	1	0.16
Miscellaneous Retail	59	6	0.96
Depository Institutions	60	137	21.82
Nondepository Institutions	61	4	0.64

Security & Commodity Brokers	62	17	2.71
Insurance Carriers	63	11	1.75
Insurance Agents, Brokers & Service	64	3	0.48
Real Estate	65	3	0.48
Holding & Other Investment Offices	67	11	1.75
Personal Services	72	2	0.32
Business Services	73	87	13.85
Motion Pictures	78	2	0.32
Health Services	80	11	1.75
Educational Services	82	2	0.32
Engineering & Management Services	87	11	1.75
Services, Not Elsewhere Classified	89	2	0.32
Non-Classifiable Establishments	99	23	3.66

Event study:

Table 3: Event Study for the market model abnormal returns - Acquirors

The table shows the mean cumulative abnormal returns (CAR) for the windows of the acquirors across multiple valuation segments. The total sample of acquirors is 475, however we only find 413 observations for our returns data. As for cash acquisitions, the total sample is 559, however we only find 517 for our returns data. We also report the difference between the mean abnormal returns between cash and stock acquisitions

Acquiror Total					
Stock			Cash		
Window	N	Mean Cumulative Abnormal Return	N	Mean Cumulative Abnormal Return	Difference
(-1,+15)	413	-1.03%*	517	0.39%	1.42%
(-1,0)	413	-0.44%***	517	0.36%*	0.80%
(+1,+30)	413	-1.2%**	517	-0.19%	-1.01%
(-2,+2)	413	-0.80%	517	0.06%	0.86%
(-5,+5)	413	-0.85%*	517	0.25%	1.10%
(-1,+1)	413	-0.82%*	517	0.12%*	0.94%
Segment 1					
Overvalued A			Overvalued T		
(-1,+15)	379	-0.73%	479	-0.24%	0.49%
(-1,0)	379	-0.2%*	479	-0.22%*	0.04%
(+1,+30)	379	-1.59%	479	-0.79%	0.80%
(-2,+2)	379	-0.43%*	479	-0.47%	-0.04%
(-5,+5)	379	-0.53%	479	-0.42%	0.09%
(-1,+1)	379	-0.36%*	479	-0.13%	0.23%
Segment 2					
Undervalued A			Overvalued T		
(-1,+15)	15	1.90%	18	2.31%	0.41%
(-1,0)	15	-1.63%	18	-0.87%	0.76%*
(+1,+30)	15	4.44%	18	3.65%	-0.79%*
(-2,+2)	15	-0.09%	18	0.53%	0.62%
(-5,+5)	15	0.25%	18	0.55%*	0.30%
(-1,+1)	15	-0.85%	18	-0.32%	0.53%
Segment 3					
Overvalued A			Undervalued T		
(-1,+15)	19	-0.90%	20	-0.18%	0.72%
(-1,0)	19	-2.23%	20	-1.04%	1.19%

(+1,+30)	19	4.1%**	20	6.39%***	2.29%**
(-2,+2)	19	-3.32%	20	-2.92%	0.40%
(-5,+5)	19	-2.43%	20	-2.66%	-0.23%
(-1,+1)	19	-3.31%	20	-3.74%	-0.43%

The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively

Table 4- Event Study for the market model abnormal returns - Targets

The table shows the mean cumulative abnormal returns (CAR) for the event windows of the targets across multiple valuation segments. The total sample of acquirors is 475 for stock acquisitions, however we only find 417 observations for our returns data. As for cash acquisitions, the total sample is 559, however we only find 466 for our returns data. We also report the difference between the mean abnormal returns between cash and stock acquisitions.

Target Total					
Stock			Cash		Difference
Window	N	Mean Cumulative Abnormal Return	N	Mean Compound Abnormal Return	
(-1,+15)	417	23.86%***	466	29.04%***	5.18%***
(-1,0)	417	16.99%***	466	21.83%***	4.84%**
(+1,+30)	417	5.99%**	466	6.31%***	0.32%
(-2,+2)	417	24.46%***	466	29.92%***	5.46%**
(-5,+5)	417	25.26%***	466	31.05%***	5.79%***
(-1,+1)	417	24.07%***	466	29.72%***	5.65%***
Segment 1					
Overvalued A			Overvalued T		Difference
Window	N	Mean Cumulative Abnormal Return	N	Mean Compound Abnormal Return	
(-1,+15)	382	25.12%***	426	27.31%***	2.19%**
(-1,0)	381	18.25%***	426	17.98%***	-0.27%
(+1,+30)	382	5.92%**	426	6.53%***	0.61%
(-2,+2)	381	25.98%***	426	27.30%***	1.32%*
(-5,+5)	382	26.73%***	426	28.41%***	1.68%*
(-1,+1)	381	25.68%***	426	26.33%***	0.65%
Segment 2					
Undervalued A			Overvalued T		Difference
Window	N	Mean Cumulative Abnormal Return	N	Mean Compound Abnormal Return	
(-1,+15)	16	22.31%**	19	24.03%***	1.72%*
(-1,0)	16	17.92%***	19	18.57%***	0.65%
(+1,+30)	16	3.56%*	19	4.71%**	1.15%*
(-2,+2)	16	22.12%***	19	23.94%***	1.82%*
(-5,+5)	16	23.34%***	19	23.17%***	-0.17%

(-1,+1)	16	21.34%***	19	22.49%***	1.15%*
Segment 3					
Overvalued A Undervalued T					
(-1,+15)	19	24.44%**	21	25.31%***	0.87%
(-1,0)	19	17.39%***	21	18.96%***	1.57%*
(+1,+30)	19	7.19%**	21	9.07%**	1.88%**
(-2,+2)	19	26.09%***	21	25.41%***	-0.68%
(-5,+5)	19	27.02%***	21	28.13%***	1.11%*
(-1,+1)	19	24.16%***	21	24.86%***	0.70%

*The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively*

Descriptive Statistics:

Table 5: **Variable Descriptions**

The table contains the description of the variables used in the study. It is divided as dependent, independent and control variables

Variable	Description
<i>Dependent Variable</i>	
<i>Premium</i>	Acquisition Premium measured as the cumulative abnormal return of the target 42 days prior to the merger announcement
<i>Synergy</i>	Acquisition Synergy based on the Synergy model
<i>BHR</i>	Market adjusted buy and hold returns based on the BHR model
<i>Completion Time</i>	Natural logarithm of the number of days between deal announcement and deal completion
<i>Independent Variable</i>	
<i>Misvaluation_A</i>	Misvaluation term for acquirors as calculated per the misvaluation model
<i>Misvaluation_T</i>	Misvaluation term for targets as calculated per the misvaluation model
<i>Misvaluation_A x DUM_Offertype</i>	Interaction term between acquiror misvaluation and Offer type dummy variable
<i>Misvaluation_A x Misvaluation_T x DUM_Offertype</i>	Interaction term between acquiror misvaluation, target misvaluation and offer type dummy variable
<i>DUM_Segment1</i>	Dummy variable for segment 1 of our observations, defined as Overvalued acquirors and overvalued targets
<i>DUM_Segment2</i>	Dummy variable for segment 2 of our observations, defined as Overvalued acquirors and undervalued targets
<i>DUM_Segment3</i>	Dummy variable for segment 3 of our observations, defined as undervalued acquirors and overvalued targets

Control Variables

<i>DUM_Offertype</i>	Dummy variable for cash vs stock acquisitions with 1 being for cash and otherwise 0. It I derived from SDC
<i>DUM_Industry</i>	Dummy variable for same industry classification, with 1 being same industry, otherwise 0. Firms are defined as being in the same industry if their 2-digit SIC(standard industrial classification) code is equal, SIC's are taken from Compustat
<i>DUM_Hostile</i>	Dummy variable for hostile takeovers, with 1 being the takeover is hostile, otherwise 0. It is an SDC variable.
<i>EPS</i>	Basic earnings per share taken from Compustat
<i>D/E</i>	Total liabilities divided by shareholder equity taken from Compustat
<i>Leverage Ratio</i>	Ratio of total liabilities over total assets taken from Compustat
<i>P/E</i>	Price to earnings ratio taken from Compustat
<i>Operating Return on Assets</i>	Operating income before depreciation and amortization divided by total assets
<i>Asset Turnover</i>	Value of a company's revenues relative to its value of assets
<i>SSTK</i>	Sale of Common and Preferred Stock taken from Compustat
<i>Size</i>	Natural logarithm of total assets

Table 6: Summary Statistics

The table reports the summary statistics for the independent and dependent variables throughout the study. The table is divided between Acquirors and Targets.

Variable	Acquirors			Targets		
	N	Mean	Std Dev	N	Mean	St Dev
Misvaluation	628	0.61	0.33	628	0.64	0.36
Premium	628	32.30	33.41	628	32.30	33.41
BHR	626	-0.11	0.63	626	-0.11	0.63
Synergy	623	0.03	0.08	623	0.03	0.08
Completion Time	628	4.69	0.62	628	4.69	0.62
Size	608	8.72	1.78	628	6.11	2.06
EPS	606	-2.03	19.79	627	0.07	2.19
D/E	625	1.42	6.21	627	3.42	7.40
Leverage Ratio	627	2.52	14.46	627	4.74	51.66
P/E	628	13.12	62.72	627	9.93	106.37
Return on assets	627	0.10	0.13	627	3.05	75.80
Asset Turnover	627	0.76	1.82			
SSTK	628	70.30	254.07			

Table 7: Mean of Misvaluation

The table shows the mean of the misvaluation measure divided amongst bidders and targets, also subdivided amongst cash and stock bids

	Bidder	Targets	Stock Bidder	Targets of stock bidders	Cash bidders	Targets of cash bidders
Misvaluation	0.607	0.641	0.560	0.580	0.627	0.667

Table 8: Correlation Table

The Table contains the Pearson correlation between the dependent and independent variables. We include our dependent variables for the acquiror and target misvaluation, we also include all of our independent variables which are premium, synergy, completion time and BHR. We have included all of the financial ratios for the acquirors and targets, additionally we included some dummy variables such as Industry and Offer type.

	Misvaluation_A	Misvaluation_B	Premium	Synergy	Completion Time	BHR	Size A
Misvaluation_A	1	.474**	.116*	-.117*	-.105*	-.114*	-.146**
Misvaluation_B		1	0.033	-.098*	-.206**	-0.088	-0.021
Premium			1	0.035	-.151**	-0.009	-0.057
Synergy				1	-.106**	.142**	-.166**
Completion Time					1	-0.060	.115**
BHR						1	-0.023
Size A							1

Contd. Table 8: Correlation Table

	EPS A	D/E A	Leverage Ratio A	P/E A	OROA A	Asset Turnover A	LOG TA T	EPS T
Misvaluation_A	.133**	-.105*	-0.079	-0.055	0.058	-.101*	-.194**	-.113*
Misvaluation_B	0.055	-.120*	-0.026	-0.038	0.029	-.119*	-.316**	-0.063
Premium	0.028	0.002	-0.032	-0.025	-0.031	-0.017	-.143**	-0.059
Synergy	-0.039	0.009	0.019	-0.016	-0.018	0.029	-0.044	-0.057
Completion Time	0.009	0.009	0.027	-0.043	-.210**	-.110**	.304**	0.026
BHR	0.036	0.015	-0.025	0.046	.128**	0.070	-0.008	0.049
Size A	.139**	-0.015	0.062	0.003	0.063	0.043	.367**	.127**
EPS T	1	-0.052	0.047	-0.024	0.039	0.013	-0.028	-0.019
EPS A		1	0.037	-0.004	0.065	0.009	0.003	0.018
D/E A			1	0.020	-0.043	-.080*	.110**	0.032
Leverage Ratio A				1	.166**	-0.012	-0.018	0.040
P/E A					1	.127**	0.025	0.067
OROA A						1	-0.039	0.033
Asset Turnover A							1	.127**
LOG TA T								1

Contd. Table 8: Correlation Table

	D/E T	Leverage Ratio T	P/E T	OROA T	Relative Size	SSTK	Industry	Offer Type
Misvaluation_A	0.029	-.131**	0.008	-.117*	0.073	0.028	.103*	.094*
Misvaluation_B	-0.069	0.042	0.009	-0.024	0.093	-0.008	0.012	.110*
Premium	0.001	-0.018	-0.036	-0.011	0.048	0.023	0.038	.184**
Synergy	-.096*	-0.025	0.000	0.013	-.098*	-0.025	-0.069	.195**
Completion Time	.298**	0.055	.080*	-0.059	-0.010	-0.008	.109**	-.470**
BHR	-.101*	-0.009	-0.035	0.037	-.116**	0.002	-0.075	.151**
Size A	.150**	0.009	0.025	.110**	0.066	.114**	-0.016	-0.054
EPS A	0.044	0.006	0.005	-0.038	0.023	0.049	0.046	0.006
D/E A	-0.035	-0.077	-0.009	.097*	-0.005	-0.027	0.042	0.045
Leverage Ratio A	0.064	0.010	-0.008	0.012	-0.012	0.008	-0.012	-.087*
P/E A	-.118**	-0.005	0.002	0.000	0.040	0.021	0.032	.146**
OROA A	-.240**	-0.043	0.014	-0.018	-.283**	.091*	0.022	.382**
Asset Turnover A	-0.058	-0.029	0.012	-0.008	0.020	0.021	-0.045	0.060
LOG TA T	.237**	0.024	-0.024	-.252**	-.276**	0.063	0.054	-.202**
EPS T	-0.040	0.015	0.008	-0.001	-0.013	0.059	0.022	0.060
D/E T	1	0.048	0.029	-0.007	-0.040	-0.059	.167**	-.298**
Leverage Ratio T		1	-0.010	0.012	-0.007	-0.021	-0.060	-0.078
P/E T			1	-0.019	0.006	0.011	-0.013	-0.019
OROA T				1	-0.021	-0.011	-0.047	0.035
Relative Size					1	-0.019	0.036	-0.071
SSTK						1	0.016	.147**
Industry							1	-.084*
Offer Type								1

The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively

Regression:

Table 9: **Regression Results, Completion Time as Dependent Variable**

The table shows the coefficients and standard error of the regression model using completion time as a dependent variable. The main explanatory variables are acquiror and target misvaluation, with a multitude of control variables. We also control for the different valuation segments.

	Coefficient	Std. Error
(Constant)	5.0342	0.2863
Misvaluation_A	-0.020	0.175
Misvaluation_T	-0.244**	0.145
Offer Type	-0.599***	0.126
Industry	0.012	0.056
Premium	-0.001	0.001
Size A	0.014	0.016
EPS A	0.000	0.001
D/E A	0.004	0.004
Leverage Ratio A	-0.002	0.002
P/E A	0.000	0.000
OROA A	-0.005	0.224
Asset Turnover A	-0.045	0.041
Size T	0.027**	0.016
EPS T	0.000	0.011
D/E T	0.004	0.004
Leverage Ratio T	0.001	0.002
P/E T	0.000	0.000
OROA T	0.198**	0.108
Misvaluation_A x Cash	0.092	0.272
Misvaluation_A x Misvaluation_B x Cash	0.013	0.234
Segment 1	-0.215	0.270
Segment 2	-0.450*	0.275
Segment 3	-0.257	0.293
Hostile	0.869***	0.407
SSTK	0.001***	0.000
R-Square	0.2650	
No of observations	617	

*The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively*

Table 10: Regression Results, Deal Premium as Dependent Variable

The table shows the coefficients and standard error of the regression model using Deal Premium as a dependent variable. The main explanatory variables are acquiror and target misvaluation, with a multitude of control variables. We also control for the different valuation segments.

	Coefficient	Std. Error
(Constant)	37.289	17.633
Misvaluation_A	14.724	10.800
Misvaluation_T	-1.669	8.990
Offer Type	19.688***	7.761
Industry	4.370	3.461
Size A	0.570	1.000
EPS A	0.051	0.082
D/E A	0.288	0.253
Leverage Ratio A	-0.008	0.098
P/E A	-0.026	0.023
OROA A	33.305***	13.777
Asset Turnover A	-2.554	2.538
Size T	-1.446	0.992
EPS T	-0.415	0.670
D/E T	0.486**	0.260
Leverage Ratio T	-0.007	0.098
P/E T	-0.009	0.014
OROA T	-12.749**	6.650
Misvaluation_A x Cash	21.166	16.835
Misvaluation_A x Misvaluation_B x Cash	-	14.389
Segment 1	-16.885	16.680
Segment 2	-12.327	17.017
Segment 3	-2.587	18.135
Hostile	37.022	25.144
SSTK	-0.002	0.006
R-Squared	0.136	
N	617	

The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively.

Table 11: Regression Results, Deal Synergy as Dependent Variable

The table shows the coefficients and standard error of the regression model using Deal Synergy as a dependent variable. The main explanatory variables are acquiror and target misvaluation, with a multitude of control variables. We also control for the different valuation segments.

	Coefficient	Std. Error
(Constant)	0.121	0.041
Misvaluation_A	-0.011	0.025
Misvaluation_T	-0.032	0.021
Offer Type	0.051***	0.018
Industry	-0.009	0.008
Premium	0.000	0.000
Size A	-0.006***	0.002
EPS A	0.000	0.000
D/E A	0.000	0.001
Leverage Ratio A	0.000	0.000
P/E A	0.000	0.000
OROA A	-0.056**	0.032
Asset Turnover A	-0.003	0.006
Size T	0.000	0.002
EPS T	-0.002	0.002
D/E T	0.000	0.001
Leverage Ratio T	0.000	0.000
P/E T	0.000	0.000
OROA T	0.006	0.016
Misvaluation_A x Cash	-0.030	0.039
Misvaluation_A x Misvaluation_B x Cash	0.037	0.033
Segment 1	-0.021	0.039
Segment 2	-0.048	0.039
Segment 3	-0.012	0.042
Hostile	-0.060	0.058
SSTK	0.000	0.000
R-Squared	0.122	
N	617	

*The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively*

Table 12: Regression Results, Buy-and-Hold>Returns as Dependent Variable

The table presents the Coefficient and standard error of multiple regressions having BHR as dependent variable. The main explanatory variables are acquiror and target misvaluation, with a multitude of control variables. We do multiple regressions to study the effect of segment 3 on on the sample as it is significant. We also interact segment 3 with relative size(which is measured as the total assets of acquirors divided by the total assets of targets). The first regression excludes the interaction term and segment 3, the second regression includes segment 3 and the third regression includes both segment 3 and its interaction term.

	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
(Constant)	-0.027	0.261	-0.470	0.344	-0.462	0.344
Misvaluation_A	0.003	0.208	0.082	0.211	0.081	0.211
Misvaluation_T	0.080	0.160	-0.063	0.175	-0.018	0.180
Offer Type	0.059	0.148	0.126	0.151	0.135	0.151
Industry	-0.091	0.068	-0.097	0.068	-0.101	0.068
Size A	-0.007	0.020	-0.007	0.020	-0.008	0.020
EPS A	0.001	0.002	0.001	0.002	0.001	0.002
D/E A	-0.003	0.005	-0.003	0.005	-0.003	0.005
Leverage Ratio A	-0.001	0.002	0.000	0.002	-0.001	0.002
P/E A	0.000	0.000	0.000	0.000	0.001***	0.000
Return on assets A	0.329	0.269	0.342	0.269	0.349	0.269
Asset Turnover A	0.138***	0.049	0.123**	0.049	0.122	0.049
Size T	0.017	0.020	0.014	0.020	0.014	0.019
EPS T	0.008	0.013	0.008	0.013	0.009	0.013
D/E T	-0.002	0.005	-0.003	0.005	-0.003	0.005
Leverage Ratio T	-0.001	0.002	-0.001	0.002	-0.001	0.002
P/E T	0.000	0.000	0.000	0.000	0.000	0.000
ROA T	0.050	0.131	0.039	0.131	0.038	0.131
Misvaluation_A x Cash	0.032	0.308	-0.198	0.328	-0.175	0.329
Misvaluation_A x Misvaluation_B x Cash	0.029	0.265	0.217	0.281	0.165	0.285
Segment 1	-0.341	0.193	0.175	0.325	0.141	0.327
Segment 2	-0.098	0.251	0.330	0.332	0.330	0.332
Segment 3			0.695***	0.353	0.831***	0.375
Segment 1 x relative size					-0.013	0.012
Hostile	1.250***	0.483	1.430***	0.490	1.438***	0.490
SSTK	0.000	0.000	0.000	0.000	-0.001	0.000
R-Squared	0.083		0.092		0.101	
N	617		617		617	

*The symbols *, **, and *** denote statistical significance at the 0.05, 0.01 and 0.001 levels respectively*